

# Effect of Esmolol on Cardiac Recovery after Cardiopulmonary Bypass Surgery

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## ABSTRACT

**Introduction:** During cardiopulmonary bypass (CPB) surgery, beta-blockers are generally avoided due to the concern of negative inotropic effects which may result in difficult weaning of patients. The present study was done to evaluate the effect of esmolol (a beta blocker) on recovery and rhythm of cardiac muscles during CPB.

**Material and Methods:** Sixty patients of rheumatic heart disease undergoing CPB received either esmolol 1 mg/kg (Study group, 30 patients) or the same volume of saline (Control group, 30 patients) before removing aortic clamp. Recovery of patients was assessed in terms of heart auto re-beat ratio, ventricular fibrillation after primary re-beat, heart rate after constant re-beat, requirement of temporary perioperative pacemaker, requirement of vasoactive drugs during weaning from cardiopulmonary bypass, recovery time, posterior parallel time and total bypass time.

**Results:** The mean age of patients in study and control group was 62.3±2.3 and 61.24± 2.32 years respectively. In esmolol treated group heart underwent re-beat automatically in 90% of patients, ventricular fibrillation after primary re-beat occurred in 6.66% patients, mean recovery time was 4.2±1.2 min, heart rate after steady re-beat was 50± 15 beats/min, only 16.66% patients needed increased dosage of vasoactive drugs and posterior parallel time was 25±8 min. In control group heart underwent re-beat automatically in 26.66% of patients, ventricular fibrillation after primary re-beat occurred in 40% patients, mean recovery time was 4.5±.3 min, heart rate after steady re-beat was 90±15 bits/min, only 50% patients needed increased dosage of vasoactive drugs and posterior parallel time was 30±9 min.

**Conclusion:** In present study esmolol has shown that it can be helpful in cardiac recovery in patients undergoing cardiopulmonary bypass.

**Keywords:** Cardiopulmonary bypass, heart rate, esmolol, arrhythmia

## INTRODUCTION

Efficacy of early administration of beta blockers to ventricular responses during cardiopulmonary bypass (CPB) surgery or within 10 minutes after aortic clamp is released is well documented.<sup>1</sup>

Esmolol is being used for different indications including STEMI, atrial fibrillation, aortic dissection and hypertension and ventricular tachyarrhythmias.<sup>2</sup>

Esmolol is an ultra-short acting cardioselective beta blocker with plasma half life of 9 minutes; it has shown to be cardio-protective in different animal and clinical model.<sup>3</sup> There are very limited studies which have investigated the use of esmolol on cardiac recovery and rhythm during CPB surgery.<sup>3</sup>

In present study, we evaluated the effect of esmolol on the

cardiac recovery in patients undergoing rheumatic heart surgeries.

## MATERIAL AND METHODS

It was a prospective randomized study was done in Deptt of Anesthesia, Gandhi Medical College and Hamidia Hospital, Bhopal over a period of 6 months between July 2015 to Dec. 2015. The study included 60 patients of rheumatic heart disease (RHD).

A written informed consent from all the patients and Ethical Committee approval was obtained before starting the study. Patients with mitral stenosis or regurgitation undergoing elective valve replacement surgery, of either sex and between the ages of 20 - 40 years were included in the study. Patients with ASA grade 2, 3 or 4, having other associated valvular or coronary abnormalities; uncontrolled pre-existing arrhythmias were excluded from the study.

All patients were randomly divided into 2 groups (30 patients in each) by sealed envelope method. Study group who received esmolol 1mg/kg prior to removal of aortic clamp and Control group who received equal volume of isotonic saline.

All patients received alprazolam on the night before surgery. In operation theater pulse oximeter, electrocardiogram was attached. Intra-arterial catheter for invasive blood pressure monitoring and central venous catheter were placed in situ.

All patients were induced with thiopentone 3-5 mg/kg, fentanyl 5-10 µg/kg and vecuronium 0.1 mg/kg. Patients were then maintained on oxygen, isoflurane and fentanyl at 2µg/kg/hr and relaxant. Two temperature probes (nasopharyngeal and rectal), Ryles tube, urinary catheter were also placed in situ.

During cardiopulmonary bypass, all myocardial preservation protocols were followed and temperature was maintained between 30-32 degree celsius.

Recovery of patients after cardiopulmonary bypass was assessed in terms of heart auto re-beat ratio ( heart beat returning itself without ventricular fibrillation or a temporary pacemaker), ventricular fibrillation after primary re-beat, heart rate after constant re-beat, requirement of temporary perioperative pacemaker, requirement of vasoactive drugs

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Parameters	Control Group	Study Group	P Value
Automatic Re-Beat*	8 (26.66)	27 (90)	0.0001
Ventricular Fibrillation*	12 (40)	2 (6.66)	0.0060
Temporary Pacemaker*	3 (10)	4 (13.33)	NS
VDR*	15 (50)	5 (16.66)	0.0137
HR After Successful Re-beat (beats/min)#	95±15	90±15	NS
HR After Steady Re-Beat (beats/min)#	90±15	50±15	0.001
Bypass Time (min)#	70±10	65±10	<0.05
Recovery Time (min)#	4.5±1.5	4.2±1.2	NS
Posterior Parallel Time(min)#	30±9	25±8	<0.05

\*Data is expressed as no of patients (%), #data is expressed as mean±SD. VDR; vasoactive drug requirement during weaning from bypass, HR; heart Rate, NS; not significant.

**Table-1:** Comparison of different parameters for recovery of patients after cardiopulmonary bypass

during weaning from cardiopulmonary bypass, recovery time (time from reperfusion to steady heart beat), posterior parallel time (time from aortic unclamping to weaning from bypass) and total bypass time.

### STATISTICAL ANALYSIS

The quantitative data was analyzed using IBM SPSS- ver.20 software and expressed as mean± standard deviation (SD) and difference compared using one-factor analysis of variance. The qualitative data was compared with chi-square analysis. P<0.05 was considered significant.

### RESULTS

In present study mean age of patients in Study and Control group was 62.3±2.3 and 61.24± 2.32 years respectively.

In present study, there was no difference in mean age, cardiac function (ejection fraction and LV end-diastolic pressure), physical examination variables and gender between both the groups (p>0.05).

There were no differences in physical examination variables, cardiac function (ejection fraction and LV end-diastolic pressure), ASA physical status, ethnicity, or gender (p>0.05).

In present study, following esmolol treatment, heart underwent re-beat automatically in 27 (90%) patients in Study group compared to 8 (26.66%) patients in Control group (p<0.05).

Ventricular fibrillation after primary re-beat occurred in 12 (40%) cases in Control group but only 2 (6.66%) cases in Study group (p<0.05).

The mean recovery time was 4.2±1.2 min in Study group and 4.5±.3 min in Control group (p>0.05).

Heart rate after steady re-beat was higher in control group as compared to study group and heart rate after successful re-beat was also higher in control group as compared to study group (table 1).

Fifty percent of patients in control group required higher dosage of vasoactive drugs during weaning from bypass whereas in study group only 16.66% patients required it (p<0.05).

### DISCUSSION

Utility of beta-adrenergic blocking drugs to control arrhythmias after cardiac surgeries are well recognized.<sup>4,5</sup> The present study is more elaborated study, mainly focusing on cardiac recovery and heart rhythm during CPB surgery.

The findings of the present study suggest that esmolol can fulfill the requirement of controlling ventricular responses

like automatic re-beat and Ventricular Fibrillation.

The present study has found a positive effect of esmolol in preventing ventricular arrhythmia in patients undergoing cardiopulmonary bypass surgery when compared to control group (p<0.05).

More no of patients in esmolol treated group got automatic re-beat success (90%), reduced the chances of ventricular fibrillation after primary re-beat as compared to control group. In present study, esmolol treatment did not enhance the requirement of temporary cardiac pacemaker with the aim of maintaining required heart rate after cardiopulmonary bypass (CPB) surgery. It may be due to the fact that when esmolol is administered in the early stages of surgery, it rarely depresses the heart rate or contractility.<sup>3</sup>

Esmolol is also reported to improve the heart recovery and oxygen consumption and delivery equilibrium which in turn enhance energy stores in myocardium and in that way provide benefits for the weaning process.<sup>3</sup>

It has been found that most of the physicians have a tendency to use beta blocker in non surgical patients for the treatment of different arrhythmias like ventricular arrhythmia.<sup>6,7</sup> In accordance with the study done by Bassiakou et al and Jingjun et al, present study also observed that beta blocker can be an alternative to improve cardiac rhythm in cardiopulmonary bypass patients.<sup>6,7</sup> There are different studies and meta-analysis for the use of esmolol in cardiac surgery.<sup>8,9</sup>

Cork et al did a study on 29 patients and reported that patients who received esmolol infusion found to have lower heart rate.<sup>1</sup> Almost similar result was observed in present study.

Visser FC et al also advocated the use of esmolol during cardiac surgery; they reported that it could be a best alternative to depolarizing cardioplegia.<sup>10</sup>

The present study had few limitations like small sample size hence a large randomized clinical trials are required to confirm these findings.

### CONCLUSION

The findings of the present study show that esmolol can provide rapid and clinical important control on ventricular response during Cardiopulmonary Bypass surgery.

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# A prospective Study Comparing Pre-Emptive Intramuscular Ephedrine Versus Intravenous Ephedrine to Prevent Hypotension During Spinal Anaesthesia in Caesarean Section

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## ABSTRACT

**Introduction:** Prevention of spinal anaesthesia induced hypotension is very important. Both intravenous (IV) and intramuscular (IM) ephedrine are being used during caesarean section to prevent hypotension. The present study was done to compare the efficacy and safety of ephedrine administered via IV and IM route.

**Material and Methods:** A prospective randomised double blind study was done on 60 parturients aged between 20-30 years, divided into Group A (intramuscular ephedrine 30 mg given 10 min prior to spinal anaesthesia, 30 patients) and Group B (intravenous ephedrine 12 mg given at the time of spinal anaesthesia, 30 patients). After intravenous preloading, spinal anaesthesia was given, baseline maternal heart rate and arterial blood pressure was recorded before induction and every 3 min for 15 min and thereafter every 5 min for 45 min. Next reading was taken at 1 hour and finally at 2 hours in recovery.

**Results:** Mean age of patients in group A and Group B was 24.26±2.71 and 24.23±2.31 years respectively ( $p>0.05$ ). Significant difference was found in maximum and minimum diastolic blood pressure (DBP) and mean arterial pressure (MAP) between both the groups. Nausea and vomiting was less in group A in which ephedrine was given via IM route ( $p<0.05$ ).

**Conclusion:** Prophylactic use of IM ephedrine was associated with lower incidence of hypotension, nausea and vomiting as compared to intravenous ephedrine.

**Keywords:** ephedrine, spinal anaesthesia, caesarean section

## INTRODUCTION

Intra operative hypotension induced by spinal anaesthesia during C-section is still a challenge for many anesthetists. Many complications are associated with intra-operative hypotension like reduced uteroplacental blood flow and fetal acidosis in neonates or nausea, vomiting and decreased consciousness in parturient.<sup>1</sup>

Many treatment options like prehydration, vasopressor agents (ephedrine) and compression of lower leg have been suggested for hypotension prevention of hypotension during spinal anaesthesia.<sup>2</sup>

Ephedrine is the drug of choice as vasopressor agents in obstetric anaesthesia. A study done by Magalha et al showed that ephedrine was more effective in controlling hypotension as compared to other vasopressor agents.<sup>3</sup> Moreover, vasopressor drugs used as prophylaxis is a reasonable option to prevent spinal anaesthesia induced hypotension.

Ephedrine can be administered via both intramuscular and intravenous route.<sup>4</sup> But best to our knowledge, efficacy of both the route was not compared yet.

Hence, present study was done to evaluate the role of in-

tramuscular and intravenous ephedrine in post spinal hypotension along with its effect on maternal blood pressure and heart rate following spinal anaesthesia in caesarean delivery.

## MATERIAL AND METHODS

The present prospective randomised double blind study was done on 60 females patients undergoing emergency caesarean section under spinal anaesthesia.

A written informed consent from all the patients and Ethical Committee approval was obtained before starting the study. Female patients with age between 20-30 years, height 150 cm having ASA grade I and II, having full term pregnancy and undergoing emergency caesarean section were included in the study.

Patients with contraindications for spinal block, coagulopathies, pregnancy induced hypertension, chronic hypertension; cardiac disease and renal disease were excluded from the study.

Patients were divided in to two groups, Group A (intramuscular ephedrine 30 mg given 10 min prior to spinal anaesthesia, 30 patients) and Group B (intravenous ephedrine 12 mg given at the time of spinal anaesthesia, 30 patients)

ECG, NIBP, urine output and SpO<sub>2</sub> were monitored. Baseline maternal hemodynamic variables were recorded.

Intravenous preloading was done with 15ml/kg Ringer's lactate solution. Spinal anaesthesia was administered at L3-L4 interspinous space with Quinke's spinal needle 23G in left lateral position under full asepsis. A dose of 2.2ml of hyperbaric 0.5% bupivacaine was given.

Baseline maternal heart rate and arterial blood pressure was recorded before induction and every 3 min for 15 min and thereafter every 5 min for 45 min. Next reading was taken at 1 hour and finally at 2 hours in recovery. Further rescue boluses of ephedrine 6 mg were given if fall in systolic blood pressure was more than 20 % from baseline value. Presence of any complications intraoperatively was noted.

## STATISTICAL ANALYSIS

The quantitative data was analyzed using IBM SPSS- ver.20

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Parameters	Group A (IM)	Group B (IV)	P value
Maximum HR (beats/min)	112.8±12.56	113.4± 13.4	NS
Minimum HR (beats/min)	93.31± 12.64	94.2±12.54	NS
Maximum SBP (mmHg )	124.4±8.1	119.2±8.32	NS
Minimum SBP (mmHg )	98.72±19.78	94.5±20.3	NS
Maximum DBP (mmHg)	80.1±12.4	75.2±11.9	0.05
Minimum DBP (mmHg)	64.9± 9.8	63.2±9.10	0.041
Maximum MAP (mmHg)	85.2±12.93	85.7±11.09	0.013
Minimum MAP (mmHg)	68.3±13.54	65.2±12.12	0.042

*HR; heart rate, SBP; systolic blood pressure, DBP; diastolic blood pressure, MAP; mean arterial pressure, IM; intra muscular, IV; intra venous, NS; not significant*

**Table-1:** Comparison of both the Groups after vasopressor administration

software and expressed as mean± standard deviation (SD) and difference compared using one-factor analysis of variance. The qualitative data was compared with chi-square analysis.  $P < 0.05$  was considered significant.

## RESULTS

In present study most of the patients in Group A [21(70%)] belong to age group of 20-25 years followed by 9 (30%) patients who were between 26-30 years of age. In Group B, most of the patients belong to [20 (66.66%)] age group of 20-25 years followed by 10 (33.33%) patients who belong to age group of 26-30 years. Mean age of patients in group A and Group B was  $24.26 \pm 2.71$  and  $24.23 \pm 2.31$  years respectively ( $p > 0.05$ ).

In Group A nausea, vomiting, decline in heart rate and tachycardia was found in 5 (16.6%), 4(13.33%), 2(6.6%) and 6(20%) patients respectively whereas in Group B nausea, vomiting, decline in heart rate and tachycardia was found in 6 (20%), 5(16.6%), 1(3.33%) and 8(33.3%) patients respectively.

## DISCUSSION

Hypotension should be prevented in all patients receiving spinal anaesthesia. As a first line treatment option, intravenous hydration was used, but now most of the researchers are questioning regarding place of preloading.<sup>4</sup> The choice of option should be vasopressors agent in hypertensive patients. In Asian countries, ephedrine is still a choice by many physicians because of its affordability.<sup>5</sup>

There are very limited studies which had compared efficacy and safety of ephedrine given by two different routes, present study has tried to evaluate the role of IM ephedrine compared to IV ephedrine in preventing hypotension during spinal anaesthesia in caesarean section.

Raskaran et al did a study on 90 patients and reported that in IM ephedrine group 26.66% patients were observed to have hypotension and only 7% patients complained about nausea and vomiting and 10 patients required rescue ephedrine.<sup>6</sup> The findings of the present study are similar to them.

The mechanism by which ephedrine causes blood pressure restoration is by raising heart rate and heart contractility via  $\beta$ -agonist activity. Ephedrine as an indirect effect also produces vasoconstriction.<sup>7</sup>

Spinal anaesthesia induced hypotension is often associated with vomiting and nausea, the possible reason for this may be due to decrease in medullary blood flow to chemoreceptor

trigger zone (CTZ). Ephedrine which is a vasopressor drug recues these side effects by increasing MAP and by reasonable assumption medullary blood flow also.<sup>6</sup> In present study there was a significant difference between maximum and minimum MAP between both the groups ( $p < 0.05$ ) which indicate that MAP was increased with IM ephedrine more as compared to IV ephedrine. Also side effects like nausea and vomiting were less in Group A (IM ephedrine) compared to Group B (IV ephedrine).

Varathan S et al did a similar study on 49 patients and concluded that 15 mg of IM ephedrine when given 10 min before decreased hypotension and provided more haemodynamic stability. They also reported that IM ephedrine was not associated with any maternal and fetal side effects.<sup>5</sup>

Lin et al did a meta-analysis for effectiveness of intravenous and intramuscular route of administration of vasopressor agents and found that there was a similar incidence of hypotension between IV (RR = 1.08; 95% CI, 0.66–1.75) and IM (RR = 1.24; 95% CI, 0.71–2.18) administration.<sup>8</sup>

The present study had few limitations such as there were less no of patients enrolled; a large randomized clinical trial is required to confirm the results of present study.

## CONCLUSION

The study shows that prophylactic administration of intramuscular ephedrine had lower incidence of hypotension as compared to intravenous ephedrine following spinal anaesthesia for emergency caesarean section.

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# Epidemiology of Burns at SMS Hospital Jaipur: Over a Period of Four and Half Year

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## ABSTRACT

**Introduction:** A Burn is defined as insult or trauma to body's tissues resulting from heat, chemical, electricity sunlight or radiation. The most common type is scald burns occurring due to hot liquids, steam, gases and inflammable liquids. Inhalational burns are caused due to inhale of smoke. The ultimate aim in burn management is early and complete healing of wounds which in turn leads to good aesthetic and functional outcomes.

**Material and Methods:** This is a retrospective study conducted at SMS Medical College and Hospital, Jaipur, Rajasthan over a period of four and a half year (January 2009- June 2013). Total 7188 (Seven Thousand One hundred and Eighty) burn patients admitted to the department (including all mode of burn).

**Result:** Out of 7188 burn patients, one thousand six hundred and thirty one (1631) patients suffered by Electrical burns (22.69%), 4872 suffered by flame burns (67.77%) and remaining 685 suffered by scald burns (9.52%). Five thousand three hundred and ten patients were of the age group 11-40 years (73.87%). Of 7188, 4440 were males (61.7%) 2748 were females (38.2%) of all burn admissions.

**Conclusion:** Our study highlights the most common of mode of burn is flame and electrical burn. By this study we want to bring in notice to health peoples that prevention is better than cure in burn patients.

**Keywords:** Epidemiology of burns, flame burn, electrical burn

## INTRODUCTION

A Burn is defined as insult or trauma to body's tissues resulting from heat, chemical, electricity sunlight or radiation. The most common type is scald burns occurring due to hot liquids, steam, gases and inflammable liquids. Inhalational burns are caused due to inhale of smoke.

Burn can be classified in to four types as follows, 1<sup>o</sup> burn involve only the epidermis or outer layer of skin, 2<sup>o</sup> burn involve the epidermis and upper part of dermis, 3<sup>o</sup> burn involve the epidermis, entire dermis and may or may not involve subcutaneous tissue, 4<sup>o</sup> involve the deeper structure like bones, muscle and tendons.

Clinically burns can cause pain, swelling, blistering, redness, charring, scarring and in extensive cases shock and even death. Infection occur as a result of destruction of the protective barrier of skin. Treatment depends on the three main factors namely cause of burn, its extent (i.e. percentage of burns) and its depth.

Antibiotic creams can prevent or treat infections. For more serious burns, treatment may be needed to clean the wound, replace the skin, and make sure the patient has enough fluids and nutrition. Patients with extensive burns frequently die

and those with lesser injuries, physical recovery is slow and painful with development of sequelae later. In addition burn injuries frequently cause deleterious psychological disturbance. Maximum patient of burns presenting in emergency are 5-10%, which are treated on out patient basis with only care of local wound but higher percentage of burns are managed systemically as well as local wound management. Our aim in burn patients management are healing the wound as earliest as possible, so in post healing phase patient has good aesthetic and functional result and resume his/her duties.

## MATERIAL AND METHODS

In the emergency department at our hospital, majority of patients presenting with burns less than (<) 10% do not need hospitalization. The sites involved in the burn process include almost the entire body.

This study was conducted to identify the patterns of burn and demographic and socio-cultural aspects of burn patients and to determine the significance of the problem of burns among all injuries in patients admitted to the Department of Burns and Plastic Surgery SMS Medical College and Hospital Jaipur Rajasthan over a period of four and a half year (January 2009- June 2013)

All 7188 (Seven Thousand One hundred and Eighty) burn patients admitted to the department, a formal history was taken through a self-answered questionnaire- interview with the patients or from the patients attendants when patient was not in a position to answer the questions due to burn severity or inhalational injury as to know the cause of burn, site affected, total body surface area burnt and clinically assess the wound and also to obtain the data regarding registration, age, sex, occupation. In case of children history was taken from their parents.

## RESULTS

Over a period of over a period of four and half year (January 2009 to June 2013), 7188 (Seven Thousand One Hundred and Eighty Eight) patients were admitted to the burns unit SMS Medical College and Hospital. Of them one thousand six hundred and thirty one (1631) patients suffered Electrical burns (22.69%), 4872 suffered flame burns (67.77%) and

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remaining 685 suffered scald burns (9.52%) [Fig:2]. 5310 were of the age group 11-40 years (73.87%) [Table: 1]. Of 7188, 4440 were males (61.7%) 2748 were females (38.2%) of all burn admissions [Fig: 3].

### Social characteristics

The ages of the burn patients ranged from 0 (Zero) to more than 60 years. Most of the patients (75%) were between 10 and 40 years of age. Males predominated, with an incidence of 62% (4440), compared to female incidence of 38% (2748) cases of total 7188. This was probably due to the larger male population in our study exposed to electric burns in professional activity. (Figs. 2, 3),[Table: 1].

### Aetiology of the burns

History from patients revealed that the majority of burn injuries, flame and scald occurred at home and electric burns occurred during work with males mostly affected. In more than three fourth (5557 of 7188) of the cases, domestic cooking was the activity responsible for the flame and scald burns. Flame was the commonest agent of burn injuries (4872 of 7188 which comes out to be 67.77 %).in scalds the commonest causative agent was boiling water, followed by cooking oil.

### Clinical assessment

Most cases were second-degree superficial or deep burns with an extent, using the rule of nine, of 10-40% of the total body surface area. The burn agent was significantly associated with the degree, depth, and severity of the burn wound;- flame burns tended to cause mixed second- and third degree, deep, and severe burns. The site most commonly affected was the face, upper extremity and upper trunk followed by the lower extremity.

## DISCUSSION

Epidemiological studies have played a pivotal role in burn prevention, owing to the fact that each subset of population has its own peculiar epidemiological characteristics and its knowledge helps in appropriate selection of target groups for preventive action.<sup>4</sup>

The developing world accounts for a vast majority (Approx 90% of burns occurring around the globe). The common reasons attributed are lake of education, overcrowding and an unsafe cooking habits. Southeast Asia accounts for roughly Sixty percent of fatal burn cases around the world with a rate of 11.6 per 1lac. Compared to 1990 the number of fatal burn cases has increased from 2,80,000 to 3,38,000 in 2010.<sup>11</sup>

The external sources causing burns are classified into: thermal (heat related), chemical, electrical and radiation. In the developed world (united states) the common cause of burn are flame (44%), scalds (33%), hot objects (9%), electricity (4%), and chemicals (3%).<sup>6</sup> majority of burn injuries occur at home (69%) or work (9%), mostly accidental in nature and occasionally homicidal (2%) or suicidal (1-2%). These sorces can also result in inhalational injury affecting the airways and/or lungs in about 6% cases.<sup>10</sup>

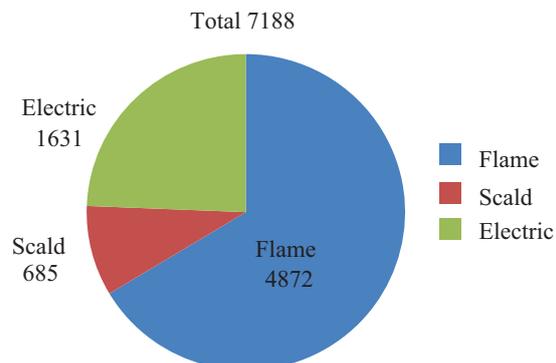
The lower socio-economic strata are more commonly affected by burn injuries. Smoking is a risk factor, although alcohol is not. Risk factors peculiar to developing world include cooking with open fire or on floors, lack of education and

Age Group	Total number of Patients	Male	Female
<10	1224	686	538
10-40	5310	3269	2041
41-60	613	420	193
>60	147	65	82

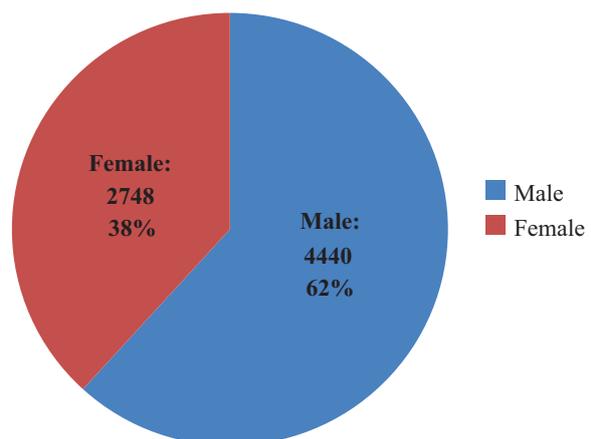
**Table-1:** Age Distribution



**Figure-1:** Hot Water burn in a 3 year female



**Figure-2:** Burn Characteristics



**Figure-3:** Sex Distribution

chronic disease in adults.<sup>7</sup>

In india, number of people sustaining burns per year is approx 7,00,000 to 8,00,000 with highest incidence in women of age group 16-35 year of age. very few amongst those affected are treated in specialist unit. The high incidence in women of 16-35 years of age group is related to unsafe kitchens and loose fitting clothing typical of India. Intention-

al burns are a common cause in young women, subsequent to domestic violence and self harm.<sup>8,9</sup>

Age and sex are important epidemiological determinants for injuries, including burns. The present study revealed that nearly three of four of the patients were aged 10-40 years, while those at age > 60 years represented 2% of the cases. The high incidence among young adults may be explained by the fact that they are generally active and exposed to hazardous situations both at home and at work.

As regards sex distribution, the male population proved to be at greater risk of sustaining burns which is contradictory to the other performed studies than the female population and predominance might be explained by the involvement of males with the handling of fire substances or devices both in domestic activities and at occupation.

Considering the agent of the burn injury, flame burns (no. 4872/67%) were the commonest agent, followed by electric (no. 1631/22%) and scald burns (no. 685/9%). Flammable liquids (kerosene and petrol) and gas related materials were the commonest source of flame burns. Burn agents are highly individualized in every country, largely depending on the standard of living and lifestyle.

In the present study, a significant association was found between age and the burn injury agent. Most scald burns were in the age group less than 10 years and were due to boiling water. The incidence of electric burn was around 22 % patients which represented very high number as compared to any other study. Most of the electric burns were caused by ignorance, non-compliance with rules and regulations, and the lack of safe work practices.

Conventionally approx 50% of burns were considered preventable.<sup>6</sup> Prevention programs have played a major role in significant reduction of rates of serious burns.<sup>13</sup> A variety of preventive measures commonly applied include limiting water temperature, smoke alarms, sprinklers, improved construction of building and fire resistant clothings.<sup>6</sup> The recommended temperature setting of water heater is below 48°C (119.8°F).<sup>12</sup> Scalds burn can also be prevented by using thermometer to measure both water temperature and splash guards on stoves.<sup>13</sup> In case of fireworks there is basic and primitive evidence<sup>14</sup> of benefit with guidelines including capping the sale of fireworks to children.<sup>12</sup>

## CONCLUSION

Most burns are preventable. However, prevention is difficult to achieve. The main ways are by legislation and education. Public awareness must be increased by any method possible, from posters to media involvement. The problems of prevention is to determine an effective strategy and to financially support a prevention campaign, and to evaluate the effectiveness of the campaign. The state government should take initiatives regarding provisions for educating general public and to provide free medications and food for the admitted patients so that they can be treated completely without the fear of financial burden. This scheme of free drug and food for the patients has been implemented in our state and patients are extremely benefitted both in terms of treatment received and financially they are not drained. Hence government of every state should try to maximise educating people

to prevent themselves from this disastrous injury and if they are exposed free treatment provisions should be available for them.

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# Correlation of Acidosis with Blood Markers (LDH and Nucleated RBCs/100 WBC) and with Mortality and Neurodevelopmental Outcome in Neonates with Perinatal Asphyxia

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## ABSTRACT

**Introduction:** Many infants suffer from perinatal asphyxia even in this century specially in developing countries. This study was undertaken to assess the correlation of serum LDH and nucleated RBCs/100WBCs) with acidosis and to assess their ability in predicting mortality and neurodevelopment in neonates with perinatal asphyxia.

**Material and methods:** Neonates born at  $\geq 35$  weeks of gestation and weighing  $\geq 2000$  gm at birth were eligible for enrollment if they had evidence of birth asphyxia (defined as Apgar score  $< 3$  at 1 min in intramural neonates and being born limp with cry  $> 3$  min after birth, in extramural neonates) and encephalopathy within 72 hours of birth. Arterial blood pH, nucleated RBC (nRBC)/100WBCs and serum LDH levels were assessed in all babies after resuscitation in intramural babies and at the time of admission in extramural babies provided they presented within 72 hours after birth. After discharge, the babies were reassessed at 28 days, 3 and 6 months of age for their neurodevelopmental status using the Amiel-Tison Assessment.

**Result:** A total of 100 neonates were enrolled of whom 29 died before discharge. Neonates who expired had a higher degree of acidosis as compared to those who survived, with mean arterial pH being  $6.97 \pm 0.16$  and  $7.063 \pm 0.142$  respectively (p value  $< 0.01$  by unpaired 't' test). nRBC count had a stronger direct correlation with acidosis as compared to LDH ( $r = 0.71$ , 95% CI 0.70 to 0.59 versus  $r = 0.54$ , 95% CI 0.67 to 0.38). Serum LDH  $\geq 810$  IU/L and nRBC count  $> 9/100$ WBCs were able to accurately predict asphyxia and adverse neurodevelopmental outcomes in these babies with a specificity of 95.65%, sensitivity of 54.55% and positive likelihood ratio of 12.54 in the former and specificity of 95.65%, sensitivity of 68.83% and positive likelihood ratio of 15.83 in the latter

**Conclusion:** Serum LDH and nRBC/100WBC directly correlated with acidosis and both increased as the acidosis increased. They can therefore serve as alternative markers of severity of asphyxia and predict mortality and neurodevelopmental outcome upto 28 days of life.

**Keywords:** pH, Neurodevelopment, Lactate Dehydrogenase (LDH), nucleated Red Blood Cell (nRBC), Hypoxic Ischemic Encephalopathy (HIE).

## INTRODUCTION

World-wide each year four million infants suffer from perinatal asphyxia. Of these, one million die and a significant number develop serious sequelae. Perinatal asphyxia ranks as the second most important cause of neonatal death after infection, accounting for about 30% of neonatal mortality.<sup>1</sup> Of the 1.2 million neonatal deaths in India every year 0.3 million infants die due to perinatal asphyxia.<sup>2</sup> No single indicator like Apgar score, HIE staging or major

organ dysfunctions have good predictive efficiency for perinatal asphyxia. Only a combination of various indices may help in diagnosis. Arterial Blood Gas (ABG) analysis including pH estimation, the most commonly used diagnostic and prognostic parameter, is available in only a few select tertiary care hospitals. It is expensive and requires sophisticated equipment. Moreover, it also requires stringent collection techniques and temperature control after sample collection. There is a need for simpler and cheaper surrogate markers to diagnose asphyxia. nRBC count is a simpler test and can be made available even at Primary Health Care centres. Serum LDH is also a readily available test and does not need stringent storage and transportation conditions. Increase in nRBC count has been reported as a possible marker of perinatal asphyxia as the hypoxia at birth induces erythropoiesis, which results in the release of immature RBCs into the fetal circulation.<sup>3</sup> Hypoxia also leads to leakage of enzymes like LDH, CPK etc. from cells into the blood stream. Amongst these, LDH levels are relatively easy to measure and may serve as a good predictor of HIE in the first few hours of life.<sup>4</sup> The present study was designed primarily to determine the correlation of acidosis (measured by arterial blood pH) with nRBCs/100WBCs and LDH in neonates with perinatal asphyxia and secondarily to assess their ability to predict neonatal mortality and neurodevelopmental outcome at 28 days, 3 months and 6 months of age in these babies.

## MATERIAL AND METHODS

A prospective observational study was designed and conducted in the neonatal unit of a tertiary care centre of north India, from June 2012 to September 2013. The sample size was based on inclusion and exclusion criteria and follow up. Neonates of 35 or more completed weeks of gestation, weighing  $> 2000$ g at admission and of  $< 72$  hrs post natal age, with perinatal asphyxia were included if bag and mask ventilation was given and clinical features suggestive of encephalopathy (as suggested by Sarnat and Sarnat staging

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1,2,3) along with metabolic or mixed acidemia (pH ≤7.2) were present and Apgar score was less than 3 at 1 minute. Extramural babies with history of being born limp or with cry delayed for more than 3 minutes after birth, having clinical features suggestive of encephalopathy (as suggested by Sarnat and Sarnat staging 1,2,3) with metabolic or mixed acidemia (pH ≤7.2) were also included. Babies with major congenital malformations and Rh incompatibility were excluded. Each subject was enrolled with written informed consent of the parent/guardian. The study was approved by the Institutional Ethical Committee.

Arterial blood pH(as a measure of acidosis), nRBC/100WBC and serum LDH level were assessed at the time of admission. Neurodevelopment was assessed by Amiel-Tison's neurological assessment.<sup>5</sup> ABG sampling was done from the radial artery and analysis was done within 30 minutes of sample collection, the sample being collected and stored under specified norms. Blood film for nRBC analysis was prepared at bed side from fresh venous blood without adding any anticoagulant. The slides were stained with Leishman's stain, fixed with methanol and nRBCs were seen under the microscope by a single pathologist who was blinded to the pH value of the baby. For serum LDH levels, about 2ml of venous blood was collected in a plain vial. Only non-hemolysed serum was analysed, immediately, by spectrophotometry. Statistical analysis was done using STATA 11 software. Variables were described by mean (±SD) and median (IQR – inter-quartile range). Non-parametric Spearman's correlation was used for comparison. Parametric unpaired t-test and non-parametric Kruskal-Walis test were used for comparing means of two groups. 'p' value <0.05 was considered significant.

**RESULTS**

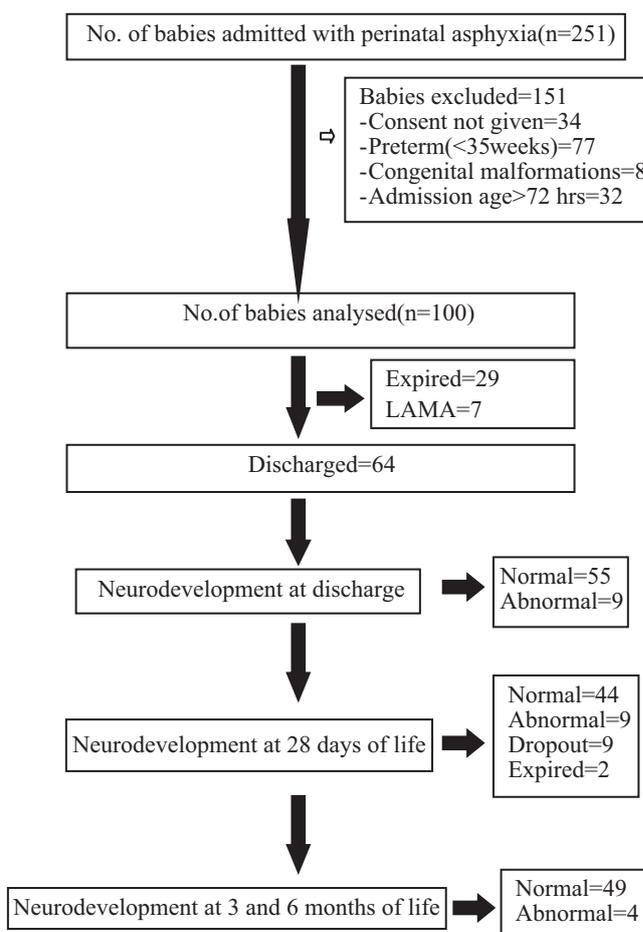
Hundred babies were enrolled for the study. Their mean gestational age was 37.35±0.967 weeks and mean weight at admission was 2706±0.432 g. Other baseline characteristics are shown in table1. Arterial blood pH, nucleated RBC (nRBC)/100WBCs and serum LDH levels were assessed in all babies after resuscitation in intramural babies (mean 1.1 hours/range 1-2 hours) and at the time of admission in extramural babies(mean 18.6 hours/ range 4-72 hours) provided they presented within 72 hours after birth of the 100 patients enrolled, 64 were discharged, 29 expired while 7 left against medical advice.(Fig.1)

**Correlation of acidosis with mortality and neurological outcome**

Babies who subsequently expired had more severe acidosis than in the babies who survived,the mean pH being 6.97 ± 0.163 in the former and 7.063 ± 0.142 in the latter (p value < 0.01 by unpaired t- test). Of the 64 babies who were discharged, 55 (85%) were neurologically normal and 9 (14%) were neurologically abnormal at discharge. Acidosis was also more severe in neurologically abnormal babies as compared to the normal ones (mean pH at admission being 6.96 ± 0.11 in the former and 7.08 ± 0.14 in the latter group (p value = 0.018 by unpaired t test). Of the 55 babies who were normal at discharge, 2 (3.6%) expired while 9 (16.36%) were lost to follow up. At 3 months 49 babies were normal and

Characteristic	Mean/Number*	Standard Deviation / Percent*
Gestational Age (Weeks)	37.35	0.967
Weight(Kg)	2.706	0.432
Sex (Male)	69*	69*
Place of Delivery (Intramural)	56*	56*
Mode of delivery (NVD)	57*	57*
Seizures	59/100	
Dyselectrolytemia	52/100	
Coagulopathy	31/100	
Azotaemia	5/100	

**Table-1:** Clinical profile of study population



**Figure-1:** Flow chart of participants enrolled

only 4 were abnormal ( 5 of the earlier abnormal babies now showed normal development). Acidosis at birth failed to differentiate between babies who were neurologically normal and neurologically abnormal at 3 and 6 months.

**Correlation of acidosis with Lactate Dehydrogenase and nucleated RBCs**

The mean (SD) of serum LDH was 767.4 (362.2) IU/L and that of nRBCs was 10.45 (8.88)/100WBC. The median (IQR) of LDH was 660 (482.5-1033) IU/L and that of nRBC was 10 (2-16.75)/100WBC. A significant linear correlation existed between acidosis and LDH level (r =0.54) and acidosis and nRBCs in the subjects ( r =0.71),( p < 0.01 for both, by non-parametric Spearman's correlation analysis).

“Receiver Operating Characteristic“ (ROC) Curve for LDH and nRBCs with pH was made in order to define a cut-off level of serum LDH and nRBCs that can reliably diagnose acidosis (pH  $\leq$  7.2) in babies with asphyxia (Table 2). Serum LDH showed excellent discriminating ability in diagnosing acidosis as area under curve was 0.87 (95% C.I. 0.79-0.95) and a value of LDH more than 810 had 95.65% specificity, 54.55% sensitivity and positive likelihood ratio of 12.54 in diagnosing acidosis (pH  $\leq$  7.2) (Fig 2). Nucleated RBCs also showed very good discriminating ability in diagnosing acidosis as area under curve was 0.84 (95% C.I. 0.77-0.92) and a value of nRBC more than 9 had 95.65% specificity, 68.93% sensitivity and positive likelihood ratio of 15.83 in diagnosing acidosis (Fig 2).

When nRBCs were analysed in different stages of HIE, it was observed that mean of nRBCs /100WBCs was 5.77 +5.42 in Stage I HIE, 12.20+6.99 in Stage II HIE and 19.63 +8.33 in Stage III HIE whereas the mean LDH level was 851.3+401.4 in Stage I HIE, 812.2+389.1 in Stage II HIE and 745.0+297.8 in Stage III HIE. n RBCs/100WBCs correlated better than mean LDH levels with increasing grades of HIE (p value <0.01).

## DISCUSSION

Our study demonstrated a statistically significant correlation of acidosis with mortality and neurodevelopment till 28 days of life. It also demonstrated a significant direct correlation of acidosis with both LDH and nRBCs, i.e. with decreasing pH, LDH and nRBCs increased. With worsening of HIE, though mean nRBC count increased significantly, no significant change was observed in LDH levels.

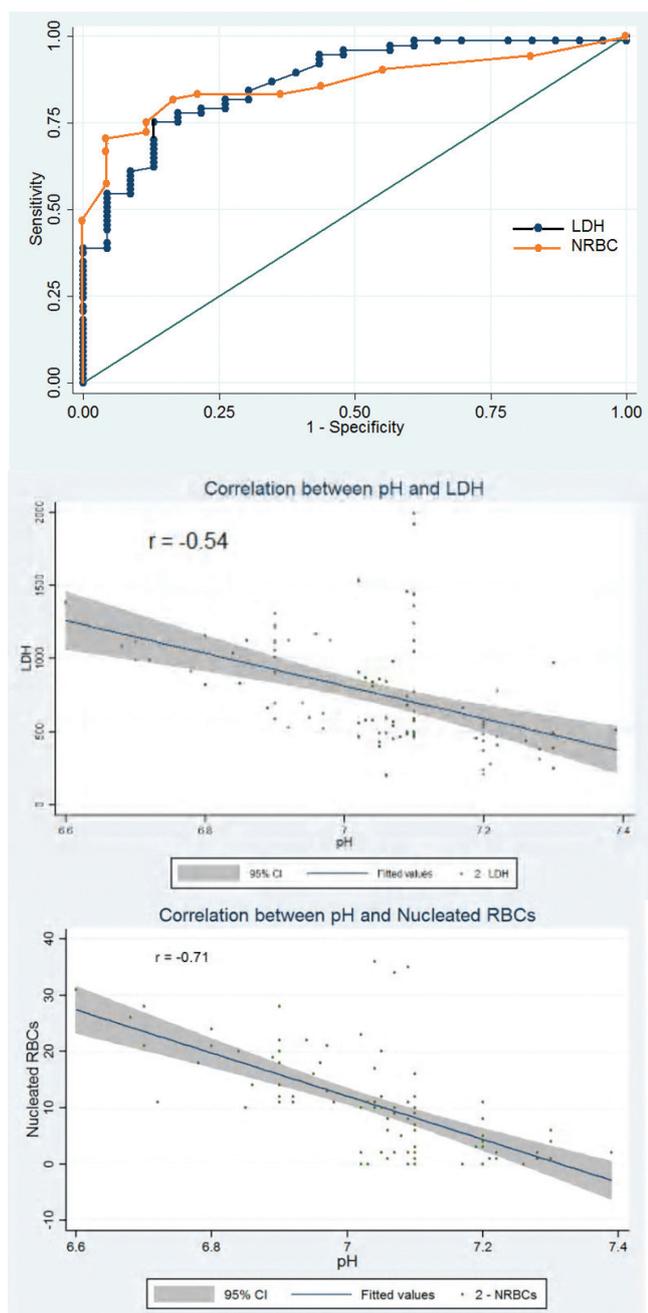
The relation between acidosis at birth and mortality in babies with perinatal asphyxia has been well documented. Low cord arterial pH (acidosis) has been used as a diagnostic biochemical criterion for perinatal asphyxia.<sup>6</sup> However,

not many studies have documented the relation of acidosis to neurological outcome, especially in India. Earlier studies<sup>7-10</sup> have reported the relation between adverse neurodevelopmental outcome and stage of HIE and Apgar score, but not with acidosis. We studied the relation of acidosis with neurodevelopment and observed that acidosis relates directly to mortality and abnormal neurodevelopment till 28 days of life, but not beyond that age. This suggests that factors other than acidosis (at birth) gradually start contributing more to neurodevelopment.

Our study also demonstrated that serum LDH increased significantly with increase in acidosis in asphyxiated babies. Reddy et al have reported earlier that LDH can also be used to discriminate asphyxia from other illnesses among neonates who present with signs of encephalopathy. They demonstrated that LDH and other enzyme levels were raised in other sick infants also, but the magnitude of elevation was higher in asphyxiated babies. However, we did not enroll babies with other illnesses. Our study demonstrated that a serum LDH of more than 810 IU/L can fairly diagnose acidosis in asphyxiated babies with a sensitivity of 54.55% and specificity of 95.65%. Previous studies have suggested different cut off values for LDH which may be because of different timing of the sample. According to Reddy et al, LDH levels greater than 580 IU/L have a sensitivity of 100% for asphyxia and a specificity of 89% in differentiating asphyxia from other illnesses, if the sample is taken within first 72hrs of life. Karlsson et al have suggested levels >1049 IU/L as having sensitivity of 100% and specificity of 97% while Karunatilaka et al have suggested a much higher cut off of 2948 IU/L of LDH in predicting HIE, along with long term adverse sequelae in asphyxiated babies. The values could be higher in the latter two studies because sampling was done within the first 6 12hrs of birth. We have chosen cut off values with higher specificity so that LDH may be used in diag-

Laboratory Test	Specificity	Sensitivity	Positive likelihood ratio	Negative likelihood ratio
LDH				
$\geq$ 695IU/L	91.30%	58.44%	6.72	0.45
$\geq$ 740IU/L	91.30%	57.14%	6.57	0.46
$\geq$ 770IU/L	91.30%	55.84%	6.42	0.48
$\geq$ 780IU/L	91.30%	54.55%	6.27	0.49
$\geq$ 810IU/L	95.65%	54.55%	12.54	0.47
$\geq$ 823IU/L	95.65%	53.25%	12.24	0.48
$\geq$ 830IU/L	95.65%	51.95%	11.94	0.50
$\geq$ 840IU/L	95.65%	50.65%	11.64	0.51
$\geq$ 845IU/L	95.65%	49.35%	11.35	0.52
nRBCs/100WBCs				
$\geq$ 6	82.61%	80.52%	4.62	0.23
$\geq$ 7	86.96%	74.03%	5.67	0.29
$\geq$ 8	86.96%	71.43%	5.47	0.32
$\geq$ 9	95.65%	68.83%	15.83	0.32
$\geq$ 10	95.65%	64.94%	14.93	0.36
$\geq$ 11	95.65%	55.84%	12.84	0.46
$\geq$ 12	100%	46.75%	-	0.53
$\geq$ 13	100%	38.96%	-	0.61

**Table-2:** Cut off values, specificity and sensitivity of LDH and nRBCs/100WBCs for prediction of acidemia



**Figure-2:** ROC curves for LDH and nRBCs/100WBCs and correlation between pH and LDH and between pH and nRBCs/100WBCs

nosing acidosis. If LDH is to be used for screening, it would not be worthwhile to use values with low specificity, as many babies without acidosis would screen positive and undergo unnecessary neuroimaging and follow up in clinic increasing the clinical burden. Mehta et al in their study have reported significantly higher Salivary LDH levels in the HIE group with a level of 893 IU/L showing excellent discriminating ability in early diagnosis of HIE.<sup>11</sup> Our study found, no relation between LDH levels and worsening stages of HIE. This may be because in our study we have used venous blood, our patient population comprised of extramural babies as well where the mean time of collecting the sample was 18.6 hrs whereas Mehta et al studied only 30 intramural babies and collected their salivary samples within 12 hours of birth. Our study also demonstrated a strong positive correlation be-

tween acidosis and nRBC/100 WBCs in venous samples i.e. as pH decreased, the number of nRBCs increased. Earlier studies<sup>12-17</sup> have shown similar results but were conducted on cord blood samples. We preferred venous samples, as cord blood may not be available if babies were born outside institutional set up and admitted later (extramurally). A cut off value of more than 9 nRBCs/100WBCs was derived by ROC analysis, to have higher specificity and positive likelihood ratio for acidosis. This value is similar to the value of >10 nRBCs/100WBCs, reported by Hassan Boskabadi et al. However, most studies have given only mean value of nRBCs/100WBCs rather than a cut off value, that can help to diagnose acidosis. In our study the mean value of nRBCs in different stages of HIE was lower than in earlier studies.<sup>3,12-17</sup> This could be because of different sites of sample collection and also because venous blood sample was collected at a mean time of 1.10hr in intramural babies but 18.6hr in extramural babies, which could have allowed time for compensation. Our study demonstrated that nRBC/100WBC and LDH levels can serve as predictors of severity of acidemia, where affordability is an issue and at peripheral centers where facilities are limited.

Limitation of our study is that we did not enroll controls due to ethical constraints in sampling otherwise healthy babies. Also, a longer follow-up of at least till 1-2 years of age would have been desirable.

### CONCLUSIONS

Serum lactate dehydrogenase and nucleated red blood cells/100WBCs directly correlate with acidosis and can be used to predict the outcome in terms of mortality in asphyxiated babies. Babies with lower mean arterial pH at admission had a worse clinical outcome. Nucleated RBC/100WBC and/or absolute nRBC count may serve as simple surrogate markers for assessment of severity of perinatal asphyxia, as well as for severe HIE whereas LDH levels can serve as a good predictor of severity of acidemia in babies with perinatal asphyxia, though not for HIE. Radial artery pH can also serve as predictor of mortality when cord pH is not feasible, as in extramural deliveries and nRBC/100WBCs and LDH level can serve as predictors of severity of asphyxia where affordability of ABG is an issue.

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# Effect of Maternal Nutritional Status on Birth Weight of Baby

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## ABSTRACT

**Introduction:** Low birth weight is associated with increased incidence of new born morbidity and mortality. Aims and objective of the research were to correlate the effect of maternal nutritional status of mother during her pregnancy on baby's birth weight.

**Material and methods:** The present study was done over a period of one year including 1034 antenatal patients of 28 weeks of gestation at Deptt. of Obstetrics and Gynecology, G R Medical College and JA Group of Hospital, Gwalior. The assessment of nutritional status of all antenatal patients was done by interrogation with a pretested and predesigned structured questionnaire. Hemoglobin level was determined in laboratory. All the patients were followed till term for pregnancy outcome particularly for baby weight.

**Results:** Most of the women (51.47%) had caloric intake between 1601-1800 Kcal, and 34.04% of patients had protein intake between 51-60 grams. Hemoglobin level was between 9.1-10gm% (44.49%). 61.90% of women who were taking 1401-1600 Kcal/day, delivered baby with weight of  $\leq$  2000 grams; while patients who had total caloric intake above 1800 Kcal delivered baby  $>$  3000 grams. About 42.87% of patients with protein intake of about 70 gm had baby weight  $\leq$  2000 grams while 35.48% had baby weight above 3000 grams with in same group. Most of the patients had haemoglobin level  $\leq$  7.0 gm% had baby weight  $\leq$  2000 grams whereas babies with weight above 3000 grams were delivered by patients with Hb above 10 gm%.

**Conclusion:** Maternal nutrition had direct effect on birth weight of new born, as less nourished mother are found to deliver higher percentage of low birth weight babies as compared to mother who are well nourished.

**Keywords:** Maternal nutritional, baby weight, pregnancy, hemoglobin level

## INTRODUCTION

Child and mother both are believed as a single unit whether it is socially, culturally or most important biologically. The biologic support which a child receive from its mother in course of its development and growth through pregnancy and lactation, totally depends on the kind of nourishment a mother received during her pregnancy.<sup>1</sup> In developing countries like India, most of the women fall in the reproductive age group of 15-44 years, which constitute 20-22% of whole population. In India, health status of mother in this group decides the health of the society, which finally determine the health of the community.<sup>1</sup>

Low birth weight (LBW) infants (bay weight  $<$ 2500 g) are at risk of morbidity and mortality at birth and during early days of life. Infant weight is directly linked to status of maternal nutrition. Lower caloric and protein intake by a mother throughout the pregnancy can result in small size of baby.<sup>2</sup> The present study was done to investigate and correlate the role of caloric and protein intake as well as the level of haemoglobin of mother with baby weight.

hemoglobin of mother with baby weight.

## MATERIAL AND METHODS

The present prospective study included 1034 antenatal patients of 28 weeks of gestation. The study was done at Dept of Obstetrics and Gynecology, G R Medical College and JA Group of Hospital, Gwalior between September 2004 to August 2005.

A detailed personal history including last menstrual period (LMP), immunization status, previous medical and obstetric history and interval between last births was recorded.

A detailed dietary history by a 24 hour recall method was obtained by interview technique on a pretested proforma. Protein and caloric intake of cooked food of each case was estimated by simple household measures like bowl/Katori, cup and spoon.

In laboratory investigations haemoglobin estimation and urine routine/microscopic (specially urine albumin) were done.

Anaemia was classified as mild (10-11 gm%), moderate (7-10 gm%) and severe ( $<$ 7 gm%) as per WHO classification.

All cases registered were from urban area as it was easier to follow them as compared to the rural population.

After registration at 28th weeks of gestation, antenatal follow up was carried out at every two weeks interval i.e. 30, 32, 34, 36, 38 and 40 weeks of gestation. Each time mother's weight and blood pressure were recorded. All cases were followed up till delivery. All deliveries were institutional deliveries and baby weight was recorded soon after birth on an electronic weighing machine by a trained personnel.

Patients who have migrated to some other place and high risk cases except for anaemia were excluded from the present study.

All the data were analyzed using IBM SPSS- ver.20 software. Analysis was performed using chi-square test and independent sample student t test. P values  $<$ 0.05 was considered to be significant.

## RESULTS

In present study, most [648 (62.70%)] of the women belonged to the maternal age group of 18-25 years followed by 352 (34%) patients who were between 26-30 years of age. Majority of the patients were literate [910 (88.01%)], 41.4 % belonged to socio economic class II and 98.5 % were house wives by occupation.

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Parameters		Baby Weight (grams)			
		≤2000 (n=21)	2100-2500 (n=455)	2600-3000 (n=313)	>3000 (n=62)
Caloric Intake (Kcal)*	≤1400	6 (28.57)	0 (0)	0 (0)	0 (0)
	1401-1600	13 (61.90)	176 (38.68)	10 (3.19)	6 (9.68)
	1601-1800	2 (9.53)	259 (56.92)	164 (52.40)	7 (11.30)
	>1800	0 (0)	20 (4.40)	139 (44.41)	49 (79.02)
Protein Intake (gm)#	≤50	3 (14.29)	27 (5.93)	16 (5.11)	0 (0)
	51-60	4 (19.04)	204 (44.84)	65 (20.77)	12 (19.35)
	61-70	5 (23.80)	114 (25.05)	105 (33.55)	28 (45.17)
	>70	9 (42.87)	110 (24.18)	127 (40.57)	22 (35.48)
Hb (gm%) <sup>s</sup>	≤7	7 (70)	3 (30)	0 (0)	0 (0)
	7.1-8	5 (18.52)	21(77.78)	1 (3.70)	0 (0)
	8.1-9	6 (7.23)	68 (81.93)	4 (4.82)	5 (6.02)
	9.1-10	2 (0.53)	232(61.38)	136 (35.98)	8 (2.12)
	>10	1 (0.28)	131(37.11)	172 (48.73)	49 (13.88)

Data is expressed as no of patients (%), <sup>s</sup>  $\chi^2=358.22$ ;  $df=12$ ;  $p=0.00001$ , #  $\chi^2=71.56$ ;  $df=9$ ;  $p=0.000001$ , \* $\chi^2=588.12$ ;  $df=9$ ;  $p=0.000001$

**Table-1:** Distribution of different parameters of mother and correlation with baby weight

Distribution of parity revealed that maximum cases were primigravida [491 (47.49%)] followed by 328 (31.72%) patients belong to gravida 2. Most of the primi's [375 (36.27%)] belonged to age group of 18-25 years and also most of multigravida [273 (26.40%)] were in age group of 18-25 years. Most of the cases [502 (48.55%)] were having height between 151-155 cm followed by 270 (26.11%) patients who had height between 146-150 cm. Distribution of patients according to maternal weight (kgs) at last visit revealed that 58.63 % patients were having weight between 51-60 kgs.

In present study, 43.52 % patients gained weight between 3.1 – 4 kg whereas 36.36% patients gained weight more than 4 kgs.

51.85 % patients of age group 18-25 years showed weight gain between 3.1-4 kg, patients of age group 26-30 years had weight gain between 3.1-4 kg and patients of age group 31-35 years had weight gain of more than 4 kg [22 (70.97%)] ( $\chi^2=21.23$ ;  $df=6$ ;  $p=0.001$ ).

In present study, most of the mothers delivered babies with weight between 2100-2500 grams [455 (53.44%)]. 26.3 % patients had inter pregnancy interval > 18 mths.

In present study, most of the women had spontaneous vaginal delivery [667(78.34%)]. Out of 1034 women, only 851 (82.30%) followed up till delivery. Out of these 851 women 846 (99.4%) delivered live babies, while 5(0.6%) delivered still born babies.

Most of the women reported caloric intake between 1601-1800 Kcal [535 (51.47%)] followed by 249 (24.08%) patients who had caloric intake between 1401-1600 Kcal.

Most of the patients were having protein intake between 51-60 grams [352 (34.04%)] followed by 321 (31.04%) patients had protein intake more than 70 grams. Most of the women had Hb between 9.1-10gm% [460 (.44.49%)] and 13(1.26%) patients were having Hb of 7 gm%.

## DISCUSSION

Low birth weight (LBW) is associated with increased risk of new born morbidity and mortality.<sup>3</sup> Women who is well nourished during her pregnancy can easily fulfill the demand

of growing fetus. Well nourished fetus will result in to a healthy baby with optimum body weight. Hence it is essential that mother's diet must contain adequate nutrients during her pregnancy so that chances of LBW baby can be avoided.<sup>4</sup> Present study had showed that current nutritional status of women as indicated by calorie intake is directly related to birth weight of the baby. Total caloric intake between 1601-1800 Kcal was recorded in 51.74% of women while 24.08% and 23.60% of women were taking calories between 1401-1600 and above 1800 Kcal respectively. When calorie intake of mother was correlated with the baby weight, it was found that more than half of patients who were taking calories between 1401 – 1600, delivered baby with body weight of ≤ 2000 grams, while those who were taking > 1800 calories delivered baby with weight > 3000 grams.

Study done by Raman et al reported that inadequate calorie intake can results in LBW babies and even supplementation given for anaemia correction would not be able to increase the birth weight.<sup>5</sup> Whereas study done by Kennedy et al found that birth weight of baby can be improved with the help of supplementations.<sup>6</sup> Gaigi et al in their study involving 1233 antenatal patients of 28 weeks of gestation did not find any significant relation of baby weight with calorie intake. The reason for non-significant relation was not explained by the author.<sup>7</sup>

The present study has observed a direct relation between protein intake and baby weight but with protein intake more than 70 g daily had not shown any further significant increase in baby weight rather it resulted in baby weight reduction. Rush et al did a similar study and reported that high protein intake might reduce the baby weight.<sup>8</sup>

In present study, 34.04% patients were consuming 51-60 grams of protein daily while 31.04% had above 70 grams of protein intake. About 42.87% of patients with total intake above 70 gm had baby weight ≤ 2000 grams while 35.48% had baby weight above 3000 grams with in same group.

Rama et al reported a decrease in abortions, preterm deliveries and still births with increase in dietary protein.<sup>9</sup> Raman et al also reported that protein consumption in the range of

30-50% of total diet would reduce chances of LBW babies.<sup>5</sup> In Asian countries like India pregnancy induced anaemia is most common complication. Dickman et al also reported a reduction in haemoglobin level by 20% between 16th and 35th weeks of pregnancy.<sup>10</sup> Reports have shown that severe anaemia can lead to low birth weight.<sup>3</sup>

In present study 44.49% of patients had haemoglobin level between 9.1-10 gm% and there was an inverse relationship between age and parity with haemoglobin level. But haemoglobin level has direct relation with baby weight. Most of the patients who had haemoglobin level  $\leq 7.0$  gm%, had baby weight  $\leq 2000$  grams whereas babies with weight above 3000 grams were delivered by patients with Hb above 10 gm%.

Amosu et al did a study on 512 patients and reported that mothers with haemoglobin level less than 7 g% found to have 9.96% incidence of LBW whereas incidence of LBW was only 0.59% with mother having haemoglobin level of more than 10 gm %.<sup>3</sup>

Gogoi et al in their study observed that 50-60% of the women had nutritional anaemia in later months of pregnancy. Studies have recommended that haemoglobin level of normal women should be around 80% in order to avoid complication.<sup>1</sup>

Giles et al reported a progressive fall of haemoglobin level during the course of pregnancy, the magnitude of fall was influenced by age and parity to a lesser extent.<sup>11</sup>

## CONCLUSION

Present study has found that nutritional status (calorie, protein and haemoglobin level) of mother can significantly influence the weight of the new born baby and may lead to LBW. Poorly nourished mother were found to deliver LBW babies as compared to women who were better nourished.

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# Study of Oxidative Stress in Pregnancy and Its Association with Pregnancy Induced Hypertension

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## ABSTRACT

**Introduction:** Pregnancy induced hypertension (PIH) is one of the leading cause of maternal and fetal morbidity and mortality. Oxidative stress is considered as one of the aetiological factor in PIH. The present study was done to study the levels of plasma malondialdehyde (MDA) and serum superoxide dismutase (SOD) level in pregnancy and their association with PIH.

**Material and methods:** Study was conducted in the Dept of Obstetrics and Gynecology of G R Medical College, Gwalior, MP. 100 antenatal patients were included in the study and they were divided into two groups: normotensive group (50 patients) and pregnancy induced hypertension group (PIH) (50 patients). MDA was estimated as per Jean et al method and SOD by Mishra and Fridovich in all the patients.

**Results:** Mean MDA level in normotensive, mild PIH and severe PIH patients was  $4.15 \pm 0.35$  nmol/ml,  $5.11 \pm 0.41$  nmol/ml and  $6.27 \pm 0.37$  nmol/ml respectively. Mean SOD level in normotensive, mild PIH and severe PIH patients was  $3.15 \pm 0.21$  unit/mg/ml,  $2.56 \pm 0.32$  unit/mg/ml and  $2.02 \pm 0.19$  unit/mg/ml respectively. There was statistically significant difference in the value of MDA and SOD between both the groups ( $p < 0.05$ ).

**Conclusion:** In women with preeclampsia, there is a significant elevation of plasma MDA level and reduction of serum SOD level which suggests significant oxidative stress in pregnancy leading to endothelial dysfunction, which may be responsible for PIH.

**Keywords:** Pregnancy induced hypertension, malondialdehyde, superoxide dismutase

## INTRODUCTION

Preeclampsia might be the result of inadequate maternal care and this may advance to eclampsia if proper care is not taken, resulting in various maternal complications. Endothelial dysfunction is considered as one of the etiological factor for the development of preeclampsia.<sup>1</sup>

Lipid peroxidation is considered as an important marker for endothelial dysfunction. Reports have shown that free radicals generated due to oxidation process may enhance vascular dysfunctions.<sup>2</sup>

Large number of evidences has shown that in women with preeclampsia, there is an increased lipid peroxidation along with reduction in natural antioxidant protection resulting in oxidative stress.<sup>3</sup>

Level of lipid peroxidation in body can be best estimated by plasma MDA level. High level of MDA indicates that body is in stressed state. SOD exhibit free radical scavenging mechanisms, resulting in reduction of oxidative stress. A lower level of SOD indicates an increased oxidative damage to the body.<sup>4</sup>

Keeping in mind the above discussions, present study was

done to evaluate the serum SOD and plasma MDA levels in antenatal patients and to find their association with PIH.

## MATERIAL AND METHODS

The present study included 100 patients who have been admitted in the Department of Obstetrics and Gynaecology, Kamla Raja Hospital, GR Medical College, Gwalior.

A written informed consent from all the patients and Ethical Committee approval was obtained before starting the study. Patients were divided into Normotensive group (50 patients) and Pregnancy induced hypertension group (PIH) (50 patients).

Antenatal patients in third trimester (28-40 weeks of gestation) were included in the study. PIH was classified as mild (systolic blood pressure  $>140$  mmHg, diastolic blood pressure  $>90$  mmHg and urinary albumin traces or +1) and severe (systolic blood pressure  $>160$  mmHg, diastolic blood pressure  $>110$  mmHg and urinary albumin +2). Above alteration in blood pressure was observed at least on two different occasions at least 6 hours apart.

A detailed history, general physical examination and obstetric examination were performed.

Estimation of plasma malondialdehyde was done as per method of Jean et al (1983) and serum superoxide dismutase was done by the method given by Mishra and Fridovich (1972) in the Department of biochemistry for a period of one year.

## STATISTICAL ANALYSIS

All the data was analyzed using IBM SPSS- ver.20 software. Analysis was performed using chi-square test and independent sample student t test. P values  $< 0.05$  were considered to be significant.

## RESULTS

In present study, there were equal no. of normotensive (50%) and PIH patients (50%). Out of 50 patients who had PIH, 30 (60%) had mild preeclampsia and 20 (40%) had severe preeclampsia.

Distribution of patients according to age showed that most of the patients in normotensive group belong to 21-25 years

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Investigation		Normotensive N=50	Mild PIH N=30	Severe PIH N=20
MDA (nmol/ml)	2-4	23 (46)	0 (0)	0 (0)
	4-5	27 (54)	13 (43.33)	0 (0)
	5-6	0 (0)	16 (53.33)	7 (35)
	>6	0 (0)	1 (3.33)	13 (65)
SOD (units/mg/ml)	3-3.6	41 (82)	2 (6.66)	0 (0)
	2.5-3	8 (16)	20 (66.66)	1 (5)
	2-2.5	1 (2)	8 (26.66)	12 (60)
	1.5-2	0 (0)	0 (0)	7 (35)
Data is expressed as no of patients (%), P value for mean MDA; between normotensive and mild PIH (t=11.13, df=78, p<0.01), normotensive vs severe PIH (t=22.53, df=68, p<0.01), mild PIH vs severe PIH (t=10.18, df=48, P<0.01), P value for Mean SOD; normotensive vs mild PIH (t=9.96, df=78, p<0.01), normotensive vs severe PIH (t=20.87, df=68, p<0.01), mild PIH vs severe PIH (t=7.05, df=68, P<0.01). MDA; malondialdehyde, SOD; serum superoxide dismutase, PIH; pregnancy induced hypertension.				
<b>Table-1:</b> Levels of plasma MDA and SOD in antenatal patients				

of age [30 (60%)] followed by 10 (20%) patients who were from 26-30 years of age. Out of 50 PIH patients, [24 (48%)] were from 21-25 years age group followed by 14 (28%) patients who belonged to age range of 26-30 years (P>0.05). In present study, 20 (40%) normotensive patients were primigravida while 15 (50%) patients who had mild preeclampsia and 16 (80%) patients with severe eclampsia were primigravida. Therefore study showed that PIH was more common in primigravidas especially severe PIH (X<sup>2</sup>, df=1, p=0.02).

Both normotensive and PIH group were comparable as per the educational status of patients. Most of the patients in normotensive group were illiterate [17 (34%)], 13 (26%) were up to intermediate, 14 (28%) were graduate whereas in patients with PIH, 19 (38%) were illiterate, 11 (22%) patients and 11 (22%) were intermediate and graduates respectively (X<sup>2</sup>=0.17, df=1, p>0.05).

In normotensive group most of the patients belonged to gestational age of 33-36 weeks [24 (48%)] followed by 18 (36%) patients who belong to gestational age of 28-32 weeks (X<sup>2</sup>=0.04, df=1, P>0.05).

Patients in both normotensive and PIH group were comparable with respect to gestational age. All the patients who were enrolled were in their third trimester (X<sup>2</sup>=0.04, df=1, p>0.05).

Most of the patients in normotensive [30 (60%)] and PIH group [31 (62%)] belong to class-III as per the modified P Kumar's classification for socioeconomic status.

In normotensive group, 48 (96%) patients had DBP between 70-80 mmHg, 16 (53.33%) patients of mild PIH patients had DBP of >90 mmHg and 14 (70%) patients of severe PIH group had blood pressure of >110 mmHg as per the criteria used for defining the patients as normotensive, mild PIH and severe PIH.

In present study, 45 (90%) normotensive patients had their urine albumin as nil whereas majority of study group patients had their urine albumin either +1 or +2.

Mean MDA level in normotensive, mild PIH and severe PIH

patients was 4.15±0.35 nmol/ml, 5.11±0.41 nmol/ml and 6.27±0.37 nmol/ml respectively. Mean SOD level in normotensive, mild PIH and severe PIH patients was 3.15±0.21 unit/mg/ml, 2.56±0.32 unit/mg/ml and 2.02±0.19 unit/mg/ml respectively.

## DISCUSSION

Oxidative stress generates free radicals which are transient and unstable. Generation of free radical leads to lipid peroxidation which in turn results in increase in MDA level, which is a marker of lipid peroxidation.<sup>3</sup> SOD is a biological antioxidant enzyme, which has an important role in preventing oxidative stress.<sup>5</sup>

In present study MDA was significantly increased in preeclamptic women as compared to normotensive women. Studies have reported that plasma MDA level is increased with the advancement of normal pregnancy.

Sayed et al performed a similar study on 80 patients to evaluate lipid peroxidation and antioxidant status in pregnant women. They reported that plasma MDA level (8.30 ± 0.97 nmol/ml) was significantly increased in women with preeclampsia (p<0.05) as compared to normotensive (5.60±0.79 nmol/ml) women whereas serum SOD level (3.03 ± 0.63 U/ml) was decreased as compared to normal women (5.19 ± 0.93 U/ml) (P<0.01).<sup>3</sup>

End product of lipid peroxidation can produce malfunction in vascular endothelium of mother, also free radicals can suppress prostacyclin synthesis and may induce contraction of smooth muscle. Both these process may lead to vasospasm which is eminent characteristic of preeclampsia.<sup>1</sup>

Pandey et al did a study on 66 patients of 28-38 weeks of gestation and reported significant decrease in SOD activity in women with preeclampsia (0.347 ± 0.069 unit/mg protein) as compared to normal women (0.704 ± 0.109 unit/mg/ml) (P<0.001).<sup>5</sup> The results of the present study are consistent with the previous studies. The possible reason for reduction in SOD activity in women with preeclampsia may be due to enhanced activity of free radicals resulting in decreased SOD production.<sup>6</sup>

A study done on 70 women by Zhou et al, also reported a significant increase in plasma MDA level 33.42± 4.50 nmol/g and decrease in serum SOD (1866±214 U/g·Hb) in women with preeclampsia as compared to normal women (MDA; 28.27±4.44 nmol/g·Hb, SOD; 2055±201 U/g·Hb).<sup>7</sup>

Lekharu et al enrolled 75 normal pregnant women and found that that MDA level was significantly high in pregnant women and SOD level was lowest in third trimester.<sup>8</sup>

## CONCLUSION

The present study had showed that oxidative stress as suggested by the alterations in levels of MDA and SOD may be the contributing factor in the pathogenesis of pregnancy induced hypertension. However the sample size in present study was small low; a large randomized trial is required to confirm the results

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# Clinical Evaluation of Corneal Ulcer among Patients Attending Teaching Hospital

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## ABSTRACT

**Introduction:** To effectively prevent blindness in patients with corneal ulcer, a proper understanding of risk factors predisposing to ulceration, and clinical and microbial characteristics of the disease is essential. Aim is to know the age and sex distribution of corneal ulcer. To identify the predisposing factors, etiological factors contributing to corneal ulcer. To study the clinical features and management of corneal ulcer.

**Material and methods:** Study was undertaken among 80 patients who were diagnosed to have corneal ulcers for a period of 1 year. This is an observational study to identify the common etiological agents, predisposing factors, age, gender, and occupational distribution and to study the clinical features.

**Results:** Corneal ulcers were common in age group 3rd and 4th decade (55%) More common in males. Male to Female is 1.63:1 Corneal ulcer was commonly observed in rural population (65%), and low socio economic status (60%). Most common in people whose occupation was Agriculture (48%). Ocular trauma was the major predisposing factor in majority of cases (46.25%). In viral keratitis Herpes simplex virus was more associated with corneal ulcers. 10% KOH wet mount and Gram stain were helpful in initiation of antimicrobial therapy. 10% KOH wet mount alone could identify fungi in 80.95% of culture positive cases. Culture positivity was 56.94%. Fungi namely Filamentous fungi was common etiological agent isolated (29.16%). In Fungal ulcers – Fusarium sp. was commonly isolated. 85% of Bacterial isolates were gram positive cocci.

**Conclusion:** Improvement in laboratory facilities, early diagnosis and early initiation of therapy can save vision in case of corneal ulcer.

**Keywords:** Corneal ulcer, viral keratitis, Vision.

## INTRODUCTION

Corneal ulcer is defined as an epithelial break accompanied by underlying stromal necrosis.<sup>1</sup> Many of these cases may develop the complications and loss of vision in the end. This made a stimulation to study the clinical evaluation of corneal ulcer in detail.

Globally it is estimated that ocular trauma and corneal ulceration, result in 1.5 to 2 million new cases of corneal blindness annually.<sup>2</sup> According to WHO, corneal diseases are among the major causes of vision loss and blindness in the world today, second only to cataract in overall importance.<sup>3</sup> Corneal blindness is a major problem in India, which adds a substantial burden to the community in general and health care resources. Further individuals with corneal blindness are usually of younger age group compared with those suffering from cataract. Hence in terms of total blind-years the impact of corneal blindness is greater. In India approximately 6.8 million people have unilateral corneal blindness, with vision less than 20/200 in at least one eye and of these, about

a million have bilateral corneal blindness. It is expected that the no. of corneal blind people in India will increase to a staggering 10.6 million by 2020.<sup>4</sup>

Corneal ulceration in developing countries has only recently been recognized as a 'silent epidemic'. *Gonzales et al, 1996* found that the annual incidence of Corneal Ulcer was 113 per 100,000 people (in Madurai South India) which was 10 times the annual incidence of 11 per 100,000 as reported in USA. In the recent APEDS (Andhra Pradesh eye disease study) conducted by L. V. Prasad Eye Institute, Hyderabad from 1996 to 2000 it was found that 7% of corneal blindness in our state is because of corneal ulcer.<sup>5</sup> Many cases with corneal ulceration end up with corneal blindness or still disastrous outcome such as corneal perforation, endophthalmitis or phthisis bulbi. About 60-70% of corneal scar/Adherent Leucoma are result of neglected or improperly treated corneal ulcers. Microbial keratitis and more so incidence of fungal keratitis is on the rise in the densely populated continents of Asia and Africa. Fungal keratitis is the major cause for corneal blindness in Asia amounting to 44 percent of central corneal ulcer.<sup>6</sup> Ongoing research towards rapid diagnosis and specific drug therapy could minimize the morbidity caused by this preventable disease.

## MATERIAL AND METHODS

A clinical study was undertaken among the patients who were diagnosed to have corneal ulcers, at the outpatient department of Regional Eye Hospital, Kakatiya Medical College, Warangal from November 2012 to October 2014. This is an observational study to identify the common etiological agents, predisposing factors, age, gender, and occupational distribution and to study the clinical features and management of corneal ulcer. 80 cases were selected for detailed study. The definition of corneal ulcer was taken as epithelial defect with inflammation of cornea.

**Inclusion Criteria:** With the consent of the patient & the clinical features consistent with the corneal ulcer, age above 1 year, both the sexes and traumatic cases.

**Exclusion Criteria:** Neonates and surgical trauma cases, and patients with corneal degenerations and dystrophies are

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excluded from the study.

**Ophthalmic Examination:** Consisting of visual acuity recording, external examination and slit lamp examination of the anterior segment of the eye. Grading of the severity of the ulcer was done taking into consideration the DB jones criteria and location of ulcer.

**The criteria for severe ulcer:** Large size, infiltration more than 6 mm, deep stromal involvement, central location of ulcer threatening visual acuity, marked stromal thinning with impending perforation, presence of hypopyon and scleral involvement.

**Laboratory Investigations:** Routine investigations, Syringing of naso-lacrimal passages, RBS, CBP, ESR, CUE, Fluorescein staining, Corneal scrapings, Smears or Staining, Culture- Corneal scraping were immersed in nutrient broth, which was brought from microbiology lab, and then promptly transported back for smearing on culture plates for bacteria and for fungi separately. Nutrient agar, Saboraud's dextrose agar and Blood agar are used for culture.

## RESULTS

The following data is the analysis of the study which was conducted on 80 patients with corneal ulcer, fulfilling the inclusion criteria, who attended the ophthalmic OPD at Regional Eye Hospital, Kakatiya Medical College, Warangal from November 2012 to October 2014.

Incidence of corneal ulcer was more common in 3rd and 4th decade that is middle age group. In this study, corneal ulcer is more common in males. 60% of the cases belong to low socio economic status, as malnutrition, poor sanitation is more common in this group.

Incidence was more among rural population as they are more involved in works prone to corneal ulcer like agriculture, construction, mining etc. Out of 80 cases, 60 cases sought treatment between 1-10 days.

Ulcer is considered central if it is present in the central 5 mm diameter. Ulcer is considered peripheral if it is present within 3 mm from the limbus. In this study out of 80 cases 55% cas-

Age in years	No. Of cases	Percentage
1-10	3	3.75
11-20	7	8.75
21-30	21	26.25
31-40	23	28.75
41-50	10	12.5
51-60	9	11.25
Above 60 years	7	8.75
Sex Distribution		
Males	49	62
Females	31	38
Total	80	100
Socio-Economic Status		
Low	48	60
Middle	32	40
High	0	0
Total	80	100

**Table-1:** Age distribution, sex distribution and socioeconomic distribution

es had stromal infiltrate of <6mm diameter. Out of 80 cases, hypopyon was found only in 23 cases.

Out of 72 cases, 41 were culture positive i.e. 56.94% and Out of 41 culture positive, 21 were fungal isolates and 20 were bacterial isolates.

Most common cause of corneal ulcer is fungal 80.95% of culture positive fungal ulcer.

Out of 21 cases, 17 cases (81%) were Fusarium spp., 4cases were Aspergillus spp

Living Conditions	No. Of cases	Percentage
Place		
Rural	52	65
Urban	28	35
Occupational Distribution		
Agriculture	38	47.5
Industrial	19	23.75
Housewives	10	12.5
Students	7	8.75
Others	6	7.5
Duration of treatment before seeking treatment		
< 10 days	60	75
<20 days	13	16
20 and more	7	9
Total	80	100
Local Predisposing factors		
Ocular trauma (including foreign bodies)	37	46.25
Dacryocystitis	6	7.5
Eye lids or lashes abnormalities	3	3.75
Decreased corneal sensation	4	5
Contact lens wear	3	3.75
Systemic		
Diabetes	6	7.5
AIDS/HIV	--	--
Immuno suppressive drug use	--	--
None	21	26.25
Symptoms of corneal ulcer		
Pain	66	82.5
Redness	80	100
Watering	80	100
Diminision of vision	62	77.5
Photophobia	31	38.75
Foreign body sensation	80	100

**Table-2:** Details of corneal ulcer in present study

Location of corneal ulcer	No. Of cases	Percentage
Location		
Central	36	45
Peripheral	21	26.25
Both sides	23	28.75
Size of Infiltrate		
<6mm in diameter	44	55
>6mm in diameter	36	45
Hypopyon in corneal ulcer		
Absent	57	71.25
Present	23	28.75

**Table-3:** Location of corneal ulcer, size of infiltrate and hypopyon in corneal ulcer

Culture	No of patients	Percentage
Culture positives	41	56.94
Culture negatives	31	43.07
<b>Culture results</b>		
Fungal	21	29.16
Bacterial	20	27.77
Sterile (negative)	31	43.07
<b>Bacterial Results</b>		
Gram Positive Bacteria		
Bacteria	n=20	Percentage
Staphylococcus aureus	6	30
Coagulase Negative staphylococcus	6	30
Streptococcus pneumonia	3	15
Other streptococcus	2	10
<b>Gram Negative Bacteria</b>		
Pseudomonas	3	15

**Table-4:** Culture results in study

Name of the study	Bacterial Isolates (%)	Gram positive bacteria(%)	Culture positive (%)
Current Study	27.77	85	56.94%
Leck A.K. et al <sup>16</sup>	23.9	80	68.71%
Srinivasan M. et al <sup>8</sup>	47.1	79	68.4%
Sharma et al <sup>6</sup>	--	--	56.70

**Table-5:** Comparing present study with other studies

**Management of corneal ulcer**

Out of 80 cases in whom treatment has been initiated, Atropine 1% eye ointment or Homatropine 2% eye drops, Tablet Vitamin C, Eye shield/ shade was used along with specific treatment. Gram staining and 10% KOH mount done and the treatment was initiated accordingly. From the culture reports, 21 cases were showing fungal pathology, 20 cases bacterial, and remaining were sterile.

**DISCUSSION**

Corneal ulcer is one of the predominant causes of blindness and ocular morbidity in developing countries. In this study, majority of the patients (55%) were in 3rd and 4th decade that is middle age group, as they are more involved in outdoor and physical activities and are exposed to risk factors more frequently.

In a study by Panda A. et al<sup>7</sup> performed on thousand eyes of thousand patients, 50% of the patients with corneal ulcer were aged between 36 and 65 years. The present study showed similar age distribution. The incidence of microbial keratitis was higher in males (62%) than in females (38%) with Male to Female Ratio 1.63:1. This ratio is near to that reported by Srinivasan M. et al<sup>8</sup>, (1.6:1). Males form the majority of working class, hence exposure to risk factors is more. Both sexes tend to develop corneal ulcer in the 3rd to 5th decades of life when presumably they are more physically active and are at higher risk of corneal injury. From the APEDS study<sup>5</sup>, trauma and keratitis were the most common cause of corneal blindness in males, whereas traditional medicine and post cataract surgery in females.

In the current study out of 80 cases, 60% of cases belong to low socio economic status. 62 cases (65%) are from rural areas, and 35% are from urban areas. The incidence is more in them because of more chance of exposure to injury, lack of awareness of the problems, delay in consulting ophthalmologist, using native modalities of treatment like application of some irritants in eye and removal of foreign body with unsterile material. The biggest group of the patients were agricultural workers (47.5%), followed by industrial workers (23.75%), house wives (12.5%), and students (8.75%). Agriculture is major occupation in this district. These patients are more prone for ocular trauma more with organic material, hence fungal ulcers are common. In a study conducted by Bharathi MJ et al<sup>9</sup>, 64.75% of patients with fungal keratitis were agricultural workers.

In APEDS study, trauma was the second major cause of corneal blindness in our population- most common cause of unilateral vision loss in developing countries. By far the most common predisposing risk factor for corneal ulcer in south India was a history of corneal injury.<sup>5</sup> In the current study, out of 80 cases, 37 cases had Ocular trauma and foreign body in eye, which contribute to 46.25% of total cases. In developing world non- surgical ocular trauma accounted for 65.4% & 48.6% of all corneal ulcers<sup>8</sup> respectively. The current study is nearly comparable to this study. In developed countries contact lens wear is the major risk factor.

According to APEDS study common cause of corneal blindness is keratitis in childhood followed by trauma. And the most common cause of trauma in urban area is flying/ thrown objects, and the rural area is due to vegetative matter. Common clinical characteristics of fungal corneal ulcer in this study were long duration of history, dry, raised necrotic slough in 80% of cases and satellite lesions in 60% of cases. While bacterial keratitis features were short duration of history, grayish white with purulent slough in 70% cases. Viral keratitis was identified by vesicular lesions on face and lids for Herpes Zoster and by punctuate keratitis in herpes simple. Majority of patients presented with symptom complex mostly with pain, redness, watering and diminution of vision. Central cornea was involved in majority of cases. In 36 patients only central, and in 23 patients both central and peripheral cornea was involved. In majority cases the area of infiltrate was < 6 mm in diameter and the depth of infiltrate was < 2/3 of stroma. The ulcers which were in peripheral location, smaller area of infiltrate and less depth had good visual outcome after healing. Studies have shown that larger Infiltrate at presentation was a significant predictor of worse 3 month infiltrate / scar size. Larger epithelial defect was a significant predictor of perforation. Predictor of longer time to re-epithelialization include infiltrate size at presentation and older age. (Prajna N V et al<sup>10</sup>). A large lesion >6mm was significant predictor for poor visual outcome. Tananuvat N et al.<sup>11</sup> In the current study, in majority of cases where symptoms were less with satellite lesions, thick, large hypopyon, irregular infiltrate margins, endothelial infiltrate, fungal culture was positive. The best correlates in fungal Keratitis were Occupation (Agriculture), Central location, Size< 5mm, Depth > 50% of stromal thickness, 10% KOH smear positive. Out of 80 cases, corneal scrapings were taken

from 72 cases, as the 8 cases were diagnosed as viral keratitis clinically. These 72 corneal scrapings were subjected to 10% KOH mount, Gram staining and culture. From these scrapings KOH mount could identify fungal organisms in 17 cases (23.61%). Whereas culture showed fungal growth in 21 cases (29.16%). 10% KOH wet mount positive and culture positive were 17 cases, Where as 10% KOH negative and culture positive were 4 cases. Hence, KOH 10% wet mount could identify fungal hyphae in 17 cases i.e., 80.95% of culture positive fungal ulcers. Due to this high sensitivity of 10% KOH wet mount, we can start treating the fungal ulcer cases before the culture reports are available. In studies by Garg. P. et. al.<sup>12</sup> 10% KOH sensitivity in identifying fungal hyphae is 90%. There is high prevalence of fungal keratitis in South India. The Prevalence of fungal pathogens in South India is 44% Sharma.S. et. al,<sup>6</sup> was significantly greater than studies in Nepal 17% Madan. P.Upadhyay et. al<sup>13</sup>, in Bangladesh 36% Dunlop A.A. et al<sup>14</sup>, in Ghana 37.6% Hagan M, et al.<sup>15</sup> In the present study the incidence of fungal keratitis is lower (29.16%) compared to the above studies, but fungal isolates were more when compared to bacterial isolates. In fungal isolates all were filamentous fungi. In 17 cases of 21 i.e.81% it was *Fusarium* and in only 4 cases it was *Aspergillus* spp i.e., 19%. In most of the studies Filamentous fungi were the major fungal pathogens. In Studies by Srinivasan. M. et al<sup>8</sup> and Leck. A.K. et al<sup>16</sup> *Fusarium* was common, 47% and 39.9%; *Aspergillus* 16% and 21.5% respectively. In a study by Taneja M et al<sup>17</sup>, at L.V. Prasad eye institute, Hyderabad, on Microbial keratitis following vegetative matter injury on 49 patients, showed that corneal infections following vegetative matter injury show a varied etiological profile, however bacterial and polymicrobial infections are more prevalent. Empirical antifungal therapy, as commonly practiced, must be avoided in cases with vegetative matter injury. In the present study also injury with vegetative matter resulted in not only fungal ulcer, but also ulcers due to other organisms. From the 72 smears for gram stain, bacterial organisms were found in 24% scrapings. Out of all cultures, 27.77% showed growth of bacteria. From this study it is observed that gram staining can be used to initiate proper therapy before culture reports are available. Bacterial Isolates in the present study was observed in 20 cases (27.77%). In studies by Leck A.K.et al<sup>16</sup> in south India (23.9%), Srinivasan. M. et al<sup>8</sup> in Madurai south India (47.1%).

Hence antibiotics were continued with decreased frequency.4 cases showing clinically bacterial not responding to initial Fluoroquinolones, antibiotic was changed to fortified eye drops. Response was good in all cases except for 3 cases refractory to treatment, showing no signs of improvement were referred to higher center. Out of 80 cases in this study, majority (87%) patients responded well to treatment. But on follow up it was observed that all patients presented with varying degrees of corneal opacities after healing.11 cases were refractory to treatment. Many refractory cases were fungal corneal ulcers. Corneal perforation was observed in 3 cases and descemetocoele in 1case. All these cases were referred to higher center for further management.

## CONCLUSION

Corneal ulcers, mostly infective are noticed in active age

group from 30 to 50 years and outdoor workers like agricultural laborers and construction workers, associated with predisposing factors like malnutrition or poor hygiene. Common etiological factors are mainly fusarium species and gram positive organisms. Early & accurate diagnosis and intensive treatment is essential for visual restoration.

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# Role of X Ray and USG in Patient Admitted with Acute Abdomen

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## ABSTRACT

**Introduction:** Acute abdomen is the common cause of emergency admissions. Investigations like X RAY and USG plays an important role in the diagnosis of disease and so prompt treatment can done without delay and unnecessary laparotomies can be avoided

**Material and methods:** This study was done on 1138 patient which were admitted over a period of one year with acute abdomen in Surgery department. Scout X-ray and USG was done in 181 patients. Scout X –Ray film gives lots of information and very helpful in diagnosing perforation and intesinal obstruction.

**Results:** Incidence of acute abdomen was 26.93%.Majority of pateints (76.97%) were from rural area. In 80% cases of acute abdomen gastrointestinal system was involved.X-ray has diagnosed all cases of perforation peritonitis (100%). Cholecystitis was diagnosed in 96% cases with USG.Ultrasound was uniquely diagnostic in cases of appendicular abscess and twisted ovarian cyst.

**Conclusion:** This study shows that simple X-Ray and USG plays an important role in definite diagnosis of acute abdomen so as to avoid unnecessary laparotomies.

**Keywords:** Acute Abdomen, Ultrasound, X- Ray.

## INTRODUCTION

The term acute abdomen defines a clinical syndrome characterized by abdominal pain of sudden onset developed over a period several hours requiring surgical or medical treatment (Das S 2000).<sup>1</sup> Acute abdomen comprises 5-10 % of people presenting as a general surgical emergency (White M.J. et al 2002).<sup>2</sup> An early and accurate diagnosis is essential for prompt and appropriate management in order to limit morbidity and mortality. Moreover identification of surgical problems is utmost importance, as most patients of acute abdomen do not require surgery. A thorough history followed by meticulous clinical examination are no doubt cornerstone of efficient patient management. However diagnosis based on clinical evaluation alone has been accurate in only 65% of cases (Staniland J.R et al1972)<sup>3</sup> and is often associated with delay in diagnosis and treatment and unnecessary laparotomies are done due to considerable overlap of symptoms and signs of various disease entities causing acute abdomen (Schwerk et al,1989).<sup>4</sup>

The purpose of laboratory tests and radiological examination is to confirm and/ or exclude diagnostic possibilities that are being considered based on a proper history and physical examination. The main goal of imaging in acute abdomen is to narrow down the differential diagnosis and for prompt treatment.

In the past plain film radiograph of abdomen were performed. Plain film radiograph is diagnostic in only about 10% of cases and therefore being discouraged (Shaffer HA Jr,1992 and Anyanwu et al 1998).<sup>5-6</sup> Scout film of abdomen

is an overused. USG has been advantage of being non-invasive, portable, cheap and no side effects.

The present study has been carried out to explore various aspects related to acute abdomen with special reference to role of Scout X-ray abdomen and ultrasonography.

The present study was conducted with the aim to know the incidence of acute abdomen, usefulness of X-Ray and USG in diagnosing the cases presenting with acute abdomen.

## MATERIAL AND METHODS

The present study was conoducted in the Department of surgery and Experimental Surgery, S.S Medical College and Associated G.M. and S.G.M Hospitals, Rewa (M.P.). 1138 patients were admitted with acute abdomen over a period of one year in surgery department. All the patients with acute abdomen were included in the study. All the patient with acute abdomen admitted in Department of Surgery with acute abdomen formed part of study.

Patients with abdominal trauma, obstructed hernia and malignancy were excluded from the study.

Patients were subjected to routine haematological, urine examination and biochemical estimations. Patients were subjected to scout Xray abdomen in standing position. Patients with dielemma of diagnosis with inconstant results of xray abdomen were subjected to ultrasonography.

All patients were managed according to clinical diagnosis on admission or its correction or confirmation after xray abdomen and USG. Patients were either conservatively managed or were subjected to surgical intervention depending on the involvement of the system. Patients were discharged and followed up as OPD.

## STATISTICAL ANALYSIS

All the data was put in microsoft excel sheet to generate tables. Discriptive statistics was used to infer results.

## RESULTS

In this study there were total 4225 admissions in the hospital. Total emergency admissions were 2714 and out of which 1138 were patients of acute abdomen.

In this study 1138 patients of acute abdomen were studied over a period of one year. The following observations were made.

Incidence of acute abdomen cases was 26.93% if total ad-

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<b>Total no of admission=4225</b>	<b>Incidence of acute abdomen cases</b>
Acute abdomen cases=1138	1138/4225x 100=26.93%
Total no emergency admissions=2714	1138/2714x100=41.93%

**Table-1:** Incidence of Acute abdomen

Sr no	Residence	No of cases	Percentage
1	Rural	876	76.97
2	Urban	262	23.02
		1138	100

**Table-2:** Distribution of cases according to residence

S No	System	No of cases	percentage
1	Gastrointestinal tract	911	80.05%
2	Genitourinary	159	13.97%
3	Miscellaneous	68	5.97%
Total		1138	100%

**Table-3:** System wise distribution of acute abdomen cases

S No	Disease group	No of X rays	X-Ray Abdomen (positive)	Percentage
1	Perforation Peritonitis	60	60	100%
2	Intestinal obstruction	27	26	96.29%
3	Cholecystitis	22	-	-
4	Appendicitis	19	-	-
5	Abscess	9	5	55.55
6	Renal/ureteric stone	9	2	22.22%
7	Appendicular lump	7	7	100%
8	APD	6	-	-
9	COLITIS	3	2	66.66%
10	Pancreatitis	1	-	-
11	Twisted ovarian cyst	1	-	-
12	Hepatitis	1	1	100%
13	Perisplenitis	1	1	100%
	Total	166	112	67.46%

**Table-4:** Role of Scout X RAY In Acute Abdomen

S No	Clinical diagnosis	No of cases	Post X-Ray Diagnosis
1	Acute intestinal obstruction	1	Perforation peritonitis
2	Colitis	1	Perforation peritonitis
3	Pelvic abscess	1	Perforation peritonitis

**Table-5:** Conditions where X-Ray was Uniquely Diagnostic:

missions taken into consideration. If only emergency admissions were considered then the incidence of acute abdomen was 41.93%.

According to place of residence 76.97% patients were from rural background (table-2).

As shown in table 3 gastrointestinal system accounts for 80.05% cases of acute abdomen.

X-Ray was 100% diagnostic in cases of perforation peritonitis. Intestinal obstruction was diagnosed in 96.29% cases (table-4).

It is evident from the table -5 that out of 166 Xrays done

S No	Disease group	No of USG	USG Abdomen	
			Positive	%
1	Cholecystitis	25	24	96%
2	Appendicitis	16	-	-
3	Perforation peritonitis	13	11	84.61%
4	abscess	11	8	72-72%
5	Renal/ureteric stone	6	5	83.33%
6	Appendicular lump	5	2	40%
7	Intestinal obstruction	4	2	50%
8	APD	4	-	-
9	Colitis	2	-	-
10	pancreatitis	2	1	-
11	Perisplenitis	2	-	-
12	Twisted ovarian cyst	1	1	100%
13	Hepatitis	1	-	-
Total		92	54	58.69%

**Table-6:** Role of USG in Diagnosis of Acute Abdomen Table 6 Role of USG in Diagnosis of Acute Abdomen

3 (1.80%) were uniquely diagnostic i.e. they all showed gas under diaphragm (perforation) when it was not suspected clinically.

It is evident from the table -5 that out of 166 Xrays done 3 (1.80%) were uniquely diagnostic i.e. they all showed gas under diaphragm (perforation) when it was not suspected clinically.

USG was able to diagnose 96% cases of cholecystitis. intestinal obstruction was diagnosed only in 50 % of cases with USG (table-6).

It is evident from the table-7 that out of 92 USG abdomen done, 14 (15.21%) were uniquely diagnostic i.e. showed a diagnosis other than first clinical diagnosis.

## DISCUSSION

The acute abdomen remains a challenge to surgeons and other Physicians. Abdominal pain is most common cause for hospital admissions in most parts of the world. An early diagnosis of the underlying cause is of great value for prompt selection of appropriate management, surgical or conservative, thereby reducing the morbidity and mortality on one hand and unnecessary laparotomy on other.

Acute abdominal pain represents 5 to 10 % of all emergency department visits. The present study shows that acute abdomen were 26.93% of all admissions in a year in surgical ward. The percentage is comparable to percentages given by Kumar A (1996)<sup>7</sup> and more than that of Pal D.K. (1992).<sup>8</sup> The present study showed that acute abdomen was responsible for 41.93% of all emergency admissions. This percentage is significantly higher than percentage observed in western studies (Brewer R J et al, 1976)<sup>9</sup> and White M J et al, 2002.<sup>10</sup>

Studies are available that have compared the role of USG and abdominal X-RAY in acute abdomen (Simeone J F et al, 1985 and Walsh P F et al 1990).<sup>11-12</sup> Walsh et al, while evaluating

Sr No	Pre USG Diagnosis	No of cases	Post USG diagnosis
1	Appendicular lump	3	Appendicular abscess-2 Twisted ovarian cyst-1
2	Perforation peritonitis	2	Appendicular abscess -1 Liver abscess-1
3	appendicitis	2	Appendicular abscess -1 Pelvic abscess -1
4	Liver abscess	2	Hydatid cyst-1 Pelvic abscess-1
5	Renal/ ureteric stone	1	Twisted ovarian cyst -1
6	cholecystitis	1	Renal cortical cyst -1
7	Pyelonephrosis	1	Small intestine mass-1
8	hepatitis	1	Carcinoma head pancreas-1
9	persplenitis	1	Hematoma spleen-1

**Table-7:** Conditions where USG was Uniquely Diagnostic

the role of immediate USG in acute abdomen showed that USG was more informative than plain X-Ray in 40% of their cases. Simeone et al shown that while plain films scored over USG in 5% cases only. In our study 78 cases both USG and X-Ray was done. In 41 (52.56%) cases USG was found superior than X-RAY. IN 19 (24.35%) cases X-ray was found more useful than USG. While both investigations were of equal value in 14 (17.04%) cases.

Overall plain film of abdomen was abnormal in 112 patients out of 166 X-Ray films carried out in 181 patients of acute abdomen. USG abdomen was abnormal in 68 cases out of 92 cases of acute abdomen where USG was performed. USG confirmed the clinically suspected diagnosis in 54 (58.69%) cases and in 14 cases (15.2%) it changed the clinical diagnosis.

All acute abdomen are not life threatening but needs critical analysis and correlation of symptom complex and signs in the patients so that therapy may be initiated for relief of pain and subsequent investigations should be carried out for continuation of conservative treatment or if required surgical intervention at the early opportunity. As a practical investigation can be planned on the basis of availability and cost effectiveness to achieve the goal to help all patients.

## CONCLUSION

Acute abdomen is the most common presentation in emergency surgical cases. Definite diagnosis is very important. For correct diagnosis X-Ray and USG plays an important role. Perforation peritonitis can be diagnosed with simple x-ray abdomen erect posture. Appendicular abscess and twisted ovarian cyst can be diagnosed with USG. In this study we had shown that a simple X-Ray And USG plays important role in diagnosis so that unnecessary laparotomies can be avoided.

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# A Rare Case of Childhood Progressive Myoclonic Epilepsy

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## ABSTRACT

**Introduction:** Progressive myoclonic epilepsies are characterized by myoclonus, tonic clonic seizures, progressive neurological deterioration, cerebellar signs and dementia. We reported a case of adolescent child with an exceedingly rare disorder.

**Case Report:** A child presented in our ward with dementia and severe myoclonus with all cerebellar signs. Child was on antiepileptics but no improvement showed in past. Our treatment reduced the myoclonus and improvement in speech and walking.

**Conclusion:** Progressive myoclonic epilepsy is very debilitating in nature with mostly poor outcome with progressive dementia and myoclonus with fatality at an early age.

**Keywords:** Myoclonus, Progressive, Genetic, Cerebellar Signs

## INTRODUCTION

The approach to a child with progressive myoclonic epilepsy is a vast and challenging task as the establishment of differential diagnosis is very complicated and is a cause of concern for both the parents and the physician.<sup>1,2</sup> Not only can the symptoms be debilitating but also development of myoclonus may be the harbinger of lifelong disability and can be fatal. Progressive myoclonic epilepsies are a group of symptomatic generalized epilepsies caused by rare disorders. Most of these disorders have a genetic component, a debilitating course and a poor outcome. Progressive myoclonic epilepsies are characterized by myoclonus, tonic clonic seizures, progressive neurological deterioration, cerebellar signs and dementia. Certain specific disorders comprise the most common causes of progressive myoclonic epilepsy:

- 1) Unverricht-Lundborg disease (Baltic myoclonus)
- 2) Myoclonic epilepsy with ragged red fibres (MERRF syndrome)
- 3) Lafora disease
- 4) Neuronal ceroid lipofuscinosis
- 5) Type I sialidosis.

Less common causes amongst specific disorders include dentato-rubro-pallido-luysian atrophy (DRPLA), the noninfantile neuronopathic form of Gaucher disease, and atypical inclusion body disease. PME has also been reported in Niemann-Pick disease type C. Most of the cases have been described from South India.

## CASE REPORT

A 12 year old female child who was conscious and oriented, presented to OPD with myoclonic jerks. Clinical history revealed difficulty in walking for last 2 years, history of frequent falls for 1 and a half year and difficulty in speech for last 1 year. On clinical examination the patient had frequent myoclonic jerks with slurring of speech and presence of cer-

ebellar signs. Myoclonic jerks were initially 5-6 episodes per day which at the time of examination were every 5-10 minutes. There was history of frequent falls 1-2 per day but presently the patient could not even stand without support due to frequent myoclonic jerks. Speech was non rhythmic with scanning present but understanding was normal. There was h/o abnormal movements of generalized tonic clonic in nature in the past six months. On examination Tone was decreased in all four limbs and generalized wasting of muscles was seen. Power was 4/5 in all limbs, all the jerks were exaggerated with pendular jerks and knee clonus present. Sensory system was normal. All the cerebellar signs were present and coordination not present. Rest of the CNS examination was normal. All other systemic examination was normal. CSF examination was normal with sepsis screen clear. MRI (Figure-1) was normal but EEG (Figure - 2) showed generalized polyspike wave and high voltage spike and wave discharges reaching anteriorly.

## Treatment outline at admission

Child was managed conservatively. Antiepileptic drugs such as sodium valproate, clonazepam, levetiracetam were given to the child. Physiotherapy as well as genetic counseling was provided to the patient. Patient showed gradual improvement and decreased frequency of myoclonic jerks on discharge and follow up.

## DISCUSSION

Unverricht-Lundborg disease (ULD), or epilepsy progressive myoclonus type 1, is an autosomal-recessive disorder that was described by Unverricht in 1891<sup>2</sup>, and by Lundborg in 1903<sup>3</sup> It is one of the most common cause of PME. The age of symptom onset in ULD is 6–15<sup>6</sup> years. Symptoms progress insidiously. Stimulus-sensitive myoclonic jerks are an essential feature for the diagnosis of the disease and are the first symptom in half the cases of ULD. Its incidence is 1 in 20,000 births.<sup>4</sup> It is linked to chromosome 21q22.3. Further linkage disequilibrium and historical recombination breakpoint mapping placed the associated gene as *CSTB*. The main mutation is in *CSTB* gene. The exact pathophysiology of the disease remains unknown. *CSTB* encodes cystatin B, a cysteine protease inhibitor. Presumably, with mutations in cystatin B and loss of inhibition of cysteine proteases, apop-

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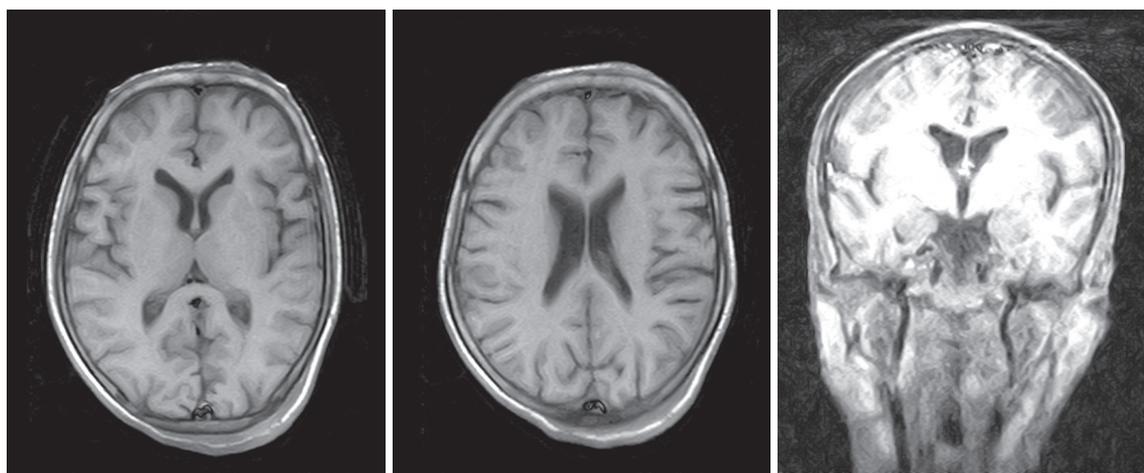


Figure-1: MRI of the patient

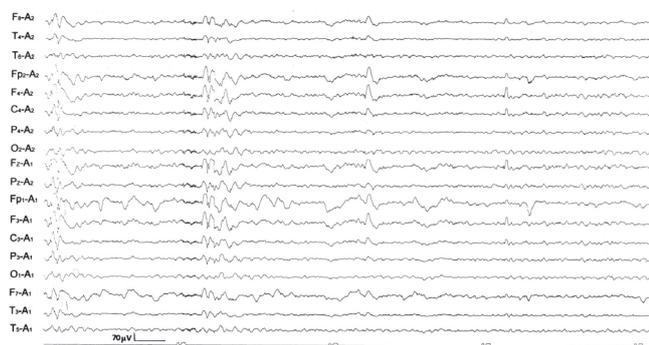


Figure-2: EEG of the patient

tosis proceeds abnormally and neurodegeneration develops. A multiprotein complex has been identified to interact with cystatin B in vitro. Immunofluorescent on focal microscopy showed that the same proteins are present in the granule cells of the developing cerebellum and the purkinje cells of adult rat cerebellum, which raises the possibility that a cystatin B multiprotein complex may have a specific cerebellar function.<sup>9</sup> For diagnosis, clinical suspicion is mainstay. There is no definitive cure for the disease. Management is symptomatic with antiepileptic drugs and physiotherapy.

## CONCLUSION

Based on history, relatively preserved cognition and vision, clinical examination and laboratory findings we came to the diagnosis of Unverricht-Lundborg Disease (ULD). ULD is one of the most common cause of PME (Progressive Myoclonic Epilepsy). Prevalance is 1 in 20,000. Age of onset is between 6 to 15 years. Stimulus sensitive myoclonic jerks are characteristic of this disease. Patient usually has ataxia, incoordination, intention tremor and dysarthria, but normal cognition.

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# Dentigerous Cyst with Unerupted Teeth in Bilateral Maxilla with Oro Antral Fistula with DM Type I: A Case Report and Review of Literature

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## ABSTRACT

**Introduction:** Dentigerous cyst is an odontogenic cysts that is developmental in origin and lined by epithelium. It arises from the crown part of unerupted, partially erupted or impacted tooth. Mandibular involvement is more common than maxilla. In mandible, third molar is commonly involved; while in maxilla, canine involvement is common. Its association with ectopic teeth in the maxillary sinus is rarely seen.

**Case report:** In the present paper, we report a case of dentigerous cysts with facial cellulitis as well as Diabetes Mellitus type-1 associated with unerupted tooth in the bilateral maxillary sinus. Also, pathogenesis of ectopic tooth, role of advanced imaging, differential diagnosis, and management are discussed.

**Conclusion:** Ectopic teeth in the maxillary sinus bilaterally in association with a dentigerous cyst is a rare finding. It is well diagnosed by x-ray and CT scan. The best surgical approach is surgical enucleation combined with extraction of unerupted teeth by Caldwell luc's operation.

**Keywords:** Dentigerous cyst, ectopic tooth, maxillary sinus, facial cellulitis.

## INTRODUCTION

The term "dentigerous cyst" was given by Paget in 1853. This is the most common type of developmental odontogenic cysts and mostly associated with the crowns of permanent teeth, rarely, with the crowns of deciduous tooth<sup>1</sup>, complex odontoma<sup>2</sup>, and supernumerary teeth.<sup>3</sup> 5-6% of all dentigerous cysts are associated with supernumerary teeth and about 90% of them are associated with a maxillary mesiodens.<sup>3</sup> The most reasonable explanation to its pathogenesis appears to be that the accumulation of fluid between the unerupted tooth and the surrounding reduced enamel epithelium leads to formation of the cyst. About 70% of dentigerous cysts occur in the mandible involving third molar while 30% of them present in the maxilla, most commonly involving canine teeth.<sup>4</sup> Male to female ratio is 2:1. The dentigerous cyst is usually single and rarely multiple or bilateral cysts have been reported in basal cell nevus syndrome, mucopolysaccharidosis (Type 4), Cleidocranial Dysplasia or in a non-syndromic patient.

The dentigerous cyst associated with ectopic teeth in the maxillary sinus is a rare entity, and very few cases have been reported in the literature.<sup>5</sup> We report a case of dentigerous cysts with unerupted teeth in the bilateral maxilla with oro antral fistula as well as Type-1 Diabetes Mellitus.

## CASE REPORT

A 23-year-old male reported with the chief complain of fa-

cial swelling on left side (Figure 1) for 10 days, as well as pus discharging painful oro antral fistula for 3days. Past history revealed that he was having recurrent facial swelling for last 3 years, for that he took treatment. He was having type 1 Diabetes Mellitus. On physical examination, he was having tender facial swelling, soft to firm in consistency. On oral cavity examination, pus discharging fistula was present in upper gingivo-buccal sulcus. On aspiration of the swelling, it yielded turbid yellow colour fluid. The patient's blood sugar was 312gm/dl. Orthopantomogram showed a thinned lined cystic lesion which contained two teeth on Left side while on Right side a small cystic lesion with tooth was present. (Figure 2) CT scan of patient confirmed the findings of OPG. It showed the expansile cystic lesion pushing the floor and lateral wall of nose, eroding floor of maxillary sinus bilaterally; involving maxillary sinus lumen and reaching upto floor of orbit on Left side.(Figure 3) The patients was kept on conservative treatment. Insulin was started to control the blood sugar for 3 days then he was taken for surgical enucleation combined with extraction of teeth by the Caldwell-Luc procedure.(Figure 4)

## DISCUSSION

Dentigerous cysts is usually painless and silent until they have enlarged sufficiently to produce expansion of the jaw. It affects commonly white men of third to fourth decade.

The diagnosis of a dentigerous cyst can be made on clinical and radiological examination as well as FNAC. The majorities of small size cysts usually discovered accidentally on routine radiological examination(OPG or Xray). Radiologically dentigerous cyst simulates other jaw cysts as most of them present as well- circumscribed, radiolucent lesions. Computerized Tomography (CT) with a dental CT software program is highly useful for the imaging and management of teeth in the maxillary sinus. Routine CT imaging is debatable and reserved for large lesions to know extension to maxilla, nasal cavity, orbital, or/and pterygomaxillary space.<sup>6</sup> In our case, orthopantomogram showed a thinned lined cystic le-

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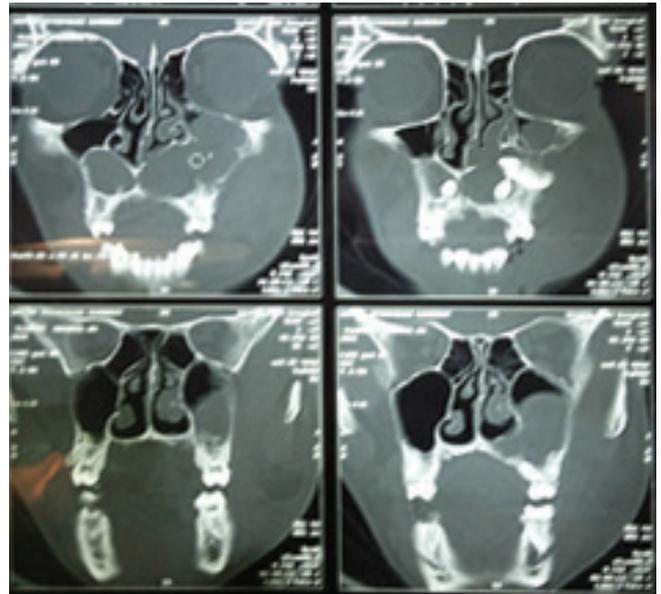
**Figure-1:** Pt's left side facial swelling



**Figure-2:** Panoramic radiograph shows bilateral well-defined radiolucencies, Left side cyst wall with fluid along with two unerupted teeth inside the cyst & Right side fluid containing cyst along with unerupted tooth.

sion which contained two teeth on Left side while on Right side a small cystic lesion along with tooth was present. CT scan of patient showed expansile cystic lesion pushing the floor and lateral wall of nose, eroding floor of maxillary sinus bilaterally; involving maxillary sinus lumen and reaching upto floor of orbit on Left side.

Preferred treatment for dentigerous cysts is surgery, in the form of enucleation or marsupialisation. The prognosis is excellent after the enucleation of the cyst and extraction of the unerupted tooth. The recurrence is rarely observed after a complete removal.<sup>7</sup> It is believed that, the decision whether to enucleate or marsupialise the cyst, depends on various patient factors. Enucleation will alter the normal tooth development while marsupialisation reduces the cyst cavity and preserves the involved tooth in the cyst. Marsupialisation assisted natural eruption of the impacted tooth in the dentigerous cyst is found in 72.4% of subjects. Based on that, it is concluded that marsupialisation promotes the natural eruption of a cyst-associated tooth and thus preferred in the paediatric population. In adult, the impacted teeth normally have only few chances to erupt; therefore enucleation is advised.<sup>8</sup> Marsupialisation of the large maxillary sinus cyst will consequently create an oroantral fistula, so in these cases surgical enucleation combined with the Caldwell-Luc approach fol-



**Figure-3:** Coronal CT image shows fluid contain cyst present in left maxillary sinus & floor of nose along with anterior wall of maxillary sinus erosion. On right side teeth containing cyst present floor of maxillary sinus.



**Figure-4:** Bilateral Caldwell Luc operation performed

lowed by primary closure is recommended.<sup>9</sup> Since its introduction, the Caldwell-Luc procedure has become a standard approach for the management of conditions where the wide anterior opening provided by this procedure might prove to be beneficial, such as antral diseases as well as an operative route to reach such sites as the pterygomaxillary space, orbit, ethmoid labyrinth and medial skull base. However the advancements in the field of antibiotic therapy and endoscopic sinus surgery have limited the indications for this operation.

It has also been reported not necessary to perform Inferior Meatal Antrostomy (IMA) for Caldwell-Luc procedure for odontogenic pathology, moreover it closes within 3 months after the operation in 82% of 367 cases.<sup>10</sup>

In our case we performed a surgical enucleation with extraction of teeth by the Caldwell-Luc procedure as it provided maximal exposure for the removal of the tooth with large dentigerous cyst that was located laterally and on floor of maxillary sinus and nose. Post operative period was une-

ventful. On follow-up the operative site healed well and the patient is asymptomatic.

## CONCLUSION

In conclusion, occurrence of an ectopic tooth in the maxillary sinus in association with a dentigerous cyst is a rare phenomenon. Its presence may be asymptomatic initially with clinical manifestations later because of involvement of adjacent structures. Conventional radiographs are sufficient for the diagnosis, but CT Scan PNS provides additional information about the size and extension of the cyst along with position of the teeth.

Surgical enucleation combined with extraction of unerupted teeth by Caldwell luc's operation is the mainstay to remove the dentigerous cyst.

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# High Morbidity among Urban Adolescent Females: A Cause For Concern

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## ABSTRACT

**Introduction:** In our country, there are an estimated 200 million adolescents, comprising one-fifth of the total population. Adolescent's problems constitute a bulk of morbidities, which are unrecognized and uncared iceberg of disease burden. Aim and objectives of the present study was planned to find out the health profile of urban adolescent girls and the associated social correlates and other contributory factors in a city of Western Uttar Pradesh.

**Material and methods:** For calculating the sample size, the prevalence of anaemia was considered as the most common health problem in adolescent girls and therefore used for calculating the sample size. With a relative precision of 10%, and prevalence of anaemia as 50% the sample size was 384. In order to have an effective coverage of the sample, the whole area was divided into nine colonies. A house to house survey was done in each colony till 40-45 adolescent girls were covered from that area, so as to cover the desired sample. During home visits, demographic profile of the family was taken along with the interview and examination of adolescent girls aged 10-19 years.

**Results:** 63.7% girls were found to be having one or the other morbid conditions. Maximum girls (77.3%) were having morbidity related to blood and blood forming organs. Overall prevalence of anaemia was 62.2% in adolescent girls. Significant relation of morbidity in girls with caste, socio-economic status, diet and housing conditions was seen.

**Keywords:** Adolescent, morbidity, anaemia, socio-demographic factors, health profile

## INTRODUCTION

Today, 84% of the world's adolescents live in the developing world. In our country, there are an estimated 200 million adolescents, comprising one-fifth of the total population.<sup>1</sup> There is a lot of upheaval and restructuring during adolescence, both physical and psychological, which make health problems in this period unique. Of the physical illnesses, the most common are recurrent respiratory infections, asthma, obesity, underweight, malnutrition, anaemia, rheumatic heart disease, injuries, poisoning, gynaecological problems, skin diseases etc. Of the psychosocial illnesses so characteristic of this age, school avoidance and failure, depression, substance abuse, juvenile delinquency and suicide are prominent. Adolescent's problems constitute a bulk of morbidities, which are unrecognized and uncared iceberg of disease burden. A large variety of morbidities among adolescents are related with nutritional deficiency disorders (stunting, wasting), menstrual disorders, RTI/STI/HIV/AIDS etc. Moreover, the complex psychosocial morbidities and high risk behaviour of adolescents have been recognized as a threat to survival, growth and development.<sup>2</sup> In general, adolescent girls are the

worst sufferers of the ravages of various forms of malnutrition viz. protein energy malnutrition, iron, iodine, calcium, vitamin A and other specific nutrient deficiencies because of their increased nutritional needs and low social power.<sup>3</sup>

Though age at marriage is increasing in India, data from NFHS-3 (National Family Health Survey 3) shows that 27% young women and 3% young men in the age group of 15-19 year were married at the time of the survey (2005-06). 30% women in the age group of 15-19 years have had a live birth by the age of 19 years. 7% married and 9% unmarried girls reported current use of modern contraceptive methods. Majority of adolescents still do not have access to information and education on sexuality, reproduction, and sexual and reproductive health and rights, nor do they have access to preventive and curative services.<sup>4</sup>

The present study is an attempt to assess the extent of adolescent health problems especially among urban girls. The present study was planned to find out the health profile of urban adolescent girls and the associated social correlates and other contributory factors in western Uttar Pradesh.

## MATERIAL AND METHODS

The present cross sectional study was carried out in an urban population of western Uttar Pradesh with an objective to study the health profile of adolescent girls in relation with the various socio-demographic and other contributory factors. For calculating the sample size, the prevalence of anaemia was considered as the most common health problem in adolescent girls and therefore used for calculating the sample size. With a relative precision of 10%, and prevalence of anaemia as 50% the sample size was 384.

Multi stage sampling technique was used. In order to have an effective coverage of the sample, the whole area was first divided into nine colonies. In the second stage, 40-45 adolescent girls were randomly covered by a house to house survey in each colony, so as to cover the desired sample. During home visits, demographic profile of the family was taken along with the interview and examination of adolescent girls aged 10-19 years. Each adolescent girl of the family was interviewed using oral questionnaire method. If any

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of the adolescent girl in the family was absent or hostile, during the time of study, the girl in the next family was interviewed. For proper response the heads of the families were explained in detail the purpose of the study. A detailed information was collected on a pre-designed and pretested questionnaire about socio-demographic characteristics and other contributory factors responsible for health, supplemented by physical examination. Haemoglobin estimation by Sahli's Haemoglobinometer was done only for those girls who gave their consent for it.

**Terms used in the study**

**Adolescent Girl:** Girls between the ages of 10-19 years (WHO)<sup>2</sup>

**Morbidity:** Different morbidities were classified according to ICD-10 classification.<sup>5</sup>

**Haemoglobin Estimation:** Haemoglobin estimation was done by Sahli's haemoglobinometer. Cut off level of Hb (g/dl) for anaemia in adolescent girls was taken as follows:<sup>6</sup>

- Non Pregnant : Hb <12g/dl
- Pregnant : Hb <11g/dl

**Grades of anaemia**

Anaemia was graded as mild, moderate and severe<sup>7</sup>

Grade	Hb concentration (g/dl)
Mild anaemia	10-below the cut off level
Moderate anaemia	7-<10
Severe anaemia	<7

**Social Class:** Modified Kuppuswamy classification<sup>8,9</sup> was used.

**Dietary Habits:** Dietary habits were classified arbitrarily into-

Vegetarian – a person who never ate animal products other than dairy milk products.

Non-vegetarian – a person who ate animal products other than dairy milk products atleast once in a while.

The housing and environmental sanitation criteria was taken as given by Garg et al.<sup>10</sup>

**STATISTICAL ANALYSIS**

The data thus collected, was descriptively analyzed and statistically evaluated using Epi-info and SPSS software.

**RESULTS**

In the present study, 63.7% adolescent girls were found to be suffering with one or more morbid conditions accounting for the sickness rate of 63.7% girls as shown in Table-1.

Table-2 shows the distribution of various types of morbidities in adolescent girls. A total of 382 morbidities were found to be present in 256 sick girls accounting for 1.49 morbidities per sick girl. Maximum girls (77.3%) were having morbidity related to blood and blood forming organs followed by psychological morbidities (20.3%) and infective and parasitic (10.9%) diseases.

Out of the total 402 girls, haemoglobin estimation could be done only in 318 girls. In all, 198 (62.2%) girls were found to be anaemic. The proportion of mild and moderate anaemia was 74.7% and 25.3% respectively as shown in Table-3. No girl was found to be having severe anaemia.

Table-4 depicts the relationship of morbidity among female adolescents with various socio-demographic factors like caste, socio-economic status, diet and housing and environ-

Sickness	No.	Percentage
Present	256	63.7
Absent	146	36.3
Total	402	100.0

**Table-1:** Distribution of girls according to sickness

Code I.C.D.	Diseases	Number	%
A00-B99	Infective and parasitic	28	10.9
D50-D89	Blood forming organs	198	77.3
E00-E90	Endocrine and Nutritional	7	2.7
F00-F99	Mental disorders	5	1.3
G00-G99	Nervous system	10	1.9
H00-H59	Eye	22	8.5
H60-H95	Ear	7	2.7
J00-J99	Respiratory	13	5.1
K00-K93	Digestive	28	10.9
L00-L99	Skin and subcutaneous tissue	9	3.5
Q00-Q99	Congenital	3	1.2
R00-R99	Psychological	52	20.3
Base		256	

**Table-2:** Distribution of girls according to various morbidities (Multiple response)

Grades (g/dl)	No.	Percentage	Prevalence (%)
Mild Anaemia (10-cut off)	148	74.7	46.5
Moderate anaemia (7- <10)	50	25.3	15.7
Severe anaemia (<7)	0	0.0	0.0
Total	198	100.0	62.2

**Table-3:** Prevalence of Anaemia in adolescent girls

Socio-demographic characters	No. (n=402)	Morbidity (No.and %)	P value
<b>Caste</b>			
General	265	148(55.8)	
OBC	111	90(81.8)	
SC	26	18(69.2)	P<0.001
<b>SES</b>			
Upper	12	8(66.6)	
Upper Middle	203	105(51.8)	
Lower Middle	110	78(70.9)	P<0.001
Upper Lower	75	63(84.0)	
Lower	2	2(100)	
<b>Diet</b>			
Vegetarian	215	116(53.9)	
Non-vegetarian	187	140(74.8)	P<0.001
<b>Housing and environmental status</b>			
Poor	63	51(80.9)	
Satisfactory	219	142(64.8)	
Good	120	63(52.5)	P<0.001

**Table-4:** Distribution of morbidity according to different socio-demographic factors

mental status. The morbidity was found to be significantly associated with the caste, being maximum in the OBCs, lower socio-economic status, non-vegetarian diet and poor housing and environmental status. ( $P < 0.001$ ).

## DISCUSSION

In the present study, 63.7% girls were found to be having one or the other morbid conditions which is lower than the study conducted by Srinivasan et al (2006)<sup>11</sup> in Tirupati town of Andhra Pradesh which revealed 94.5% of girls having one or more morbid conditions. In another study by Basu et al<sup>12</sup> only 13.6% girls were without any health problems and 86.4% had one or more health problems. In the present study maximum girls (77.3%) were having morbidity related to blood and blood forming organs (nutritional anaemia) followed by psychological morbidities (20.3%), infective and parasitic (10.9%), digestive (10.9%), eye related (8.5%), ear related (2.7%), respiratory (5.1%) and skin related (3.5%) whereas Anita et al (2003)<sup>13</sup> in Rohtak reported anaemia (55.5%), dysmenorrhoea (43%), dental caries (37.2%), pediculosis (31%), menorrhagia (21%), URTI (17.5%), vaginal discharge (16%), refractory errors (13.4%) and acne (11%). In a study by Susmitha KM et al<sup>14</sup> in Nellore the leading causes of morbidity were pediculosis (83.2%), pallor (41%), dysmenorrhoea (43.6%), dental caries (28%), skin diseases (26.4%), vitamin deficiency (21.5%), passing worms in stools (13.2%) and defective vision (12%).

Singh et al (2006)<sup>15</sup> in Lucknow revealed inadequate oral hygiene (55.4%), pediculosis (39.2%), cold and cough (25.8%), lymphadenopathy (22.2%), scabies (16.2%), inflamed tonsils (7.8%), fever (7.5%) and ear discharge (7%) where as Srinivasan et al (2006)<sup>11</sup> reported pediculosis (87.5%), dental caries and skin disorders (50% each), worm infestation (18.3%), ENT disorders (17.5%), clinical anaemia (5.8%) and defective vision (4.7%).

In the present study overall prevalence of anaemia was 62.2% which is comparable to multicentric study recently completed in 3 regions of India (Mumbai, Gujarat and Delhi)<sup>5</sup> which showed anaemia prevalence as 62-65%, 57-65% and 48-50% respectively in adolescent girls but low as compared to 73.7% reported by Misra et al (1995).<sup>16</sup> Majority of anaemic girls in the present study were having mild anaemia 46.5% and 15.7% were having moderate anaemia.

Morbidity in the present study was maximum (81.8%) in OBC followed by Scheduled caste (69.2%) and least in General caste (55.8%) and this relation of morbidity with caste was statistically significant ( $P < 0.001$ ). The reason for high morbidity in lower caste could be due to lack of money, either due to poverty or due to more number of children in the family, lack of knowledge about child care practices, and poor personal hygiene. Similar result was seen in a study conducted in rural and urban schools of Lucknow by Sachan Beena et al<sup>17</sup> where adolescent girls belonging to general caste have less morbidity than other backward classes and scheduled caste, and this difference was statistically significant.

In the present study, the majority of girls belonged to Upper Middle and Lower Middle classes (77.9%) and the morbidity was maximum (84% and 100%) in upper lower and lower

class followed by lower middle (70.9%) and upper and upper middle class (66.6% and 51.8% respectively) and this difference in morbidity with social class was found to be significant ( $P < 0.001$ ). This may be because of better availability of high quality and nutritious food with better socio-economic status. Present study showed significant relationship of morbidity ( $P < 0.001$ ) in girls who were non vegetarian (74.8%) as compared to those who were vegetarian (53.9%). As no supportive literature could be traced hence further exploration is needed. In the present study morbidity was maximum (80.9%) with poor housing and environmental conditions and lowest (52.5%) with good housing and environment and this difference in morbidity with housing conditions was significant ( $P < 0.001$ ). Poor housing and environment is also associated with infections and infestations which in turn lead to nutritional deficiencies.

## Limitations of the study

Laboratory investigations for the different morbid conditions was not done except for Haemoglobin estimation in the field.

## CONCLUSION

Education of females is a driving force for better health. Health education programs on common diseases and hygiene should be carried out on a regular basis in schools in consultation with concern health authorities. Extensive basic health and nutrition education should be included in school curricula and all nutrition programmes. A significant association of morbidity with caste, SES, diet and housing conditions suggests a need to develop strategies for adult education and to improve the living standards of the population. Regular contacts with adolescents through school health programme and teachers training programme can be of much help.

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# A Study of Etiological Clinical Biochemical and Radiological Profile of Patient with Acute Pancreatitis with Reference of Out Come in Government General Hospital, GMC, Guntur

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## ABSTRACT

**Introduction:** Pancreatitis continues to stir up controversy. The etiology, clinical profile, complications and response to therapy may be different in different parts of the world. The objective of this study was to evaluate the incidence, causative factors, investigations and complications in patients presenting to medical departments of Guntur Govt hospital, Guntur in 50 patients.

**Material and methods:** Fifty patients meeting the inclusion criteria who presented between January 2014 and December 2014 to the medical departments at GGH, Guntur were studied. Detailed history was taken and physical examination performed and investigated.

**Results:** Out of the 50 patients included, 43 were males and 7 were females. The incidence of pancreatitis was found to be 1.98/1000/year. 74% of patients had pain predominantly in the epigastric region which was relieved in the majority (73.5%) by sitting forward with knees flexed against the chest. 45 (90%) patients had elevated serum amylase. 80% of patients had alcohol as the main etiological factor. USG was 80-90% sensitive in detecting Acute pancreatitis. Complications were present in 30 (60%) out of 50 patients and Pseudocyst was present in 23% of patients.

**Conclusion:** We observed that among the study group most of the patients were suffering from acute pancreatitis. Most common in males. All the patients were presented with pain abdomen and most of them had it in the epigastrium and commonest site for radiation is to the back. Alcohol is the main etiological factor. USG was 80-90% sensitive in detecting Acute pancreatitis. Pseudocyst is the commonest complication in patients with Acute pancreatitis. Prognosis was good.

**Keywords** Pancreatitis; Incidence; Alcohol; Ultrasonography; Serum amylase; Complications.

## INTRODUCTION

Pancreatitis, which is most generally described as any inflammation of the pancreas, is a serious condition that manifests in either acute, chronic or acute on chronic forms leading to abdominal pain.<sup>1-3</sup> Acute pancreatitis has a sudden onset and short duration, whereas chronic pancreatitis develops gradually and worsens over time, resulting in permanent organ damage. It may result in progressive destruction of the exocrine tissue and in some patients a loss of endocrine tissue as well. However owing to the tremendous reserve of pancreatic function, insufficiency may be subclinical at least in the beginning of the disease.

The early diagnosis of pancreatitis and its complication is still difficult and natural history as well as the prognosis of the disease remains yet to be defined. The clinical profile, complications and response to therapy may be different in

different parts of the world and it is therefore important that experiences from different parts of the country be recorded. Hence this study is done to understand the various etiological factors, clinical features and complications occurring in this part of Guntur (south India).

Aims and objectives of the research were to study the various clinical presentations of Acute Pancreatitis in Government General Hospital, Guntur and to study the complications and outcome of Acute Pancreatitis.

## MATERIAL AND METHODS

The present study enrolled 50 patients who were diagnosed as Acute Pancreatitis based on inclusion and exclusion criteria from the patients attending medical and surgical departments of Guntur Govt Hospital. Study was conducted over a period of one year (January 2014 to December 2014).

### Method of Collection of Data

This is a prospective and observational study. Ethical clearance was obtained from the institutional Ethics Committee of Guntur Medical College. Informed consent was taken from the patients in their own language before collecting data.

The investigator sought the help of staff and head of the concerned departments (Medicine and Surgery) to conduct the study. All the patients both inpatients and outpatients were screened for pancreatitis during the period of one year were taken as denominator of the study. Meticulous records were maintained regarding clinical features, family history of pancreatitis, alcohol intake, dietary habits, stigmata of alcoholic liver diseases and by performing various<sup>4</sup> investigations like blood routines, serum amylase, serum LDH, serum calcium, liver function test and radiological investigations like plain X ray abdomen and abdominal ultrasonography.

Ultrasonography of abdomen was used for categorizing the patients into:

- Acute pancreatitis when the patient had hypoechogenic bulky pancreas.
- Chronic pancreatitis when they had ductal dilatations and calcifications.
- Acute on Chronic when they had both the features of

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Acute and Chronic pancreatitis.

### Inclusion Criteria

All patients (of all ages and sex) attending medical and surgical wards of Govt Hospital Guntur who have been diagnosed to have pancreatitis.

### Exclusion Criteria

- 1) All Abdominal conditions having similar clinical features other than pancreatitis.
- 2) All patients with post surgical or post traumatic pancreatitis.
- 3) Patients who refused to take part in the study.
- 4) Patients with carcinoma of pancreas.

The data collected in a specially designed proforma were processed and subjected to relevant statistical analysis.

### STATISTICAL ANALYSIS

Descriptive statistical procedure and evaluation were done to analyze results. Chi-square test was applied and p-values were determined. All the relevant statistical methods were carried out using SPSS (version 19.0) for Windows.

### RESULTS

This was a prospective study done at Govt General Hospital, Guntur among fifty patients from the Medical and surgical departments who met the inclusion criteria over a period of twelve months from January 2014 to December 2014 who were diagnosed of pancreatitis. This study presented here has revealed results which are as follows.

#### Age and sex distribution

The demographic profile of the study samples showed that maximum subjects belonged to the age group between 21-40 years (70%). Males (86%) were more than females (14%).

#### Etiological factors

Table 1 shows the number of Alcoholics present in the study subjects. 40 (80%) out of 50 subjects were alcoholic. 5 (10%) out of 50 subjects had Gall stones and 1 out of 50 subjects had hypertriglyceridemia. No obvious etiology was found in 4 (8%) out of 50 subjects.

Table 2 shows that 15 (28%) out of 50 subjects had 3 times elevation of serum amylase and 30 (60%) out of 50 had 5 times elevation of amylase. 5 subjects (12%) shows no elevation.

Table 3 shows that USG was 80-90% sensitive in detecting Acute Pancreatitis.

Table 4 enlighten the distribution of complications in Acute Pancreatitis. 7 (23.1%) out of 30 subjects develop pseudocyst. 5 (16.5%) out of 30 subjects develops hyperglycemia. 5 (16.5%) subjects shows necrosis in USG.

Table 5 depicts the Prognosis in the Patients with Acute Pancreatitis based on BISAP score (B: BUN>25mg%, I: impaired mental status, S: SIRS 2/4, A: age>60yrs, P: pleural effusion)

### DISCUSSION

Acute pancreatitis is an inflammatory disease of the pancreas. The etiology and pathogenesis of pancreatitis have been extensively investigated worldwide. The clinical profile, complications and response to therapy may be different in different parts of the world and it is therefore important that experiences from different geographical areas be discovered

Alcoholism	40	80%
Gall Stones	5	10%
Hypertriglyceridemia	1	2%
Idiopathic	4	8%

**Table-1:** Main Etiological Factors in Acute Pancreatitis

	No. of Cases	Percentage
>3x Normal	15	30%
>5x Normal	30	60%
Not Elevated	5	10%

**Table-2:** Pattern of amylase in acute pancreatitis

Total no of cases	Yes	No
50	40	10
100%	80%	20%

**Table-3:** Identification of pancreatitis based on usg

Necrosis	5	16.5%
Pseudocyst	7	23.1%
Ascites	3	9.9%
Thrombosis	2	6.6%
Pleural Effusion	2	6.6%
Hypotension	1	3.3%
Gastrointestinal Haemorrhage	2	6.6%
Azotemia	2	6.6%
Hyperglycemia	5	16.5%

**Table-4:** Distribution of complications in acute pancreatitis

BISAP Score	Total No. of Patients	Recovered
0	42	42
1-3	6	6
3-5	2	1

**Table-5:** Prognosis in patients with acute pancreatitis

and studied. Numerous etiopathological factors predisposing to pancreatitis have been identified, yet there is a need to further evaluate this entity which has significant morbidity and mortality.

Although advances in pancreatic function testing and imaging procedures have broadened our knowledge of pancreatitis, the early diagnosis of acute, chronic or acute on chronic pancreatitis and its complication is still difficult. Therefore this study was undertaken at Govt General Hospital Guntur, to study the clinical and etiological profile of pancreatitis.

Our study was unique in the way that the entire population covered was from a rural background. A total of 50 patients who presented during the period of 12 months (January 2014 to December 2014) were studied. An attempt has been made to compare this study with other studies on pancreatitis after adopting comparable standards of diagnosis and modification. Out of 25,200 patients screened for pancreatitis during the study period of one year in Medical and Surgical departments, fifty cases were diagnosed to have pancreatitis.<sup>5</sup>

In this study the age of patients range from 12 to 70 years and most of the patients were between 21-40 years of age. It is comparable to a study on 35 patients with chronic pancreatitis conducted by Lee MG et al where the age of the patients ranged from 21 to 67. It also correlate with another study

conducted by Wayne et al on recurrent pancreatitis, were the age at diagnosis ranged from 25 years to 39 years. The present study has shown that 86 % of the patients were males and only 14 % were females.

In this study abdominal pain was the presenting symptom in all the patients with acute pancreatitis. This correlates with a study conducted by Lee MG et al in which 30(86%) patients out of 35 cases had abdominal pain.

The site of abdominal pain may also vary in patients with pancreatitis. In our study 37(74%) patients had pain predominantly in the epigastrium, five (10 %) patient had pain in the left hypochondrium, three (6%) in the right hypochondrium and diffuse pain in five patients(10%). In 23 (67.6) patients there was history of radiation of pain to the back. 11(32.4%) patients experienced pain radiating to other areas. However, this does not correlate with a study conducted by Lankisch PG et al, where 68 % of patients had pain predominantly in the epigastric region, 32 % in the right hypochondrium, 50 % in the left hypochondrium and 25% in the hypogastric region.<sup>6</sup>

In this study, abdominal pain was relieved by sitting forward with knees flexed against the chest in 25 (73.5%) patients and one (2.9%) subject had relief of pain by squatting and clasping knee to the chest. The rest 8(23.5%) of the patients were relieved of their pain in other positions.

In acute pancreatitis, at the onset of the disease severe pain may limit the food intake. In chronic alcoholics qualitative malnutrition may also contribute to weight loss. In our study most of the patient's body mass index was between 18.5 to 24.9 kg/m<sup>2</sup>. This was comparable to a study conducted by Mentula P et al where the mean BMI was between 25.2 – 26.2 kg/ m<sup>2</sup>.<sup>7</sup>

In most of the countries, alcohol is the major etiologic factor in the development of Acute Pancreatitis. In the present study alcohol consumption was present in 40(80%) out of 50 acute pancreatitis. This was correlating with Lee MG et al who reported that 77% of the patients in their study were chronic alcoholics. Similarly, in a study conducted by Montalto G et al 62% were alcoholics. The study conducted by Shaheen MA (2007) in 760 patients of acute pancreatitis, the percentage of alcoholics was only 53%.<sup>8</sup>

Interestingly in our study, there were no patients with family history of pancreatitis. Serum amylase and lipase activities are elevated only during acute attacks of pancreatitis and not during asymptomatic intervals. In this study, 15(30%) out of 50 acute pancreatitis patients had more than 3 times elevation of serum amylase and 30 (60%) out of 50 acute pancreatitis patients had elevated serum amylase more than five times and 5 (10%) patients show no elevation of serum amylase.<sup>9</sup>

The sensitivity and specificity of ultrasonography and CT in patients with acute pancreatitis are in the range of about 80-90%. The present study revealed the evidence of pancreatitis by ultrasound in 40(80%) patients. In the present study, hyperglycaemia was present in 5(16.5%) out of 50 acute pancreatitis cases. This can be correlated with a study by Wakasugi H et al where 15% patients had diabetes mellitus.<sup>10</sup> Also a study by Lee MG et al revealed evidence of diabetes in 16 % of patients.

In this study 30(60%) out of 50 acute pancreatitis patient

had complications 7(23.1 %) patients developed pseudocyst in this study. This was comparable with the study by Lee MG et al in which 5 out of 35(14.2%) patients developed pseudocyst. The other complications noted were ascitis in 3(9.9%) and Necrosis in 5(16.5%), Thrombosis of vessels in 2(6.6%), pleural effusion in 2(6.6 %) patients hypotension in 1(3.3%), Gastrointestinal haemorrhage in 2(6.6%), Azotemia in 2(6.6%), hyperglycaemia in 5(16.5%), Purtscher's retinopathy in 1(3.3%).

In this study 42(84%) patients were recovered with out any complications. 6(12%) patients patients were recovered normally even with the development of Complications. 1(2%) patient died because of the development of complications

## CONCLUSION

In this study we concluded that most of the clinical observations was in accordance with other studies conducted earlier. Among the study pain was a predominant symptom in acute pancreatitis and most of them had it in the epigastric region. Alcohol is the major etiological factor in acute pancreatitis which is in accordance with the other studies. The present study revealed that USG was 80-90% sensitive in detecting acute pancreatitis. The most common complication observed in patients of acute pancreatitis was pseudocyst followed by necrosis and hyperglycaemia.

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# Comparison of ZN Stain (RNTCP) Versus Fluorescent Microscopy and Modification of Cold Stain to Detect Acid Fast Bacilli from Sputum Sample

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## ABSTRACT

**Introduction:** Microbiological diagnosis is the crux for the effective treatment of pulmonary TB (PTB). The search for rapid and efficient method has resulted in several modification of ZN stain. With this background this study was planned to compare the results of Revised National Tuberculosis Control Programme (RNTCP) advocated method of ZN stain with modified cold method using 7.5% phenol, 0.3% CF as recommended by WHO and IUATLD and 20% sulfuric acid as decolorizer. Objective of the research was to compare the results of ZN stain (RNTCP) with the modified cold method, Compare the results of ZN stain (RNTCP) with Fluorescent microscopy.

**Material and methods:** A prospective interventional study was carried using 266 sputum samples received at DMC. All the 266 samples were subjected to three methods- ZN stain modified cold stain and FM. They were compared for sensitivity and specificity in terms of qualitative results and grades of smear as recommended by RNTCP.

**Results:** The smear positivity rate was 27.65%, 24.90% and 27.44% in Ziehl-Neelsen stain, modified cold stain and fluorescent microscopy respectively. Compared to ZN stain the proposed modified cold method has sensitivity of 90.41% and specificity of 100%. The concordance of qualitative result between ZN and modified cold method was 97.34%. Comparison of RNTCP grades of smear with ZN and modified cold stain has Kappa with Linear Weighting as 0.877 and Kappa with Quadratic Weighting as 0.877.

**Conclusion:** Modified cold method cannot replace the ZN stain. However as it is economical and safe, can be adopted for training medical and paramedical students

**Keywords:** Acid fast bacilli, Fluorescent microscopy, *Mycobacterium tuberculosis*, Sputum smear, Ziehl-Neelsen stain

## INTRODUCTION

Tuberculosis is caused by *Mycobacterium tuberculosis* complex. It is the most common disease affecting the low socio-economic group in developing countries like India. World Health Organization (WHO) statistics as of 2011 estimates gives global incidence of 8.7 million cases, about 2.2 million from India. About 40% of Indian population is infected with tuberculosis.<sup>1</sup>

Tuberculosis commonly affects lungs but can also be extra-pulmonary. Hence microscopic examination of sputum for detection of Acid Fast Bacilli (AFB) is of utmost importance. Early detection can prevent further complication. As per WHO or Revised National Tuberculosis Control Programme (RNTCP), an individual with at least one sputum smear positive for AFB or culture positive for tubercle bacilli is labeled to be suffering from Pulmonary Tuberculosis (PTB).

In developing countries like India with deficit of resources compared to high TB burden, culture facility is not adequately available. Hence most of the TB cases are diagnosed based on Sputum Smear Microscopy (SSM).

The search for rapid and efficient method has resulted in several modification of Ziehl-Neelsen stain (ZN). Microbiological diagnosis is crucial for the effective and prompt treatment of pulmonary TB (PTB).<sup>2</sup> Diagnosis of pulmonary tuberculosis by demonstration of Acid Fast Bacilli (AFB) in sputum smears by ZN staining is known to be economical and less time consuming. The decolorizing agent used is 25% H<sub>2</sub>SO<sub>4</sub> in the ZN staining. But in modified cold stain we propose to use 20% H<sub>2</sub>SO<sub>4</sub> and heating of slide is not done. The limitations for ZN stain use in remote area are i) Shortage of trained and experienced technician. ii) Availability of spirit for heating. iii) It may be dangerous to use 25% of acid and fire. Recently under RNTCP some of designated Microscopy Centre (DMC) use only Fluorescent microscopy for screening, cross checking only the positive slides by ZN stain.

Revised National Tuberculosis Control Programme (RNTCP) guidelines<sup>3</sup> recommend use of 1% basic fuchsin (BF) in ZN staining. Guidelines of World Health Organization (WHO)<sup>4</sup> and International Union against Tuberculosis and Lung Disease (IUATLD)<sup>5</sup> advocates use of 0.3% Carbol fuchsin (CF) as primary staining reagent.

Selvakumar et al. showed that use of 0.3% of BF may result in 20% smear positive patients being missed.<sup>6</sup> The reduced smear positive result was found to be due to lowered concentration of phenol to ~1.7%.<sup>7</sup> But in the standard ZN staining the phenol concentration is 5% and CF 1%.<sup>3</sup>

Reducing the concentration of phenol automatically reduces the smear positivity.<sup>7</sup> In another study, there was a significant fall in sputum smear positivity when the concentration of phenol was 7.5% and BF 0.1%.<sup>8</sup>

The standard text books of microbiology advocate the use of acid-alcohol mixture or use of 20% sulfuric acid.<sup>9,10</sup> In a study of the 171 smears that were positive in the ZN stain (RNTCP) only 2 were negative in the cold method using

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Gabbett’s methylene blue containing 20% sulfuric acid and phenol and Carbol fuchsin same as in ZN stain, indicating almost 100% correlation between the two methods. There was no difference in the intensity of staining in both methods.<sup>11</sup> Now RNTCP has brought in Fluorescent microscopy for screening, cross checking only the positive slides by ZN stain, time may not be a constraint. But availability of spirit as fuel for hot method maybe a limiting factor in some centres and it may be dangerous to use acid (25%) and fire. With this back ground this study is planned to compare the results of RNTCP advocated method of ZN stain with modified cold method using 7.5% phenol, 0.3% CF as recommended by WHO and IUATLD and 20% sulfuric acid as decolorizer.

**MATERIAL AND METHODS**

A prospective interventional study was undertaken with permission from state tuberculosis officer. Institutional ethical committee clearance obtained. We could collect 266 samples for our study. All the sputum samples were received at Designated Microscopy Centre [DMC] at Government tertiary care hospital during the study period.

**Inclusion criteria:** All adults of both the gender suspected to be a case of pulmonary tuberculosis as per RNTCP guidelines

**Exclusion criteria:** Samples other than sputum, Samples macroscopically resembling saliva

Sample size: 266 (The average number of sputum samples received at our DMC is 150 per month, since ICMR short term project study period is 2 months)

**Sample collection method**

All sputum samples received for fluorescent microscopy at the DMC were screened for presence of Acid Fast Bacilli (AFB) by ZN stain (RNTCP) and modified cold method as described below. All the smears were prepared by the same, trained RNTCP technician thereby ensuring quality of smear. All smears were examined microscopically by using an oil-immersion microscope. Routine Fluorescent microscopy results at Designated Microscopy Centre of our hospital as recorded by the trained RNTCP technician were recorded.

All positive slides and 20% of the negative slides at random were reviewed by the microbiologist to eliminate any error in screening.

**ZN staining:** Heat-fixed smear on glass slides was flooded with filtered CF and heated until steaming, left for five minutes. After rinsing the slides with stream of water, 25% Sulphuric acid is used to decolorize the smears for 2 to 3 minutes. The slides rinsed as above and counter stained with 0.1% methylene blue for 30 seconds. The slides are washed, air dried before examination under a oil immersion of binocular microscope.<sup>3</sup>

**Modified Cold method:** Heat fixed smears on microscope slide flooded with solution B (contains 0.3% BF<sup>6</sup> and 7.5% phenol<sup>8</sup> and allowed to stand at room temperature for 10 minutes. The smears were then washed in running water, counterstained with 0.1% methylene blue for 2 minutes, and subsequently washed in tap water and air-dried.

**Grading of smears:** The smears were graded using 100x oil immersion objective as per RNTCP guidelines.<sup>3</sup> Scanty = 1-9 AFB in 100 oil immersion fields; Grade 1+ = 10-99 AFB in 100 oil immersion fields; Grade 2+ = per oil immersion field an atleast 50 fields.

field in at least 50 fields; Grade 3+= 10 or more AFB per field in at least 20fields; Negative = no AFB in 100 fields.

**STATISTICAL ANALYSIS**

Data collected were analysed using SPSS software, kappa value and p value were calculated.

**RESULTS**

A total of 266 sputum smear samples received at the Designated Microscopy Centre were subjected to Ziehl-Neelsen stain, modified cold stain and fluorescent microscopy during the study period of two months. Two smears stained with ZN stain and one smear stained by modified cold method were of poor quality hence not included in the study. Comparison of the qualitative result of the above three microscopic methods is depicted in table 1. The smear positivity rate is 27.65%, 24.90% and 27.44% in Ziehl-Neelsen stain, modified cold stain and fluorescent microscopy respectively. Compared to ZN stain the proposed modified cold method has sensitiv-

Staining method	Ziehl Neelsen stain N= 264	Modification of cold stain N= 265	Fluorescent Microscopy N= 266
Smear microscopy result			
Positive	73	66	73
Negative	191	199	193

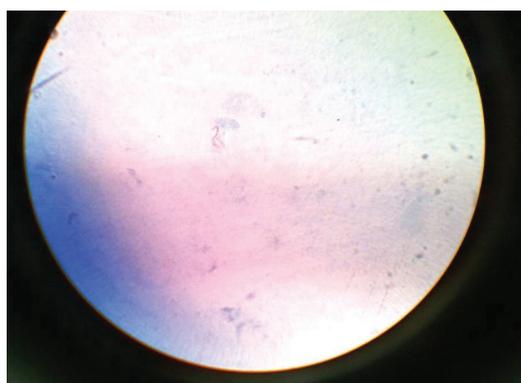
**Table-1:** Comparison of qualitative results of Ziehl- Neelsen method, Modified cold staining method and Fluorescent microscopy.

Modified Cold Stain Method	ZN stain method							Total
	Grade of positive smears	3+	2+	1+	Scanty	Negative	Any positive	
3+	11	-	-	-	-	11	11	
2+	10	12	-	-	-	22	22	
1+	4	5	14	-	-	23	23	
Scanty	-	-	4	6	-	10	10	
Negative	-	-	2	5	191	7	198	
Any positive	25	17	18	6	-	66	66	
Total	25	17	20	11	191	73	264	

**Table-2:** Cross tabulation of Positive smear grades by Ziehl-Neelsen stain and Modified cold stain method

Study	Slide +ve rate by ZN	Slide +ve rate by FM	Sample size
Prasanthi et al <sup>16</sup>	50%	69%	38
Ulukanligil et al <sup>17</sup>	9.89%	12.47%	465
Golia S et al <sup>1</sup>	10.41%	16.56%	634
Suria et al <sup>19</sup>	12.4%	19.1%	225
Jayachandra et al <sup>8</sup>	9.7%	Not done	196
Our study	27.65%	27.44%	266

**Table-3:** Comparison of slide positivity rate between ZN and FM in various studies



**Figure-1:** Photomicrograph of Modified cold stain demonstrating Acid Fast Bacilli (1000x) as pink colored, beaded or barred forms, while the tissues cells and other organism are stained blue



**Figure-2:** Photo micrograph Ziehl-Neelsen stain of sputum smear showing AFB (1000x) as bright pink colored, beaded or barred forms, while the tissues cells and other organism are stained blue



**Figure-3:** Photomicrograph of Auramie- O stain sputum smear by LED microscopy (400x). The bacilli are seen as yellow luminous organism in a dark field

**Comparative statistics of Modified cold method against Ziehl-Neelsen method**

Sensitivity=90.41% p value for 0.5 is 0.014019  
 Specificity=100% for 1.0 is 0.023342  
 Positive predictive value =100% kappa value smear positivity is 0.877  
 Negative predictive value = 96.46% kappa value for smear grading is 0.872  
 False negative = 9.5%  
 False positive = 0%  
 Smear positivity rate for ZN = 27.65% & modified cold method = 24.9%

ity of 90.41%, specificity and positive predictive value of 100%, Negative predicted value of 96.46%, p value at 95% confidence interval is 0.014019. Comparison of qualitative results (in terms of slide positive and negative for AFB) of modified cold stain method with ZN stain has kappa value of 0.9317 with 95% confidence limits (0.8818-0.9816, Standard error {SE} 0.0255). The p value is 0.014019. Comparison of RNTCP grades of smear with ZN and modified cold stain has Un weighted Kappa of 0.7417 with 95% confidence limits (0.6547-0.8287, SE0.0444), Kappa with Linear Weighting is 0.877 with 95% confidence limits (0.8373-0.9167, SE0.0202) and Kappa with Quadratic Weighting is 0.877 with 95% confidence limits (0.8373-0.9167). Out of 11 smears graded as scanty by ZN stain, 6 were graded scanty by modified cold method. All these 6 smears had bacilli count between 5 to 9/100 oil immersion fields. The remaining 5 smears had bacilli count <5/oil immersion field by ZN stain

**DISCUSSION**

The slide positivity rate of ZN stained smears was minimally (0.21%) better than fluorescent microscopy (FM). The slide positivity rate of Modified cold method is slightly lower than ZN stain (2.75%) and FM (2.64%). This finding is similar to that seen in other study.<sup>8</sup> The color contrasts of the smears stained by both the methods were visually identical in agreement with other studies.<sup>12</sup>

The specificity of the qualitative result of modified cold method is cent percent against ZN stain. There were no false positives reported from modified cold method. It is well documented in other studies comparing ZN stain with variant cold methods; cold staining method is at least as specific as ZN although falls short of it in terms of sensitivity. The ZN Method is also known to give a few false positive results (Toman1979), perhaps due to the heating step involved in staining.<sup>13</sup> The sensitivity is of 90.41%. The p value obtained is statistically significant. The concordance of qualitative result between ZN stain and modified cold method is 97.34%. In other study employing 2.5% of basic fuchsin the Concordance between ZN and cold stain was 90% (kappa 0.7).<sup>14</sup> Comparison of qualitative results (in terms of slide positive and negative for AFB) of modified cold stain method with ZN stain has kappa value of 0.9317.

Comparison of RNTCP grades of smear with ZN and modified cold stain has Kappa with Linear Weighting as 0.877 and Kappa with Quadratic Weighting as 0.877. According to Landis and Koch's kappa value between 0.81-1.0 is interpreted as perfect agreement.<sup>15</sup>

The smears stained by ZN method can detect bacilli when the concentration of bacilli is 10<sup>5</sup>/mL of sputum, whereas a more sensitive staining technique like FM stain detects the bacilli when the bacillary load is 10<sup>4</sup>/mL of sputum.<sup>18</sup>

The qualitative result of the proposed modified cold method of staining was found to be in perfect agreement with the ZN stain. But the performance of the proposed modified cold stain method was slightly inferior to the standard ZN stain method by (2.75%). So we propose that modified cold method cannot replace the ZN stain. However as it is economical and safe, can be adopted for training medical and paramedical students.

The qualitative result of FM was found to be slightly inferior to the ZN unlike in other studies. This could be due to the FM and ZN smear being screened by different persons. ZN smear and Modified Cold stain smear was preliminarily screened by the investigator. So there is a possibility of thorough screening. The FM was done by the RNTCP laboratory technician as part of his routine work. No incentive was provided to him. We understand that if sample load at a DMC is low then definitely the performance of ZN stain matches that of FM. Limitations: FM should have been done by the investigator itself but because of time constraints it could not be done.

## CONCLUSION

The qualitative result of the proposed modified cold method of staining was found to be in perfect agreement with the ZN stain. But the performance of the proposed modified cold stain method was slightly inferior to the standard ZN stain method by (2.75%). So we propose that modified cold method cannot replace the ZN stain. However as it is economical and safe, can be adopted for training medical and paramedical students. We suggest the performance of modified cold method may be evaluated by extending the time of staining with carbolfuchsin in order to not to miss the scanty number of AFB.

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# Analytical Study of Exhumations and its Medico-Legal Importance

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## ABSTRACT

**Introduction:** Bringing out of ground to bring the facts in to light is the main objective of Exhumations. Due to litigancy, breach of trust, unfaith, jealous and other reasons and also enhanced awareness of people about provisions of law to safeguard the rights of people in the interest of justice, there is rise in demand for exhumations not only to find out the actual cause and manner of death but also to confirm the identity of the deceased.

**Material and methods:** Study of 18 cases was done in the department of Forensic Medicine, Osmania Medical College, Hyderabad, for a period of three years.

**Results:** Authorities with judicial or quasi judicial powers are the competent to carry out this task with assistance of medical experts to solve the many medico legal questions that rose in the course of investigation.

**Conclusions:** Many scientific and justifiable conclusions are made to aid in the administration of justice.

**Keywords:** Exhumation, executive magistrate, decomposition, cause of death.

## INTRODUCTION

The term exhumation means, ex - Out of, Humus – ground, Exhume -To bring in to light, especially after a period of obscurity or Burial.<sup>1</sup> It is a medico legal, disinterment or digging out of a buried body.

The corporal exhumation exists from the advent of mankind on this earth but the utility has changed with the passage of time and civilization. There are instances where buried dead bodies were dug up for research, cannibalism, resurrection, rituals etc.

In the present context the retrieval of dead is carried out for different purposes by different agencies like rescue missions, archeological teams, law enforcement agencies, Anthropologists etc.<sup>2</sup> Agencies vested with judicial or quasi judicial powers are the competent authorities to carry out such task. If an individual died under suspicious circumstances and buried, a legitimate investigating agency (police) may exhume the body to determine the cause of death.

However, Law of land also protects a body interred in 'consecrated' ground, and permission must also be sought from the competent authorities before any exhumation can be considered. All the exhumed cases are dealt with under section 176 Cr.P.C. i.e., Executive Magistrate has to conduct inquest.<sup>3</sup>

### Aims and objectives

The increasing awareness of general public about tort in general and element of legality in particular, the incidences of Exhumations of deceased bodies are on rise. There is no time limit for doing exhumations. Exhumation should be done in broad daylight by a competent authority.

### The aims and objectives of present study were

- To make a comprehensive analysis of the exhumation deaths with special reference to:
  - Condition of the body at the time of Exhumation with relation to the state of ground, weather and the manner of death?
  - Time taken for the Exhumation from the Occurrence of death making a Medico legal problem.
  - Whether any injuries other than bone injuries were noticed and also how far the Histopathology was useful?
  - How far Exhumations were useful in the administration of Justice?
- Are there any other special laboratory investigations which can be made to utilize routinely for the main aim of Exhumations, like identity and cause of death.
- To suggest other methodologies and modalities for adoption under special circumstances.
- To know the pitfalls, limitations, lacunae encountered which are subjective as well as objective in nature.
- Accurately decide the identity, cause of death and manner of death, because majority of the cases are done by an expert.
- Reasons to do exhumations are to establish identity, to determine cause, manner and time since death and to collect material evidence.

## MATERIAL AND METHODS

For the present study we have collected the case reports of exhumations carried out by department of Forensic Medicine, Osmania Medical College, Hyderabad during the period July 2004 – May 2007.

A standard prescribed protocol is followed. After receipt of Exhumation order from competent authority i.e., Executive Magistrate, in the presence of Executive Magistrate, Police Investigating Officer of the Jurisdiction and Medical Officer conducting medico legal autopsy, exhumations were conducted. After bringing out of the body from the grave, confirming its identity in known cases by near relatives. Then only the autopsy procedure was initiated to fulfill the current study objectives.

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A total number of 18 cases were done and in more than 10 cases we have attended personally, taken the photographs, noted the findings, interacted with various sections of the people, got acquainted with topography, field conditions, management skills needed apart from the display of professional and scientific work.

We have compiled all the data acquired from inquest reports, field observations, postmortem examination reports, photographs, and lab reports are incorporated in tables and charts which were enclosed at the end and all components are discussed and conclusions are made subsequently.

**RESULTS**

The autopsies on exhumed bodies are performed for medico legal purposes in criminal cases such as homicide, suspected homicides, suspicious cases of poisoning, deaths resulted due to criminal abortions, malpractice or negligence. Apart from it civil cases like accidental death claims, double indemnity insurance, workmen’s compensation claims, liability for malpractice, negligence, torts, survival ship, inheriting claims to determine the cause of death. Even though the scope of exhumations stretches from crime to compensation, in reality its application is negligible and instances of misuse are more common.

In the present study a total number of 18 exhumations carried out by department of Forensic Medicine, Osmania Medical College, Hyderabad from June 2004 – May 2007, with yearly break up of 3 cases in the year 2004-05, 9 cases in the year 2005-06, 6 cases in the year of 2006-07.

A close observation and study of these cases has unveiled interesting results in relation to demography, sociology and psychology apart from forensic aspects.

The results of the study are as follows:-

1. The exhumations were more conducted in the summer months.
2. Though the two thirds are filed under 174 CrPC/ 176 CrPC, one third cases are either suspected homicide or homicide and buried.
3. Male sex is showing some predominance than over female.
4. Homicides are more among female gender than the male.
5. Nearly two thirds of exhumations were carried out within month of burial.
6. Nearly three quarters of cases were in the state of putrefaction.
7. In one third of study cases, soft tissue injuries were made out and skeletal injuries also present in 11% of cases.

**DISCUSSION**

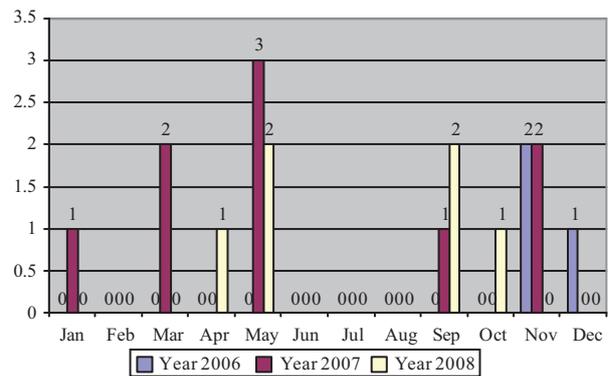
Perusal of Figure-1 shows the number of exhumations carried out during this period, month and year wise. More exhumations are during May and November months.

On Perusal of Table No. 1 it is evident that out of 18 cases about 61% i.e., 11 cases showed were dealt under section 174/ 176 CrPC and one third 6 cases were dealt under u/s. 302 IPC, followed by one case S.304 IPC. Homicides and suspected homicides are dominating allegations. It is also

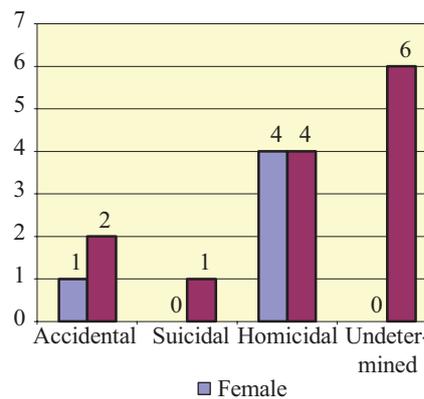
observed that, 17 cases out of 18 cases (94.4%) the police proceeded with exhumation after establishment of identity of the deceased and identification of dead bodies at the time of exhumation is only formal. Table - 2 shows that males predominate over female sex and in number at all age groups.

On perusal of Figure - 2, with reference to manner of death, homicides are more in females and in one third cases (all males) the manner was not established.

While doing the study the following results also studied which are not mentioned in the table or chart forms are that it is evident that 61.11% of cases exhumation was carried out



**Figure-1:** Month and year wise distribution of exhumations in the years 2004 – 2006.



**Figure-2:** showing sex wise distribution of exhumed bodies in relation to manner of death. Graphic presentation of sex and manner of death

Nature of Inquest	No. of Cases
174 / 176 Cr. P.C.	11
302 IPC	6
304 PIC	1
Total	18

**Table-1:** Showing nature of inquest

Age in years	No of cases (18)	
	Male	Females
< 20yrs	1	0
20 – 40 yrs	10	4
40 – 60yrs	2	1
> 60yrs	0	0
Total	13	5

**Table-2:** Table showing age and sex wise distribution of the deceased

within 1 month from the date of burial. In another 27.77% of cases the exhumations are carried out between 1 to 6 months after burial, the two cases remaining is exhumed (11.11%) after more than 6 months. Even though there is no time limitation period to carry out such procedures all the requests for the exhumations are made within a few days or few months after death, as these complaints are mostly concerned with the criminality rather than the civilian in nature. In majority cases (>70%) burials are lawful.<sup>4</sup>

It is also evident that 72.22% of the bodies are in a state of putrefaction followed by skeletonization (16.66%). In the rest of the cases (11.11%) different combinations of post-mortem changes are seen like putrefaction, mummification, adipoceros and partial skeletonization. The commonest change observed is the putrefaction which aids in the time estimation since death.<sup>5</sup>

With regard to soft tissue injuries, all types of injuries irrespective of nature of force are recognized wherever morphology is present, even though the tissues are in a state of decomposition. In the present study the soft tissue injuries are recognized in the bodies of up to two-month-old burial. Out of 18 cases irrespective of nature of complaint in 6 cases (33.33%) soft tissue injuries are recognizable. Out of 18 cases, in 3 cases (16.66%) shows skeletonization Out of the 18 cases in 2 cases (11.11%) the soft tissue injuries are associated with underlying skeletal injuries. All blunt and cutting force injuries are made out and they are present overhead and neck. In case of trunk only contusions and abrasions are evident particularly in the chest wall in 3 cases and in 2 cases injuries over extremities are recognized, with six cases in combination with soft tissue injuries over head and neck also. This clearly shows that head and neck is the major contributor for recognizable soft tissue injuries.<sup>6</sup> This does not indicate that injuries are absent on the other part of the body. As the soft tissue injuries overhead and neck retain their morphology for longer periods compared to other parts of the body. During putrefaction the possibility of the recognition of soft tissue injuries like abrasions, contusions and burns is relatively less.<sup>7</sup>

### Suggestions

From the observations and discussions the following suggestions were made out:

Even though the exhumations are of prime interest in regular medico legal work, but their static position changing year after year reflects the legal awareness in the people, increasing availability of medico legal services in private and corporate hospitals and exchange of the information between various agencies affecting the disposal of the dead.

1. Like other maladies associated with urbanization, increasing incidence of exhumations are also a static example secondary to lack of human touch and relationships, increasing criminal attitude and enhanced litigancy.<sup>7</sup>
2. Associated penal sections at the time of registration of complaints apart from 174/ 176 Cr. P.C. clearly shows that the police are making some ground work before actual exhumation, there by asking the medical officer

conducting the exhumation to fill up the gaps of the puzzle in a challenging situation.<sup>8</sup>

3. The problem of identity is less marked even in skeletonized bodies unless contested by the complainants. Even when contested application of advanced techniques like DNA profile aids in clearing the issue.
4. The male sex is on slight preponderance over female sex subjected to exhumation.<sup>9</sup>
5. The high incidence of complaint and request for exhumation are seen from low socio economic group as they are attached to least importance about the sacrilege and sanctity of death and easily carried away by whims and fancies of other people.
6. In majority of exhumations the decedents belongs to middle age group and married who are more vulnerable to sex, stress, strain, violence, frustrations, and failures. Hence the majority of allegations of exhumation are homicidal violence.<sup>10</sup>
7. Exhumations carried out at remote places are usually secret disposals and outcome will be violent death of homicidal intention. This is contrast to exhumations in notified areas (regular Graveyards) where the outcome will be either suicide or accident.<sup>11</sup>
8. The dead bodies found buried at shallow depths i.e. 1 to 2 feet below the ground level usually indicate hurried disposal in secrecy by the perpetrator to conceal the crime.
9. Legal heirs or the relatives of the deceased usually carry out the burial in notified graveyards. In majority of the cases where deaths are due to diseases, suicides or accidents. The complaints for exhumation are due to mistrusts, and unsettled issues among the family members.
10. As the dead bodies are beyond recognition, non-corporal evidence like clothing and corporal abnormalities play an important role in the establishment of identity and sex.<sup>12</sup>

And from the forensic pathologist point of view an exhumation was nothing, but a case for establishment of identity and cause of death. But the actual challenge lies beyond this if the corporal evidence is studied in a proper prospective to prove or disprove a matter in question by including the services of Forensic Science experts.

### CONCLUSION

In the present study a total number of 18 cases of exhumations were done at department of the Forensic Medicine, Osmania medical college, Hyderabad during the period 2004-2006. The study of 18 cases in a short span of three years is note worthy taking into consideration of rarity of these cases in regular medico legal work. The study of these cases from registration to reburial has yielded a lot of information from medico legal point of view, as the analytical findings are actual proofs rather than analytical presumptions.

After the research work on these exhumations a proforma for exhumation is prepared for the benefit of medico legal experts which aid them to draft the all the relevant information to achieve the objectives of exhumation.



# Prediction of IUGR and Adverse Perinatal Outcome by Colour Doppler Examination of UA PI and MCA:UA PI Ratio

B.D Gupta<sup>1</sup>, Raksha Sharma<sup>2</sup>, Kunjan Shah<sup>2</sup>

## ABSTRACT

**Introduction:** The most common methods used for evaluation of fetuses identified, as SGA are BPP & NST. Neither of these tests are sensitive for predicting poor outcome in IUGR. It is here that the role of colour doppler comes. Doppler parameters S/D ratio, RI & PI of uterine, umbilical and fetal vessels have been in use for long in predicting perinatal outcome. In present study, we are using ratio of MCA:UA PI. The research was planned to study whether the MCA:UA PI ratio is a better predictor of SGA fetuses and adverse perinatal outcome than the MCA PI or the UA PI used alone.

**Material and methods:** Prospective study done in pregnant women (30-40 weeks of Gestational. Age) attending antenatal clinics of NIMS Medical College And Hospital, Jaipur from July 2014 to June 2015

**Results:** Umbilical Artery PI: Out of 50 pregnancies studied, 13 showed abnormal UA PI, among which 11 were SGA & 10 had adverse perinatal outcome. Among remaining 37 pregnancies with normal PI ratio, 3 showed adverse perinatal outcome out of 13 SGA. Middle Cerebral Artery PI: 2 out of 50 pregnancies showed abnormal MCA PI & both fetus were SGA & had adverse perinatal outcome. Out of remaining 48 pregnancies, 11 showed adverse perinatal outcome out of 23 SGA. MCA:UA PI Ratio: 11 of 50 pregnancies showed an abnormal MCA:UA PI ratio & all were SGA & had adverse perinatal outcome. Among remaining 39 pregnancies, 2 patients showed adverse perinatal outcome out of 14 SGA. After applying statistical analysis, its proved that MCA:UA PI RATIO is better predictor of SGA and perinatal outcome than either the MCA PI or UA PI alone.

**Conclusion:** The MCA:UA PI ratio was a better predictor of adverse perinatal outcome than either the MCA PI or UA PI alone.

**Keywords:** Umbilical Artery, IUGR, Colour Doppler

## INTRODUCTION

The prevention of low birth weight (LBW) is a public health priority in India where, the condition is largely attributed to IUGR. A fetus affected by IUGR forms a subset of cases of Small for Gestational Age (SGA) infants.<sup>1</sup> LBW leads to an impaired growth of the infant with its attendant risks of a higher mortality rate, increased morbidity, impaired mental development and the risk of chronic adult diseases.<sup>2</sup>

USG helps to identify a heterogeneous group of SGA fetuses that include fetuses with IUGR, fetuses with small constitution, and fetuses with appropriate growth (misdiagnosed as small). The correct detection of the compromised IUGR fetus to allow for timely intervention is the main objective of antenatal care.

The most common methods used for evaluating health in fetuses identified as SGA are the BPP and NST. In high-risk women, AC at less than the tenth centile has sensitivities of

72.9–94.5% and specificities of 50.6–83.8% in the prediction of fetuses with birthweight at less than the tenth centile.<sup>3</sup> Use of NST to assess fetal condition is not associated with better perinatal outcome; in fact, a systematic review of randomized trials showed that there was a trend towards increased mortality in the group receiving CTG compared with those who did not.<sup>4</sup> Thus, neither of these tests are particularly sensitive for predicting poor outcome in IUGR pregnancies. It is here that the role of colour doppler comes to detect the abnormal vascular resistance patterns.

Doppler parameters like S/D ratio, RI (Resistance index) & PI (Pulsatility index) of uterine, umbilical and fetal vessels have been in use for long in predicting perinatal outcome. However, in present study, we are using ratio of MCA:UA PI, which remains constant after 30 weeks of gestation. MCA:UA PI ratio and PI of UA (umbilical artery) will help in diagnosis of SGA fetuses & help to predict adverse perinatal outcome.

Aims and objectives of the research were to study whether the MCA:UA PI ratio is a better predictor of SGA fetuses and adverse perinatal outcome than the MCA PI or the UA PI used alone, to study whether the UA PI can be used to identify IUGR per se and to find out relevant statistical data related to above study.

## MATERIAL AND METHODS

Prospective study was done in pregnant women (30-40 weeks of Gestational Age ) attending antenatal clinics & indoor patients of NIMS Medical College and Hospital, Jaipur over a period of July 2014 to June 2015. On basis of obstetric history & clinical examination, 50 cases of high risk pregnancies were selected. Out of 50, 25 CASE GROUP: decreased AC i.e. < 10th percentile for Gestational Age. SGA was diagnosed based on USG parameters with estimated foetal weight being <10th percentile for GA.

### Adverse perinatal outcome

- Fetal bradycardia or tachycardia requiring Casearean section
- Presence of meconium stained liquor
- APGAR score at 5 minutes < 7
- Admission to NICU
- Perinatal morbidity and mortality

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Examination conducted on GE LOGIQ 500 & VOLUSON 730 PRO with the help of multifrequency convex probe, two to three times.

- ▶ PI of both arteries were observed.
- ▶ MCA:UA PI ratio was calculated.
- ▶ Doppler study was considered abnormal if –
  - UA PI: >2SD
  - MCA PI: <5th percentile
  - MCA:UA PI < 1.08

## STATISTICAL ANALYSIS

Microsoft excel software was used to make tables. Descriptive statistics were used to infer results.

## RESULTS

Table 1 is showing UA PI (umbilical artery pulsatility index) in adverse perinatal outcome and in SGA. Out of 50 pregnancies studied, 13 showed abnormal UA PI, among which 11 were SGA & 10 had adverse perinatal outcome. Among remaining 37 pregnancies with normal PI ratio, 3 showed adverse perinatal outcome out of 13 SGA.

Table 2 is showing MCA PI (Middle cerebral artery pulsatility index) in adverse perinatal outcome and in SGA. 2 out of 50 pregnancies showed abnormal MCA PI & both fetus were SGA & had adverse perinatal outcome. Out of remaining 48 pregnancies, 11 showed adverse perinatal outcome out of 23 SGA.

Table 3 is showing MCA:UA PI in adverse perinatal outcome and in SGA. 11 of 50 pregnancies showed an abnormal MCA:UA PI ratio & all were SGA & had adverse perina-

tal outcome. Among remaining 39 pregnancies, 2 patients showed adverse perinatal outcome out of 14 SGA.

After applying statistical analysis, its proved that MCA:UA PI ratio is better predictor of SGA and perinatal outcome than either the MCA PI or UA PI alone. Diagnostic accuracy of MCA:UA PI was 72% for SGA and 96% for adverse perinatal outcome.

## DISCUSSION

IUGR is a pathological condition characterized by fetal birth weight < 10<sup>th</sup> percentile for that gestational age. It is strongly related to uteroplacental insufficiency. In IUGR, umbilical blood flow is significantly reduced, mainly due to changes in the placental vascular resistance. Doppler is an important clinical tool for fetomaternal surveillance in high risk pregnancies.

MCA/UA ratio reflects not only the circulatory insufficiency of the umbilical velocimetry of the placenta manifested by alterations in the umbilical S/D ratio but also the adaptive changes resulting in modifications of the middle cerebral S/D ratio.<sup>7</sup> Because the MCA/UA ratio incorporates data not only on placental status but also on fetal response, it is potentially more advantageous in predicting perinatal outcome. Doppler data combining both umbilical and cerebral velocimetry provide additional information on fetal consequences of the placental abnormality.<sup>8</sup>

In our study out of 13 cases with SGA and adverse perinatal outcome, increase UA PI was seen in 11 and 10 cases respectively. Giles et al<sup>9</sup> have found that a decrease in the number of resistance vessels in the tertiary stem villi in the placenta

	UA PI in adverse perinatal outcome			UA PI in SGA		
	Present	Absent	Total	Present	Absent	Total
Abnormal PI	10	3	13	11	2	13
Normal PI	3	34	37	13	24	37
	13	37	50	24	26	50

**Table-1:** UA PI in adverse perinatal outcome and in SGA

	MCA PI for adverse perinatal outcome			MCA PI for SGA		
	Present	Absent	Total	Present	Absent	Total
Abnormal PI	2	0	2	2	0	2
Normal PI	11	37	48	23	25	48
	13	37	50	25	25	50

**Table-2:** MCA PI in adverse perinatal outcome and in SGA

	MCA:UA PI Ratio in adverse perinatal outcome			MCA:UA PI ratio in SGA		
	Present	Absent	Total	Present	Absent	Total
Abnormal PI	11	0	11	11	0	11
Normal PI	2	37	39	14	25	39
	13	37	50	25	25	50

**Table-3:** MCA:UA PI in adverse perinatal outcome and in SGA

	Compiled results for SGA					Compiled results for adverse perinatal outcome				
	FN	FP	PPV	NPV	DA	FN	FP	PPV	NPV	DA
UA PI	45.80%	92.30%	84%	64.80%	70%	77%	92%	77%	92%	70%
MCA PI	8%	100%	100%	52%	54%	15%	100%	100%	77%	78%
MCA:UA PI	44%	100%	100%	64%	72%	84%	100%	100%	94%	96%

**Table-4:** Compiled results for adverse perinatal outcome and SGA

causes an increase in resistance, leading to decreased flow through the UA and an increase in the UA PI.

In our present study of 50 cases, the diagnostic accuracy of MCA:UA PI was 72% for SGA while 96% for adverse perinatal outcome which is comparable to the study of Gramillini et al and Bano et al who also reported that MCA:UA PI has greater diagnostic accuracy. Gramillini et al reported 70% diagnostic accuracy of MCA:UA PI for SGA while 96% for adverse perinatal outcome. Bano et al reported 72.2% diagnostic accuracy of MCA:UA PI for SGA while 95.6% for adverse perinatal outcome.

In our study the diagnostic accuracy of UA PI was 70% for SGA while 78% for adverse perinatal outcome which was correlating with the study of Gramillini et al being 65.5% and 83.3% respectively.

The diagnostic accuracy of MCA PI was 54% for SGA while 78% for adverse perinatal outcome in present study which is also correlating with the study of Bano et al being 54.4% and 77.8% respectively.

Arduini et al<sup>10</sup> also reported that assessment of MCA/UA PI index provide better information in predicting perinatal outcome when compared with umbilical or middle cerebral artery Doppler indices alone.

## CONCLUSION

The MCA:UA PI ratio was a better predictor of adverse perinatal outcome than either the MCA PI or UA PI alone. The UA PI can be used to identify IUGR per se. While interpreting UA & MCA PI we have to refer to reference charts to predict perinatal outcome. However, this ratio remains constant in later weeks of pregnancy & this single value alone makes interpretation easier. Hence, Doppler ultrasound especially MCA:UA PI ratio should be an integral component of the routine evaluation of high risk pregnancies as it helps in obstetrical surveillance and management and thereby improving adverse perinatal outcomes.

## ABBREVIATIONS

UA = Umbilical Artery, MCA = Middle cerebral Artery, PI = Pulsatility Index, LBW = Low Birth Weight, SGA = Small for Gestational Age, IUGR = Intra uterine Growth Retardation

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# Risk Factors in Retinal Vein Occlusion

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## ABSTRACT

**Introduction:** Retinal vein occlusion (RVO) is a common vascular disorder of the retina and one of the most common causes of vision loss worldwide. Specifically, it is the second most common cause of blindness from retinal vascular disease after diabetic retinopathy. Purpose of the research was to evaluate risk factors for retinal venous occlusion (RVO)

**Material and Methods:** Study was conducted on a total of 25 patients who attended the OPD of ophthalmology, Govt. Medical College, Jammu between Aug. 2014 to July 2015. Patients were investigated for risk factors of RVO.

**Results:** 14 males, 11 females patients with mean age of 51.8 years were studied. Hypertension and hyperlipidemias were strongly associated with RVO. Smaller number of patients showed association with diabetes mellitus, chronic kidney disease and POAG. Homocysteine levels were evaluated in four patients only and two of them showed raised fasting S. homocysteine levels.

**Conclusion:** We found RVO is a significant cause of visual impairment in general population. Identifying associated risk factors and treating these could help reduce the incidence of RVO.

**Keyword:** Retinal vein occlusion, retinal artery, central retinal vein occlusion

## INTRODUCTION

“Retinal venous obstruction was first established as a clinical entity due to thrombosis by Julius Von Michel” (1878).<sup>1</sup> It is generally accepted that close proximity of the central retinal artery and vein in the region of lamina cribrosa and their common adventitial sheaths are the critical anatomical factors which cause compression of the vein by sclerotic artery leading to turbulent blood flow, endothelial damage and thrombus formation in retinal venous obstruction.<sup>2</sup> There are three distinct types of RVO: branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO), and an anatomical variant of CRVO, namely, hemiretinal vein occlusion (HRVO). Retinal vein occlusions have a characteristic, although somewhat variable, appearance with intraretinal haemorrhage, cotton – wool spots, tortuous and dilated retinal veins, retinal edema and occasionally optic disc swelling. These findings are present segmentally in BRVO, in either the superior or inferior two quadrants in HRVO and in all quadrants of the fundus in CRVO.<sup>3</sup> Retinal venous obstructions are multifactorial in origin and no single factor on its own causes the occlusion. A whole host of local and systemic factors acting in different combinations and to different extents may produce the vascular occlusion.<sup>4</sup> At present, the efforts to improve visual acuity in retinal venous obstruction have been disappointing and a better understanding of various predisposing factors and pathophysiology assumes a lot of importance in the prevention and in the development of newer treatment modalities. The purpose of this study was to

evaluate the risk factors for retinal venous occlusion.

## MATERIAL AND METHODS

The study was conducted in the Department of Ophthalmology, Government Medical College, Jammu. All the patients who reported to OPD with RVO during the period from August 2014-July 2015 were evaluated.

### Inclusion criteria

All patients with Age > 20 years diagnosed with diabetes mellitus, hypertension and hyperlipidaemia

### Exclusion criteria

1. Age <20 years and > 80 years
2. Associated other ocular diseases that cause significant visual impairment, Immunocompromised patients and pregnant patients.

A total of 25 patients of retinal vein occlusion were included in the study as per the inclusion and exclusion criteria. Patient particulars like name, age, sex and address were recorded. A detailed ocular history from all the patients was also recorded. All the patients underwent complete systemic examination in which the vitals of the patient i.e. pulse rate, blood pressure, respiratory rate were recorded, special emphasis was paid on the cardiovascular system. Detailed local examination of both the eyes was done. This included.

- Visual acuity both uncorrected and best corrected.
- Anterior segment examination by slit lamp.
- Pupillary reaction was noted to find the RAPD.
- Fundus examination was done by both direct and Indirect Ophthalmoscopy.
- IOP measurement by NCT.
- Investigations were done.
- HB, BT, CT
- FBS, RFTs
- Lipid Profile
- S. Homocystiene level (in young patients only)

Hypertension was defined as patients with blood pressure (BP) > 140/90 mm Hg or patients taking anti – hypertensive medication.

- Diabetes mellitus is defined as FBS > 126mg/dl.

- Hyperlipidemia was defined as

S. cholesterol > 200 mg/dl., S. triglycerides > 180 mg/dl., HDL cholesterol > 30 – 60 mg/dl, LDL cholesterol > 100 mg/dl.

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Serum Homocysteinemia was defined as fasting S.Homocysteine levels > 12 mmol/dl.

Deranged RFTs were defined as S. creatinine levels > 1.2 mg/dl., S. urea levels > 40 mg/dl.

POAG was labeled in patients already on anti-glaucoma medication or IOP > 21 mmHg with optic disc changes or visual field defects.

## STATISTICAL ANALYSIS

Data is represented in the form of tables and analyzed with the help of descriptive statistics.

## RESULTS

The mean age of patients in the present study was 51.8 years (range 24-72 years). Male: female ratio was 3:1. Demographic data of the patients is shown in Table 1.

Of the systemic factors which were studied for association with RVO, hypertension showed the strongest association. 64% of patients had systemic hypertension. Mean systolic blood pressure was  $143.68 \pm 20.42$ , mean diastolic blood pressure was  $126.00 \pm 13.67$ . Type – II Diabetes mellitus was present in 12% of patients. 2 patients who had Diabetes mellitus also showed Non – proliferative diabetic retinopathy changes in the fundus. 32% of patients showed increased lipid levels. Of the 4 Patients who were below 30 years, 2 patients had hyperlipidemia. 12% of patients with history of hypertension on irregular treatment showed deranged RFTs. S.Homocysteine levels were studied only in patients who were below 40 years of age. Out of 4, 50% of patients showed homocysteinemia. These two patients also had hyperlipidemia. One of them had bilateral veinous obstruction and the other had central Retinal veinous occlusion. The CRVO patient was female and had systemic hypertension also. The other two young patients showed no systemic or ocular association except one of them had marginally raised triglyceride levels.

Of the ocular associations history of Primary open angle glaucoma was present in 16% of patients in our study. Systemic and Ocular risk factors are depicted in Table2. Table 3 shows the amount of visual impairment at the time of presentation.

## DISCUSSION

The current study evaluated 25 consecutive patients with Retinal veinous obstruction to assess the significance of risk factors that may be associated with RVO 84% of patients were above 40 years of age in our study. Gutman (1983) in his study reported that 90% of retinal vein obstructions occur above 50 years of age.<sup>5</sup> Hayreh (1994) also reported only 3-5% of cases of Retinal Veinous occlusion under the age of 40 years in his study.<sup>6</sup> So increasing age is an important risk

factor for RVO as supported by previous studies.

Cugati et al (2006) noted increasing mean arterial blood pressure and atherosclerotic retinal vessels were significant predictors of incident Retinal vein obstruction.<sup>7</sup> Arakawa et al (2011) concluded in their study that higher blood pressure is an independent risk factor for the development of Retinal Veinous Occlusion.<sup>8</sup> Stem et Al (2013) confirmed in their study that hypertension and vascular diseases are important risk factors for central Retinal vein Occlusion.<sup>9</sup> Therefore the findings of our study correlate well with above mentioned studies.

Srestha at al (2006) showed incidence of 8% isolated diabetes in their study.<sup>10</sup> In our study also, isolated diabetes was seen in 8% subjects. However DM was present in 12% patients. One patient had both HTN and DM. Lee et al (2013) concluded in their nationwide survey that both HTN and DM are associated with RVO. However they found HTN more strongly associated with BRVO and DM more often associated with CRVO.<sup>11</sup>

Coluciell (2005) in his study confirmed hypertension, diabetes, hyperlipidemias as risk factors for retinal obstruction.<sup>12</sup> Paul et al (2008) in their study concluded that hypertension and hyperlipidemia are common risk factors for Retinal veinous occlusion in adults and diabetes mellitus is less common.<sup>13</sup> Lim et Al (2008) found association of RVO with older age, higher systolic blood pressure and hypercholesterolemia.<sup>14</sup>

In Beaver Dam Eye study, higher serum creatinine levels constituted a significant risk factor for retinal veinous occlusion over 15 years follow-up.<sup>15</sup> Arakawa et al (2011) reported in their study association between chronic kidney diseases and retinal veinous obstruction independent of age, sex and diastolic blood pressure.<sup>8</sup> Renal dysfunction and RVO are both closely related to Hypertension. This fact indicates simultaneous pathology in the retinal and renal vasculature caused by hypertension. In our study, we found chornic kidney disease in 12% patients who were on erratic treatment for hypertension.

Serum homocysteine levels were evaluated in only 4 patients who were below 40 years of age. 50% of those evaluated showed raised levels. This suggests strong association between S. homocysteinemia and RVO. Although our sample size is too small to deduce any significant outcomes. According to study by Narayansamy et al (2007) 15 of 29 patients (51.72%) of CRVO with mean age of  $30 \pm 6$  years exhibited hyperhomocysteinemia.<sup>16</sup> Study by Tuello et al (2010) concluded that hyperhomocysteinemia is the most common emerging risk factor related to Retinal Veinous occlusion.<sup>17</sup> POAG was present in 16% patients in our study. Glaucoma was found to be significantly associated with CRVO accord-

Age in years	Patients of RVO	Sex		Type of RVO		
		Male	Female	CRVO	BRVO	HRVO*
21 – 40	4	3	1	2	2	1
41 – 60	14	8	6	6	7	1
61 – 80	7	3	4	2	5	
Total	25	14	11	10	14	2

\*One young patient had bilateral involvement where he had BRVO in one eye and HRVO in other eye.

**Table-1:** Demographic Profile of Patients of RVO.

S. No	Characteristic	Present	Absent
1	Systemic HTN	16	9
2	FBS> 126mg%	3	22
3	Hyperlipidemia	8	17
4	Deranged RFTs	3	22
5	Homocysteinemia*	2	2
6	Raised IOP (POAG)	4	21

\*S. Homocysteine levels were done only in 4 patients under 40 years of age.

**Table-2: Systemic and Ocular Risk factors In RVO.**

Category	Category of visual Impairment	Patients of RVO
0	Normal (6/6 – 6/18)	4
1	Visual Impairment (<6/18 – 6/60)	8
2	Sever visual imp (.6/60 – 3/60)	3
3	Blind (<3/60 to 1/60)	6
4	Blind (<1/60 to only PL)	4
5	Blind (No PL)	0

**Table-3: Showing visual Impairment in RVO**

ing to Koizumi et al (2007) in their study.<sup>18</sup> It is postulated that the central retinal Vein may get compromised at the lamina cribrosa in patients with raised intraocular pressure. Last but not the least, the prognosis for vision is not good if the macula is involved and this applies to all cases of central and to many cases of tributary thromboris, proved by Moore (1924) and Brandstrup (1950).<sup>19-20</sup> In our study also ten patients were blind at the time of presentation and all those patients had CRVO. This shows that severe amount of visual impairment is associated with CRVO than with BRVO or HRVO. Satyavathi et al. (2015) in their study showed 8 out of 13 cases of CRVO, 15 out of 35 cases of BRVO and 1 out of 2 cases of HCRVO had visual acuity less than 6/60.<sup>21</sup>

**CONCLUSION**

Our study shows that increasing age, systemic hypertension and hyperlipidemia are the three risk factors which are strongly associated with RVO. However, smaller amount of risk is associated with Diabetes melliteus, chronic kidney disease and raised intra-ocular pressure. Therefore, we recommend primordial prevention of these lifestyle diseases to reduce the incidence of RVO in general population and emphasize the importance of regular IOP checkup in patients above 40 years.

Limitation of our study is smaller sample size and probably S.Homocysteine levels should have been evaluated in the whole study group to derive significant relationship between homocysteinemia and RVO.

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# Sterilization of Gypsum Cast and Dies by Microwave Irradiation -An in Vitro Study

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## ABSTRACT

**Introduction:** Disinfection of casts after obtaining them from the impressions is important to prevent cross contamination and spread of infections. The study was carried out to evaluate the effect of microwave irradiation method of disinfection on surface details reproducibility and compressive strength of dental casts.

**Material and Methods:** Type III and IV gypsum samples were subjected to microwave irradiation method of disinfection. Microwave irradiation was given for 3 min at full power of 900 Watts and 2450 MHz's. The control and test group casts were examined to evaluate the effect of disinfection procedure on surface details. Surface details of casts were evaluated under low angle light at X10 magnification with a stereo zoom microscope in terms of degradation of the reproduced 0.05-mm-wide line and graded. The compressive strength test was conducted on an Instron universal testing machine with a 10kg load cell at a crosshead speed of 0.05cm/min.

**Results:** Microwave irradiation of type III and IV gypsum samples after one hour of pouring reduced the strength of materials significantly ( $p < 0.05$ ) with loss of surface details. The compressive strength values of dental stone and die stone were not significantly affected by irradiation at the end of 24 hours ( $p > 0.05$ ). Microwave irradiation of the samples at the end of one hour resulted in changes in the surface details but surface details were not altered significantly when irradiated at the end of 24 hours.

**Conclusion:** We suggest the use of microwave irradiation after 24 hours of air drying to decontaminate the casts prepared by using type III and IV gypsum products since it does not produce significant changes in surface details and is convenient.

**Keywords:** microwave irradiation, dental casts, disinfection, compressive strength, surface details

of these organisms into dental casts while setting have been demonstrated.<sup>4</sup> Some microbes have been shown to remain viable within gypsum cast materials for up to seven days.<sup>5</sup> Various methods to disinfect dental casts have been proposed and carried out. These include immersing the casts in disinfecting solutions, spraying the casts with disinfecting solutions,<sup>6,7</sup> incorporating chemicals into gypsum at the time of mixing<sup>3</sup> or using die stone containing disinfectant. It was observed that physical properties such as setting time and setting expansion were affected by incorporating disinfectants into gypsum.<sup>8,9</sup>

Microwave irradiation as an alternative to conventional methods has been reported in literature.<sup>10,11</sup> It is found out that this method is effective and practical and eliminates cross contamination via the cast because it can be repeated at every stage as and when required.<sup>10</sup>

The ideal disinfection procedure should not affect the physical and chemical properties of the gypsum cast unchanged to achieve accuracy of the final prosthesis.<sup>12</sup>

This study was done to explore the effect of microwave irradiation on the mechanical properties, that is, compressive strength properties and surface detail reproduction of type III and type IV gypsum samples.

## MATERIAL AND METHODS

Two types of dental gypsum products were subjected to two methods of disinfection. The gypsum products tested included:

Type III gypsum product (Kalstone, Kalabhai Dental P Limited, Mumbai) and Type IV stone (Kalrock, Kalabhai Dental P Limited, Mumbai).

**Die fabrication:** An aluminium die according to ADA spec-

## INTRODUCTION

Increased awareness of the potential for transmission of numerous infectious microorganisms during dental procedures have led to an increased concern for, and attention to, infection control in dental practice.<sup>1</sup> Patient derived dental impressions and gypsum casts are contaminated with numerous microbes including *Candida*, MRSA, *P. aeruginosa* which are known as opportunistic pathogens responsible for nosocomial and /or life threatening infection in immuno-compromised hosts.<sup>2</sup>

Impression making is one widely used procedure where clinicians must balance the requirement to maintain an intact barrier system with the need to produce accurate dental casts.<sup>3</sup> Dental impressions become contaminated with the micro organisms from patients' saliva and blood, which can cross infect gypsum casts poured against them. Movements

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ification No. 25<sup>13</sup> was fabricated to be used as a test die for evaluation of surface detail. The test die had a diameter of 30 mm. All its surfaces were polished. 3 parallel lines, x, y, and z, to a depth of 50, 20, and 75 mm, respectively are inscribed for evaluation of surface details. Cross lines cd and c'd' are provided for the determination of dimensional stability (Figure 1). For the measurement of compressive strength measurement, an aluminium split mould die with guide screws was machine milled. It had 3 compartments for sample preparation, each with 40mm length and 20mm diameter, according to ANSI /ADA specification No. 25 (Figure 2).

**Mixing and pouring of gypsum samples:** The gypsum products were mixed according to manufacturer's instructions. One hundred grams of type III and type IV were weighed to the nearest +/- 0.1 grams using a physical balance and 32 and 24 ml of water was measured to the nearest +/- 0.1 ml for type III and type IV respectively. The powder was added to distilled water in a clean rubber mixing bowl, allowed to soak in water and then hand spatulated for 10 seconds with a round headed steel blade spatula, followed by spatulation for 20 seconds in a mechanical mixer (Motova SL, BEGO, Bremen, Germany) connected to vacuum to obtain a creamy, bubble free mix.

The mixed dental stone was poured on to the metal die in small increments placed on a mechanical vibrator (Vibromaster; BEGO, Bremen, Germany). The vibration frequency and amplitude were set at 6000 cycles/min and step 3 amplitude (0.4 mm) respectively to prevent formation of air bubbles. The collar was covered with a glass slab to ensure that the base was parallel to the test surface. The casts were allowed to set for 1 hour at room temperature. The casts that were to be checked after 24 hours were removed from the die and allowed to air dry for 24 hours on a table top.

**Disinfection using microwave irradiation:** The prepared samples of the microwave irradiation group were kept on the glass plate in the microwave oven and timer set to 3 min at full power of 900 Watts and 2450 MHz (Onida Power Convection Microwave). After irradiation the casts were allowed to cool down to room temperature and then subjected to the tests respectively. A pilot study done to establish the optimum time for microwave irradiation of dental casts revealed that the specimens were completely dried with the removal of excess water within 3 minutes. Hence for the present study 3 minutes of irradiation time was selected.

**(a) Sample preparation for surface detail evaluation:** A collar was fabricated with elastic material (Impregum Penta Soft Polyether Impression Material; 3M ESPE, St. Paul, Minn) to box the test die to retain the poured gypsum product.

The test casts that did not reproduce the entire length of the 0.05-mm-wide line were discarded. Thirty test casts each of the type III and IV were reproduced from the metal die directly.

The samples, thus prepared were classified into 2 groups as follows:

- Group 1 (Microwave irradiation for 3 minutes at 900 W, 2450 MHz). Ten samples of each type were tested at 1 hour.

- Group 2 (Microwave irradiation for 3 minutes at 900 W, 2450 MHz). Ten samples of each type were tested at 24 hours.

**Compressive strength evaluation:** The compressive strength test was conducted on an Instron universal testing machine (Instron Corp., Canton, Mass.) with a 10kg load cell at a crosshead speed of 0.05cm/min. The samples were placed on the platform and the load applied. The samples were then crushed between the load and the platform. The results obtained were recorded in MPa.

**(b) Sample preparation for compressive strength evaluation:** Compressive strength of type III and IV was determined on the cylindrical samples made according to ANSI/ADA specification. The split metal mould were filled with dental stone under mechanical vibration. The cylindrical test samples were allowed to set for 1 hour and then retrieved. The samples prepared for each type of gypsum products were classified into four groups as follows and were then crushed (Figure 3):

- Group 1 (control). Ten samples of each type were tested at 1 hour.
- Group 2 (control). Ten samples of each type were tested at 24 hours.
- Group 3 (Microwave irradiation for 3 minutes at 900 W, 2450 MHz). Ten samples of each type were tested at 1 hour.
- Group 4 (Microwave irradiation for 3 minutes at 900 W, 2450 MHz). Ten samples of each type were tested at 24 hours.



Figure-1: Aluminium die for surface detail evaluation



Figure-2: Aluminium split mold die for compressive strength evaluation

**Surface detail evaluation:** The control and test group casts were used to evaluate the effect of disinfection procedure on surface details. The effect on the casts in terms of degradation of the reproduced 0.05-mm-wide line was examined under low angle light at X10 magnification with a stereo zoom microscope (Motic® type 102 M Stereozoom microscope, Vancouver, Canada). Same investigator performed all the microscopic studies of the casts. The casts were evaluated based on the graded scoring system with rating values of 1 through 4 (Figure 4).

- Rating 1 indicated a well-defined, sharp continuous line
- Rating 2 indicated a continuous line, but with some loss of sharpness
- Rating 3 indicated a loss of continuity of the line
- Rating 4 indicated complete obliteration of the line.

**STATISTICAL ANALYSIS**

The observations made on compressive strength of each sample were statistically evaluated using independent t test for one hour groups and one way ANOVA multiple comparison Tukey HSD post hoc test for 24 hours groups. For statistical analysis of the surface details the chi-square test was used to determine the significance of relationship between the numbers of scores. All computations were conducted in the SPSS software (version 11.5).

**RESULTS**

The effects of microwave irradiation on samples were evaluated.

**Compressive strength**

Table – 1 shows the readings of compressive strength evaluation after microwave irradiation of dental stone and die stone.

**Type III stone samples:** At one hour interval, the mean compressive strength of samples of control group was significantly higher compared to microwave irradiation group (p<0.05). However at 24 hours, compressive strength values of dental stone showed no significant difference between control group and microwave irradiated group (p>0.05).

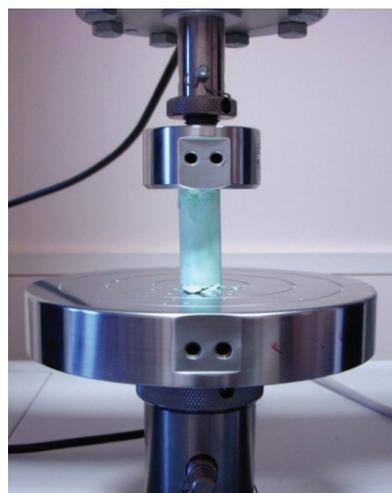
**Type IV die stones:** At one hour interval, the mean compressive strength of samples of control group was significantly higher compared to microwave irradiation group (p<0.05). At 24hours compressive strength values of control group and microwave irradiated samples were not significantly different (p>0.05).

**Surface details**

Summary of results obtained for the detail reproduction of dental stone and die stone samples subjected to microwave irradiation are presented in Table 2.

All the samples of dental stone and die stone in the control group exhibited better surface detail reproduction and were able to reproduce a line of 50µm thick clearly as indicated by 100% score in score 1. When the samples were microwave irradiated at one hour, dental stone samples have shown minimum changes in the surface details as noted from the scored obtained which lie mainly between score 1 and 2. With die stones, microwave irradiation did not cause any change in the surface detail as seen in 90% samples having score score 1.

Both dental stone and die stone did not show much change in the surface detail when subjected to microwave irradiation at 24 hours as is clear from the 90% and 80% sample having



**Figure-3:** Compressive strength evaluation using Instron Universal testing machine (Instron corp, Canton, Mass)



**Figure-4:** Surface detail evaluation of prepared samples with Motic type 102 M stereozoom microscope (Motic stereozoom, Canada)

Description	1Hr Control	1Hr Microwave	24Hr Control	24Hr Microwave
Dental Stone				
Mean (MPa)	18.57	15.93	23.95	23.25
S.D	1.16	3.03	2.18	1.34
Die Stone				
Mean (MPa)	24.04	16.80	33.81	33.49
S.D	3.04	1.45	1.86	1.75

**Table-1:** Readings of compressive strength evaluation after microwave irradiation of dental stone and die stone

Description	Dental Stone				Die stone			
	1	2	3	4	1	2	3	4
1Hr Control	10	-	-	-	10	-	-	-
1Hr Microwave	4	5	1	-	9	1	-	-
24Hr Control	10	-	-	-	10	-	-	-

**Table – 2:** Scores for surface detail evaluated after microwave irradiation of the dental stone and die stone.

Group	Dependent Variable	(I) Class	(J) Class	Mean Difference (I-J)	p
Dental Stone	HR 24	Control	Micro	0.7000	0.802
Die Stone	HR 24	Control	Micro	0.3190	0.991

**Table-3:** One way ANOVA multiple comparisons Tukey HSD post hoc test between 24 hours samples for compressive strength for dental stone and die stone.

Test	Value	p
Dental stone Pearson Chi-Square	39.531	0.001 vhs
Die stone Pearson Chi-Square	33.424	0.001 vhs

**Table-4:** Chi-Square Tests for surface detail comparison between the 24 hours microwave and hypochlorite immersion groups of dental stone and die stone

score 1 respectively for dental stone and die stone.

## DISCUSSION

Since the autoclaving process would be damaging to a dental cast, the American Dental Association (ADA) and the Centers for Disease Control and Prevention<sup>14</sup> have suggested methods for the disinfection of dental casts, including immersion or spraying with the disinfectant. It is important that these procedures and materials have no effect on the physical properties of the dental casts.<sup>15</sup> It was observed that the immersion disinfection process affects the surface quality of the casts/dies. It has been shown by Rudd et al (1970)<sup>16</sup> that immersing a stone cast even in tap water for 15 min altered surface properties.

Studies undertaken to evaluate the disinfection potential of microwave irradiation of dental casts have proved it is an effective method.<sup>10,11</sup>

Microwaves comprise the portion of the electromagnetic spectrum extending from the frequency of 300 MHz to 3,00,000 MHz. Most commercial microwave ovens operate at 2450 MHz. Microwaves are generated by magnetron and propagated in a strong line along the wave guide what is called the dominant mode. Microwaves are absorbed in materials containing water and produce friction of water molecules in an alternating electrical field. The energy thus produced is transformed into heat and it is supposed that microorganisms with high water content can be consequently killed in short time.

However, microwave irradiation was found to cause enlargement of the pores on the surface of the cast because of the rapid loss of water as steam which may have an influence on the mechanical characteristics and reproducibility of the surface details.<sup>17</sup> Since the fabrication of a dental prosthesis requires the dental cast to undergo various laboratory procedures, the strength of the dental cast and its ability to retain the surface details is of utmost importance.

### Effect of microwave irradiation on compressive strength

The results obtained for compressive strength for one hour were subjected to independent t test whereas the 24 hours samples were subjected to One way ANOVA multiple comparisons Tukey HSD post hoc test. It was noted in the present study, that both dental stone and die stone had a decrease in the compressive strength when subjected to microwave irradiation at one hour. This decrease was more prominent in die stone as compared to that seen for dental stone.

This could be explained by the differences in the crystal shape, density, intermeshing and entanglement of dehydrate crystals in the gypsum tested. In die stone, the number of crystal nuclei formed is much greater and the amount of intermeshing and entanglement is greater compared to dental stone. Such an arrangement results in the formation of a dense mass with less amount of porosity. When type IV gypsum casts are subjected to microwave irradiation, excess water used during mixing, although less compared to dental stone, forms steam and creates cracks or porosities while leaving the surface. Because structure of die stone is dense, the escape of steam creates stress in the material which probably leads to formation of minor cracks in the material. Formation of porosities or micro cracks could be the reason why die stone failed at low stress values. Dental stone, on the other hand, is not as dense as die stone, allows easy escape of the steam and there by showing little change in compressive strength. Compressive strength of dental stone and die stone specimens measured at 24 hours is not significantly different from the compressive strength of microwave irradiated specimens. This is understandable as most of the excess water would have evaporated from the material with 24 hours. Microwave irradiation in these samples may not produce steam which may create cracks or porosities.

In a study conducted by Leubke and Schneider<sup>16</sup> (1985), it was noted that at 2 hours, there was no significant difference in compressive strength of type III dental stone dried in microwave oven when compared with the air dried stone. They also suggested that microwave ovens should not be used to disinfect extremely wet or water soaked casts because rapid boiling of free water may crack the casts. They also observed that the die stones were physically changed by microwave drying because of the appearance of cracks and holes on the surface. In our study we noticed the same effect. Many holes and cracks were easily seen on the outer surface of the specimens, which was easily broken by handling.<sup>16</sup>

Setting the oven at lowest power level has been advocated by Leung RL et al (1983).<sup>4</sup> In a study done by Tuncer et al (1993)<sup>18</sup> it was observed that highest power level resulted in a decrease in the compressive strength of type IV die stone. A pilot study, done to establish the optimum time for microwave irradiation of dental casts showed that. specimens were completely dry with the removal of excess water within 3 minutes after heating in microwave. Hence for the present study 3 minutes of irradiation time was selected after air drying the samples

### Effect of microwave irradiation on surface detail

#### reproduction:

Microwave irradiation of dental stone and die stone samples at the end of one hour resulted in changes in the surface details in about 60% samples. However, this effect was not significant when the samples were irradiated with microwaves

at the end of 24 hours. The loss of surface details at one hour can be explained on the basis of porosity or microcracks formed by the steam during microwave irradiation.

Microwave irradiation of samples after one hour of pouring reduced the strength of the materials significantly ( $p < 0.05$ ) and also there was loss of surface detail. The compressive strength values of samples were not significantly affected by microwave irradiation at the end of 24 hours ( $p > 0.05$ ). Microwave irradiation of the samples at the end of one hour resulted in changes in the surface details in about 60% samples but the surface details were not altered significantly when the samples were irradiated with microwaves at the end of 24 hours.

## CONCLUSION

Based on the observations of this study, it can be inferred that microwave irradiation of dental casts after one hour of pouring reduced the strength of materials significantly ( $p < 0.05$ ) and also there was loss of surface detail. The surface details and compressive strength were not altered significantly when the samples were irradiated with microwaves at the end of 24 hours.

In view of the seriousness of the diseases like HIV and hepatitis it is worth waiting for 24 hours when using microwave irradiation. We, therefore, recommend the use of microwave irradiation after 24 hours of air drying to decontaminate the dental casts till better alternatives are available

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# Water can Perineum due to Gonococcal Infection

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## ABSTRACT

**Introduction:** Gonorrhoea is a common sexually transmitted disease caused by *Neisseria gonorrhoeae*, a gram negative diplococci. In the modern era of broad spectrum antibiotics, urethral fistulae (watering can perineum) is one of the forgotten sequelae of chronic gonococcal infection.

**Case report:** Here we report two cases of gonococcal urethritis and multiple sinuses in the glans penis in immunocompetent patient.

**Conclusion:** In the present scenario of HIV pandemic, ineffective treatment of patient or their partners for gonorrhoea due to emergence of multidrug resistant strains, may result in development of these complications.

**Keywords:** Chronic Gonococcal urethritis, Multiple discharging sinus of penis, water can perineum.

## INTRODUCTION

Sexually transmitted diseases (STI) are problem since Ancient period. These diseases are usually spread through sexual relations. Gonorrhoea is the most common sexually transmitted infection in the tropics. The risk of gonorrhoea infection after single exposure is about 20% for male and probably higher for females.<sup>1</sup> Symptomatic uncomplicated infections in male usually manifest as thick, yellow mucoid urethral discharge and dysuria.<sup>2</sup> The complications are acute urethritis, epididymitis, abscess and fistula formation and systemic diseases due to haematogenous spread. One of the uncommon complication urethral fistulae can be seen in case of ineffective treatment of gonorrhoea especially in the era of HIV pandemic.<sup>3</sup>

## CASE REPORT

### CASE-1

A 27 year, male presented with dysuria for 1 ½ months, purulent pus discharge per urethra with scaling from glans penis for 1 month and micturition from several openings of glans for 8 days. Patient had multiple addictions and history of high risk sexual behavior. He had no associated fever, bleeding per urethra, testicular pain or joint pain. On examination of there were numerous healing ulcers with scaling over glans penis [fig 1] with purulent pus discharge from urethra and also from several openings around the glans penis. There was no lymphadenopathy and systemic examination was not contributory. His hemogram, blood biochemistry were normal.

### CASE 2

A 55 year male, having no high risk sexual behavior, presented with whitish discharge per urethra and multiple sinuses with ulceration around glans penis for one year. He had history of dysuria and inguinal swelling one year back

which subsided on conservative management but after one month he developed the discharge and ulcer which lead to disfigurement of the glans penis. On examination there were multiple discharging sinuses around the glans penis with puckered scarring [fig 2]. There was discharge from urethra as well as from the sinuses on pressing the penis. He had associated non-tender inguinal lymphadenopathy but systemic examination was normal. His hemogram showed mild normocytic-normochromic anemia and blood biochemistry was normal.

Examination of the urethral discharge of both patients showed gram negative diplococci [fig 3]. Their blood for VDRL and serology for HIV were nonreactive. Their evaluation for urinary tract tuberculosis, fungal infections was negative. Both the patients were treated with injection Ceftriaxone and were referred to Urology department.

## DISCUSSION

Watering can perineum means urination through the perineum due to multiple urethroperineal fistulas which are most commonly caused by chronic inflammatory urethral strictures due to tuberculosis, schistosomiasis, or gonorrhoea.<sup>4</sup> Due to stricture urine extravasates into periurethral glands leads to periurethral abscesses which burst on skin, form urethrocutaneous fistulae. It has been described in immunocompromised patients.<sup>5</sup> Fungal infections (Eumycotic mycetoma or Actinomycotic mycetoma) and Lymphogranuloma venereum (LGV) infections can mimic watering can peri-



**Figure-1:** Purulent discharge from urethra and periurethral sinus.

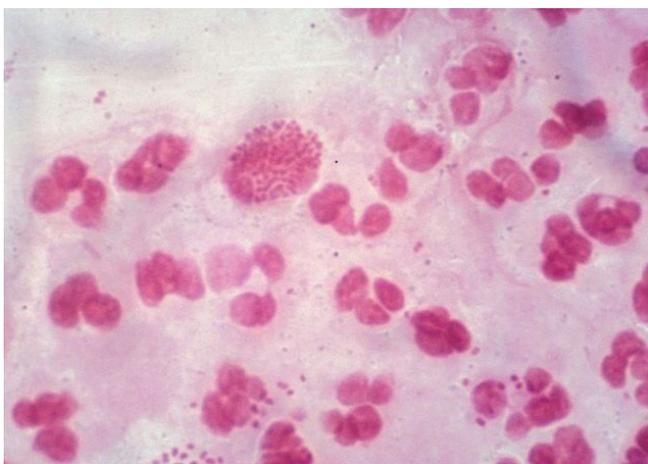
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**Figure-2:** Purulent discharge with puckered scarring



**Figure-3:** Diplococci on gram stain of urethral discharge.

neum but these sinuses discharge black, pale, or red grains.<sup>5</sup> Patients with urethral discharge should be treated early with proper antibiotics to prevent stricture and wateringcan perineum should be treated with suprapubic urinary diversion and delayed urethral reconstruction by Uro-Surgeon.

## CONCLUSION

Due to emergence of multidrug resistant strains patients and their partners should be treated with proper antibiotics. Early recognition and management of stricture disease can prevent undue morbidity associated with disintegrating perineal disease.

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# Study of Efficacy of Combination of Cyproterone Acetate and Ethenyl Estradiol in Androgenic Symptom

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## ABSTRACT

**Introduction:** Androgenic disorders are the most common endocrinopathies of women. The present study was done to study the efficacy and side effects of cyproterone acetate and ethinylestradiol combination for the management of symptoms of hyperandrogenism in females.

**Material and Methods:** The present study was done on 20 females in the Department of Obstetrics and Gynaecology, GRMC, Gwalior. All patients were given combination of cyproterone acetate (2mg) and ethinylestradiol (0.35 µg) from day 1 of menstrual cycle till day 21. Follow up was done 6 months to 1 year for improvement in their presenting complaints of acne, hirsutism and menstrual irregularities.

**Results:** In present study, most (80%) of the female were married, most (65%) of them were having age between 21-30 years. Seventy percent were having acne, 60% had menstrual irregularity and 45% had hirsutism. After 3 cycle, 40% showed disappearance of papules, 71% had improvement in hirsutism in mild cases and 75% patients showed improvement in regular menstrual cycle and normal blood loss during menses whereas, after 6 cycles all patients showed complete disappearance of papules and hirsutism. Only one patient reported severe headache and nausea with the therapy.

**Conclusion:** The combination of cyproterone acetate and ethinylestradiol was effective in reducing the symptoms of hyperandrogenism in females. Effect of drug combination over androgenic symptoms was noted with earliest effect seen over menstrual irregularities which were earliest to normalise within 3 cycles. With the exception of nausea and breast tension in the short term and chloasma with long-term treatment, the therapy was well tolerated.

**Key words:** polycystic ovarian syndrome, hyperandrogenism, acne, hirsutism, menstrual irregularity, cyproterone acetate, ethinyl estradiol

## INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a common endocrine disorder, which can cause menstrual disturbances, ovulation disorder, miscarriage, pregnancy-related complications and metabolic syndrome.<sup>1</sup> In PCOS, hyperandrogenism is clinically silent in 30% of European women and 80-90% of oriental women or induces hirsutism in 60-83% of women and acne in 11-43% of women.<sup>2</sup> Hyperandrogenism is characterized by excessive production or secretion of androgens which in modest excess leads to clinical symptoms such as increase in sebaceous gland activity leading to acne and increase in sexual hair on locations such as the chin, upper lip, abdomen and chest.<sup>3</sup> The clinical dermatologic manifestations of hyperandrogenism include hirsutism, acne, seborrhea, alopecia, and in severe cases, signs of virilization.<sup>4</sup> Symptomatic therapy based on the main complaint remains the treatment of choice for PCOS. Individualized therapy

should include steroid hormones, antiandrogens, and insulin sensitizing agent.<sup>1</sup>

Accumulation of sebum leads to the formation of comedones which finally results into acne.

Apart from sebum accumulation, colonization of bacteria (*Propionibacterium acnes*) in damaged follicular epithelial cells may also result in to acne. Acne affects around 40-50 million people in the world.<sup>5</sup>

Androgens may also exacerbate the formation of acne by enhancing production of sebum. Most of the PCOS women with acne, may show facial lesions and around 50% of the people have manifested lesions on chest, neck and upper back.<sup>5</sup> Enzyme 5- $\alpha$ -reductase is responsible for regulating androgen bioactivity by converting testosterone to dihydrotestosterone (DHT) which even more potent.<sup>5</sup> Commonly, androgenic symptoms are being treated by oral contraceptives, as they decrease the secretion of adrenal, gonadotrophins or ovarian androgens.<sup>3</sup>

For women with PCOS who do not wish to become pregnant, the combined oral contraceptive (OC) generally is first-line treatment, especially to reduce hirsutism and acne. Although all OCs will suppress ovulation, thereby inhibiting production of androgens in the ovary and reducing serum androgen levels, some OCs are more effective than others in treating clinical signs of hyperandrogenism, depending upon the androgenic properties of the progestin. One strong progestin, cyproterone acetate, acts as an androgen receptor antagonist and effectively reduces hirsutism and acne.<sup>6</sup>

The aim of this study was to investigate the effect of long-term use of combination ethinyl estradiol/cyproterone acetate on the androgenic symptoms in women with PCOS.

## MATERIAL AND METHODS

Study was conducted in the Department of Obstetrics and Gynaecology, Gajra Raja Medical College, Gwalior (M.P.), India. After obtaining consent from female patients suffering with androgenic symptoms like acne, hirsutism or alopecia were included and patients who were pregnant, migraine or with cerebrovascular insufficiency, jaundice or existing liver tumors, undiagnosed vaginal bleeding, history of thromboembolic phenomenon, history of breast or endometrial carcinoma were excluded. Total 20 patients were enrolled

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amongst them 4 were married and 16 were unmarried. Patients were subjected to examination of acne, hirsutism, obesity, general examination, per vaginum examination (if patient is married) and duration of regimen. The acne was graded according to number of comedones, papules, pustules present over face, chest or back as mild <10 score, moderate 10-25 score or Severe >25 score.<sup>7</sup> Hirsutism was graded according to Ferriman Gallway scale in mild 7-9 score, moderate 10-14 score, and severe >=15 score.<sup>2</sup> All 20 patients received combination of cyproterone acetate 2 mg and Ethinyl estradiol 0.35 µg starting from day 1 of their menstrual cycle in cyclic form for 21 days. They were followed upto 6 month to 1 year for improvement in their presenting complaints for acne, hirsutism, menstrual irregularities and whether the patients were satisfied or not with the treatment. Patients were also observed for other side effects.

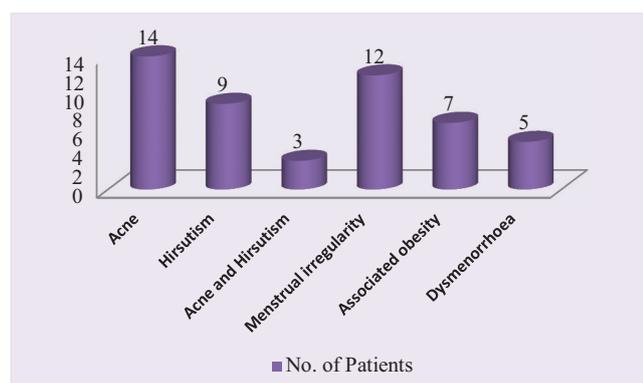
## RESULTS

Out of total 20 female patients with androgenic symptoms, 4 patients were married and 16 patients were unmarried. Age distribution of the patients showed 13 patients were between age 21 to 30 years, 6 patients were below age 20 years and only 1 patient was more than 30 year of age.

Distribution of patients according to symptoms (acne, hirsutism, acne and hirsutism, menstrual irregularity, associated obesity and dysmenorrhoea) is shown in Fig. 1.

Oligomenorrhoea and metropathia haemorrhagica were observed in 12 patients who were having menstrual irregularity. Distribution of patients as per the menstrual irregularity is shown in Table 1.

5 patients were suffering from mild acne, 6 patients were suffering from moderate acne and 3 patients were suffering from severe acne. Effect of the drug combination over acne is shown in Table 2.



**Figure-1:** Distribution of cases according to the presenting symptoms

Amongst total 20 patients, 14 patients were suffering from acne over face, chest and back. After 3 cycle, about 1/3 of patient recovered and after 6 cycles about 3/4 of patients recovered. Rest of patients was having definite healing of acne and was satisfied with treatment and continued the treatment. 3 patients with severe acne continued treatment for more than 6 cycles and showed complete disappearance of pustules and number of papules to < 10. Their grade improved to mild acne. Facial acne was earliest to improve with back and chest taking longer time for improvement.

Effect of drug combination over hirsutism during the treatment period was observed as per following Table 3.

Overall effect of drug combination on androgenic symptoms is shown in Table 4.

Only one patient was having severe headache and nausea for which she withdrew the treatment. No other patients reported any other side effect.

## DISCUSSION

Persistent acne, hirsutism and menstrual irregularity are typical androgenic disorders caused by excessive androgenic action. Approximately 10-20% of women suffer from disorders related to hyperandrogenism, the most common endocrinopathy.

The study included 20 patients with androgenic symptoms who were followed for > 6 months.

Most common presenting symptom (70%) was acne over face, chest and back, out of which 35% of patients were suffering from mild acne, 43% with moderate acne and 21% were having severe acne. 36% of patients showed improvement in acne after 3 cycles and about 71% of patients recovered after 6 cycles. Rest of the patients had some improvement and were satisfied. Similar result was also found by Gollnick H et al, who reported more than 50% of reduction in papules and pustules after cycle 6. By the end of 6 cycles 64.3% of patients showed a lower grade of acne in their study.<sup>8</sup>

In the present study 9 patients had hirsutism, out of which 7 patients (78% of the patients) were having mild and 2 patients (22% of the patients) had moderate hirsutism. In mild hirsutism after 3 cycles, 5 (71.43%) patients reported with change in texture of hair to fine soft and light with no change in frequency of waxing. When treatment was continued for 6 or more cycles, both change in texture and decrease in frequency of waxing were noted. In moderate hirsutism patients, improvement was noted after 6 or more cycles in both change in texture and decrease in frequency of waxing. Overall it was found that at 6 month slight improvement was noted in hirsutism and more improvement was seen only af-

Sr. No.	Menstrual cycle	Total no. of patients	No. of patients with menstrual irregularity	% Age
1.	Irregular	20	12/20	60%
	Oligomenorrhoea mean cycle duration: 71 days minimum: 40 days maximum: 140 days		10/20	50%
	Metropathiahaemorrhagica		2/20	10%

**Table-1:** Distribution of patients according to menstrual irregularities

Total no. of patients of Acne			Mild	Moderate	Severe
			5	6	3
Cycle 0 No. of patients	Papule	< 10	5	-	-
		10 to 25	-	6	-
		> 25	-	-	3
	Pustule	< 10	-	6	-
> 10		-	-	3	
Cycle 3 No. of patients	Papule	Disappear	2	-	-
		< 10	3	2	-
		< 25	-	-	1
	Pustule	Disappear	-	-	-
		< 10	-	-	1
Cycle 6 No. of patients	Papule	Disappear	5	2	-
		< 10	-	4	1
		< 25	-	-	2
	Pustule	Disappear	-	6	1
		< 10	-	-	2
> Cycle 6 No. of patients	Papule	Disappear	-	-	-
		< 10	-	-	2
		< 25	-	-	-
	Pustule	Disappear	-	-	3
		< 10	-	-	-

Acne = Mild <10 score, Moderate 10-25 score, Severe >25 score

**Table-2:** Effect of the drug combination over acne

	Cycle 0 No. of patients at the start of treatment	Cycles 3 No. of patients improved		Cycles 6 No. of patients improved		> 6 Cycles No. of patients improved	
		Change in texture of hair (fine, soft, light)	Decrease in frequency of waxing	Change in texture of hair (fine, soft, light)	Decrease in frequency of waxing	Change in texture of hair (fine, soft, light)	Decrease in frequency of waxing
Mild	7 (78%)	5/7	-	7/7	7/7	7/7	7/7
Moderate	2 (22%)	-	-	2/2	-	2/2	2/2
Severe	0 (0%)	-	-	-	-	-	-

**Table-3:** Effect of drug combination over hirsutism during the duration of treatment

Androgenic Symptoms	Cycle 0 No. of patients	Cycles 3		Cycles 6		> 6 Cycles	
		No.	%	No.	%	No.	%
Acne	14	5/14	35%	11/14	78%	14/14	100%
Hirsutism	9			5/9	56%	7/9	78%
Menstrual irregularities	12	9/12	75%	12/12	100%	12/12	100%
Obesity	7	No effect of drug combination seen over obesity					
Dysmenorrhoea	5	-	-	3/5	60%	5/5	100%

**Table-4:** Effect of drug combination over androgenic symptoms

ter longer duration of treatment >6 cycles. Similar results were reported by Morin-Papunen et al, where 20 patients with hirsutism were studied and the hirsutism score was decreased slightly at 6 months.<sup>9</sup>

Effect of drug combination over androgenic symptoms was noted with earliest effect seen over menstrual irregularities which were earliest to normalize within 3 cycles. 75% of patients improved with regular cycle and normal blood loss

during menses. After completion of 6 cycles all patients with menstrual irregularities improved with regular cycles and normal blood loss, 78% of patients of acne showed improvement and 77.78% patients of hirsutism showed improvement with only change in texture of hair. Aydinlik et al, studied 1161 patients of PCOS with dysmenorrhea and reported that this combination has beneficial effects. Complete abolition of dysmenorrhea was seen at 4-12 cycles of treatment which

is comparable to our study.<sup>10</sup>

In our study only one patient had severe headache and nausea after 2 cycles of treatment, which was similar to the previous studies.<sup>10</sup> With the exception of nausea and breast tension in the short term and chloasma with long-term treatment, none of the adverse events usually ascribed to this combination.

## CONCLUSION

It is concluded that combination of cyproterone acetate and ethinyl estradiol is an effective treatment for acne of all grades, all types of lesion and hirsutism with improvement in menstrual irregularities in patients with symptoms of hyperandrogenism. However the limitation of our study is the small study population and further larger studies are needed.

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# A Study of Incidence of Malignancy in Solitary Nodule of Thyroid

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## ABSTRACT

**Introduction:** Common presentation of thyroid disorders is solitary nodule. A discrete swelling in an otherwise impalpable gland is termed as solitary nodule of thyroid. The majority of solitary thyroid nodules are benign. The incidence of malignancy is 10-20%, being more common in females with a mean age of 35 years. Present study was aimed to identify the incidence of malignancy in solitary nodule thyroid.

**Material and methods:** The study was carried out in upgraded department of general surgery, Osmania General Hospital, Hyderabad, in 108 patients with solitary thyroid nodule from June 2009 to November 2011

**Results:** The solitary thyroid nodules were seen in 1.76% of surgical admissions. The mean age of the incidence of solitary thyroid nodule is 35 years. The incidence of malignancy in solitary thyroid nodule is 18.51%. The solitary thyroid nodules were frequent in females than males in the ratio of 6.71:1.

**Conclusions:** It is concluded from the present series that 18.15% of solitary thyroid nodules are malignant, with female preponderance and a mean age of solitary thyroid nodule is 35 years.

**Keywords:** Solitary thyroid nodule, Malignancy, age, sex, incidence.

## INTRODUCTION

Thyroid nodules are a common clinical problem. Thyroid nodule is a palpably or radiologically distinct lesion from the surrounding thyroid parenchyma. There is a high risk of malignancy in STN than in multiple nodules. Because of this reason, Solitary thyroid nodules have to be treated with high degree of suspicion and plan treatment in a systematic manner. Solitary thyroid nodules (STN) occur in 4 - 7% of the adult population. They are more common in females (6.4%) as compared to males (1.5%). Papillary and follicular cancer comprises the vast majority (90%) of all thyroid cancer. Further, thyroid cancers are aggressive if in children with early metastasis to the surrounding structures and to regional lymph nodes and distant sites including lungs and bones. Aims of study were to study the incidence of malignancy in solitary nodule thyroid and to study the Age and Sex distribution of solitary nodule thyroid.

## MATERIAL AND METHODS

A study was carried out on 108 patients who were admitted and operated for solitary thyroid nodule at Osmania General Hospital, Hyderabad, during the period of June 2009 to November 2011. Sample size was based on inclusion and exclusion criteria.

The patients were referred to this tertiary hospital for palpable swellings in thyroid gland, some were picked up on routine clinical examination, as well as on ultrasonography

thyroid. Patients below the age of 10 years, pregnant females, those with history of radiation exposure to neck, and those patients with family history of thyroid cancers were excluded from the study. The case records of 108 solitary thyroid nodules were analyzed. The solitary thyroid nodule was a single nodule of either lobe or isthmus of the thyroid gland. The recorded proformas included history, through clinical examination, investigations which were needed for the study including FNAC, thyroid function tests, and x-ray neck with special emphasis on the rate of growth of the swelling, any change in voice, pressure symptoms, and any clinical evidence of thyroid dysfunction. None of the patients had history of exposure to Radiation.

## RESULTS

14 male (12.96%) and 94 female (87.03%) patients in the age group of 10-60 and above years with palpable solitary thyroid nodule were evaluated (Table 1). The percentage of STN among total surgical admissions is 1.67%. Sex distribution shows majority of patients were females, with a male female ratio of 1:6.71 (94 of 108), (Table 1) and the incidence of malignancy in STN was more in females

After the final histopathology, the Adenomatous colloid goiters were observed in 32 patients, followed by Nodular goiter in 22 patients. There were 18 patients who had Follicular adenoma. Of the 108 specimens examined, 16 were papillary carcinomas, 4 were follicular carcinomas (Table-2). The incidence of malignancy in the present series is 18.51% which is comparable with other studies. In the present series, papillary carcinoma is the commonest malignancy of Solitary Thyroid Nodule 16 (80%) of the total of 20 malignancies (Table-3)

In this series, the prevalence of malignancy is significantly higher in patients above 60 years of age, and females had more number of malignant nodules than males (Table-3). The mean age of the incidence of solitary thyroid nodule is 35.71 years. Regardless of age, males had malignant lesions in 14.28% compared to females with 17.02%. This can be explained by the reason that the number of females in this series is 6.7 times the number of males

## DISCUSSION

The solitary thyroid nodule is rather a common disease having an incidence of 4-7% reported in the general population and mostly benign.<sup>1,2</sup> The major concern in such patients is

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S. No	Age Distribution	Males	Females
1	10-19	-	6
2	20-29	5	2
3	30-39	1	33
4	40-49	3	12
5	50-59	5	8
6	60 and above	-	8
Total		14	94

**Table-1:** Distribution of age and sex in the incidence of solitary thyroid nodule

Histopathologic findings in patients with solitary thyroid nodule		
Histopathologic Diagnosis	Number of Patients	%
Benign lesions		
Adenomatous colloid goitre	32	29.62
Follicular adenoma	18	16.66
Hashimotos thyroiditis	7	6.48
Simple cyst	2	1.85
MNG	5	4.62
Nodular goiter	20	18.51
Hurthle cell adenoma	3	2.77
Fibrosing thyroiditis	1	0.92
Malignant lesions		
Papillary CA	16	14.81
Follicular CA	4	3.70

**Table-2:** Results of histopathology of the biopsies in solitary thyroid nodule (n=108)

Age group	Papillary CA	Follicular CA	Total
10-19	-	1	1
20-29	5	-	5
30-39	4	1	5
40-49	1	-	1
50-59	2	-	2
60 and above	4	2	6
Total	16	4	20

**Table-3:** Distribution of the type of malignancy in different age groups in solitary thyroid nodule (n=20)

C. Leigh <sup>8</sup>	1969	20.9%
A K Sarda <sup>5</sup>	1997	10.8%
Mazafferi et al <sup>4</sup>	1998	11-12%
Aimal Munir et al	2002-2003	13.3%
G.A Khairy <sup>9</sup> et al	2004	13.9%
Talepoor et al	2005	15.8%
Catrherine Lundgreen <sup>10</sup>	2007	20.9%
Judy Jin <sup>11</sup> et al	2009	15%
Salim Ahmed et al <sup>7</sup>	2011	12.3%
Md. Abul Hossain, <sup>12</sup> Md. Zakaria Sarkar, et al	2014	28%
Naz akhtar <sup>13</sup> Majeedullahbuzdar,	2015	15.3%
Rameshbabu, Madhavi shyamala <sup>14</sup>	2015	10.83%
Present series	2016	18.51%

**Table-4:** Comparison of results with other similar studies

the potentiality of a thyroid nodule to malignancy. The incidence of thyroid malignancy in patients with a palpable nodule ranges from 11% to 20%, while according to some authors, even up to 50%.

However Stoffer et al reported that 13.8% of glands resected in thyroid operation for any reason contained carcinoma. Many surgeons would advise routine surgical resection for every solitary thyroid nodule. Such a policy resulted in many patients undergoing unnecessary operations for what was subsequently shown to be benign thyroid disease.

It is therefore logical to propose a more selective surgical policy for patients with solitary thyroid nodules. At present, fine needle aspiration cytology (FNAC) is the most reliable and widely used diagnostic tool in the clinical work up of solitary thyroid nodules.<sup>6</sup> In this study, the accuracy of FNAC is 98.1%.

In 1964 Veith FJ, Brooks JR, Grigsby WP, et al: reported a series of 299 patients who were found to have single thyroid nodules at the time of surgery, there was a 5:1 female to male ratio. The great majority of which were papillary adenocarcinoma.

In another study by Dr Aimal Munir Tarrar<sup>8</sup>, et al from April 2002 to April 2003, 60 patients with clinical solitary thyroid nodule were included. Maximum malignant cases were (50%). Papillary CA was the common malignancy (50%).

G. A. Khairy<sup>10</sup> studied on the surgical and histological data of 172 patients with solitary thyroid nodules who underwent surgery were reviewed. Thirteen point nine percent (13.9%) of patients were found to have malignancy; most of them were papillary type.

In the present series, though follicular neoplasms were more frequently seen in FNAC, after final Histopathology, papillary carcinomas were frequent 16 of 20, and the remaining 4 were follicular carcinomas. Among the 16 papillary carcinomas, 4 were follicular variants, 1 showed adjacent Hashimoto's, 1 was a Hurthle cell variant (table-2).

There is also a female preponderance of 87%, and the male to female ratio is 1:6.71. The highest numbers of thyroid nodules were seen in the age group of 20-40 years, the mean age of patients was 35 years. The youngest patient was of 11 years. The age group between 20-50 years is susceptible for hormonal changes, hence the peak incidence during this period (table-1).

The age distribution pattern is important as the incidence of malignancy in solitary nodule thyroid is high at both extremes of age. Hence the nodules occurring in patients younger than 20 years and older than 50 years have to be considered malignant until proven otherwise. There is increased incidence of thyroid nodules with age; however 90% of the lesions in the females are benign which in the present series is 83.3%. In 1975 Gogas JG, Skalhøe GD, in their study on 1300 thyroidectomies of which 70 had carcinoma. The incidence of malignancy in solitary nodule was 9.7% the risk of malignancy was higher in males (9.2%) than in females (4.3%).

In the present series, out of a total of 14 males, 2 had malignant nodules (14.28%) while 94 females had 16 malignant nodules (17.02%). In present series, the incidence of malignancy in solitary thyroid nodule is 18.51% which is comparable to the incidence in other series in which it varies from

5% to 30%<sup>4</sup> (table-4).

Md. Abul Hossain<sup>13</sup>, et al in 2014 observed that male to female ratio was 1:7 and the highest number of patients with thyroid nodule were found in age group 31-40 years. The relative frequency of malignancy in solitary thyroid nodule was 28%

Naz akhtar<sup>14</sup> et al in 2015 in their study noted that Majority of the patients i.e. 53(42.7%) were between 31-40 years. Malignancy in solitary thyroid nodule shows 19(15.3%)

Ramesh babu and Madhavishyamala<sup>15</sup> in 2015 studied on malignant incidence in solitary nodule thyroid. The female male ratio is 8:1. The peak age incidence is in 21-30yrs of age group. The incidence of malignancy being 10.83%.

## CONCLUSION

Results were compared with available literature reported previously

The solitary thyroid nodules were seen in very less cases of surgical admissions with 3rd decade having the peak incidence. There are no cases below 10 years of age. Papillary carcinoma is the commonest malignancy observed constituting to 80% of the malignancies. Further studies are needed to explore the suitable cause and prevention for Papillary carcinoma.

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# Drug Treatment of Oral Sub Mucous Fibrosis – A Review

Revant H. Chole<sup>1</sup>, Ranjtkumar Patil<sup>2</sup>

## ABSTRACT

Oral submucous fibrosis (OSMF) is a potentially malignant disease that results in progressive juxtaepithelial fibrosis of the oral soft tissues, resulting in increasing loss of tissue mobility, marked rigidity and an eventual inability to open the mouth. The treatment of oral submucous fibrosis includes iron, multivitamins including lycopene, spirulina, pentoxifylline, local submucosal injections of steroids, hyaluronidase and chylomicrons, aqueous extract of healthy human placenta, and surgical excision of the fibrous bands.

**Keywords:** Oral submucous fibrosis, corticosteroids, vitamins, lycopene, spirulina.

## INTRODUCTION

Oral submucous fibrosis (OSMF) is a potentially malignant disease that results in progressive juxtaepithelial fibrosis of the oral soft tissues, mainly occurring in the Indian subcontinent. It is a chronic, insidious, disabling disease involving oral mucosa, the oropharynx, and rarely, the larynx. OSMF results in an increasing loss of tissue mobility, marked rigidity and an eventual inability to open the mouth.<sup>1,2</sup> The most commonly involved site is buccal mucosa, followed by palate, retromolar region, faucial pillars and pharynx.<sup>3</sup>

The etiopathogenesis of OSMF is complex and incompletely understood. The main agent involved in the pathogenesis of OSMF is areca nut. Areca nut is made up of alkaloid and flavonoid components. Four alkaloids namely arecoline, arecaidine, guvacine, and guvacoline have been identified in areca nut, of which arecoline is the most potent agent and plays a major role in the pathogenesis of OSMF by causing an abnormal increase in collagen production.

Many treatment protocols for oral sub mucous fibrosis have been proposed to alleviate the signs and symptoms of the disorder. Patient is advised to completely quit the habit of betel nut chewing. The treatment of oral submucous fibrosis includes iron, multivitamins including lycopene, pentoxifylline, local submucosal injections of steroids, hyaluronidase and chylomicrons, aqueous extract of healthy human placenta, and surgical excision of the fibrous bands.

## DRUG TREATMENT

### Corticosteroids

Corticosteroids are immunosuppressive agents which are believed to decrease inflammation and collagen formation, thereby reducing the symptoms and resulting in increased mouth opening. Corticosteroids such as hydrocortisone, triamcinolone, dexamethasone and betamethasone have been used in the treatment of OSMF. Steroids suppress inflammatory reactions, thereby preventing fibrosis by decreasing fibroblastic proliferation and deposition of collagen. In a study by Borle RM et al<sup>8</sup> three hundred twenty-six patients with oral submucous fibrosis were divided into two groups and

treated either with conventional submucosal injections of steroids and hyaluronidase, or with topical vitamin A, steroid applications, and oral iron preparations. The results were compared. The conventional treatment with injections was found to be hazardous, whereas the conservative treatment was found to be safe. Both treatments were purely palliative. The use of processed areca nut is on the increase. In the impending danger of increased occurrence of oral submucous fibrosis and subsequent oral cancer following this habit is colossal. Another study by Ameer NT et al<sup>9</sup> evaluated the effect of intralesional triamcinolone in OSMF by giving bi-weekly submucosal injections of 40 mg triamcinolone for 12 weeks and followed up for 1 year. The effect of therapy was evaluated subjectively by improvement in symptoms and objectively by increase in mouth opening.

### Enzymes

Enzymes such as collagenase, hyaluronidase and chymotrypsin are being used for the treatment of OSMF. Hyaluronidase by breaking down hyaluronic acid (the ground substance in connective tissue) lowers the viscosity of intercellular cement substance. Better results are observed with respect to trismus and fibrosis. Patients receiving hyaluronidase alone showed a quicker improvement in the burning sensation and painful ulceration produced by the effects of local by-products, although combination of dexamethasone and hyaluronidase gave better long-term results than other regimens.<sup>10</sup>

In another study no statistically significant difference in sign and symptom was seen in OSMF patients between hydrocortisone acetate and hyaluronidase versus triamcinolone acetate and hyaluronidase.<sup>11</sup> Treatment regimen of group B was more convenient to the patients because less number of visits required and cheap. No side effects were seen. The authors concluded that hyaluronidase is much quicker in ameliorating painful ulceration and burning sensation than dexamethasone, but the effect is short term, although its combination with steroids gives somewhat better longer-term results.

### Vitamins and minerals

Vitamins, micronutrients and minerals are effective in controlling the burning sensation and ulceration in OSMF. In one study OSMF patients received supplementation of vitamins and minerals for one to three years. Significant im-

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provement in symptoms, like intolerance to spicy food, burning sensation, and mouth opening, was observed at exit.<sup>12</sup> Vitamins A, B, C, D, E and minerals like copper, iron and magnesium stabilize and deactivate the free radicals before they attack cells. In a study by Kumar A et al<sup>13</sup> oral lycopene therapy showed improvement in the signs and symptoms of OSMF. In a study by Shetty P et al<sup>14</sup> the efficacy of spirulina as an antioxidant adjuvant to corticosteroid injections in the management of 40 OSMF subjects of south Karnataka and north Kerala was evaluated. Clinical improvements in mouth opening was significant in the posttreatment period in both Spirulina and placebo groups. Both the groups showed statistically significant reduction in burning sensation. However, when both groups were compared, mouth opening and burning sensation was found to be statistically very highly significant in favor of the spirulina group. Spirulina can bring about clinical improvements in OSMF patients and can be used as an adjuvant therapy in the initial management of OSMF patients.

#### Peripheral vasodilators

Vasodilators like pentoxifylline have vasodilating properties and hampered mucosal vascularity in OSMF could be increased by the use of pentoxifylline. Pentoxifylline suppresses leucocyte function and alters fibroblast physiology and stimulates fibrinolysis. In one study the effect of pentoxifylline was studied on the clinical and pathologic course of OSMF. This investigation was conducted as a randomized clinical trial incorporating a control group (Standard drug group SDG, multivitamin, and local heat therapy) in comparison to pentoxifylline test cases (Experimental drug group EDG, 400mg 3 times daily, as coated, sustained release tablets). The authors concluded that pentoxifylline can be used as an adjunct therapy in the management of oral submucous fibrosis.<sup>15</sup> In another study Pentoxifylline 400mg for a period of 7 months, showed an improvement in total signs and symptoms of OSMF. No significant side effects were observed.<sup>16</sup> Oral isoxsuprine as well as dexamethasone with hyaluronidase injections combined to physiotherapy showed improvement in oral submucous fibrosis. Oral isoxsuprine can be more effectively used in the treatment of OSMF.<sup>17</sup>

#### Other drugs

Drugs like interferon gamma (IFN-gamma) is a known anti-fibrotic cytokine. In a study by Haque MF et al<sup>18</sup> intra-lesional IFN-gamma treatment showed improvement in the patients mouth opening from an inter-incisal distance before treatment of 21 +/- 7 mm, to 30 +/- 7 mm immediately after treatment and 30 +/- 8 mm 6-months later, giving a net gain of 8 +/- 4 mm (42%) (range 4-15 mm). In this study patients also reported reduced burning dysaesthesia and increased suppleness of the buccal mucosa.

Apart from the above therapies, immunized cow's milk has shown promising results in OSMF.<sup>19</sup> The milk from cows immunized with human intestinal bacteria contains an anti-inflammatory component which suppresses the inflammatory reaction and modulate cytokine production in OSMF.

#### Ayurvedic therapy

Turmeric as a spice and household remedy has been known to be safe for centuries. turmeric oil is proved to be effective

in OSMF.<sup>20</sup> The anti-inflammatory, antioxidant and antifibrotic properties of curcumin interfere with the progression of OSMF at multiple stages in the pathogenesis of this complex disease. The antioxidative and scavenger properties of curcumin, make it a very effective chemopreventive agent in the prevention of cancer. Tea when used in combination with vitamins, with its antioxidant property can bring improvement in mouth opening in OSMF.

#### CONCLUSION

Management of OSMF should include counseling of patient along with lycopene/spirulina/multivitamin/minerals in the initial stages. Moderate stages of OSMF should be treated with intralesional steroids or pentoxifylline, where as advanced stages should be treated surgically.

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# To Evaluate the Efficacy of Short Term Intermittent Chemotherapy in Spinal Tuberculosis

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## ABSTRACT

**Introduction:** Noncompliance in the treatment of spinal tuberculosis (ST) can lead to treatment failure followed by occurrence of drug resistance. In order to improve compliance, a short-course treatment with direct observation of drug intake is required. Very few authors have evaluated the efficacy of World Health Organization recommended Directly Observed Treatment Short Course (DOTS) strategy in osteoarticular tuberculosis. The present study was done to evaluate the efficacy of short term intermittent chemotherapy in directly observed treatment short-course intermittent (DOTS) regimen in spinal tuberculosis.

**Material and Methods:** A prospective study was performed on 24 patients with spinal tuberculosis from October 2008 to June 2010 in the Department of Orthopedics, DDU Hospital, New Delhi. All the patients were given the DOTS regime as recommended by WHO and followed up at intervals of one month during the treatment for assessing the clinical improvement and compliance to the therapy.

**Results:** In present study, there were 41.66% males and 58.33% female patients. Lumbar spine was most commonly involved [10 (42%)], followed by dorsal spine [6 (25%)]. ESR was found to be elevated in all patients. CRP was positive in 45.5% patients. Sixteen (80%) patients have shown increase in weight at the end of 6 month treatment. Clinical improvement was seen in all patients and 87.5% patients were fully compliant to the therapy.

**Conclusion:** DOTS intermittent therapy was effective in spinal osteoarticular tuberculosis and should be given for at least 8 to 10 months.

**Keywords:** Short term intermittent chemotherapy, spinal tuberculosis, DOTS regimen

## INTRODUCTION

The prevalence of spinal tuberculosis (ST) is high in India and has become a one of the leading cause of morbidity and mortality.<sup>1</sup>

The management of ST requires multifaceted approach including drugs alone or combined with surgery along with drugs. Now a day's drug treatment is recommended in specific indications to majority of patients with surgery.<sup>2</sup>

Irregular treatment with even effective drugs is associated with poor outcome in case of spinal tuberculosis.<sup>3</sup>

Now, World Health Organization (WHO) has recommended Directly Observed Treatment Short Course (DOTS regimen) for ST.<sup>4</sup> It is based on intermittent drug intake and short-course therapy along with good management practices.

A study done by Chen et al reported the effectiveness of DOTS regime in patients having spinal tuberculosis.<sup>5</sup>

The present study was done to evaluate the efficacy of short term intermittent chemotherapy in DOTS regimen in patients of spinal tuberculosis.

## MATERIAL AND METHODS

The present prospective study was done from October 2008 to June 2010 in the Department of Orthopedics, DDU Hospital, New Delhi. The study included 24 patients below 70 years of age who had spinal tuberculosis. A Written informed consent from all the patients and Ethical Committee approval was obtained before starting the study.

Cases of ST with immuno-compromised status such as HIV, cancer, severe protein energy malnutrition, diabetes or renal failure, age group of more than 70 years, defaulter and treatment failure cases, tuberculosis patients taking immunosuppressive drugs and cases of ST during pregnancy were excluded from the present study.

Investigations including blood, C-reactive protein, chest X- ray PA view, X-ray of the affected part of the body, Zeihl-Neelson and gram stain of aspirate /pus /tissue were performed.

MRI of affected part and polymerase chain reaction was done in selective cases who were not diagnosed by above mentioned routine investigations.

In doubtful cases of ST tissue biopsy was considered if the site is easily accessible without causing much morbidity to the patient to establish the diagnosis.

If the clinical condition of patient did not improve even after intensive phase and there was suspicion of multiple drug resistance then culture and sensitive of aspirate was done for diagnosis and guiding the therapy.

On the basis of investigations and clinical correlation the treatment was started. The DOTS regime recommended by WHO for ST category I patients was followed i.e. 2(HRZE)3 + 4(HR)3. Extension of the intensive phase was done for one month depending upon the response in clinical condition.

Surgery of the affected part was considered if a lesion was not responding favorably to the ATT or as advocated in the "Middle Path Regime" or if there was any doubt in diagnosis. The surgical intervention was done as per the conventional indications.

All the patients were regularly followed up at intervals of one month during the treatment for assessing the clinical im-

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provement and compliance of the patient.

The improvement was assessed with radiographs and heamogram with ESR and C-reactive protein at the interval of one month till the treatment was completed. The other clinical parameters such as increase appetite, weight gain, absence of other constitutional symptoms was also taken into account. Clinical parameters for evaluation include subjective sense of well being, improvement in constitutional symptoms like fever, anorexia, lassitude, subjective decrease in pain and gain in weight, decrease in size of abscess, healing of sinus, erythrocyte sedimentation rate and radiological sign of healing.

After completion of treatment patients were called at interval of every three month and assessed to find local recurrence of ST.

## STATISTICAL ANALYSIS

All the data were analyzed using IBM SPSS- ver.20 software. Analysis was performed using chi-square test and independent sample student t test. P values <0.05 was considered to be significant.

## RESULTS

In present study, there were 10 (41.66%) males and 14 (58.33%) females.

All patients (100%) had an elevated ESR at the time of presentation.

Among the spinal tuberculosis cases, 15 (63%) patients had a positive picture on X-ray and 9 patients had a positive picture on MRI.

Distribution of lesions in patients of ST revealed that lumbar spine was most commonly involved 10 (42%) patients, fol-

lowed by dorsal spine 6 (25%). Other places involved were dorsolumbar [5 (21%)], lumbosacral [1 (4%)], cervical [1 (4%)] and cervico-dorsal [1 (4%)].

3 patients had positive history of pulmonary Koch's and 1 had active disease.

Spinal tuberculosis patients were started on WHO DOTS category-I. Clinical evaluation and estimation of weight, ESR and CRP was done every month.

Duration of treatment extended in 16 (66.66%) cases of spinal tuberculosis. 8 (33.3%) patients were given 6 months of treatment. Eleven (46%) patients were given 7 months of treatment, 2 (8.3%) patient were given 8 months of treatment, 2 (8.3%) patients were given 10 months of treatment and 1 (4.1%) patient was given 12 months of treatment. Clinical improvement was seen in all patients and 87.5% patients were fully compliant to the therapy.

## DISCUSSION

World health organization has recommended the use of short-course chemotherapy (SCC) in ST in developing countries.<sup>6</sup> Previous studies done by Konstam et al and Hahn MS reported no difference in gender distribution of the of the disease<sup>7,8</sup> Present study had also not found any gender difference in spinal tuberculosis ( $p>0.05$ ).

Watts et al did a study and showed that age distribution of tuberculosis was based on the endemicity of disease.<sup>9</sup> In present study, skewedness of the disease towards young population signifies the endemicity of ST in our country.

In present study, young working class patients were mostly affected. However, close observation revealed that the ST involved housewives more (38%). This pattern might be due to the higher stress to the spine in case of housewives.

Previous studies have reported pain as the most common presenting symptom in their patients of ST. It was there in all of our patients.<sup>9,10</sup> Among the ST patients, the most common presenting feature was constitutional symptoms (88%) and cold abscess was found in (25%) of cases.

In present study, elevated ESR was found in all the patients. But workers around the world are not in unison regarding the usefulness of ESR as an indicator of disease activity.<sup>9,11</sup> A study done by Vaughn KD found an elevated ESR whereas Watts et al reported that ESR remained low in diseased patients and is non-specific in nature.<sup>9,11</sup> Although ESR values fluctuate between a wide ranges, in present study an elevated value of ESR was observed along with presence of constitutional symptoms, both can be regarded as the important index of disease activity.

The reason why the present study had preferred ESR as marker of activity because consistently fall of ESR closely followed the activity of disease in majority of patients in first few months of treatment when even MRI was unable to

Parameters		ST
Age	<40	22 (91.66)
	≥40	2(8.330)
Gender	Male	10 (41.66)
	Female	14 (58.33)
Occupation	Students	6 (25)
	Housewife	9 (37.5)
	Manual worker	6 (25)
	Service	3 (12.5)
	Pre-school	0(0)
Clinical feature	Pain	20 (83)
	Constitutional symptoms	21 (88)
	Palpable abscess	6 (25)
	Neurological deficit	9 (38)

Data is expressed as no of patients (%), ST; spinal tuberculosis, EST; extra spinal tuberculosis

**Table-1:** Distribution of patients according to different parameters

Months			0	1	2	3	4	5	6	T-3	T-6	T-9	T-12
ST (n=24)	ESR*	M	62	49.6	37.3	30.4	25.2	29.3	27.9	17.7	16.9	16.4	15.7
	CRP	+ ve	10	2	1	0	0	2	1	0	0	0	0
	WG	M	45.5	46.9	47.8	48.9	48.8	48.8	50	50.3	50.9	51.5	51.8

\*6 month of ATT, M; mean, N; no of patients, +ve; positive cases, ESR; erythrocyte sedimentation rate, CRP; C-reactive protein, WG; weight gain in Kg, ST; spinal tuberculosis

**Table-2:** Follow up of patients on therapy

show the healing changes and assessment of improvement was purely clinical. Also ESR estimation is cheap, save time and provide reproducible results.

All patients were started treatment with short term intermittent chemotherapy as per WHO recommendations.

There was significant relief in pain and also reduction in ESR at the end of 2<sup>nd</sup> month in all the patients. ESR was within normal limit at the end of treatment.

All 24 patients of ST showed signs of recovery as observed by ESR on follow up. Of these, 8 (33%) did not show any further deterioration afterwards till the termination of the treatment at 6 months. The remaining 16 patients (67%) showed some kind of deterioration during the continuation phase.

In present study, the fall in ESR at the end of 2 months was not significant, however at the end of 6 month was found to be significant. This implies that the fall in ESR value is not by chance in all forms of tuberculosis whether spinal or extra spinal tuberculosis. So, we can safely say that the spinal tuberculosis requires longer duration of therapy than the extra spinal tuberculosis as 87.5% patients required 6-8 months of chemotherapy.

In our study weight gain was found to be a very useful indicator of clinical improvement. Among the ST patients, 83% (21/24) had shown increase in weight gain after six months of treatment and all patient had shown weight gain after 1 year of treatment completion.

In present study all the patients had shown improvement, but for 66.66% patients treatment duration was extended.

The present study had few limitations like small sample size. Follow-up period was short. A prolonged follow-up of 5-10 years is essential to ascertain the actual rate of relapse.

## CONCLUSION

Spinal tuberculosis is common orthopaedic problem in India that can be diagnosed early with judicious use of clinical evaluation. DOTS treatment needs to be titrated depending on the clinical, lab finding and radiological evidence. As per our observation spinal tuberculosis should be given at least 8 to 10 months of DOTS treatment.

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# Evaluation of Quality of Life due to Visual Impairment in Patients with Glaucoma

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## ABSTRACT

**Introduction:** Untreated glaucoma may lead to vision loss and lead to poor quality of life. Aim of the research was to study the quality of life (QoL) in patients with glaucoma and its impact on medical and surgical treatments.

**Material and methods:** The present study was done at department of Ophthalmology, G R Medical College, Gwalior from Aug 2013 to Oct 2014. The study included 60 subjects who were divided into three groups: Group A (20 cases of Primary Open Angle Glaucoma (POAG) on medical treatment), Group B (20 cases of POAG who underwent glaucoma surgery) and Group C (20 age matched healthy volunteers). QoL of patients was assessed using National Eye Institute Visual Functioning Questionnaire (NEI VFQ)-25.

**Results:** Mean age of patients in Group A (n=20), Group B (n=20) and Group C (n=20) was 53.20±1.23 years, 52.12±2.31 years, 51.54±2.23 years respectively. Overall NEI-VFQ score was significantly different in all three groups (p<0001). The subscales most commonly influenced in glaucomatous patients were general health, near activities, mental health, peripheral vision, role limitations, dependency and driving (p<.05).

**Conclusion:** QoL of patients with glaucoma was poor as compared to control group. QoL of medically treated patients is good as compared to surgically treated patients. QoL decreased on increasing the drug regime.

**Keywords:** glaucoma, quality of life, NEI VFQ-25

## INTRODUCTION

Glaucoma is a heterogenous group of disease which leads to optic nerve damage. The prime focus in the management of glaucoma patients should be on preventing the progression of optic nerve damage and resulting visual loss.<sup>1</sup>

Along with above said points, effect of the disease on quality of life (QOL) of glaucoma patients is also generating interest in the field of ophthalmology.<sup>2</sup>

QOL of glaucoma patients can be studied by using vision-directed instruments such as National Eye Institute Visual Function Questionnaire (NEI VFQ), the visual function (VF)-14 and the Activities of Daily Vision Scale (ADVS).<sup>1</sup> Different authors have evaluated the scores using different vision-directed instruments and found that scores were generally low in glaucomatous patients as compared to patients without glaucoma.<sup>1</sup>

The present study was done to evaluate the QoL in patients with glaucoma, to see the effects of type of therapy and to compare it with healthy volunteers.

## MATERIAL AND METHODS

The present study included 60 subjects attending glaucoma clinic of Ophthalmology Department of G R Medical College, Gwalior between Aug 2013 to Oct 2014.

Diagnosed cases of POAG, patients having no other ocular or systemic diseases except glaucoma, individuals between 40 to 60 year of age and cases of trabeculectomy, operated between past 3 to 12 months were included in the present study.

All subjects were divided into three groups: Group A (20 cases of POAG on medical treatment), Group B (20 cases of POAG who underwent glaucoma surgery) and Group C (20 age matched healthy volunteers).

Quality of life of patients was assessed using National Eye Institute Visual Functioning Questionnaire (NEI VFQ)-25; interview was performed by a single ophthalmologist.

NEI VFQ-25 questionnaire addressed aspects of visual disability on 12 subscales, which include general health, general vision, ocular pain, near vision, distance vision, social function, mental health, role limitations, dependency, driving, color vision and peripheral vision.

Each subscale had questions with five possible answers ranging from 1 to 5 or 6. Each subscale was converted to a possible score ranging from 0 to 100, with a higher score indicating a better QoL. A composite score, which was the mean score of all subscales, was also calculated.

The associated relevant examinations including visual acuity, pupillary reaction, flashlight test, Van Herick test, slit lamp bio-microscopy, fundus examination, applanation tonometry and Gonioscopy was also carried out.

## STATISTICAL ANALYSIS

Comparison between the variables was carried out using a Chi-square test (categorical variables) and an analysis of variance (ANOVA) test (numerical variables), Student t-test with a significance of 95%. P<0.05 was considered as significant.

## RESULTS

In present study, mean age of patients of Group A (n=20), Group B (n=20) and Group C (n=20) was 53.20±1.23 years, 52.12±2.31 years, 51.54±2.23 years with female to male ratio of 9:11, 8:12 and 9:11 respectively.

Comparison of NEI-VFQ score among all three groups found a significant difference in overall QoL score among

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Subscales	G	NG	Group		Medication				Drug Regime			Surgery
			A	B	Beta blocker	PG Analogue	Alpha agonist	CA inhibitor	Mono	Dual	Triple	
GH	63.1 <sup>#</sup>	73.7 <sup>#</sup>	66.2	60.0	75.0	75.0	75.0	75.0	75.0	66.6	60.0	60.0
GV	67.5	71.2	71.2	63.7	81.2	75.0	75.0	75.0	75.0	66.6	63.7	63.7
OP	65.3	69.3	67.5	63.1	68.7	71.8	75.0	75.0	78.7	62.5	63.1	63.1
NV	58.5 <sup>#</sup>	69.9 <sup>#</sup>	70.0 <sup>#</sup>	51.5 <sup>#</sup>	74.9	74.9	79.1	66.6	82.4	66.6	61.6	61.6
DV	68.5	71.2	66.0	61.0	72.8	68.7	79.1	66.6	79.0	61.0	51.0	51.0
SF	64.0	71.2	68.7	59.3	71.8	78.1	81.2	75	76.1	75.0	59.3	59.3
MH	53.0 <sup>#</sup>	77.0 <sup>#</sup>	62.6 <sup>#</sup>	43.4 <sup>#</sup>	64.4	78.0	70.8	62.6	71.1	59.7	43.4	43.4
RD	63.4 <sup>#</sup>	75.0 <sup>#</sup>	65.8	61.1	75.0	68.5	74.5	75	72.5	53.8	61.1	61.1
Dependency	58.1 <sup>#</sup>	69.5 <sup>#</sup>	65.1 <sup>#</sup>	51.1 <sup>#</sup>	76.2	79.0	63.3	71.6	74.4	62.7	51.1	51.1
Driving	52.0 <sup>#</sup>	76.3 <sup>#</sup>	65.4 <sup>#</sup>	38.6 <sup>#</sup>	74.9	76.9	63.3	66.6	72.8	72.2	38.6	38.6
CV	87.5	90.0	71.2	63.7	75.0	75.0	75.0	75.0	75.0	66.6	63.7	63.7
PV	58.1 <sup>#</sup>	76.2 <sup>#</sup>	66.2 <sup>#</sup>	50.0 <sup>#</sup>	81.2	75.0	87.5	75.0	77.5	75.0	50.0	50.0
OS	61.3 <sup>#</sup>	74.2 <sup>#</sup>	67.2 <sup>#</sup>	55.5 <sup>#</sup>	74.2	74.6	74.9	71.5	73.9	65.6	55.5	55.5

NG; non glaucomatous, G; Glaucomatous, PG; prostaglandin, CA; Carbonic anhydrase GH; general health, GV; general vision, OP; ocular pain, NV; near vision, DV; distance vision, SF; social function, MH; mental health, RD; role limitations, CV; color vision, PV; peripheral vision, OS; overall score <sup>#</sup> P<0.05

**Table-1:** Comparison of NEI-VFQ Score with different parameters

these three groups ( $p < .0001$ ) (table 1).

## DISCUSSION

In addition to disturbed visual function and increased treatment cost, glaucoma also affects quality of life of patients. Influence starts from the date of diagnosis of glaucoma, at the beginning there is fear of blindness by the patient and later progression of disease, both lead to continuous decrease in focus for day to day activities and also shakes the patient's self confidence.<sup>3</sup>

For the assessment of QoL of glaucoma patients, NEI VFQ-25 is the most widely used ophthalmic QoL questionnaire and has been validated by various studies throughout the world.<sup>4</sup> As per the Gignac et al, NEI VFQ-25 is the only tool which is able to provide data which is both specific and sensitive to eye related problems, it also generates knowledge regarding status of the patients.<sup>5</sup>

Sherwood et al did a study to analyze the QoL of glaucoma patients using Medical Outcomes Study (MOS)-20 as a quality tool, reported that patients with glaucoma scored less as compared to normal patients.<sup>2</sup> Similar were found in the present study.

Jampel et al and Sawada et al, both did similar studies using NEI VFQ-25, reported patients with glaucoma had clearly compromised QoL.<sup>1,6</sup> In present study, we identified a composite score which was higher in non glaucomatous subjects as compared to glaucomatous subjects ( $p < .0001$ ) which is in accordance with other studies. However, a lower QoL score was observed in present study as compared to American and Japanese workers.<sup>1,6</sup>

The possible reason may be due to illiteracy, poor personal hygiene, poverty, poor standard of living and medical facilities. Also, patients with glaucoma have associated social stigma, which may lead to depression; forbidding them to have good access to medical facilities.

In present study, the subscales most commonly influenced in glaucomatous patients were general health, near activities, mental health, peripheral vision, role limitations, dependency and driving ( $p < .05$ ).

Study done by Evans et al suggested that areas which are mostly affected in glaucomatous patients are chiefly general health, general vision, mental health, expectations, driving and near activities both for NEI VFQ and NEI-VFQ 25 questionnaires.<sup>7</sup> Efforts were also made to compare QoL of glaucoma patients and different ocular morbidities, comparison revealed that QoL of glaucoma patients was more affected specially mental aspects.<sup>7</sup>

Glaucomatous patients reported more difficulty in driving as compared to controls and perceived difficulty keep on increasing and damaging visual function in better eye.<sup>8</sup>

This may be due to the fact that glaucoma patients find difficulty in discovering peripheral objects. One study found that patients with glaucoma were less likely to see pedestrians on road side during real road tests and required intervention by the evaluator.<sup>9</sup>

Near vision jobs like reading are also one of the most precious visual functions in all patients; studies have reported 40% of the patients had difficulty in reading.<sup>10</sup>

Among glaucomatous group, patients under medical treatment had better QoL performance than those subjected to surgery. The subscales most commonly affected are near activities, mental health, peripheral vision, dependency and driving ( $p < .05$ ).

Regarding surgical intervention, in early stages of disease, mental health and peripheral vision, as measured by the NEI VFQ-25 were the most commonly affected subscales.<sup>11</sup>

Present study had limitations like patients have not been classified according to severity of disease, which can influence QoL and also the sample size was small.

## CONCLUSION

Glaucomatous patients have poor QoL than non-glaucomatous and glaucomatous patients on medical treatment have better QoL score than the surgically treated patients. There was no difference in QoL of glaucoma patients on monotherapy with different antiglaucoma medications, while there was worsening of QoL as the number of antiglaucoma med-

ications increased.

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# Prevalence of Supernumerary Teeth in Bengali Population of India

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## ABSTRACT

**Introduction:** A supernumerary tooth is an additional tooth to the normal series and can be located in almost any region of the dental arch. It can come across as an inadvertent finding on a radiograph or following spontaneous eruption. Multiple supernumerary teeth are associated with cleft lip and palate, cleidocranial dysplasia and Gardner's syndrome. This study attempts to evaluate the frequency, demographics, epidemiological characteristic history, different clinical parameters, eruptive complications and presence of any associated pathology or syndrome in subjects of a specific community of India with supernumerary tooth.

**Material and Methods:** A total of 16,249 patients of 5-65 years of age were screened over a period of one year. Along with proper history taking, the identification of the supernumerary tooth was confirmed clinically and radiologically. Data relating to gender, age, location, morphology, axial inclination and presence of associated pathology or syndromes with respect to supernumerary tooth were recorded.

**Results:** A total of 200 supernumerary teeth were observed in 127 patients (63.5%) of whom 92 were males (72.4%) and the rest females (27.6%). Of the 200 supernumerary teeth, 119 (93.7%) were erupted and seen clinically whereas 81 teeth (63.77%) were impacted and were accidental findings on radiographs. Besides these, several other data were collected.

**Conclusion:** The identification of this anomaly provides a clue towards the possibility of any complication, pathologies, other related dental anomalies, syndromes and familial association in the Bengali population of Burdwan district, West Bengal, India.

**Keywords:** Cleidocranial dysplasia; Gardner's syndrome; Mesiodens; Prevalence; Supernumerary

## INTRODUCTION

The term supernumerary means "being in excess of the usual or prescribed number". Supernumerary teeth are defined as "any tooth or odontogenic structure that is formed from a tooth germ in excess of the usual number for any given region of the dental arch."<sup>1</sup> Teeth additional to the normal complement have been found in the earliest remains of humans and have been recorded in the dental literature since the days of Paul of Aegina in the seventh century AD.<sup>2</sup> The term "hyperdontia" is preferred by some authors to describe the dentition which contains one or more supernumerary teeth.<sup>3</sup> Supernumerary teeth have been found in all areas of the dental arches and may present in both the permanent and primary dentitions, but are five times less frequent in the primary dentition.<sup>4,5</sup> The reported prevalence of supernumerary teeth in the permanent dentition of Caucasians is between 0.15% and 3.9% and it appears to be highest among the Mongoloid racial group, with a reported frequency higher than 3%.<sup>6</sup> Supernumerary teeth appear with a higher frequency in men than in women, with a 2:1 ratio.<sup>6,7</sup> Supernumerary teeth may be classified according to their

morphology and location. The morphological classification includes conical, tuberculate, supplemental and odontoma types.<sup>8</sup> The classification based on location is in accordance with the work of Bolk, which groups the supernumerary teeth as mesiodens (between the two central incisors), paramolars (rudimentary teeth situated lateral to the molars) and distomolars (distal to the third molar).<sup>9</sup> They are more commonly located on the maxillary midline, where they are referred to as mesiodens, representing 80% of all the supernumerary teeth.<sup>10</sup> This location is followed in decreasing order of frequency by upper distomolars, upper paramolars and proportionately far behind by lower premolars, upper lateral incisors, lower distomolars and lower central incisors. Upper premolars are exceptional, as are upper and lower canines and lower lateral incisors.<sup>10</sup> Multiple supernumerary teeth are rare and most cases are syndrome related, while the prevalence rates for non-syndromic multiple supernumerary teeth is less than 1%.<sup>6</sup>

Regarding the etiology of supernumerary teeth, most authors point to phylogenetic factors, specifically hyperactivity within the dental lamina, causing the appearance of additional dental buds.<sup>11</sup> Inheritance is also considered to be a major contributor to the development of supernumerary teeth. Supernumerary teeth are seen to run in families over several generations, sometimes skipping one or more generations. Supernumerary teeth are often associated with certain syndromes for example, Gardner's syndrome, cleidocranial dysplasia and some conditions such as cleft lip and/or palate.<sup>12-13</sup> The purpose of the study was to evaluate the frequency, demographics, epidemiological characteristics history, different clinical parameters, eruptive complications and presence of any associated pathology or syndrome in patients with supernumerary tooth.

## MATERIAL AND METHODS

All patients visiting the outpatient department of Burdwan Dental College and Hospital, Burdwan, West Bengal, India for various dental and oral complaints were screened clini-

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cally for supernumerary teeth over a time period of one year from November 2014 to October 2015. Along with proper history taking, the identification of the supernumerary tooth was confirmed clinically and radiologically. Standard intraoral examinations were made with the help of a mouth mirror and a high-intensity light. Data relating to gender, age, location, morphology, axial inclination, mechanical accidents and presence of associated pathology or syndromes with respect to supernumerary tooth were recorded. When a supernumerary tooth was confirmed the presence or absence of any other impacted supernumerary tooth/teeth and associated lesions, if any were excluded. The variables were statistically analyzed using SPSS version 16.

## RESULTS

A total of 16,249 patients of 5-65 years of age were screened over a period of one year for the presence of supernumerary teeth. The supernumerary teeth were most commonly manifested in the 3<sup>rd</sup> decade of life (33.1%) followed by the 2<sup>nd</sup> decade (21.3%). Nine patients (7.0%) gave a family history about the presence of supernumerary teeth. However none of the patients with multiple supernumerary teeth were found to be associated with any syndromes.

A total of 200 supernumerary teeth were observed in 127 patients (63.5%) of whom 92 were males (72.4%) and the rest females (27.6%). Of the 200 supernumerary teeth, 119 (93.7%) were erupted and seen clinically whereas 81 teeth (63.77%) were impacted and were accidental findings on radiographs. While most of the patients presented clinically with one supernumerary tooth only, the rest varied from two-four in number (Table 1). Of the 81 impacted supernumerary teeth, the most common presentation was one supernumerary tooth per patient while others presented variation from two-five teeth. (Table 2).

In 89 cases, supernumerary teeth (70.1%) were present in the upper arch, in 28 cases (22.0%) in the lower arch and in 10 cases (7.9%) they were present in both the arches. Location wise break-up of the supernumerary teeth is presented in Table 3.

Regarding the morphology of the supernumerary teeth, in most of the cases they had a non-specific morphology (65.4%, n=83). (Table 4). In 50.4% of the cases (n=64) the supernumerary teeth were oriented normally. They were tilted in 59 cases (46.5%) and inverted in four cases (3.1%). Also majority of the supernumerary teeth showed complete root formation (86% n=172), with only 28 teeth having incomplete roots (14%).

Another objective of our study was the analysis of the clinical-eruptive complications associated with the supernumerary teeth. In this context we found displacement of adjacent teeth (22.0% n=28) to be the most frequent problem followed by prevention of eruption of the adjacent teeth (6.3% n=8). Caries and periapical pathology were observed in eight cases (6.3%). Resorption of the adjacent teeth, another frequent complication of supernumerary teeth was however not seen in any of our cases.

## DISCUSSION

A total of 16,249 patients were screened for the presence of supernumerary teeth. The overall prevalence of super-

Nos. of supernumerary teeth presented clinically	Nos. of patients	Percentage (%)
1	72	56.7
2	14	11.0
3	5	3.9
4	1	0.8

**Table-1:** distribution of cases with erupted supernumerary teeth

Nos. of impacted supernumerary teeth	Nos. of patients	Percentage (%)
1	33	26.0
2	13	10.2
3	1	0.8
4	1	0.8
5	3	2.4

**Table-2:** Distribution of cases with impacted supernumerary teeth

Location	Nos. of cases	Percentage (%)
Anterior region	49	38.6
Canine region	1	0.8
Premolar region	36	28.3
Molar region	19	15.0
Distomolar region	22	17.3

**Table-3:** Location wise distribution of supernumerary teeth

Morphology	Nos. of cases	Percentage (%)
Non specific	83	65.4
Anterior tooth	10	7.9
Canine	1	0.8
Premolar	30	23.6
Molar	3	2.4

**Table-4:** Morphology wise distribution of supernumerary teeth

numerary teeth was 0.78 (n=127). According to the various literature sources, the reported prevalence of supernumerary teeth varies according to the population studied between 0.1-3.8%.<sup>6</sup> In the present study, of the total 200 supernumerary teeth, 93.7% were erupted while 63.7% were impacted and were incidental findings on radiographs. Multiple additional supernumerary teeth were detected during radiographic examination of some patients who showed clinically single supernumerary tooth. Hence, radiographs play an important role in the early diagnosis and treatment of patients with supernumerary teeth which in turn is important for the prevention of complications.

In our study, supernumerary teeth were more common in males (72.4% versus 27.6% in females), which was in agreement with the observation made by Rajab et al.<sup>6</sup> However, other investigators such as Dominguez et al have observed no difference between the sexes.<sup>14</sup> The supernumerary teeth in the present series of cases were most commonly manifested in the 3<sup>rd</sup> decade of life (33.1%) which was in coincidence with the findings of other authors who report this decade to be the most common period of supernumerary tooth presentation.<sup>15</sup>

Ma Isabel Leco Berrocal et al. did an observational study of the frequency of supernumerary teeth in a population of 2000 patients in the European University of Madrid.<sup>16</sup> They observed supernumerary teeth in 1.05% of the subjects (mean age 20.2 years), with a greater frequency in males. The most frequent location was in the maxilla (79.2%), fundamentally in the distomolar zone and at pre-maxillary level. The presence of mechanical accidents was the most frequent complication (54%), the displacement of adjacent teeth being the most common finding, along with the presence of follicular cysts.

Paula Fernández Montenegro et al. did a retrospective study in a population of 36,057 patients.<sup>17</sup> In their study, the most frequent supernumerary teeth identified were mesiodens (46.9%), followed by premolars (24.1%) and distomolars (18%). As for location, 74.5% of the supernumerary teeth were found in the maxilla while 46.9% were present in the palatine/lingual area. Heteromorphology was noted in two thirds of the supernumerary teeth, with conical shape being the most frequent.

Robert P. Anthonappa et al. did a retrospective study among 208 children of southern China aged between 2 to 16 years.<sup>18</sup> The study showed that males were more frequently affected than females in the ratio of 3.1:1. Of the 283 supernumerary teeth, 95.0% were located in the premaxilla, 71.5% were conical, 70.7% were unilateral, 29.3% were bilateral, 47.7% were inverted and 16.9% were erupted. The mean age at the time of diagnosis and removal of the supernumerary teeth was  $7.3 \pm 2.7$  years (the minimum age was 2.1 years) and  $8.1 \pm 2.7$  years (the minimum age was 4.1 years), respectively. 70% of the children were in the mixed dentition stage and 81.3% of the supernumerary teeth were removed under general anesthesia.

Açkgöz et al. did a study (1999-2004) to evaluate the radiological and clinical findings of supernumerary teeth in 9550 male patients examined.<sup>19</sup> 251 supernumerary teeth were detected in total and were found to be located mostly in the premolar region. The prevalence of multiple supernumerary teeth was 0.06%. Out of 37 multiple supernumerary teeth examined, 30 were impacted. Various associated anomalies were seen in 21.6% of cases. Although the mean age was high (23.1 years), no pathologies such as root resorption of adjacent teeth or cystic formation were observed in their study.

L. D. Rajab et al. did a survey to investigate the characteristics of supernumerary teeth among children attending the Department of Paediatric Dentistry at the Jordan University Hospital.<sup>6</sup> The study population consisted of 152 children with age ranging from 5 to 15 years. They found that males were affected more than females with a sex ratio of 2.2: 1. 77% of the patients had one supernumerary tooth, 18.4% had two and 4.6% had three or more supernumeraries. 90% of the supernumerary teeth occurred in the premaxilla, of which 92.8% were in the central incisor region and of these 25% were located in the midline. The other 10.4% of the supernumeraries were located in the premolar, canine, molar and lower central incisor regions. Two cases were of non-syndrome supernumerary teeth. 75% of the supernumeraries were conical, 83.1% were in the normal vertical position and 26.5% were erupted. Conical-shaped supernumerary teeth

had a significantly higher rate of eruption compared to the tuberculate type.

In this study, 59.5% of the supernumeraries were erupted, which was higher than the previously reported eruption rates.<sup>6,17</sup> In 38.6% of the cases the supernumerary teeth occurred in the premaxilla, which has been identified as the predominant location by many authors, followed by the premolar (28.3%) and distomolar regions (17.3%).<sup>6,17</sup> Only one case presented with a supernumerary tooth in the canine region, which was consistent with the findings of other studies where the presence of supernumerary teeth in the canine region was reported to be rare.<sup>7</sup>

Non-specific morphology of the supernumerary teeth was seen in 65.4% of the cases and these results coincide with the ones reported by Rajab and Hamdan and Kim and Lee.<sup>7,20</sup> As reported by Yousof et al, in the present study also the most common supplemental teeth were the premolars (23.6%).<sup>21</sup> In most of the cases, the supernumerary teeth were orientated normally. This finding differed from that reported by Tay et al, who found most of the supernumerary teeth in an inverted position, but agreed with the findings by Liu et al.<sup>22,23</sup> Regarding root completion, 86% of the cases presented with supernumerary teeth having complete roots.

As for the clinical complications caused by the supernumerary teeth, we found displacement of the adjacent tooth to be the most frequent complication (22%). This was in agreement with the findings of Rajab et al and Asaumi et al.<sup>6,24</sup> In eight cases, the eruption of permanent teeth was obstructed by supernumerary teeth (6.3%). No resorption of adjacent tooth or any other dental anomalies associated with supernumerary teeth were detected. Association of caries and periapical pathology with the supernumerary teeth was observed in 6.3% of our cases. Similar findings were noted by Hattab and Othman.<sup>25</sup>

Although many authors have found a strong familial association of supernumerary teeth with an autosomal dominant transmission, only nine cases with a positive family history of supernumerary teeth were observed in the present case series.<sup>26</sup> This finding suggested that many cases of supernumerary teeth can be purely sporadic with rare familial association. Lastly, though many cases of supernumerary teeth associated with syndromes like Gardner's syndrome, Clediocranial dysostosis, or cleft lip and palate have been reported we did not find any such case. But this finding also was in accordance with the observation made by Batra et al and García et al who reported of cases presenting with multiple supernumerary teeth but not associated with any complex syndrome.<sup>26,27</sup>

## CONCLUSION

The results of the present study gave some information on the prevalence of supernumerary teeth in the Bengali population of Burdwan district, West Bengal, India. The identification of this anomaly could provide a clue towards the possibility of any complication, pathologies, other related dental anomalies, syndromes and familial association.

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# Comparative Study of Single Dose Pre-Emptive Gabapentin vs Clonidine for Post Operative Pain Relief in Lower Limb Surgeries Under Spinal Anaesthesia

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## ABSTRACT

**Introduction:** Spinal anesthesia is a technique, which is frequently preferred in lower extremity surgery. It has been reported that preoperative administration of gabapentin, approved for neuropathic and chronic pains, also reduces post-operative pain. Clonidine also possesses anti-nociceptive properties. Purpose of the study was to evaluate and compare the duration of post-operative analgesia with premedication by oral Gabapentin or Clonidine in lower limb surgeries under spinal anaesthesia.

**Material and Methods:** The present study was done at the Department of Anesthesiology, Gandhi Medical College, Hamidia Hospital and Bhopal. Sixty patients belonging to ASA grade I and II, having age between 18 -65 years were randomly divided as: Group G (received 300 mg of Gabapentin) and Group C (received 100 mcg of Clonidine). Drugs were given orally one hour prior to administration of spinal anaesthesia. Postoperative analgesic duration, total dose of analgesic used and pain scores were analysed.

**Results:** All demographic characters, duration of surgery, total dose of analgesic, pain scores, type of surgery and side effects were similar in both the groups ( $p > 0.05$ ). Total postoperative analgesic duration was 9.02 hours in Group G whereas 14.20 hours in Group C ( $P < 0.001$ ).

**Conclusion:** In present study, clonidine was a better adjuvant compared to gabapentin when given orally 1 hour before spinal block in lower limb surgeries.

**Keywords:** gabapentin, clonidine, spinal anaesthesia

## INTRODUCTION

Pain is always unpleasant for the patients who had undergone a surgery. Pain usually develops due to tissue damage. Satisfactory relief in pain brings back the normal physiological function and prevents the development of chronic pain. Opioids are being used since long time for postoperative pain relief.<sup>1,2</sup>

Administration of opioids during post-operative period can lead to complications such as sedation, respiratory depression, pruritis and constipation.<sup>3,4</sup> Regional analgesia demand additional intervention and it also has possible risk of hypotension and bradycardia.<sup>4</sup>

Clonidine is an agonist of  $\alpha_2$  adrenergic receptor which provides dose dependent analgesia at spinal sites. There is a complete absorption of oral clonidine and peak plasma concentration is achieved after 1-3 hours of administration. It inhibits neurotransmission in both A- delta and C fibers and also escalates the inhibitory effect of local anesthetic on C-fibre.<sup>1</sup>

Gabapentin is an anticonvulsant which is a structural analogue of Gama Amino Butyric Acid (GABA). It possesses

analgesic effect for different conditions like diabetic neuropathy, neuropathic pain, neuralgia and reflex sympathetic dystrophy. Recent reports have shown a positive response on postoperative pain relief.<sup>5</sup>

The present study was done to evaluate and compare the duration of post-operative analgesic effect of oral gabapentin with clonidine as premedication in lower limb surgeries under spinal anaesthesia.

## MATERIAL AND METHODS

The present prospective study was done on 60 patients belonging to ASA grade I and II and having age between 18 -65 years in the Deptt. of Anaesthesiology, GMC and Hamidia Hospital, Bhopal.

Patients with physical status ASA Grade III and IV, having severe systemic diseases (heart diseases, hepato renal diseases, bleeding disorders, psychological problems, etc.) and patients who were allergic to any medicine were excluded from the study.

Routine monitoring such as non invasive blood pressure (NIBP), pulse oximetry and ECG was instituted on arrival in preparation room and then in operation theatre (OT) continuously.

The patients were randomly divided using envelop method into two groups of 30 each: Group G (who received 300 mg gabapentin) and Group C (who received 100 mcg clonidine). All doses of gabapentin and clonidine were given per oral one hour prior to administration of spinal anaesthesia with a small sip of water.

Visual Analogue Scale (VAS) was explained to the patient during preoperative visit and also in preparation room. No other premedication was instituted. All patients were preloaded with 10ml/kg ringer lactate solution before administering spinal anaesthesia. Spinal anaesthesia was instituted with 3 ml of hyperbaric 0.5% bupivacaine (15mg).

Fluid administration was continued intra-operatively and hypotension, if any, was treated with fluid replacement and i.v mephentermine.

Pain was assessed postoperatively by VAS; immediate postoperatively and at every two hourly thereafter. Any patient

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with VAS score of more than three were administered diclofenac 1 mg/kg intramuscularly.

Any complications like dizziness, somnolence, diplopia, vomiting, confusion, pain, and urinary retention were recorded in first 24 hours post operatively.

All statistical analysis was done using IBM SPSS ver. 20. Two sample paired t-test was used to find out significance between two samples. Data was reported as mean value  $\pm$ SD. A P-value of  $< 0.05$  was considered statistically significant.

## RESULTS

In present study, mean age of Group G and Group C was  $44.1 \pm 13.0$  years and  $39 \pm 13.4$  years respectively ( $p > 0.05$ ). Mean weight in Group G and Group C was  $67.5 \pm 9.50$  and  $61.67 \pm 9.27$  kg respectively ( $p > 0.05$ ). In group G and Group C, 23(76.66%) and 22(73.33) patients belong to ASA status I respectively ( $p > 0.05$ ).

Mean duration of surgery in Group G and Group C was  $51.17 \pm 23.66$  min and  $48.17 \pm 27.68$  min respectively ( $p > 0.05$ ).

Distribution of patients according to type of surgery revealed that out of 30 patients in Group G, surgery for fracture neck of femur, fracture tibia, fracture patella and fracture both bone leg was performed in 5 (16.66%), 20 (66.66%), 2(6.66%) and 3 (10%) patients respectively whereas, in Group C, surgery for fracture neck of femur, fracture tibia, fracture patella and fracture both bone leg was performed in 5(16.66%), 19 (63.34%), 3 (10%) and 3 (10%) respectively.

The intra operative hemodynamic values i.e. mean blood pressure, heart rate and respiratory rate were similar ( $P > 0.05$ ) in both the groups at all measured intervals.

The total postoperative analgesic duration (time from spinal analgesia to first dose of analgesic) was 9.02 hours in Group G whereas 14.20 hours in Group C ( $P < 0.001$ ).

The mean total dose of analgesic in first 24 hour was 72.5mg in Group G, whereas 62.5mg in Group C. Total dose of analgesics in first 24 hour was less in Group C ( $P > 0.05$ ).

Pain scores were similar, as patients were given analgesics immediately on reaching the VAS scale of three ( $p > 0.05$ ). Six patients (20%) in either group experienced somnolence ( $p > 0.05$ ). Dizziness was experienced in five patients (17%) in Group G as compared to four patients (14%) in Group C ( $P > 0.05$ ).

## DISCUSSION

In post operative period, the most common complain made by the patients is always pain. Pain impulse initiates the cascade of different changes in the somatosensory systems, which escalate the response to accompanying stimuli and amplify pain.<sup>6</sup>

In present study, we used 100 mcg of clonidine as reports have shown that incidence of hypotension and bradycardia was more with higher doses in patients undergoing spinal anesthesia.<sup>7,8</sup>

Marashi et al did a study on 66 patients posted for total thyroidectomy without lymph node dissection, reported significantly lower VAS pain scores in clonidine group as compared to gabapentin group ( $P < 0.001$ ).<sup>9</sup> But in present study VAS score was similar in both the group ( $p > 0.05$ ). This may be due to the demand of more rescue analgesia. A study done

by Prasad et al also confirmed the results of Marashi et al.<sup>1</sup> Marashi et al also reported less consumption of post-operative morphine in gabapentin group as compared to clonidine group ( $P = 0.02$ ).<sup>9</sup> But in present study, total dose of analgesic used in first 24 hour was similar in both the groups ( $p > 0.05$ ). In both the groups, only 20% patients experienced somnolence and 17% and 14% patients reported dizziness in gabapentin and clonidine group respectively ( $p > 0.05$ ). Other studies reported higher incidence of post operative nausea and vomiting in clonidine (40.9%) than gabapentin (9.1%).<sup>9</sup>

In present study, postoperative analgesic duration was significantly longer in clonidine group as compared to gabapentin ( $P < 0.001$ ).

Many workers have studied the duration of postoperative analgesic effect in clonidine group. A study done by Montazeri et al reported that when oral clonidine was used in spinal anesthesia, the mean duration of both sensory and motor blockage was increased with clonidine.<sup>10</sup> Various other workers have shown that when 150-200 mcg of clonidine was given preoperatively resulted in significant increase in sensory analgesia.<sup>7,8,11</sup> Prasad et al did a randomized study on 90 females of 30-60 years of age who underwent vaginal hysterectomy under spinal anesthesia reported that duration of analgesia was lower in clonidine group as compared to pregabalin ( $p < 0.001$ ).<sup>1</sup>

Partahusniutojo did a similar study and confirmed that mean duration of analgesia was significantly increased with clonidine when 150 mcg was used in spinal anesthesia.<sup>12</sup>

## CONCLUSION

In our study, patients who were premedicated with clonidine showed better pain tolerance compared to gabapentin. Although the VAS scores were almost similar, patients in clonidine group showed lesser need for rescue analgesia compared to those in the gabapentin group. Thus we conclude that clonidine was an better adjuvant compared to gabapentine when given orally 1 hour before spinal block.

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# A Holistic Approach for Management of Squamous Cell Carcinoma of Maxilla: A Case Report

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## ABSTRACT

**Introduction:** Oral squamous cell carcinoma (SCC) is a malignant neoplasm, originating from the oral epithelium. Incidence and mortality rates for oral SCC may vary depending on personal habits, socioeconomic characteristics, environmental factors and quality of health care facilitates available in the geographical location.

**Case Report:** This paper presents a case of 45-year-old female patient diagnosed with moderately differentiated squamous cell carcinoma of the maxilla. The treatment provided was right hemi-maxillectomy with split thickness skin grafting, followed by maxillary obturator for obliteration of the surgical defect and dental rehabilitation.

**Conclusion:** The paper highlights comprehensive management of maxillary SCC to provide disease-free life, as well as restore the form and function post-operatively.

**Keywords:** Oral cancer, surgery, rehabilitation, skin graft, maxillectomy

## INTRODUCTION

Oral cancer is a global health problem of increasing incidence and high mortality rates. More than 5,00,000 patients worldwide are estimated to have oral cancer.<sup>1</sup> The International Association for Cancer Research (IARC) and the World Health Organization (WHO) latest records show an incidence of 2,63,020 cases (3.8 rate) with high mortality 127,654 (1.9 rate). Unfortunately, the 5-year survival rate has not changed during the last half of the century (still being around 50–55%), in spite of the advances in diagnosis and treatment.<sup>2</sup> Early diagnosis is of utmost importance for reducing cancer mortality, since the identification of smaller lesions allows less aggressive and debilitating treatments.<sup>3</sup> However, almost half of intraoral cancers have late diagnosis (stages III or IV). Diagnostic delay is, the main reason why most patients' of oral SCCs are discovered in advanced stages, leading to significant increase in post-operative morbidity and mortality.<sup>4</sup>

## CASE REPORT

A 45-year-old female patient reported to Maxillofacial Surgery Department of Krishna Hospital, Karad, with a complaint of pain on the right side of upper jaw since 3 months. The pain was of a dull aching type and continuous in nature. The pain was referred to the right pre-auricular region. It aggravated on mastication, mouth opening and any other para-functional movements of the jaw and relieved on taking medications. The patient also complained of swelling on right side of the face and burning sensation on an intake of hot and spicy food.

Medical history revealed that patient was known asthmatic and on medication for same (Tab Deripylline 200 mg). A pre-

vious incisional biopsy report suggestive of a non-specific inflammatory lesion was available with the patient. Personal history revealed mishri (roasted tobacco used to clean teeth) application 2 times a day for past 15 years.

On clinical examination an extra-oral diffuse swelling over right mid-face extending anterior-posteriorly from ala of nose up to malar prominence and superior inferiorly from 0.5 cm below the inferior orbital ridge to the corner of the mouth was seen (Figure 1a). Swelling was tender and hard in consistency. There was no rise in local temperature. Cervical lymph nodes were not palpable bilaterally.

On intraoral examination, 3 X 3 cm ulcero-proliferative growth was appreciated in the right gingivo-buccal sulcus, extending from upper right canine up to the right first molar area. The lesion was red and white in appearance with a rough surface, ill-defined rolled out edges and fixed to underlying bone. (Figure 1b) The lesion extended over to the palatal mucosa. Radiographic examinations (para-nasal sinus view and orthopantomogram) showed the lesion invading the maxillary alveolus reaching up to the floor of the maxillary sinus on the right side. An incisional biopsy of lesion was carried under local anesthesia. A histopathological finding was suggestive of moderately differentiated squamous cell carcinoma. Distant metastasis was ruled out on chest, abdomen and pelvis radiographs and ultrasonography examination. The patient was subjected to cone beam computed tomography (CT) scan of face and neck for further evaluation and better surgical planning (Figure 2). The treatment plan included excision of the lesion (right hemi-maxillectomy, sparing the infraorbital nerve and orbital floor). Classic Weber-Ferguson incision was placed and left hemi maxilla was exposed. (Figure 3a, b) Low level hemi-maxillectomy was done with the sufficient safe margins (Figure 3c, d). Maxillectomy defect was lined with meshed split thickness skin graft harvested from patient's right thigh. A surgical plate (feeding plate) was placed after completion of the surgery (Figure 3e, f). The excised specimen was sent for histopathological evaluation, which confirmed the diagnosis of moderately differentiated Squamous Cell Carcinoma. All

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the margins, the excised specimen were free including the lining of maxillary sinus excised from the superior part of the roof of the sinus. Interim obturator was given to the patient after contraction of the defect. After an initial healing period, 6 weeks of radiotherapy was advised. Each week, 5 cycles of radiotherapy, (1.8 to 2 Gy each) was given to the patient (total radiation dose: 55 – 60 Gy). At 9 months postoperatively, a final dentate functional obturator was fabricated to restore the missing tooth and obliterate the maxillectomy defect (Figure 4). The patient was put on periodic recall and did not show any sign of recurrence.

**DISCUSSION**

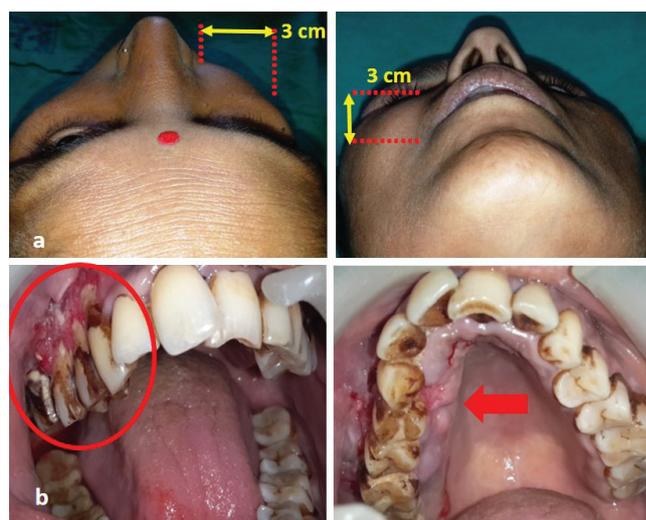
Squamous cell carcinoma (SCC) constitutes about 90 % of all malignant neoplasias of oral mucosa. It often involves tongue, buccal mucosa, gingival alveolus and floor of the mouth. It is more common in male and usually seen in fourth to sixth decade of life. Cause of SCC IS multifactorial ranging from environmental, social and behavioral causes, with prime causes being smoking and drinking addiction of an individual.<sup>6</sup>

The initial clinical presentation of SCC may mimic leukoplakia, erythroplakia or leuko- erythroplakia. Its growth can be either exophytic or endophytic. In majority of cases, smaller lesions are asymptomatic and pain appears only when muscles or nerves are invaded at advanced stages of the disease. In most advanced cases, in which the underlying bone are affected, the radiographic examination shows radiolucent areas without defined limits.

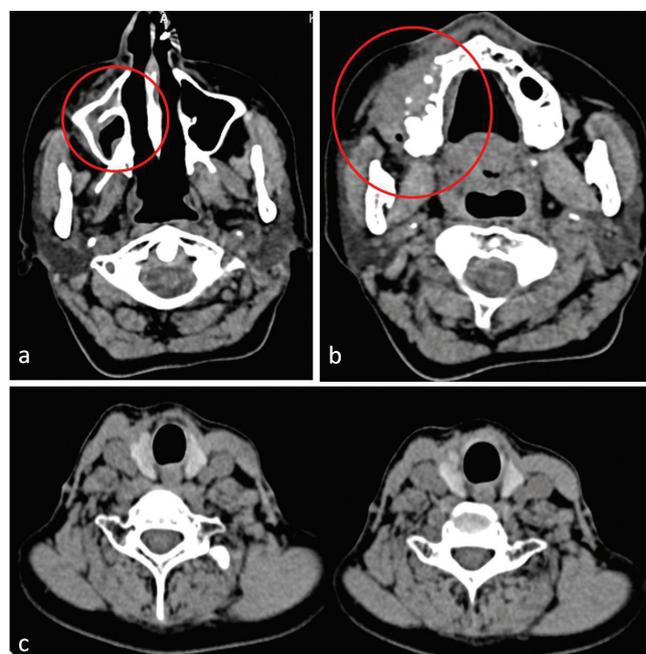
Early detection of pre-malignant and malignant lesions are possible if every dental professional performs oral screening in the suspected group of patients. On detection of any lesion, a biopsy should be advised, if the lesion doesn't regress within 12-14 days. Diagnostic adjuvants like exfoliate cytology, brush biopsy, toluidine blue staining, auto fluorescence, salivary proteomics, DNA analysis, biomarkers and spectroscopy help in differentiating dysplastic tissue from a normal one.<sup>6</sup> The confirmatory diagnosis is obtained by histopathological examination which also determines the type and stage of the lesion. Early diagnosis effects the treatment outcome and consequently the prognosis and the patient's survival.

For a complete rehabilitation of such patients, an interdisciplinary approach should be taken into consideration for the restoration of form, function and well-being of the patient. The choice of treatment largely depends on the site, stage of the disease and on the overall health status of the patient. Early stages of intraoral cancers are likely to be cured by surgery alone. Advanced tumors (stages III and IV) generally require surgery, followed by radiation therapy. Radiotherapy is associated with side effects that vary in intensity and duration and are dependent on several factors. Not all patients will experience all possible complications but they should be aware of the potential risks.

In case of squamous cell carcinoma of the maxilla, the extent of tumor decides the type of maxillectomy. For smaller lesions, alveolectomy through an intra-oral approach is preferred. Weber Fergusson incision is the preferred extra oral approach for larger and aggressive lesions invading



**Figure-1:** Extra oral examination of the swelling present on right side upper cheek region (a), Intra oral examination of the ulcero proliferative growth present on right maxillary alveolus (b)

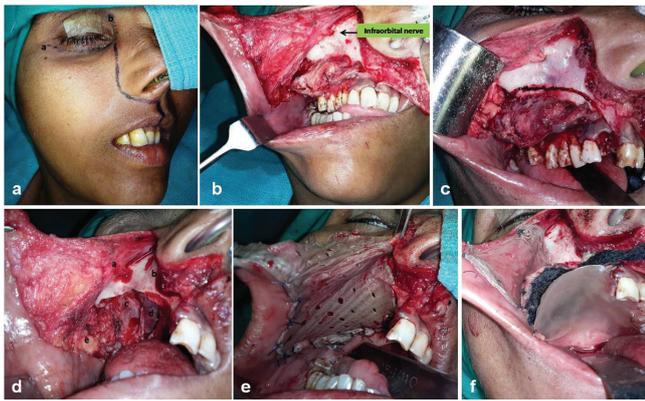


**Figure-2:** CT scan face (axial view) showing obliteration of maxillary sinus and invasion of buccal cortex of the right alveolus, involvement of the medullary bone reaching upto palatal cortex (a and b), CT scan neck (axial view) showing no lymph nodes enlargement (c)

surrounding structures like nose, orbit or maxillary sinus. Modification of Weber Fergusson incision like Lynch and subciliary extensions are to be incorporated if tumor extends superiorly and laterally respectively.<sup>7</sup>

The cosmetic, functional and psychological results of oral cancer treatment may combine to produce devastating effects on the patient, especially if the tumor is extensive. A variety of functions including speech, deglutition, management of oral secretions and mastication requires well planned reconstructive options.<sup>8</sup>

The reconstructive ladder algorithm advocates that reconstruction of post-ablative surgical defects should be achieved through least invasive way. The reconstruction option may



**Figure-3:** Surgical steps (a) Weber Ferguson incision marked along with its extension, a: subciliary extension, b: Lynch extension for demonstration purpose, (b) exposure of the lesion (c) osteotomy cuts placed for the excision of the lesion, (d) hemi maxillectomy defect; a-infra orbital nerve, b-pyriform fossa, c-roof of antrum, d-nasal mucosa, e-buccal pad of fat (e) split thickness skin graft lining the maxillary defect, (f) defect packed with betadine soaked roller guaze and secured with surgical plate



**Figure-4:** Final Obturator was given 9 months after Surgery.

vary from primary closure of the defect, skin grafts, local flaps, regional flaps to more advanced free tissue transfer, subject to the type and extent of the defect.<sup>8</sup> In the present case, split thickness skin graft followed with obturator was the choice of treatment to obliterate the maxillectomy defect. Split-thickness skin grafts (STSGs) may be harvested from any surface of the body, but the sites chosen should be concealed easily in recreational clothing and minimize the discomfort during re-epithelialization. Common sites include the upper anterior and lateral thighs. A split-thickness skin graft provides a tissue surface that accepts pressure and has more friction resistance. The scar band that forms at the junction of the residual mucosa and skin graft assists in retention of the obturator at the defect site.<sup>9</sup>

Postsurgical maxillectomy defects predispose the patient to hyper nasal speech, leakage of fluid into the nasal cavity, and impaired masticator function. The prosthesis used to repair the defect is known as a maxillary obturator. An obturator (derived from Latin word obturate, meaning to stop up) is a disc or plate, which closes an opening or defect of the maxilla as a result of a partial or total removal of the maxilla. The goals of prosthetic rehabilitation, include separation of oral and nasal cavities to allow adequate deglutition and articulation, possible support of the orbital contents to prevent enophthalmos and diplopia, support of the soft tissue to restore the mid facial contour, and an acceptable esthetic

result.<sup>10</sup> Prosthodontic therapy for patients with acquired surgical defects of the maxilla can be divided into three phases of treatment: the surgical obturator, the temporary obturator and the definitive obturator, each phase serving a different purpose. The surgical obturator is a base plate appliance which is constructed from the preoperative impression cast and inserted at the time of resection of the maxilla in the operating room. The surgical obturator provides a barrier on which the surgical packing can be placed. It maintains the packing in the proper relationship, thus ensuring close adaptation of the skin graft. It also reduces oral contamination of the wound during the immediate postsurgical period and may thus reduce the incidence of local infection, and the nasogastric tube maybe removed early. Hence, it is also called as feeding plate. The temporary obturator is constructed from the postsurgical impression cast. The closed bulb extending into the defect area is hollow. It is given after initial healing and contracture of the defect. A definitive obturator is not indicated until the surgical site is healed and dimensionally stable and the patient is prepared physically and emotionally for the restorative care that maybe necessary. The most important aspect of stability is occlusion. Maximal distribution of the occlusal force in centric and eccentric jaw positions is imperative to minimize the movement of the prosthesis and the resultant forces on individual structures. The majority of maxillectomy defects can be ideally reconstructed with an uncomplicated prosthetic obturator, facilitating easy surgical follow-up. Benefits of rehabilitation with an obturator, include the ability to visualize the defect for ongoing cancer surveillance and restoration of function with minimal surgical intervention in a timely manner.<sup>10</sup>

## CONCLUSION

Oral cancer is one of the common cancers seen in our sub-continent. The Oral SCC of the maxilla is usually due to tobacco, gutka, pan, pan masala or mishri. Early detection is always beneficial not only for the patient but also for the surgeon. Advanced cases should be treated by the multispecialty approach. Patient should not only be disease free but should be adequately rehabilitated to give an opportunity to carry out his/her day to day activities. Rehabilitation and reassurance of the patient provide increased post-operative prognosis and survival rate.

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# Complete Androgen Insensitivity Syndrome in an Adult - A Rare Entity

Mandepudi Geethika<sup>1</sup>, K. Mounika Reddy<sup>1</sup>, K. Venkat Ramreddy<sup>2</sup>, R.S.N. Moorthy<sup>3</sup>

## ABSTRACT

**Introduction:** Androgen insensitivity syndrome is a rare disorder affecting androgen receptor gene in individuals with XY karyotype. It is an X linked recessive disorder. It is characterized by resistance of male human cells to respond to androgens resulting in female phenotype due to androgen receptor gene mutation. They have normal female external genitalia, normal breasts but no mullerian duct derivatives with testis in abdominal or inguinal location. They present with bilateral inguinal hernia in females, primary amenorrhea or infertility. Malignant transformation of testis is a risk factor in these individuals. Diagnosis is done by clinical features, imaging, laboratory findings and karyotyping. Management is multidisciplinary approach which includes disclosure of condition to the patient at appropriate age, vaginoplasty for sexual activity, gonadectomy and hormone replacement therapy.

**Case Report:** We report a case of a female of age 20yrs with complaints of infertility. On investigating there are no mullerian duct derivatives and no ovaries or testis. Final diagnosis was done with karyotyping which showed XY karyotype.

**Conclusion:** Ultrasound is initial method of investigation for evaluation of mullerian structures. However MRI is gold standard investigation. Medical and surgical care forms part of management.

**Keywords:** Androgen insensitivity syndrome, XY karyotype, bilateral inguinal hernia.

CAIS as androgen receptor is completely unresponsive to androgens. They present with primary amenorrhea or infertility. They do not have uterus, cervix, fallopian tubes and ovaries. Breast development is normal with abnormal composition. Pubic and axillary hair is scanty or absent. Undescended testicles may be present or they may be atrophied. Testosterone is in the normal range for males.<sup>1</sup>

## Partial androgen insensitivity syndrome

When the patients have some function of the AR, their phenotypic presentation varies from mildly virilized female appearance to undervirilized male appearance. It is suspected when ambiguous genitalia is present at birth. Mullerian structures are absent but some structures of wolffian ducts are present depending on the amount of functionality of AR.<sup>1</sup>

## Mild androgen insensitivity syndrome

In MAIS (“undervirilized male syndrome”) XY karyotype, Mullerian structures are absent. Spermatogenesis may be impaired. Gynecomastia is seen in puberty.<sup>1</sup>

## CASE REPORT

**Patient:** A Patient aged 20 years with female habitus and voice having normal intellectual function was referred to the radiology department for evaluation of primary amenorrhea and infertility.

**Clinical features:** Patient came with chief complaints of primary amenorrhea and infertility. Patient’s sister was found to have similar complaints. On general physical examination, patient had normal adipose tissue distribution, absent hair over the body and axilla with scanty pubic hair, breast showed tanner stage 3. On gynecological examination, patient had normal female external genitalia, no clitoromegaly and per vaginal examination revealed a long and blind ending vagina.

**Imaging:** On ultrasound, absent uterus with a normal vagina is seen.

Both the ovaries are not visualized as shown in Tranabdominal image in fig (1).

There is no inguinal hernia and the testis could not be visualized.

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## INTRODUCTION

Disorders of sex development (DSD) refer to a group of congenital conditions in which development of chromosomal, gonadal, or anatomical sex is atypical. Androgen Insensitivity syndrome (AIS), is a DSD affecting the androgen receptor (AR).<sup>1</sup>

From 8 weeks of gestation in male embryo, AR gene is expressed. Testis starts secreting testosterone from 9 weeks. By the action of testosterone, Wolffian duct differentiates into epididymis, vas deferens and seminal vesicles. 5alpha-reductase type2 acts on testosterone to produce a powerful androgen, dihydrotestosterone. This powerful androgen acts on AR and stimulates differentiation of primordial external genitalia. Androgen receptor is coded by AR gene present on X chromosome and so the inheritance pattern is X linked recessive. Several mutations occur in androgen receptor gene, leading to impairment of receptor function.<sup>2,3</sup>

The phenotype of AIS is variable depending on the functionality of the AR. Three different phenotypic presentations are: Complete androgen insensitivity syndrome  
Partial androgen insensitivity syndrome and  
Mild androgen insensitivity syndrome.

## Complete androgen insensitivity syndrome

Phenotypic presentation is completely female from birth in

Both the kidneys were normal.

MRI abdomen with pelvis was done, testis could not be visualised. Rest of the findings were consistent with ultrasound i.e., absent uterus and ovaries with intact vagina. Fig (2) is sagittal T2 Weighted Fat sat image showing absent uterus. Fig (3) and (4) are Coronal T1 and T2 – weighted images showing absence of uterus and ovaries respectively.

**Karyotyping:** Blood sample is sent for karyotyping which revealed 46 XY.

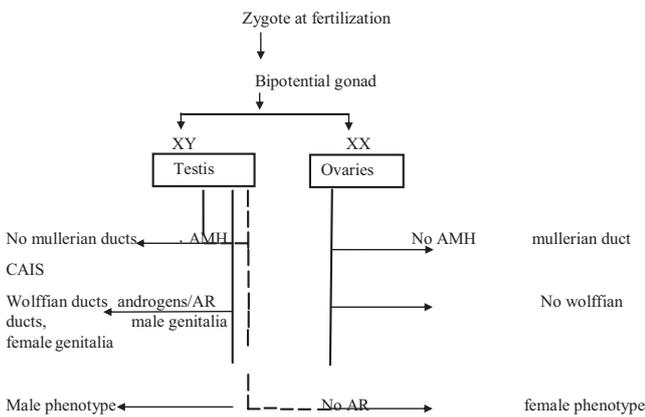
**DISCUSSION**

Complete androgen insensitivity syndrome is an X-linked recessive androgen receptor disorder. It is characterized by a female phenotype with an XY karyotype. The prevalence of this disorder is between 1 and 5 in 100,000 genetic males. They have normal female external genitalia and because these individuals are with XY karyotype, they do not have Müllerian duct derivatives. Testis is present in abdomen, labial or inguinal region.<sup>4</sup>

There are three phenotypes of AIS which represent a spectrum of defects in androgen action:<sup>5</sup>

- Complete androgen insensitivity syndrome (CAIS), with typical female external genitalia
- Partial androgen insensitivity syndrome (PAIS) with wide range of virilization.
- Mild androgen insensitivity syndrome (MAIS) with typical male external genitalia.

**Pathogenesis:** X-linked androgen receptor gene, encodes for the ligand-activated androgen receptor--a transcription factor and member of the nuclear receptor superfamily.<sup>6</sup> AR gene is responsible for normal development of both internal and external genitalia in 46XY individuals. About 400 AR gene mutations are identified which are responsible for AIS.<sup>7</sup> Pathogenesis is shown below<sup>6</sup>:



**Clinical manifestations**

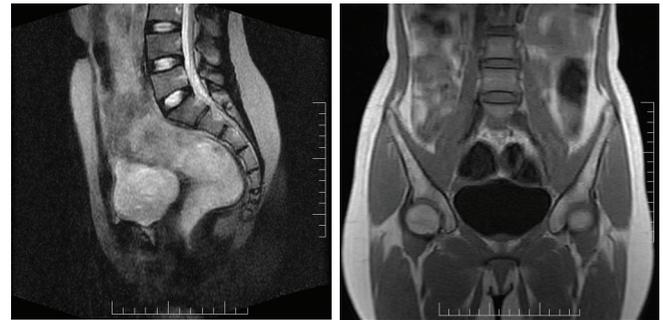
CAIS have female phenotype with no mullerian duct derivatives and ovaries. They do not even have Wolffian duct derivatives.

These patients may present

1. When there is discrepancy between antenatal and post-natal phenotype or prenatally because of difference in karyotype result and anatomical gender at birth.
2. Monolateral or bilateral inguinal hernia or masses before puberty. On examination these masses are actually testis.



**Figure-1:** Transabdominal image shows absent uterus with normal vagina. Ovaries are not visualised



**Figure-2:** Sagittal T2W FS image shows absent uterus; **Figure-3:** Coronal T1W image showing absence of uterus and ovaries respectively



**Figure-4:** Coronal T2W image showing absence of uterus and ovaries respectively

3. At puberty they present with amenorrhea. They have normal breasts and external genitalia with scanty or absent pubic and axillary hair. On imaging, there is blind ending vagina, no uterus and ovaries.

Testis is generally present in inguinal region, labia majora and can also be intra-abdominal. They are usually fibrosed, atrophied or very small in size. These testis have a risk of malignancy especially germ cell tumors or gonadoblastomas.<sup>2,8</sup>

There are five grades of PAIS depending on the severity of undervirilization

1. Normal female genital phenotype, with androgen-dependent pubic and/or axillary hair development at puberty.
2. Female phenotype with mild clitoromegaly or small degree of posterior labial fusion.
3. There are undifferentiated phallic structures intermediate between clitoris and penis, and the urogenital sinus presents perineal orifice and labioscrotal folds.
4. Predominantly male phenotype with perineal hypospadias.

dias, small penis, cryptorchidism or bifid scrotum.

5. Presents with isolated hypospadias and/or micropenis. The clinical features of the last described PAIS forms are very similar to the MAIS.

In MAIS, at puberty, there is alteration in the spermatogenesis and fertility, more commonly they present with impotence and gynecomastia.<sup>3</sup>

**Endocrine features:** Endocrine features of CAIS and PAIS are the same.

1. During early infancy, serum Luteinizing Hormone (LH) and Testosterone (T) are normal or overproduced.
2. Until the puberty, LH and T levels are in the normal range.
3. At the puberty, because of androgen insensitivity, there is no feedback on hypothalamus and hypophysis and this results in elevated T and LH levels. Normal development of breast in CAIS is due to increased estrogen levels formed by action of aromatase on increased testosterone levels. Anti-Müllerian Hormone (AMH) concentration is normal.
4. The bone mineral density is less in women affected by CAIS and are at risk of osteoporosis.<sup>2,3</sup>

#### Diagnosis

1. No female internal genitalia and gonads on imaging
2. 46XY karyotype
3. Elevated testosterone and LH hormone levels
4. Clinical findings like female phenotype, normal breast and absent axillary, pubic hair.

All these features confirm the diagnosis of CAIS. The specific mutation responsible for androgen receptor defect can also be identified.<sup>2</sup>

**Differential diagnosis:** The differential diagnosis of CAIS include 17  $\beta$ -hydroxysteroid dehydrogenase type 3 deficiency (17  $\beta$  HD-3), Swyer syndrome and MRKH syndrome.

In 17  $\beta$ -hydroxysteroid dehydrogenase type 3 deficiency, the external genitalia is of female phenotype. The presence of wolffian duct derivatives, male voice, pubic and axillary hair growth and sometimes clitoromegaly are important diagnostic clues for differentiating 17  $\beta$  HD-3 deficiency from CAIS. Because of ineffective level of androgen there is no prostate development in these patients.

In Swyer syndrome, (XY gonadal dysgenesis), there is uterus with normal axillary and pubic hair but lacks breast development.

In MRKH syndrome, there is no uterus but breast development is normal. It can be differentiated from CAIS by presence of ovaries and 46 XX.<sup>9</sup>

**Management:** Management of androgen insensitivity syndrome is a multidisciplinary approach.<sup>6</sup>

Full disclosure about the condition to the child should be done before adulthood. Extensive counselling and psychological support is also important. Dilator therapy or vaginoplasty is done before sexual activity is contemplated.<sup>2</sup>

Due to the risk of malignant transformation of testis, gonadectomy should be done. This is done after puberty as risk of developing malignancy is rare before puberty. In patients who develop virilisation, gonadectomy should be done immediately to preserve the female phenotype. Bilateral lapa-

rosopic gonadectomy is the preferred procedure for removal of intra-abdominal testes.<sup>10</sup>

Because gonadectomy is done, hormonal replacement therapy is required to induce puberty and/or maintain secondary sexual characteristics, to maintain bone density. For this purpose, generally estrogens are used.<sup>11</sup>

#### CONCLUSION

CAIS is a very rare disorder. Based on Clinical features, imaging, laboratory findings and karyotyping diagnosis is done. Imaging is necessary for planning gonadectomy and for watchful waiting in those who refuse surgery. Medical care and surgical care forms the mainstay of treatment. Psychosocial support and Hormone replacement therapy are two aspects of medical care. Vaginoplasty and gonadectomy are two aspects under surgical care.

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# Placement of Immediate Implants in the Anterior Maxilla –A Case Report

Sunil Kumar Singh<sup>1</sup>, Sadam Srinivasa Rao<sup>2</sup>, Prabuddh Sen<sup>1</sup>, K.V. Ramana Reddy<sup>3</sup>

## ABSTRACT

**Introduction:** Immediate dental implants have greatly reduced the treatment time and the number of surgical interventions. Recently it has been noted that this treatment modality can be used in aesthetically demanding cases especially the anterior maxilla.

**Case Report:** In the present case report a 23 year old male patient reported to our unit with fractured upper front teeth. After careful examination and treatment planning immediate implant treatment was initiated. The teeth were extracted atraumatically. We placed two implants into the extraction sockets. The defect was closed with Perioglas graft. The prosthetic rehabilitation was done with metal ceramic crowns.

**Conclusion:** It was found that the immediate implant therapy has several advantages such as reduced treatment length, preservation of soft and hard tissues surrounding the implant and reduced number of operations. Immediate implant treatment therefore has a great future in the treatment of aesthetic zones.

**Keywords:** Immediate implant, perioglas, Aesthetic zone

## INTRODUCTION

Dental implants have become a standard treatment option for replacement of missing teeth. Originally, it was standard protocol to wait for a period of 6 to 8 months after tooth extraction, to place the dental implant. This was to allow for the healing of the alveolar bone.<sup>1</sup> However this waiting period was a major disadvantage of this treatment modality. Subsequently, attempts were made to shorten this duration of waiting period. Techniques such as early placement, immediate delayed placement and immediate placement were developed.<sup>2</sup> Moreover, the aesthetic requirement of the patient has to be taken into consideration for shortening the treatment time wherever anterior teeth were to be replaced. The immediate implant placement in an extraction socket was first described by Schulte and Heimke in 1976.<sup>3</sup> Not only are the time period and number of operations reduced, several other advantages have been put forth including improved implant survival rates, better aesthetics, higher patient satisfaction as compared to delayed implants and prevention of undue resorption bound to happen post extraction.<sup>4</sup> It also allows for maintenance of gingival form and promotes periimplant gingival tissue esthetics by maintaining the interdental papillae. Small osseous defects, which are frequently found adjacent to implants placed at the time of tooth extraction, can be grafted with autogenous or synthetic bone grafts. However, because of the nature of this treatment method, a higher risk of complications and failures may be expected.<sup>1</sup> In this case report the harmony of hard and soft tissues was preserved by immediate implant placement.

## CASE REPORT

A 23 year male patient reported to the Department of Oral and Maxillofacial Surgery, Army College of Dental Sciences with a complaint of fractured upper front teeth due to trauma. Relative medical history was sound. The following teeth were fractured – 11, 21 and 22. (Fig. 1) Unfavourable prognosis for the teeth was explained to the patient. The patient was informed about various treatment options. The patient being conscious about esthetics and early rehabilitation opted for immediate implant placement.

Pre surgical radiographic evaluation was carried out with OPG (Fig. 2) and IOPA for appropriate treatment planning. After measuring the socket lengths implants (ADIN) of size 4.2\*13.5 mm were selected. After injecting 2% lignocaine (1:80,000 conc.), the fractured teeth were atraumatically extracted using a periosteal elevator (Fig. 3). However, during the extraction of 22, the buccal cortical plate got fractured and we decided to proceed with placement of two instead of three implants. The extraction sockets were evaluated for any osseous defects, infection or granulomatous tissue. The sockets were thoroughly debrided with saline solution and after sequential drilling with copious irrigation, the implants were placed (Fig. 4). The residual gaps between the implants and the cortical bone, was filled with Perioglass. The closure of the site was done using 3-0 vicryl sutures. The second stage surgery was done after a healing period of 6 months. The implants were exposed carefully, without damaging the surrounding bone. The gingival former was placed and kept in place for 2 weeks, then removed. A closed tray impression was made, using implant analogues and transfer coping, using addition silicone impression material. The shade of the prosthesis was matched with Vita 3D Shade Guide. A metal ceramic prosthesis was fabricated. The crowns were cemented with Glass Ionomer luting cements on the abutment (Fig. 5) Post operative OPG was taken. Follow up was done over a period of 18 months.

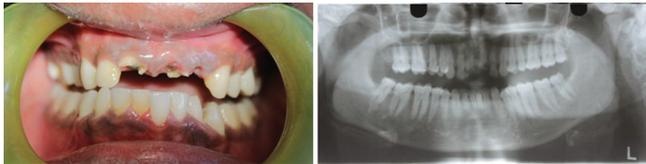
## DISCUSSION

There are many indications for immediate implant place-

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**Figure-1:** Fractured anterior teeth; **Figure-2:** OPG



**Figure-3:** Extraction socket; **Figure-4:** Implant placed



**Figure-5:** After final prosthesis

ment such as tooth extraction due to root fracture secondary to trauma, root resorption, unfavourable crown root ratio. Contraindication include acute infection, loss of bone in periapical region, and severe gingival recession. The proper case selection and surgical technique is important for success of immediate implants.

There are several controversies about local pathology having an adverse effect on the treatment outcome. Chronic infection is not an absolute contraindication, but debridement of the alveolus is recommended. The use of antibiotic prophylaxis is useful in medically compromised patients. In the present study local pathology was not present.<sup>1</sup>

Initially, it was said that immediate placement of implants preserves alveolar bone.<sup>5</sup> However this is considered to be controversial since morphologic hard and soft tissue changes of the post-extraction site may occur despite immediate placement. Also, slightly palatal or lingual placement of the implant in the extraction socket is recommended. This avoids exposure of the implant surface because buccal wall of socket is thin. Also, in order to preserve the alveolar bone, careful extraction is important and it is advised to section multi-rooted teeth before extracting! It is accepted that when a gap of more than 2mm is present between the implant and cortical bone, bone grafting is advised, because the potential for spontaneous bone formation in such defects is poor.<sup>6</sup> Good results were obtained in our case, where we used Perioglas bone graft. It has been noted in the literature that immediate implant success rates in the maxilla is lower than that of the mandible. Therefore, extra caution

must be exercised while working on the anterior maxillary region, especially with respect to bone preservation.<sup>7</sup> There are multiple advantages of immediate implants, including reduction in the number of operations and the overall length of treatment. Other suggestive advantages include ideal orientation of the implant, preservation of the bone at the extraction site and other optimal soft tissue esthetics.<sup>8</sup>

## CONCLUSION

In this case, our patient met all the indications for immediate implant placement. Using this technique, we were able to provide the patient with a desirable aesthetic and functional outcome. Immediate implant placement may be a highly technique sensitive procedure. However, careful case selection and treatment planning usually result in good success rates.

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# Sero-Prevalence of Dengue in A Sub-Urban Region

Deepali Danave<sup>1</sup>, Vijay Kulkarni<sup>1</sup>

## ABSTRACT

**Introduction:** Dengue has become endemic in India with outbreaks occurring almost every year. Detection of dengue specific IgM and IgG antibodies forms an important tool in diagnosis and prevalence studies. Our goal was to screen patients for dengue antibodies to establish the sero-prevalence.

**Material and Methods:** The study was conducted in a tertiary care teaching institute from Jan-Dec. 2008. Blood samples of 103 clinically suspected cases of dengue were collected from various OPDs and IPDs. Detection of IgM and IgG antibodies was done by enzyme immunoassay (EIA) based on an immunocapture principle.

**Results:** Of the total samples 76.69% were positive for dengue antibodies with dominance of paediatric population. Maximum samples (74.68%) were positive for IgG antibodies followed by a combination of IgM + IgG antibodies (18.98%) and least for IgM antibodies (6.32%).

**Conclusion:** Though less specific compared to NS1 antigen assay IgM / IgG antibody detection still forms mainstay of diagnosis of dengue in peripheral and resource poor settings.

**Keywords:** Dengue infection (DI), IgM / IgG antibodies.

## INTRODUCTION

Dengue is a fatal viral infection with wide clinical spectrum. Uneventful primary infections are the commonest though it can culminate into dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).<sup>1</sup> The etiological agent is four serotypes of dengue virus (DV) namely DEN-1, DEN-2, DEN-3 and DEN-4 belonging to genus Flavivirus and family Flaviviridae. The primary vectors for its spread are infected *Aedes aegypti* and *Aedes albopictus* mosquito species.

Dengue is almost endemic throughout India. In tropical areas the vector is active year around and dengue occurs throughout the year. Diagnosis of dengue infection (DI) may be made by RT-PCR or by the isolation of virus from the blood in cell cultures.<sup>2</sup> These gold standard tests for identification of DI are not within the reach of peripheral and even most tertiary care laboratories. Of late, non-structural protein 1 (NS1) antigen detection is available for diagnosis of DI.<sup>3</sup> Serologic diagnosis depends on the demonstration of fourfold or greater rise (or fall) in antibody titres.<sup>2</sup> Detection of dengue specific IgM/IgG antibody has been the mainstay of diagnosis of DI.

We undertook the current study to evaluate the serologic and demographic profile of dengue patients in our suburban area.

## MATERIAL AND METHODS

The study was conducted in the Department of Microbiology at a tertiary care teaching hospital from January 2008 to December 2008 after obtaining institutional ethical clearance and informed consent from the selected subjects. A total number of 103 blood samples were collected from clinically suspected cases of dengue virus infection, coming to various

OPDs, IPDs and emergency services in our hospital. Patients having fever, headache, myalgia of 4-5 days or more were referred by the physicians and samples were collected after informing patients. Sera were separated and subjected to detection of dengue specific IgM/IgG antibodies by using enzyme immunoassay (EIA) based on an immunocapture principle. The test kits used were ImmunoComb® II-Dengue IgM and IgG BiSpot manufactured by ORGENICS Ltd., Yavne, Israel.

The tests were performed strictly as per the manufacturer's instructions. This being an investigational study, rigid statistical parameters were not considered.

## STATISTICAL ANALYSIS

Descriptive statistics were used to generate results. Tables were made with the help of Microsoft excel.

## RESULTS

Of the 103 serum samples tested, 79 samples (76.69%) were positive while 24(23.30%) were negative for dengue antibodies (Table 1). Of the positive samples 53 (67.08%) belonged to the paediatric age group (less than 12 years) and half of it i.e. 26 samples (32.91%) were from adult population (Table 2). Amongst the positive cases 59 samples (74.68%) had IgG antibody, 15 samples (18.98%) had both IgM and IgG antibodies while 5 samples (6.32%) had only IgM antibody (Table-3). The ratio of male to female cases was the same.

## DISCUSSION

Effective and accurate diagnosis of dengue is of primary importance for clinical care, early detection of severe cases, case confirmation and differential diagnosis.<sup>4</sup> Dengue can be diagnosed by serological tests such as dengue specific NS1 antigen and IgM and IgG antibodies. As per the guidelines of WHO,<sup>4</sup> NS1 antigen can be detected up to 9 days after the onset of illness. 50 % of the patients are sero-positive for IgM antibodies by days 3-5 after the onset of illness increasing to 80% by day 5 and 99% by day 10. IgM levels peak about 2 weeks after the onset of symptoms and then decline generally to undetectable level after 2-3 months. Low titre of anti-dengue serum IgG is generally detectable at the end of the week of illness increasing gradually thereafter with serum IgG still detectable after several months and probably even for the life.<sup>4</sup>

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Duration	Total	Positive	Negative
Jan-Dec 2008	103	79(76.69%)	24 (23.30%)

**Table-1:** Distribution of total samples

	Paediatric Group	Adult Group	Total
Males	28	11	39
Females	25	15	40
Total	53(67.08%)	26(32.91%)	79

**Table-2:** Age-wise and sex-wise distribution of positive cases

Positivity	IgM	IgG	IgM + IgG	Total
Males	2	30	7	39
Females	3	29	8	40
Total	5 (6.32%)	59(74.68%)	15 (18.98%)	79

**Table-3:** Antibody-wise distribution of positive cases

Our study focused on evaluation of DI by detection of IgM / IgG antibodies. The high rate of seropositivity (76.69%) that we detected underlines the fact that this suburban area is probably endemic for dengue. We found that paediatric population was double the adult population in sero positivity. IgM positive cases (6.32%) indicated primary infection in the earlier stages, IgM + IgG positive cases (18.98%) indicated late primary or secondary infection. Maximum cases (74.68%) however were IgG positive indicating later stages of infection or old cases. With 18 out of 35 states in India now being considered endemic for dengue and the spread of the disease from urban to suburban and rural areas the actual number of cases may count in millions.<sup>5</sup> Explosive dengue epidemics are being reported every year from more than 100 endemic countries spanning South-East Asia, Western Pacific, Africa, the Americas and the East Mediterranean.<sup>6</sup> A study has reported that NS1 test followed by NS1 + IgM and IgG test would provide all the information required for a dengue patient.<sup>7</sup> Another study substantiates that NS1 Ag assay alone and when used in combination with IgM ELISA has the ability to improve diagnostic algorithm.<sup>8</sup> Apart from NS1 antigen, IgM, IgG detection, thrombocytopenia can also serve as a significant parameter in detection of DI.<sup>9</sup> Thus NS1 antigen assay proves to be a favourite for diagnosis of DI. Indian healthcare system is resource poor. High end technological support is available in only a few elite locations. Most tertiary care teaching hospitals lack in viral culture set-up and ELISAs for NS1 antigen detection. Though companies are providing ICT based tests for NS1 antigen detection they are not as sensitive as ELISA. Thus detection of dengue specific antibodies forms the primary tool for diagnosis in rural and semi urban areas. This is what formed the mainstay of our study. Due to unavailability we could not include NS1 detection in test panel. Nonetheless epidemiology can be well outlined by antibody detection.

## CONCLUSION

To conclude we say that IgM / IgG antibody detection comes after NS1 antigen assay. But dengue often breaks out in resource poor settings. So a laboratory has to provide reasonable diagnosis without hi-end technical support. Here anti-

body detection based assays might prove to be an excellent tool.

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# Segments of Spinal Cord Harboursing Motor Neuron Somata of Median Nerve in Rabbit

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## ABSTRACT

**Introduction:** Median nerve is the main nerve of forearm. With knowledge of location of motor roots we can explain motor loss of different muscles of forearm. The study was conducted with an aim to see the segments of spinal cord harbouring motor neuron somata of median nerve in rabbit.

**Material and methods:** Six New Zealand white adult rabbits were used in the study. Retrograde changes, chromatolysis including cell body response were induced in the motor neuron somata of median nerve by sectioning the nerve of left side under general anaesthesia. The right side was used as control. The animals were sacrificed at an interval of 8 to 28 days after operation and perfused fixed in 10% buffered formalin. Cervical spinal cord segments (C4-C8) and thoracic spinal cord segments (T1 and T2) were processed for paraffin embedding. 40-micron thick serial transverse sections were obtained and stained with thionine. The stained sections were examined microscopically to identify the neuron somata showing retrograde changes including chromatolysis.

**Results:** Chromatolysis (or cell body response) was observed in the caudal part of fifth cervical (C-5) segment, the whole length of sixth to eighth cervical (C6-C8) segment and up to the middle of first thoracic (T-1) segment.

**Conclusion:** The length of the spinal cord harbouring motor neuron somata of median nerve extends from the caudal part of fifth cervical (C-5) segment up to the middle of first thoracic (T-1) segment.

**Keywords:** motor neuron somata, spinal cord segment, median nerve, chromatolysis

## INTRODUCTION

Nervous system is the system that controls and co-ordinates other systems of body. It consists of highly specialized cells called neuron and neuroglia cells which are supporting cells. Most neurons consist of a central mass of cytoplasm within a limiting cell membrane, the cell body, perikaryon or soma, from which extend a number of branched processes, or neurites. One of these, the axon, is usually much longer than the others and conducts information away from the cell body. The other processes are termed dendrites and these typically conduct information towards the soma (cell body).

Nerve cell bodies stained with basophilic dyes such as thionine, cresyl violet, toluidine blue etc. show numerous microscopic clumps of Nissl granules or Nissl bodies, which consists of rough endoplasmic reticulum and associated ribosomal RNA.<sup>1</sup>

When the axon is cut (axotomy), typical morphological changes can be seen in the cell body. There is swelling of the cell and the apparent disappearance of Nissl granules. All these changes are termed as Chromatolysis.<sup>2</sup> There is migration of the nucleus towards the periphery of the cell and an increase in the size of the nucleus, nucleolus, and cell body.

However, it has become increasingly clear that the morphological manifestations of this response are different in different cells, and the chromatolysis itself is not invariably seen.<sup>3</sup> Hence the term "axon reaction", "retrograde reaction" or "cell body response"(CBR) have come to be considered more appropriate to designate the whole range of alterations that may occur.<sup>4-6</sup> We can see the location of motor neuron somata of different nerves by producing chromatolysis or cell body response (CBR) in different animals. Location of motor neuron somata of different nerves supplying forelimb muscles have been studied by retrograde cell degeneration technique, by electrophysiological method, and by retrograde axonal transport of horseradish peroxidase (HRP).<sup>3,7-18</sup> These studies have shown the locations of motor neuron somata of major forelimb nerves in the cervical enlargement of spinal cord.

The aim of present study is to find out cranio-caudal extent of spinal cord that harbours the motor neuron somata of the median nerve in rabbit.

## MATERIAL AND METHODS

Six adult New Zealand white rabbits were used in this study. Three of them were females and three of them were males. The median nerve was cut in axilla just after where the two roots are meeting together to form the trunk of median nerve, on left side. The right side was used as control.

The operations were performed under general anaesthesia and aseptic conditions. Ether was used for general anaesthesia and inhalation route was used. The median nerve was exposed in left axilla and cut. A part of the trunk of nerve was also removed from the site of the cut to prevent reunion. Then the animals were sacrificed with an overdose of chloroform at intervals of 8 to 28 days after operation. They were immediately perfused, firstly by about 500 ml of normal saline (0.9% sodium chloride solution) followed by about 1500 ml of 10% formal saline.

On next day rabbit was dissected. Vertebral column was exposed after removing skin and muscles of the back. Spine and laminae of vertebrae were cut through bone cutter and spinal cord was exposed. Complete spinal cord including hindbrain was taken out. Segments of spinal cord was counted with the help of emerging spinal nerves. Fourth cervical

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to second thoracic segments of spinal cord were separated and kept in numbered containers filled with formalin solution. A small cut (nick) was given on right side for side identification. Tissue blocks of each segment were prepared after paraffin embedding. Serial transverse sections of each embedded segment were cut at 40 micrometers thickness. The sections (attached to albuminised slides) were stained with thionine stain and examined microscopically to identify the neuron somata showing “cell body response” (figure-1) or “typical chromatolysis” (figure-2).

## RESULTS

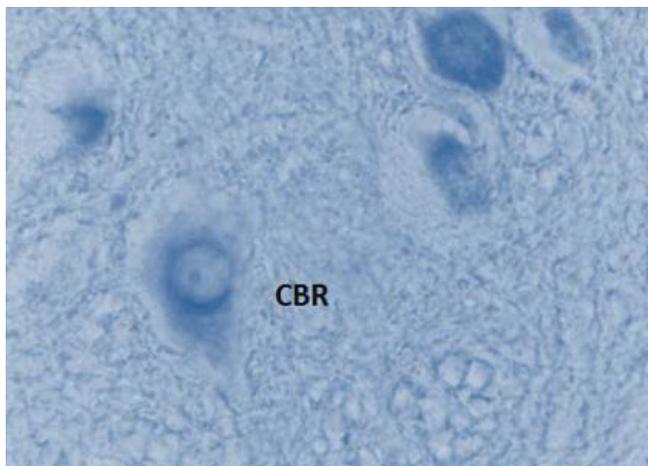
Chromatolysis (or cell body response) was observed in the caudal part of fifth cervical (C-5) segment, the whole length of sixth to eighth cervical (C6-C8) segment and up to the middle of first thoracic (T-1) segment (figure-3, 4).

## DISCUSSION

The findings of the present study are nearly in agreement with the cat where motor neuron somata of median nerve were located from midlevel of sixth cervical (C-6) to mid to caudal region of first thoracic (T-1) segments.<sup>19</sup> The findings of the present study are in near agreement with the cat where motor neuron somata of median nerve were located from caudal part of sixth cervical (C-6) to first thoracic (T-1) segments.<sup>12</sup> The findings of the present study are in near agreement with the study on cat where motor neuron somata of median nerve were located from caudal part of sixth cervical (C-6) to caudal part of first thoracic (T-1) segments.<sup>16</sup> The findings of the present study are in near agreement with the study on monkey where motor neuron somata of median nerve were located from seventh cervical (C-7) segment to caudal part of first thoracic (T-1) segments.<sup>20</sup> In Albino rat it was found that the motor neuron somata of median nerve formed a group extending longitudinally from the cranial part of sixth cervical (C-6) to caudal part of first thoracic (T-1) segments, whereas in present study motor neuron somata of median nerve in rabbit were found from caudal part of fifth cervical (C-5) segment to upto middle of first thoracic (T-1) segments.<sup>21</sup>

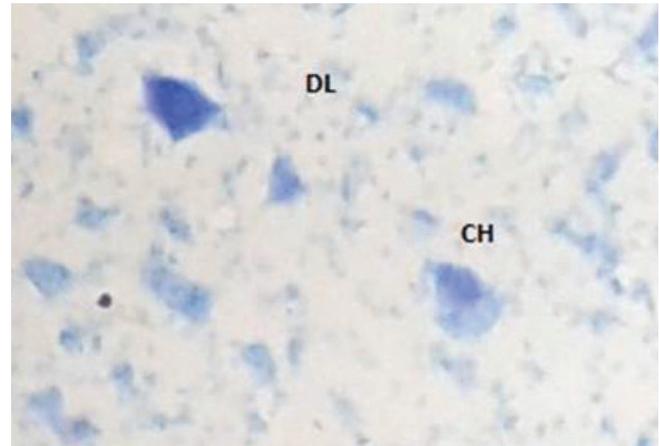
## CONCLUSION

The length of the spinal cord harbouring motor neuron so-

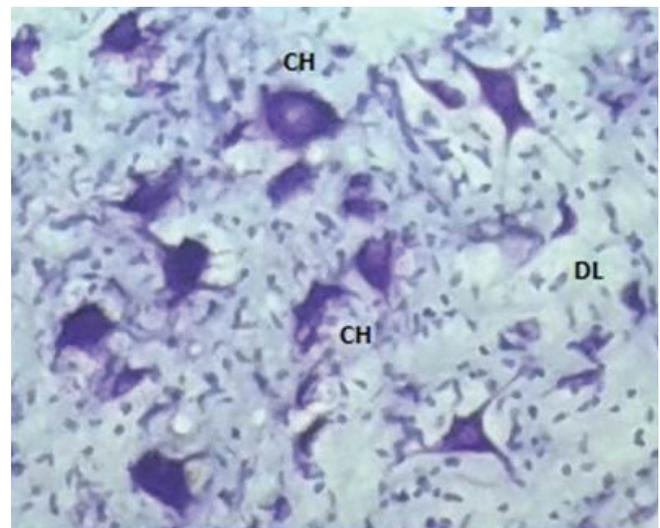


**Figure–1:** Photomicrograph of transverse section of spinal cord showing cell body response (CBR). Thionine stain X400

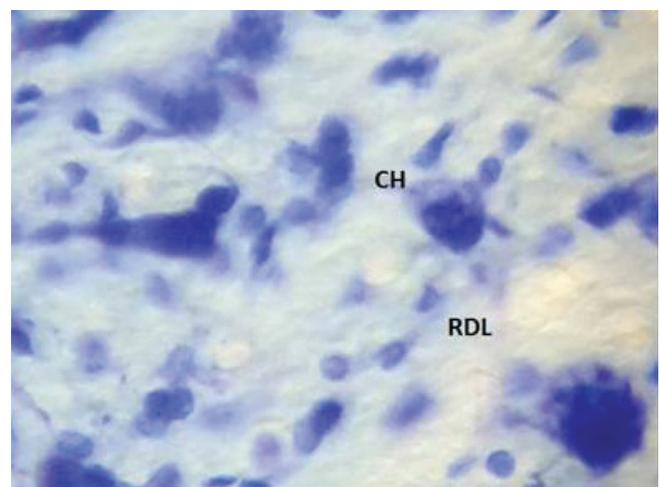
mata of median nerve extends from the caudal part of fifth cervical (C-5) segment up to the middle of first thoracic (T-1) segment.



**Figure–2:** Photomicrograph of transverse section of spinal cord showing chromatolysed neuron soma (CH). Thionine stain X400



**Figure–3:** Photomicrograph of a part of transverse section of spinal cord passing through caudal part of fifth cervical (C-5) segment showing chromatolysed cell (CH). Thionine stain X400



**Figure–4:** Photomicrograph of a part of transverse section of spinal cord passing through cranial part of first thoracic (T-1) segment showing chromatolysed cell (CH). Thionine stain X400

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# Mycological Profile of Fungal Rhinosinusitis in a Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Fungi are the common cause of rhinosinusitis. The aim of the research was to isolate and identify fungi causing rhinosinusitis.

**Material and Methods:** The present study was conducted over a period of 18 months (December 2013 to June 2015) and comprised patients of all age groups and either sex presenting with features of fungal rhinosinusitis. Specimens collected were Nasal mucosa and crusts/ nasal scrapings, maxillary antral aspiration using sterile techniques, endoscopic guided middle meatus swab/aspiration, sinus tissue culture during endoscopic sinus surgery, nasal discharge and excised nasal polyp.

**Results:** a total of 216 cases of fungal rhinosinusitis were analysed out of which fungal positivity was 46(21.29%) by direct examination/ culture or both. The most common fungus isolate was *Aspergillus flavus* 23(50%) followed by *Aspergillus fumigatus* 7(15.22%).

**Conclusion:** As fungal diseases are not notifiable infections like viral, bacterial or parasitic disease hence these are not given much attention and usually diagnosis is established very late. Therefore early diagnosis and recognition of fungal sinusitis is very important, not only because it is curable in the early stages, but also to prevent progression of the disease in to the more serious and destructive invasive forms.

**Keywords:** Fungal rhinosinusitis, *Aspergillus flavus*

## INTRODUCTION

Rhinosinusitis is group of disorders characterised by inflammation of the nose and the paranasal sinuses. Fungi are not an uncommon cause of sinusitis and incidence of such infection in recent years has shown marked increase in healthy population especially in North India. An estimated 5-10% of chronic sinusitis patients actually have a form of fungal sinusitis. The infection is substantiated by demonstration of fungal elements in debris material aspirated from affected sinuses as well as in culture. *Aspergillus flavus* is the predominant agent isolated from cases of allergic fungal rhinosinusitis in the Indian subcontinent, whereas in the other parts it is *Aspergillus fumigatus*.<sup>1</sup> Fungal rhinosinusitis (FRS) is categorized into two groups: (A) Invasive and (B) Non-invasive fungal rhinosinusitis. Invasive diseases include: 1) acute invasive (fulminant) FRS; 2) granulomatous invasive FRS and; 3) chronic invasive FRS. The non-invasive diseases include: 1) saprophytic fungal infestation 2) fungal ball and 3) fungus related eosinophilic FRS that includes allergic fungal rhinosinusitis (AFRS).<sup>2</sup>

## MATERIAL AND METHODS

The present study was conducted over a period of 18 months (December 2013 to June 2015) and comprised patients of all

age groups and either sex presenting with features of fungal rhinosinusitis and 216 samples were collected from outpatient department of Ram Lal Eye and ENT Hospital attached to Government Medical College Amritsar. The Patients were recruited in the study after an informed consent based on following inclusion and exclusion criteria and approval of ethical committee was taken.

## Data collection

The following data was collected:-

- Patients details including name, age, sex, CR no, history (present, past, personal, family, treatment)
- Presenting features like nasal discharge, nasal polyposis, proptosis, headache, cheek swelling, diminished vision, blindness, seizures, vomiting and altered sensorium.
- Investigation details.

## Sample collection and transport

The indications for obtaining specimens for culture are according to the standard recommendations and guidelines. Antibiotics were withheld one week prior to the operations. The specimens collected were Nasal mucosa and crusts/ nasal scrapings, maxillary antral aspiration using sterile techniques, endoscopic guided middle meatus swab/aspiration, sinus tissue culture during endoscopic sinus surgery, nasal discharge and excised nasal polyp.

## Processing of fungal specimen:

**Microscopy<sup>3</sup>:** The direct microscopic examination of the samples was done by potassium hydroxide (KOH) preparation. A drop of 10% KOH was poured on specimen and coverslip was placed over it. The slide was heated gently over flame and examined under microscope after few minutes. If specimen was not properly dissolved, it was kept for some more time in a wet petridish and examined. Overheating was avoided so that crystals of KOH were not formed.

**Culture<sup>4</sup>:** The samples were inoculated on two tubes of Modified Sabouraud dextrose agar (SDA) with antibiotics (chloramphenicol 50mg and gentamicin 20mg). One tube was kept at 25°C and second tube was kept at 37°C. The

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inoculated media was kept for a minimum period of three weeks. The growth obtained was identified on the basis of colony morphology, pigment production and microscopic examination by LCB preparation.

**Lactophenol Cotton Blue (LCB)<sup>5,6</sup>:** Mount was made from growth on culture media to study morphological features of fungal isolates.

## RESULT

Out of 46(21.29%) fungal positive specimens, 26(56.52%) were positive by both culture and direct KOH examination and 14(30.43%) were KOH positive and culture negative. Cultures the most common fungus isolated was *Aspergillus flavus* 23(50%) followed by *Aspergillus fumigatus* 7(15.22%) and *Mucor spp* 5(10.86%). Other fungal isolates were *Aspergillus terreus* 4(8.69%), *Penicillium spp* 3(6.52%) and *Fusarium* 2(4.35%). Among the less commonly isolated fungi were *Rhizopus spp* 1(2.18%) and *Alternaria spp* 1(2.18%).

## DISCUSSION

In our study there was predominance of chronic sinusitis in male patients with male: female ratio of 1.4:1 which is concordant with the study done by Prateek et al<sup>7</sup> (1.33:1) and Shone GR (1.8:1).<sup>8</sup> However study done by Micheal et al<sup>9</sup> and Dufour et al<sup>10</sup> showed female predominance. The results obtained in this study can be attributed to the fact that the males are more commonly exposed to irritating pollutants to traffic, dust and factories.

In this study, 155(71.76%) patients were from middle class and 61(28.24%) were from poor class. There were no patients from rich class. Most of the patients belong to urban area 130 (60.19%) than rural area 86(39.81%). This can be due to the fact that the population residing in urban area is more commonly exposed to the irritant pollutants of traffic, dust, factories residuals as compared to the rural region,

these irritants leads to rhinitis which further leads to chronic sinusitis.

In our study age of patients ranged from 11 to 60 years (mean 27.6 years). Maximum numbers of cases were found to be of age group 21 – 40 (69.44%). The least age group was 51-60 years (3.70%). There were no cases from age group below 10 and above 60 years. This is similar to the study done by Das et al<sup>11</sup> in Chandigarh reported ages of patients with fungal rhinosinusitis ranged from 2 to 81 years (mean 31 years).

In the present study out of 216 cases, the most common presenting complaints were nasal obstruction 196(90.74%) followed by posterior nasal discharge 160(74.07%), anterior nasal discharge 126(58.33%), headache 98(45.37%), aural symptoms 38(17.59%), cough with expectoration 38(17.59%), fever 32(14.81%), ocular symptoms e.g. watering of eyes, diminished vision, blindness 22(10.18%) and facial fullness 16(7.41%) In another similar study done at PGI Chandigarh rhinorrhoea with nasal polyposis (45.8%) and proptosis (46.4%) were the most common presentations followed by headache (11.3%), cheek swelling (9.5%), Diminished vision (8.9%), blindness (5.3%) and seizures, vomiting and altered sensorium (5.3%).<sup>12</sup>

The most common risk factor found in our study was Nasal allergy 42(19.44%) followed by deviated nasal septum 24(11.11%) and nasal polyp 24(11.11%). Other risk factors were hypertension 12(5.55%), bronchial asthma 10(4.62%) and Diabetes 9(4.16%) In India bronchial asthma and diabetes mellitus are extremely common and in some patients these conditions remains undiagnosed which predispose them to chronic sinusitis.

In this study fungal positivity was 46(21.29%) by direct examination/ culture or both. Out of these 26(56.52%) were positive by both culture and direct KOH examination and 14(30.43%) were KOH positive and culture negative. This could be due to antifungal therapy or due to inadequate specimen as well the faulty technique of SDA slant inoculation. The correlation is statistically significant. The most common fungus isolate was *Aspergillus flavus* 23(50%) followed by *Aspergillus fumigatus* 7(15.22%). This is due to the fact that dust and frequent sand storms contain large number of *Aspergillus* conidia that can easily settle on the injured mucosa of the sinuses. Other fungus isolates were *Mucor spp* 5(10.86%), *Aspergillus terreus* 4(8.69%), *Penicillium spp* 3(6.52%) and *Fusarium* 2(4.35%). Among the less commonly isolated fungi were *Rhizopus spp* 1(2.18%) and *Alternaria spp* 1(2.18%). This study was similar to the study done by Michael et al in Tamil Nadu where *Aspergillus flavus* (47.61%) was the most common isolate followed by *Aspergillus fumigatus* (14.28%).<sup>13</sup> In another study done by Veress et al who reported 46 cases in Sudan caused by *Aspergillus flavus*.<sup>14</sup> He also reported that hot climate with low humidity is responsible for this disease. Similar weather conditions are also found in Punjab.

Despite recognition of fungal rhinosinusitis as a serious disease entity for more than two centuries, our knowledge about the epidemiology and medical microbiology of the disease remains incomplete and subject to newer findings and research.

Direct examination (KOH)	Culture positive (N=32)	Culture negative cases (n=184)
KOH positive (n=40)	26(56.52%)	14(30.43%)
KOH negative (n=176)	6(13.04%)	170(78.70%)
X <sup>2</sup> = 85.630, DF = 1, P value < 0.001 which is highly significant		
<b>Table-1:</b> Distribution of fungus isolates on the basis of direct and culture examination		

Type of fungus	No of cases	Percentage (n=46)
<i>Aspergillus flavus</i>	23	50.00
<i>Aspergillus fumigatus</i>	7	15.22
<i>Mucor spp.</i>	5	10.86
<i>Aspergillus terreus</i>	4	8.69
<i>Penicillium spp.</i>	3	6.52
<i>Fusarium</i>	2	4.35
<i>Rhizopus spp.</i>	1	2.18
<i>Alternaria spp.</i>	1	2.18
Total	46	100.00
<b>Table-2:</b> Distribution of fungal isolates in clinical cases of rhinosinusitis		

## CONCLUSION

These days since the awareness among people is increasing and they are becoming more concerned about the health related issues so there is better recognition of this disease entity. The mycological assessment are essential to confirm the diagnosis. These mycological protocols if carried out in well-equipped microbiology laboratories having all advanced facilities available for isolation and identification of the causative agents, the diagnosis can be simplified since there are no specific clinical and radiological indicators. Therefore our suggestion to clinicians is that all the rhinosinusitis patients should be screened for fungal etiology. Treatment requires surgical debridement to remove the hypertrophic tissue and mucinous secretions, nasal and oral corticosteroids are often used to modulate the immune response.

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# Transverse Cerebellar Diameter – An Ultrasonographic Parameter For Estimation of Fetal Gestational Age

R Nagesh<sup>1</sup>, Seetha Pramila VV<sup>2</sup>, Anil Kumar Shukla<sup>3</sup>

## ABSTRACT

**Introduction:** Several parameters are in use for the assessment of fetal gestational age by ultrasonography. Fetal transverse cerebellar diameter can be used as another parameter for the gestational age estimation. Cerebellum being part of hind brain is situated in posterior cranial fossa and is less vulnerable for deformation. Aim of the study was to measure and correlate transverse cerebellar diameter with fetal gestational age and to evaluate cerebellar growth pattern by ultrasonographic cerebellar grading.

**Material and Methods:** This is a prospective cross sectional study consisting of 100 normal singleton gestations in the period of 15 to 40 weeks. Average gestational age of all the fetuses was calculated by using bi parietal diameter, head circumference, abdominal circumference and femoral length. Fetal transverse cerebellar diameter was measured. cerebellar grading was done by ultrasonography.

**Results:** We observed a linear correlation between transverse cerebellar diameter and gestational age (correlation coefficient  $r=0.992$ ,  $p<0.001$ ). The study showed 18%, 49% and 33% of the cerebellum were of grade I, grade II and grade III respectively. Ultrasonography showed progressive changes in cerebellum from grade I to grade III with advancing gestational age.

**Conclusions:** Transverse cerebellar diameter can be used as a reliable parameter in the estimation of fetal gestational age. Its grading can be used in evaluation of development of fetus.

**Keywords:** Transverse Cerebellar Diameter, Gestational Age, Cerebellar Grading, Ultrasonography.

growth changes can be evaluated on USG. The maximum diameter of this organ being transverse can be measured by USG accurately at all the stages of development. It is less vulnerable for deformation from extrinsic compression as it is located in thick bony fossa. It is not influenced by alterations in the fetal growth such as macrosomia and intra uterine growth retardation.<sup>2</sup> Hence it can be used as a reliable parameter for estimation of fetal gestational age compared to other routine parameters. It is observed that fetal TCD in normal gestations correlates well with fetal growth indices. USG being non invasive, cost effective, easily available, can be used for imaging fetal cerebellum. TCD can be a better marker for gestational age estimation.

Our aim of this study was to correlate the TCD with fetal gestational age and to assess the cerebellar growth pattern by ultrasonographic grading.

## MATERIAL AND METHODS

This prospective cross sectional study consisting of 100 normal singleton pregnant women was carried out in our Hospital during the period from March to December 2015. The pregnant women who were referred to our department for routine antenatal ultrasound examinations were selected for the study. Among them normal singleton gestations in the period of 15 to 40 weeks of gestation were included for the study. The study was approved by the ethical committee of our institution and consent was taken from all the patients before USG examination. All the gestations were evaluated by USG to confirm gestational age and compared with their Last Menstruation Period (LMP). Patients with incorrect LMP and USG dating scan difference of more than a week in first trimester were excluded from the study. Women with systemic disorders or obstetric disorders, anomalous fetuses and multiple gestations were also excluded from the study.

All the selected pregnant women were scanned transabdominally in supine posture with 3.5 MHz convex probe using Siemen's sonoline G50 ultrasound system. All the TCD were recorded in millimeters. The fetal cerebellum was identified in the transverse view of posterior cranial fossa by using thalami, cavum septum pellucidum and 3rd ventricle as landmarks, followed by rotation of the transducer below the tha-

## INTRODUCTION

Cerebellum is the part of the hind brain situated in the posterior cranial fossa dorsal to the pons and medulla separated by the fourth ventricle. It is well protected in the posterior cranial fossa by the dense petrous ridges and the thick occipital bone. It is separated from the cerebral hemispheres by a fold of duramatter, the tentorium cerebelli. The cerebellum consists of a mid line part called vermis and two lateral hemispheres. It develops around 5th week of embryonic life from the dorso lateral part of the alar lamina of the metencephalon.<sup>1</sup>

Assessment of fetal gestational age is an essential part of obstetric ultrasonography (USG). It helps in the evaluation of fetal growth and management. For the estimation of fetal gestational age the commonly used parameters are- Mean Sac Diameter (MSD), Crown Rump Length (CRL), Bi Parietal Diameter (BPD), Head Circumference (HC), Abdominal Circumference (AC) and Femoral Length (FL). Transverse cerebellar diameter (TCD) can be used as another parameter for the estimation of fetal gestational age.

Fetal cerebellum starts developing at 5th week of antenatal life, continues to develop through out gestational period. The

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lamic plane to view the butterfly like structure the cerebellum.<sup>3</sup> The TCD was obtained by placing the calipers at the outer to outer margin measuring the widest diameter of the cerebellum [Figure-1].<sup>2</sup> A single best and widest transverse diameter of the cerebellum was recorded.

All the cerebellum were examined by USG to assess the growth pattern, they were grouped into three categories as per the following USG criteria.<sup>4</sup>

Grade-I: The cerebellar hemispheres are round, appear as two cystic globules on either side of the midline, lack echogenicity and the central vermis is not developed, resembling a pair of ‘eye glasses’.

Grade-II: The two cerebellar hemispheres appear oval and hypoechoic with echogenic outer margins and the vermis is seen as a central rectangular tissue connecting the two hemispheres resembling ‘dumb bell’ shape.

Grade-III: The cerebellum changes to a more triangular, homogeneously echogenic and solid structure appearing like ‘fan’ shaped structure occupying posterior cranial fossa.

**RESULTS**

Among the 100 pregnant women who were in the age group of 18 to 35 yrs, 23% were less than 20 yrs, 69% in the age group of 21 to 30 yrs and 8% above 30 yrs. 48 % were primiparous and 52 % were multiparous. Out of these gestations 72% fetuses were in cephalic, 12% in breech, and 16% in unstable presentations.

**TCD measurements**

Among the total 100 fetuses from 15 to 40 weeks of gestation age, TCD measurements frequency ranged from 1 to 10 for each gestational age. The minimum TCD was 14 mm at 15 weeks of Gestational age and maximum TCD was 56 mm at 39 weeks. Mean median and standard deviation were calculated for all the gestational age and TCD. The mean gestational age was 27.64 +/- 7.3 weeks. The mean TCD was 33.09 +/- 12.5 mm. We observed a linear correlation between TCD and gestational age from 15 to 40 weeks. Correlation coefficient  $r = 0.992$  and  $p < 0.001$  which were statistically significant indicating high degree of correlation between TCD and gestational age. The TCD in mm was almost corresponded to gestational age in weeks from 15 to 20 weeks, and later on TCD in mm exceeded gestational age in weeks. A scatter diagram was plotted using all the TCD and gestational age data as shown in [Figure-2].

**Cerebellar Grading**

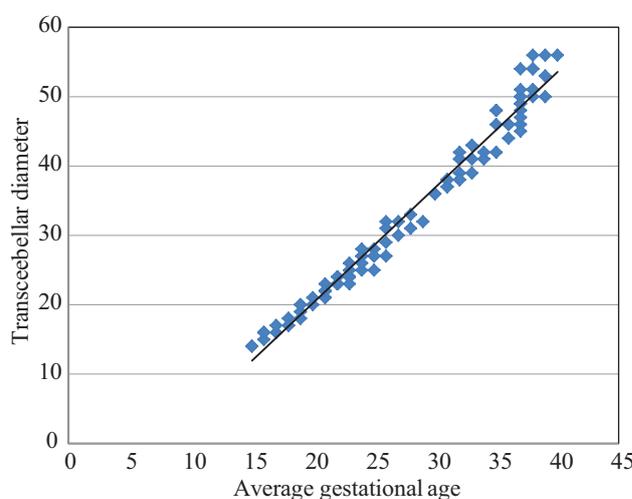
Among the 100 cases in this study USG cerebellar grading showed, 18 %, 49 % and 33% of grade I, II and III respectively. There was a progressive change from Grade I to Grade III with advancing gestational age. Results have been shown in [Table-2].

Of the 18 cerebellum of grade I, the median gestational age was 18 weeks and the median TCD was 18 mm. The minimum gestational age was 15 weeks, maximum gestational age was 26 weeks and the minimum TCD was 14 mm, maximum TCD was 27 mm in this group.

Of the 49 cerebellum of grade II, the median gestational age was 24 weeks and the median TCD was 27 mm. The minimum gestational age was 16 weeks, maximum gestational



**Figure-1:** Ultrasonographic image showing TCD measurement (Arrow)



**Figure-2:** Scatter plot- transcerebellar diameter in mm versus gestational age in weeks.

		TCD	GA
TCD	Pearson Correlation	1	.992**
	Sig. (2-tailed)		.000
	N	100	100
GA	Pearson Correlation	.992**	1
	Sig. (2-tailed)	.000	
	N	100	100

\*\*Correlation is significant at the 0.01 level (2-tailed). Pearson’s correlation coefficient,  $r = 0.992$ ,  $p < 0.001$ .

**Table-1:** Statistical analysis

age was 34 weeks and the minimum TCD was 16 mm, maximum TCD was 43 mm.

Of the 33 cerebellum of grade III, the median gestational age was 37 weeks and the median TCD was 48 mm. The minimum gestational age was 31 weeks, maximum gestational age was 40 weeks and the minimum TCD was 37 mm, maximum TCD was 56 mm.

**DISCUSSION**

Accurate gestational age estimation is the corner stone in any obstetric management. Fetal development monitoring is now possible with the introduction of USG. Several biometric parameters are in use for the assessment of fetal gestational

Cerebellum grades	Number of patients	Percentage	Median gestational age in weeks	Median TCD in mms
Grade I	18	18%	18	18
Grade II	49	49%	24	27
Grade III	33	33%	36	48

**Table-2:** Results of ultrasonographic cerebellar grading.

age and growth during the antenatal period. USG biometric parameters are helpful in determination of gestational age where correct LMP is not known. Higher peri natal mortality has been reported in patients whose expected date of delivery is not known. Wrong assessment of gestational age can result in prematurity or post maturity. All these will lead to increased peri natal and infant morbidity and mortality.

It is said that USG fetal biometry is reliable in first two trimesters and its reliability diminishes as the gestation advances.<sup>5</sup> No single parameter is reliable in third trimester as shown by many studies. Usually average gestational age is calculated using one or more parameters is the currently practiced method in routine obstetric USG. In patients with incorrect and unknown LMP dates, USG helps in the assessment of correct fetal gestational age and fetal disorders. Hence USG plays a major role in modern obstetric practice. In addition to the currently used biometric parameters, TCD can be used as a established and reliable USG parameter. TCD measurement is very simple and accurate. It is superior to other biometric parameters as it is not affected in many disorders like abnormal skull shapes, fetal growth retardation, and multiple pregnancies and large for date fetuses.<sup>1</sup> Hence it can be used as a reliable parameter in all routine antenatal USG.

In this study USG visualization of cerebellum was around 13 to 14 weeks of gestation. We observed the progressive USG changes of cerebellum from grade I to grade III as described in earlier literatures. Cerebellum can be easily imaged in the transverse sections of posterior cranial fossa without any difficulty and TCD measurement can be taken. We noticed in our study the TCD in millimeters is almost equal to gestational age in weeks up to 20 weeks, thereafter TCD in millimeters exceeds gestational age in weeks and reached up to 56 mm. In our study we observed a linear relationship between TCD and gestational age indicating the reliability in the estimation of gestational age and monitoring fetal growth. Our findings are consistent with observations made in previous studies. The progressive USG changes of the cerebellar development is attributed to purkinje cell differentiation and decrease in cerebellar water content with advancing gestational age.<sup>6</sup>

## CONCLUSION

We observed a linear relationship between TCD and fetal gestational age between 15 to 40 weeks of normal gestations ( $r=0.992$ ,  $p<0.001$ ). The TCD increased with advancing gestational age and the USG cerebellar growth pattern changed progressively. The relation between TCD and gestational age was well correlated. Hence TCD can be used as a reliable and accurate biometric parameter for estimation of gestational age. It is a very useful parameter in assigning gestational age in patients where correct LMP is not known. Cerebellar grading helps in the evaluation of the development of the fetus.

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# Role of 64 Slice MDCT with Addition of Single T2W Sequence on 1.5 Tesla MRI in Local staging of Rectal Carcinoma

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## ABSTRACT

**Introduction:** The local staging of rectal cancer is crucial for prognosis and treatment planning. It aims at determining the exact extent of the tumour and helps the clinician in deciding whether surgery alone or surgery in combination with neo-adjuvant chemotherapy should be offered to the patient. The study was done to compare the accuracy of 64 slice MDCT with 1.5T T2W sequence in local staging of biopsy proven cases of rectal carcinoma, to assess the agreement between MDCT and MRI in local staging with histopathological staging and to assess the agreement between the imaging modalities (MDCT and MRI) in local staging of rectal cancer in all patients.

**Material and methods:** This prospective study was conducted from November 2012 to August 2014 wherein 41 biopsy proven cases of rectal carcinoma were evaluated with Dual phase MDCT and T2W MRI. The local staging was performed and correlated with histopathology which was taken as the gold standard.

**Results:** The overall accuracy of MRI (89 %) was marginally better than MDCT (83 %) in detecting the invasion of the tumour however no comparable difference in the accuracy was found in detection of metastatic perirectal nodes (50%).

As compared to histopathology, kappa value for T staging on MDCT was 0.7 (substantial agreement) and was 0.8 (good agreement) for MRI. While the kappa value for N staging on MDCT is 0.3, indicating a fair agreement between MRI and MDCT and histopathological nodal staging. There was a good agreement between the imaging modalities in local staging (K=0.75) with respect to Tumour staging and a very good agreement in local nodal staging (K=0.88).

**Conclusion:** The accuracy of MRI is marginally better than MDCT in detecting invasion of the tumour with no comparable difference in detection of perirectal metastatic lymph nodes. The agreement of MRI with histopathology was better for tumour staging, with both modalities demonstrating a fair agreement for nodal staging. The agreement between the imaging modalities was substantial for tumour staging and very good for nodal staging.

**Keywords:** Rectal, carcinoma, cancer, local staging, MDCT, MRI.

allows examination in different vascular phases to optimally detect target lesions.<sup>6</sup> With the advent of powerful gradient coil systems and high resolution surface coils, Magnetic resonance imaging (MRI) is playing an important role in local staging of rectal cancer. It is highly accurate in predicting whether tumour free margin can be achieved and thus provides important information for treatment planning, especially in patients with advanced rectal cancer.<sup>7</sup>

Objectives of the research were to compare the accuracy of 64 slice MDCT with 1.5T T2W sequence in local staging of biopsy proven cases of rectal carcinoma, to assess the agreement between MDCT and MRI in local staging with histopathological staging and to assess the agreement between the imaging modalities (MDCT and MRI) in local staging of rectal cancer in all patients.

## MATERIAL AND METHODS

This prospective study was conducted in Department of Radiodiagnosis and Imaging of Kasturba Hospital from November 2012 to August 2014, using GE Signa HDxt 1.5 T MRI and 64 slice Phillips MDCT scanner. The total number of cases included in this study was 41. The study was conducted in accordance with the guidelines of Institutional Ethical Committee and informed consent was obtained.

All the biopsy proven cases of rectal carcinoma, which were referred for MDCT staging workup for rectal carcinoma were included and further limited MRI (T2W sequence) was performed.

**CT Technique:** Dual phase MDCT of the abdomen and pelvis was performed, after 45 minutes of oral mannitol administration and insufflation of rectal air just before the scan. The scans were performed after IV injection of 80 ml of iohexol with slice thickness of 5 mm, reconstruction interval of 1.5mm, matrix 512 x512, 120 Kvp, 250 ma and pitch of 1.1.

**MR Technique:** Subsequently, patients underwent MRI of pelvis using a phase array coil. T2 weighted Fast Spin Echo sequence was done using a FOV of 25, TR 80, TE 4500, Slice thickness 3mm and NEX of 4. Initially sagittal images were acquired and further true axial images were planned

## INTRODUCTION

Colorectal cancer is third most common cancer and is responsible for significant mortality and morbidity.<sup>1</sup> The incidence in Asian population is 4.3 per one lakh population. The prognosis of rectal cancer depends upon the extramural tumour spread into mesorectum<sup>2,3</sup>, ability to achieve surgical clearance<sup>4,5</sup>, and presence of occult hepatic and lymph nodal metastases.

The local staging of rectal cancer is crucial to determine the tumour extent, prognostication and treatment planning. Cross sectional imaging modalities like Dual phase MDCT

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perpendicular to the rectal wall at the level of the tumor and coronal images were planned perpendicular to axial images. TNM staging was used to stage the cancer, where T1 and T2 tumours were confined to the mucosa. T3 were tumors invading the muscularis propria and confined to it and those infiltrating the adjacent organs were considered as stage T4. Size criteria of 5mm was taken into consideration for local nodal staging. Absence of perirectal nodes was given stage of N0, presence of 1-3 nodes of more than 5 mm was N1 and more than 4 nodes was considered as N2.

The MDCT and MRI sections were reviewed on workstation and local T and N staging was performed separately for MDCT and MRI. Histopathological staging obtained after surgery, was taken as the gold standard. Cohen's Kappa test was used for measuring the agreement between imaging modalities and histopathology.

## RESULTS

Out of the 41 patients 18 cases underwent surgery and histopathological T and N staging was available. The remaining 23 cases were referred for NACT, and palliative therapy and thus histopathological staging was unavailable.

Out of these 18 cases, histopathological analysis showed T2 stage in 9 cases (50%), T3 in 8 cases (44%), and T4 in one case (6%). Local nodes showed stage No in 9 cases (50%),

stage N1 in 5 cases (28%) and stage N2 in 4 cases (22%). The accuracy of MRI (88.8%) on local staging was marginally better as compared to MDCT (83.3%) in local Tumour staging, with both modalities being equally accurate in detecting the metastatic local lymphadenopathy (50%).

### T staging

As compared to histopathology, kappa value for T staging on MDCT was 0.7 (substantial agreement) and was 0.8 (good agreement) for MRI. There was a good agreement between MRI and MDCT in local staging (K=0.75) with respect to Tumour staging. The sensitivity, specificity and accuracy of MDCT and MRI in local Tumour staging is as depicted in Table 1.

### N staging

The kappa value for N staging on MRI and MDCT is 0.3, indicating a fair agreement between MRI and MDCT and histopathological nodal staging. There was a very good agreement between MRI and MDCT in local nodal staging (K=0.88). The sensitivity, specificity and accuracy of MDCT and MRI in local Nodal staging is as depicted in Table 2.

## DISCUSSION

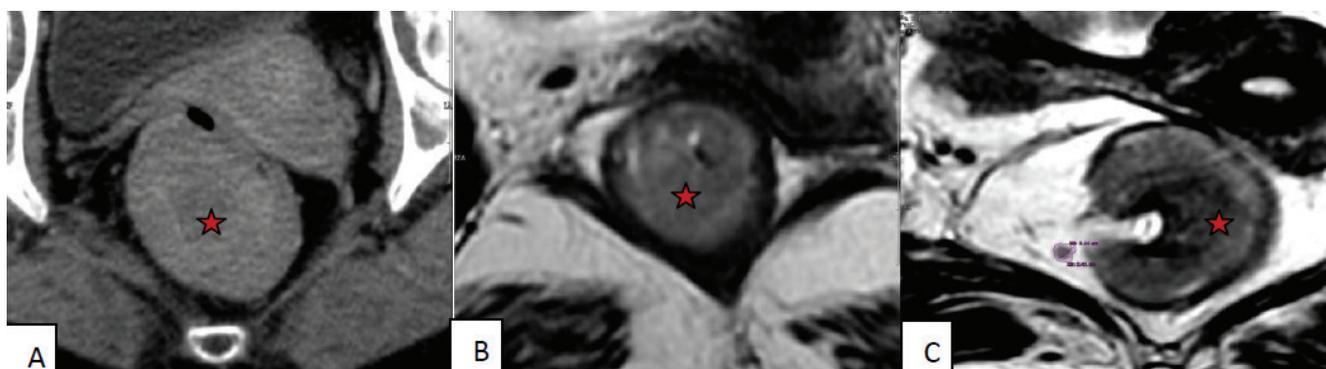
Although rectal cancers can be diagnosed using various modalities such as per rectal examination, barium enema,

Local	T stage	Sensitivity (%)	Specificity (%)	Accuracy(%)
MDCT	T1-2 stage	77.8	100	88.8
MRI	T1-2 stage	77.8	100	88.8
MDCT	T3 stage	87.5	80	83.3
MRI	T3 stage	100	80	88.8
MDCT	T4 stage	100	94.1	94.4
MRI	T4 stage	100	94.4	100

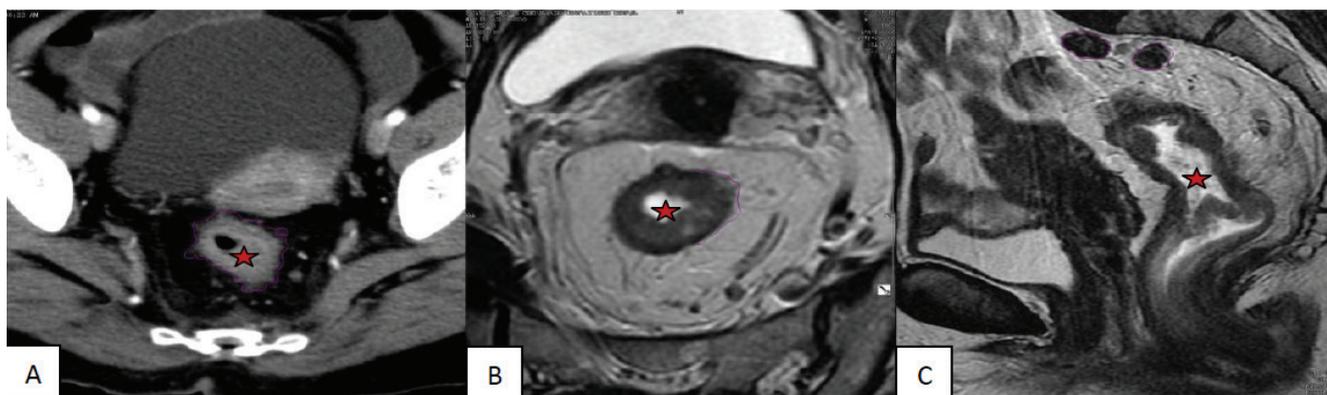
**Table-1:** The sensitivity, specificity and accuracy of MDCT and MRI in local Tumour staging.

Local	N stage	Sensitivity (%)	Specificity(%)	Accuracy(%)
MDCT	No stage	11.1	100	55.5
MRI	No stage	11.1	100	55.5
MDCT	N1 stage	80	92.3	88.8
MRI	N1 stage	80	100	94.4
MDCT	N2 stage	100	43	55.5
MRI	N2 stage	100	43	50

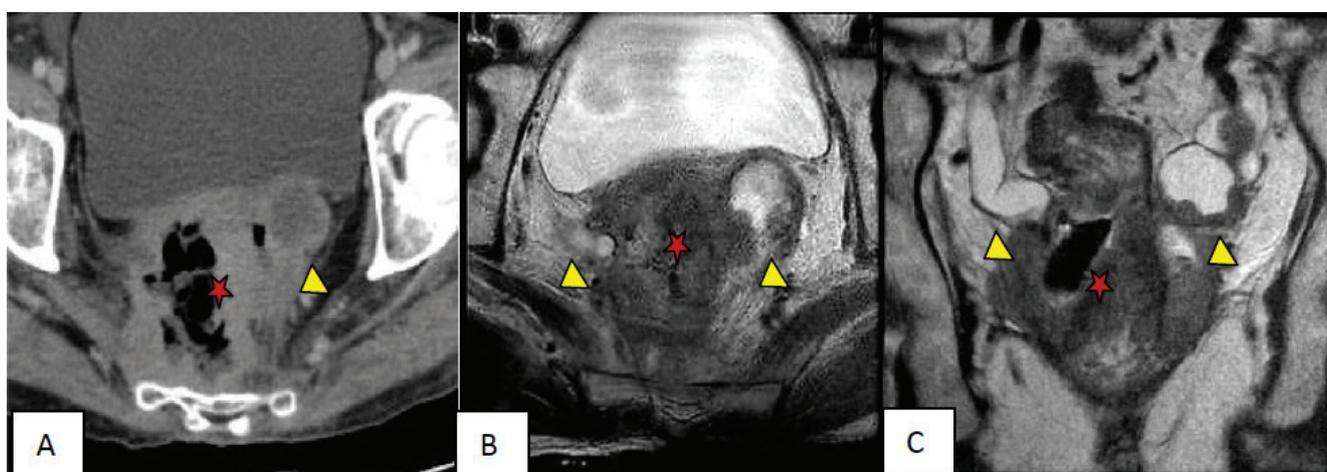
**Table-2:** Sensitivity, Specificity and Accuracy of MDCT and MRI in local Nodal staging.



**Figure-1:** MDCT axial image (A) shows heterogeneously enhancing polypoidal growth (star) in rectum causing luminal compromise. T2 weighted MRI axial images (B, C) show hyperintense polypoidal growth (star) in the rectum infiltrating the muscularis layer, not extending into the mesorectal fat. Single perirectal node (curvilinear line) was identified, which was smaller than 5mm, hence the tumour was staged T2 N0 which corresponded with histopathological staging.



**Figure-2:** MDCT sagittal and axial image (A) shows heterogeneously enhancing high rectal wall thickening (star) with extension of the tumour into the mesorectal fat (curvilinear line). MRI T2 weighted axial and sagittal images (B, C) show rectal wall thickening with extension of the growth into the mesorectal fat (curvilinear line) and two enlarged perirectal nodes (arrow head). The tumour was staged T3 N1 which was proved on histopathology.



**Figure-3:** Sagittal and axial MDCT (A) image show heterogeneously enhancing low rectal wall thickening (star) infiltrating the ureters (arrow head). T2 weighted MRI axial and coronal images (B,C) show extensive locally advanced low rectal growth (star) infiltrating the mesorectal fat with encasement and infiltration of ureters (arrow head) on either sides. The tumour was given a stage of T4 N0. The patient subsequently underwent a palliative surgery and bilateral DJ stenting.

colonoscopy or sigmoidoscopy, these do not provide sufficient information about the extraluminal spread of the tumor. Cross sectional imaging modalities such as Endoscopic Ultrasound, MDCT and MRI, help in detecting tumour infiltration into various layers of bowel wall and beyond it.

The accuracy of MDCT in Tumour staging is comparable to previous studies<sup>8-10</sup> due to similar parameters of image acquisition. The accuracy in detection of T4 lesions was better in present study when compared with previous studies<sup>10,11</sup> perhaps due to the fact that the lesions demonstrated a gross infiltration which could be easily identified.

The study by Kim CK et al.<sup>8</sup> demonstrated similar sensitivity and specificity of MDCT in detecting the T1/2 and T3 lesions. In present study, sensitivity, specificity and accuracy of MRI in T2 and T3 tumours were 77.8 %, 100% and 88.8% and 100 %, 80 % and 88.8% respectively which correlate well with previous studies.<sup>8,12</sup>

With respect to agreement of imaging modalities with histopathology, MDCT showed substantial agreement for tumour staging. Agreement of MRI tumour staging with histopathology was similar to study by Aysun Uçar et al.<sup>13</sup>, due to similar parameters of image acquisition and evaluation.

We found a good agreement between both the imaging mo-

dalities (MDCT and MRI) in local Tumour staging.

The accuracy of MDCT in detecting the nodal status was 50 %, which is in concordance with the data published by Matsuoka H et al<sup>12</sup> with both studies assuming size criteria for diagnosing positive nodes. Present study showed a low 50 % accuracy rates in local nodal staging by MRI which is poor as compared to the previous published data<sup>12,14</sup> as most of the nodes detected in the study were reactive on histopathology, with increased false positive rate.

There was a fair agreement between histopathology and both modalities for nodal staging. While a very good agreement was found in between MDCT and MRI in local nodal staging. The major limitation of present study was small sample size as most of the cancers were discovered in advanced stage with loco regional spread and distant metastases and were treated with chemotherapy-radiotherapy. The reason for absence of T1 stage tumour in our study can be explained by the fact that these early cancers are asymptomatic and cannot be detected unless a regular screening is performed.

## CONCLUSION

Accuracy of MRI (89 %) is marginally better than MDCT (83 %) in detecting invasion of the tumour (T staging). No

comparable difference in the accuracy was found between MDCT and MRI in detection of metastatic perirectal nodes due to inability to distinguish between metastatic and reactive nodes. The agreement of MRI with histopathology was better for tumor staging as compared to MDCT, with both modalities demonstrating a fair agreement for nodal staging. The agreement of MDCT with MRI was substantial for tumor staging and very good for nodal staging.

## ABBREVIATIONS

MDCT- Multi Detector Computed Tomography, T2 W- T2 weighted Imaging, MRI- Magnetic Resonance Imaging, T stage - Tumour Staging, N stage – Nodal Staging, IV- Intra Venous, KVP- KiloVoltage potential, Mas- Milli ampere second FOV- Field Of View, TR- Relaxation Time, TE- Time to Echo, NEX- Number Of Excitations

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# Study of Serum Zinc and Copper levels in Type 2 Diabetes Mellitus

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## ABSTRACT

**Introduction:** Diabetes Mellitus is a metabolic disease characterised by hyperglycemia due to defective insulin secretion or action. Levels of trace elements like Copper and Zinc have been found to be altered in this disorder. These might have some role in progression of this disease. Purpose of the study was to estimate serum zinc and copper levels in type 2 diabetes mellitus patients with and without micro-vascular complication and to compare with that of healthy individuals. And also, to identify the inter-relationship among these.

**Material and methods:** A cross sectional study was carried out in the Department of Biochemistry in collaboration with Department of Medicine, Regional Institute of Medical Sciences, Imphal, Manipur. Eighty randomly selected cases of confirmed type 2 diabetes mellitus (T2DM) patients diagnosed for more than one year and another forty, age and sex matched, healthy controls were included in this study. Serum copper and zinc levels were estimated colorimetrically in the serum of these patients using commercially available kit.

**Results:** Serum Zn levels were lower for T2DM cases with complication ( $89.65 \pm 4.21$ ) than cases without complications ( $92.32 \pm 5.15$ ) and controls ( $95.40 \pm 3.90$ ), while serum Copper was highest among cases with complication ( $164.05 \pm 9.32$ ) than cases without complication ( $161.40 \pm 6.43$ ) and controls ( $131.85 \pm 7.92$ ).

**Conclusion:** Altered levels of trace elements Zn and Cu are found to be an important predisposing factors for diabetic patients for developing complications.

**Keywords:** Diabetes mellitus, Zinc, Copper

## INTRODUCTION

Diabetes Mellitus is most common endocrine disease. It is a group of metabolic disease which is characterized by hyperglycaemia, various clinical manifestations and systemic complications and is caused by either deficiency in the secretion or action of insulin or both. The metabolic derangement is frequently associated with permanent and irreversible functional and structural changes in the cells of the body, those of the vascular system, being particularly most susceptible. The chronic hyperglycaemia of diabetes is associated with long term damage, dysfunction and failure of different organs, and these changes in turn lead to development of well-defined clinical entities, the so called complications, which may affect especially the eyes, kidneys, heart, blood vessels, the skin and the nervous system.<sup>1</sup>

Interest in trace elements has been steadily increasing over the last 25 years. Trace elements are accepted as essential substances for optimum human health, because of their diverse metabolic characteristics and functions. They serve a variety of catalytic, structural and regulatory functions in which they interact with macromolecules such as enzymes, pro hormones, pre secretory granules and biological mem-

branes.<sup>2</sup>

Direct association of minerals, trace elements and vitamins in the pathogenesis and natural course of both type 1 and 2 diabetes mellitus has been observed in many research studies. An alteration in the metabolism of these minerals and vitamins has been demonstrated. Diabetes mellitus is a heterogeneous disease associated with an absolute or relative deficiency of minerals as well as insulin resistance.<sup>3</sup> Some trace elements act as antioxidants, prevent membrane peroxidation while others act directly on glucose metabolism. It is generally agreed that disturbed concentration of Zinc (Zn) and Magnesium (Mg) in the body are often found in patients of diabetes mellitus.

Among the trace elements Copper (Co) and Zn are of particular interest.<sup>4</sup> In subjects with Insulin Dependent Diabetes Mellitus (IDDM), Zn concentrations have been demonstrated to be lower in leucocytes and erythrocytes than in serum, while no such alteration has been found with copper.<sup>5</sup> Cu is involved in oxidation – reduction and has a dominant role in diverse proteins such as cytochrome oxidase and cytoplasmic superoxide dismutase.

Zinc another essential trace element, is a component of many enzymes, and plays an important role in the maintenance of several tissue functions including the synthesis, storage and release of insulin.<sup>6,7</sup> Zn plays an important role in glucose metabolism.<sup>8</sup> It has been found to enhance effectiveness of insulin in vitro and it has been postulated that its deficiency may aggravate the insulin resistance in non-insulin dependent diabetes mellitus (NIDDM).<sup>9</sup>

Aims and objectives of the research were to estimate serum zinc and copper levels in type 2 diabetes mellitus patients with and without micro-vascular complication and to compare with that of healthy individuals. And also, to identify the inter-relationship among these components in healthy controls, type 2 diabetes mellitus with and without complications.

## MATERIAL AND METHODS

This cross sectional study was carried out in the Department

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of Biochemistry in collaboration with Department of Medicine, Regional Institute of Medical Sciences, Imphal, Manipur, India during the period from September 2011 to August 2013. The study group comprised of eighty randomly selected cases of confirmed T2DM patients diagnosed with T2DM for more than one year among patients coming from different areas of Manipur and attending diabetic clinic and/or admitted in the Medicine ward, irrespective of sex, religion and socio-economic status. Cases were divided into two groups. (i)- Forty confirmed type 2 diabetic mellitus patients without complication who were under treatment with insulin or oral hypoglycemic agents and/or diabetic diet. (ii)- Forty confirmed T2DM cases with complication like nephropathy, retinopathy or neuropathy etc under treatment. Forty age and sex matched apparently healthy individuals were selected as controls.

All cases and controls were aged 18 years and above. Each individual enrolled in study underwent a detailed history, clinical examination and laboratory examination designed for the study. Type 2 DM patients with and without complication were diagnosed on the basis of history, physical examination, biochemical investigations and according to revised criteria for diagnosing DM issued by consensus panel expert from the National Diabetes Group and World Health Organization.

Patients suffering from carcinoma, any chronic systemic disease, smokers, alcoholics, pregnant, lactating mothers, with history of acute infections and thyroid dysfunction were excluded from this study.

Five ml of blood was collected from each individual. Four ml was collected in sterile plain vial for examination of Zn and Cu. It was processed within 1hr. of collection.

Serum copper and zinc levels were estimated colorimetrically

using Di-Br-PAESA method using commercially available kit of CREST BIOSYSTYEM, GOA.

## STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS version 16. Datas were expressed in Mean  $\pm$  SD. Statistical tests like  $\chi^2$ -test, independent t-test, ANOVA (F-test) and correlation coefficient 'r' were applied whenever found suitable and necessary. The P-value less than 0.05 was considered significant. Study was approved by the institutional ethical committee. Informed consent was obtained from all individuals and nature of the study was explained to them.

## RESULTS

Table -1 shows that in both the case groups i.e. diabetics with complication and diabetics without complications, the number of females were more than males. However insignificant test value (P = 0.670) indicates that a visible variation of number of males and females over the three groups, is considered, negligible and therefore the three groups are compatible in the sense that sex is matched.

Zinc level was clubbed into two groups i.e., 81-90  $\mu\text{g/dl}$  and 91 – 100  $\mu\text{g/dl}$  for the purpose of analysis, and the distribution pattern of the values among the three groups is being shown in this table-2. Majority of the diabetics with complications (55%) and diabetics without complications (70%) had Zn level in the range of 81-90  $\mu\text{g/dl}$  and majority of the controls had Zn level in the range of 91-100  $\mu\text{g/dl}$ .

Copper level was distributed into 6 groups as shown in table 3. It is observed that majority of diabetic cases with complications (45%) and majority of diabetics without complications (57.5%) had Cu level in the range 156-165  $\mu\text{g/dl}$ , whereas majority of controls (37.5%) had Cu level in the range of 116-125  $\mu\text{g/dl}$ .

sex	Types of group					
	controls	%	Case with complications	%	Case without complications	%
male	21	52.5	19	47.5	17	42.5
female	19	47.5	21	52.5	23	57.5
total	40	100	40	100	40	100

Table-1: Groups and sex wise distribution

Zn $\mu\text{g/dl}$	Types of group					
	Control	%	Cases with complication	%	Cases without complication	%
81-90	6	15	22	55	28	70
91-100	34	85	18	45	12	30
total	40	100	40	100	40	100

Table-2: Groups and distributions of Zn level

Cu in $\mu\text{g/dl}$	Types of Group					
	controls	%	Cases with complications	%	Cases without complications	%
116-125	15	37.5	-	-	-	-
126-135	17	42.5	1	2.5	-	-
136-145	7	17.5	1	2.5	-	-
146-155	1	2.5	12	30	7	17.5
156-165	-	-	18	45	23	57.5
166-175	-	-	8	20	10	25
total	40	100	40	100	40	100

Table-3: Groups and distribution of Cu level

Table-4 shows distribution of mean  $\pm$  SD of trace elements i.e. Zn and Cu among the three study groups. In case of Zn, it is found to be highest in the control group followed by diabetics without complications and then diabetics with complications. For Cu, diabetics with complications have the highest level and control the lowest. The variation of mean for each trace elements was found to be highly significant ( $p < 0.001$ ) statistically.

In order to evaluate better understanding of multiple comparison Post Hoc test is done and the findings are shown in Table 5. The pair-wise mean comparison is performed for Zn, Cu. It was observed that for Zn, all comparisons are statistically significant. Nevertheless, insignificant difference is observed between the two diabetic groups.

## DISCUSSION

In recent years, chronic diseases such as diabetes and hypertension have been shown to be major causes of death worldwide.<sup>10</sup> The prevalence of diabetes in developed countries has reached immense proportions which represent a major public health problem.

In current study number of females were found to be more than males in both groups i.e. in diabetics with complication and diabetics without complications. This finding is consistent with the statement that Type 2 DM is more common in women.<sup>11,12</sup>

In this study, zinc levels in diabetics – both with complications and without complications, were lower than the control group. This finding was in agreement with the findings of Schlienger JL et al<sup>13</sup> and Pai LH,<sup>14</sup> but this finding was contradictory with the findings of Osman E et al,<sup>15</sup> D'Ocon C et al<sup>16</sup> and Mateo MC et al.<sup>17</sup> In the mammalian pancreas, Zinc is essential for the correct processing, storage, secretion, and action of insulin in beta ( $\beta$ )-cells. Insulin is stored inside secretory vesicles or granules, where two  $Zn^{++}$  ions coordinate six insulin monomers to form the hexameric-structure on which matured insulin crystals are based.<sup>18</sup> It is also known that like, most other chronic disorders, diabetes increases the excretion of minerals.<sup>19</sup> Hyperglycemia in diabetes is usually associated with hyperzincuria and increased urinary loss of  $Zn^{++}$ , which is responsible for decreases in total body  $Zn^{++}$ .<sup>20-22</sup> Zinc has antioxidant properties; thus it can stabilize macromolecules against radical induced oxidation.<sup>23</sup> Zinc

is a component of the important antioxidant enzyme superoxide dismutase (Cu-ZnSOD).<sup>24</sup> Thus the protection of this antioxidant against free radicals generated in the disease<sup>25</sup> will be diminished. It is also very important to note that Zn concentration regulates the metabolism of other very important members of the antioxidant defence system. Vitamin A (an antioxidant) is dependent on adequate zinc level for its release from the storage site in the liver and metabolism.<sup>24,25</sup> Similarly the potent antioxidant, vitamin E and zinc have a number of functions in common, including membrane stabilization, antioxidant functions and modulation of prostaglandin metabolism.<sup>26</sup> Furthermore, zinc deficiency produces high vulnerability to lipoprotein oxidation in experimental models.<sup>27</sup> Hyperglycemia and hyperinsulinemia increases the production of free radicals and there is evidence that lipid peroxidation is increased in type 2 diabetes mellitus patients.<sup>28</sup>

Although some investigators suggest that decreased serum Zn levels can be prevented by oral Zn replacements, later researches<sup>29-31</sup> indicated that different representations of serum Zn level are independent of diet.

Present study has shown increased Cu levels in diabetic patients- both with complication and without complications, than the controls. Similar finding has been observed by other studies as Di-Silvestro RA et al<sup>32</sup> and Zagar AH et al.<sup>33</sup> Urinary excretion of copper has been found to be affected by diabetes mellitus.<sup>34,35</sup> Previous studies proved involvement of copper to cause oxidative stress. Majority of plasma copper is transported bound to ceruloplasmin (>95%); rest is bound to albumin, transcuprein and copper-amino acid complexes.<sup>36</sup> Ceruloplasmin is an acute phase reactant, has ferro-O<sub>2</sub>-oxidoreductase (pro-oxidant) activity directed towards ferrous ion stimulated lipid peroxidation and formation of hydroxyl radical in Fenton reaction.<sup>36</sup> Copper is toxic in its unbound form, causes redox imbalance due to its highly redox active nature, which leads to activation of stress sensitive intracellular signaling pathways through Haber-Weiss reaction.<sup>36,17</sup>

The increase in Cu ion levels in patients with diabetes mellitus may be attributed to hyperglycaemia that may stimulate glycation and release of copper ions and this accelerates the oxidative stress, so that, Advanced Glycation End products are formed<sup>38</sup>, that are involved in the pathogenesis of diabetic complications. Transition metal like copper has affinity

	Mean value $\pm$ SD			P value
	controls	Cases with complications	Cases without complications	
Zn	95.40 $\pm$ 3.90	89.65 $\pm$ 4.21	92.32 $\pm$ 5.15	< 0.001
Cu	131.85 $\pm$ 7.92	164.05 $\pm$ 9.32	161.40 $\pm$ 6.43	< 0.001

**Table-4:** Distribution of mean  $\pm$  SD of Zn and Cu among the three study groups

variable	(I)	(II)	Mean difference* (I-II)	p-value
Zn	Control	Case with complication	5.75000	0.001
		Case without complication	3.07500	0.008
	Case with complication	Case without complication	-2.67500	0.025
Cu	Control	Case with complication	-29.55500	0.001
		Case without complication	-32.20000	0.001
	Case with complication	Case without complication	-2.64500	0.423

\*The mean difference is significant at the .05 level

**Table-5:** Pair-wise (group) comparison of Mean of trace elements

to bind with proteins that have been glycosylated. Copper in its free form is a potent cytotoxic element because of its redox chemistry it readily participates in Fenton and Haber-Weiss reactions to generate ROS.<sup>39</sup> Ceruloplasmin and serum albumin are the main Cu binding proteins in plasma and there is some evidence that chronic hyperglycemia can damage the Cu binding properties of both.<sup>40</sup>

Considering all of the findings together it was implied that the ratio of Cu/Zn levels, instead of serum Zn levels alone provides more useful information.<sup>41,42</sup> In present study there exist antagonistic relationship in the levels of Cu and Zn in diabetes. Thus the role of trace elements in diabetes mellitus become important.<sup>43,44</sup>

## CONCLUSION

Altered levels of trace elements Zn, Cu are found to be important predisposing factors for diabetic patients for developing complications. From the present study it may be concluded that altered levels of trace elements like zinc and copper may have a role in the pathogenesis and progression of T2DM. The decreased blood levels of Zn and increased blood levels of Cu as have been found in present study can be utilized for the screening, diagnosis and management of diabetes mellitus. However this observation requires further study.

Because of important role of trace elements like zinc and copper in diabetes mellitus, it is suggested that an adequate supply of these substances in the diet of diabetic patients can be beneficial in the long term management of diabetic patients, and further studies in this field are recommended.

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# The Oral Health Status and Treatment Needs of Institutionalized and non Institutionalized Disabled Children in Navi Mumbai, India

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## ABSTRACT

**Introduction:** Dental care is the most common unmet health care need in children with special health care needs. The aim of this study was to assess and compare oral health status and treatment needs of institutionalized and non institutionalized children between the ages of 5 and 13 in Navi Mumbai, India.

**Material and Methods:** The study consisted of 100 institutionalized and 100 non institutionalized children disabled. For each child, caries, oral hygiene status and treatment need was assessed.

**Results:** The institutionalized disabled children showed lower caries experience in both primary and permanent teeth as compared to that of non institutionalized disabled children. Poor oral hygiene was seen in institutionalized disabled children as compared to non institutionalized disabled children.

**Conclusions:** The oral hygiene measures used and degree of mental retardation were significantly associated with oral hygiene status in both institutionalized and non institutionalized disabled children.

**Keywords:** caries, disabled, oral hygiene status, treatment needs.

## INTRODUCTION

As per WHO, disabilities are an umbrella term, covering impairments, activity limitations, and participation restrictions.<sup>1</sup> As per WHO report it is estimated that the total disability in the world is about 10%. According to the Census 2001, there are 21.9 million persons with disabilities in India who constitute 2.13 percent of the total population.<sup>2</sup> This includes persons with visual, hearing, speech, locomotor and mental disabilities. In Maharashtra the population of disabled is found to be 1569582.<sup>2</sup>

Dental care is reported to be the most common unmet health care need in children with special health care needs.<sup>3</sup> Numerous studies have been reported on the prevalence of dental disease in persons with handicapping conditions. Much of the evidence has been conflicting, especially with regard to the prevalence of dental caries. Generally, there appears to be agreement with the high prevalence of periodontal disease, malocclusion, and oral cleanliness; however, agreement about dental caries is not as great. Much of the disagreement stems from the residence of the population. Whether a person is institutionalized or non institutionalized makes a considerable difference with regard to the daily personal care provided to that patient.<sup>4</sup> Very few studies compare the occurrence of dental diseases between children in institutions and those at home.<sup>5</sup>

The present study was undertaken with the aim of assessing and comparing the oral health status and treatment need of the institutionalized disabled children (group A) and non institutionalized disabled children (group B).

## MATERIAL AND METHODS

The present study was conducted by the Department of Pediatric and Preventive Dentistry, Navi Mumbai, India, in association with special schools and institutions for disabled children in and around Navi Mumbai.

Random sampling was used for the study, and sample size was determined as hundred (100) in each group. The ethical committee clearance was obtained from the concerning authority of the institution. Prior consent was obtained from the respective schools, institutions, and individual group B child's parent to conduct the study.

Children were distributed for disabling conditions, as per classification given by Nowak A.J modified to suit the present study as Physically Handicapped, Mentally Retarded, Congenitally abnormal, Childhood autism and Blind.<sup>6</sup> Those children who fell under more than one category were combined under multihandicapped. Children belonging to group A were those who resided within the premises of the institution. The group B children were those who live at home with their families attending special schools. Uncooperative children who did not allow oral examination were excluded from the study.

The study was carried out by using specific proforma. The first part of the proforma sought information on the individual's identity, age and sex, type of disability, IQ level, cooperation, oral hygiene practices and medical history. These were obtained from the child's medical reports, questionnaire filled by parent/caregiver and school/institution records. Children were categorized based on their intelligence quotient (IQ) as mild, moderate and severe mental retardation available from their records as per Wechsler Intelligence Scale for Children.<sup>7</sup>

The second part of the proforma had the clinical oral examination using dentition status and treatment need index as recommended by World Health Organization 1997 and Simplified Oral Hygiene Index Score given by Greene and Vermillion.<sup>8,9</sup> Clinical examination was carried out in natural light in their respective institutions with children seated on an ordinary chair, using plane mouth mirror, using WHO

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criteria. The same examiner conducted all the examinations.

## STATISTICAL ANALYSIS

SPSS package was used for data entry and analysis. Descriptive statistics were obtained, including percentages and frequencies for categorical data and means and standard deviations for numerical data. The categorical outcomes were analyzed by chi-square tests and the quantitative outcomes were analysed by either a t test or ANOVA, as appropriate. A  $p$  value  $<0.05$  was considered significant.

## RESULTS

Hundred disabled children aged 5-13 years were examined in institutions and those attending special school each. The mean age of group A was 10.13 years and of group B was 10.26 years. In group A, 45% were males and 55 % were females, whereas in group B, 51% were males and 49% were females. Distribution for type of disability across both groups is shown in table 1(A). It was found that 79% of group A and 81% of group B were cooperative (table 1(B)).

In the group B, 84% used toothbrush, 15% used a finger, and 1% used a power brush for brushing their teeth whereas 9% of group A did not clean their teeth at all (table 1(C)). 63% of group A children brushed once a day without help, as compared to 49% of group B who brushed once a day with help. 19% of Group B children brushed more than once a day (table 1(D)). In group A only 3% had visited a dentist as compared to 20% in the group B. Visit to the dentist was seen low in both groups. (Table 1(E))

The mean deft score in group A was 2.77 ( $d=2.73$ ,  $e=0.01$ ,  $f=0.03$ ), which is lower as compared to mean deft (3.55) of the group B with the mean  $d$ ,  $e$  and  $f$  values 3.43, 0.09 and 0.03 respectively (Table 2a). Statistically significant ( $p <0.05$ ) difference between the deft index of group A and group B was predicted by the paired t test. The paired t test showed that the difference between the  $d$  component of group A and group B was statistically significant ( $p <0.05$ ).

No significant differences were seen for the extracted and filled components. It was seen that the mean DMFT score in the group A was 1.68 ( $D=1.66$ ,  $M=0.02$ ,  $F=0.0$ ), which is lower as compared to mean DMFT of the group B (1.93; with  $D=1.80$ ,  $M=0.01$ ,  $F=0.12$ ).

In group A, 61 individuals required one surface filling, 33 required two surface fillings, 15 required pulp care and restoration and 24 required extraction treatment. Of the 100 group B children 60 children required one surface filling, 30 required two surface fillings, 20 required pulp care and restoration and 32 require extraction (Table 2b). Further statistical analysis showed that differences between the groups were not significant.

There was no significant difference in the mean OHI-S scores between the group A (2.42) and Group B (2.22) (Table 2c). Significant difference was found in the oral hygiene index scores based on oral hygiene measures in both groups. Further, significant difference was found in the oral hygiene index scores based on degree of retardation in both groups. (Table 3)

## DISCUSSION

Higher percentages of children were multi-handicapped and physically handicapped in group A, as compared to group B. This was due to the sample selection which included a residential school, society for education of crippled, catering mainly to the physical and multi-handicap children who are often admitted to the institutions due to the nature of care required.

The present study shows 91% of group A and 84% of group B children used toothbrush for cleaning their teeth. A difference in the use of tooth brushing aids was seen in children across the group A and groups B, where 9% of the group A children did not clean their teeth whereas 15% of group B used finger for cleaning their teeth. Only 1 group B child used a power brush and none of the groups reported use of a modified brush.

Percentage distribution		Group A (%)	Group B (%)
(A) Type of disability	Physically handicapped	24	5
	Mental retardation	45	72
	Congenital	2	0
	Childhood autism	2	6
	Blind	1	2
	Combination	26	15
(B) Co operation	Good	79	81
	Poor	21	19
(C) Tooth brushing AIDS	Toothbrush	91	84
	Finger	0	15
	Modified toothbrush	0	0
	Power toothbrush	0	1
	None	9	0
(D) Oral hygiene measures	Once a day with help	28	49
	Once a day without help	63	32
	No cleaning	9	0
	More than once a day	0	19
(E) Visit to dentist	Yes	3	20
	No	97	80

**Table-1:** Percentage distribution of type of disability, cooperation and responses to questionnaire.

			Group A	Group B	Pearson Chi-Square
(a) Caries	Primary teeth	deft	2.77	3.55	0.000*
		d	2.73	3.43	0.000*
		e	0.01	0.09	0.439
		f	0.03	0.03	0.576
	Permanent teeth	DMFT	1.68	1.93	
		D	1.66	1.80	
		M	0.02	0.01	
		F	0	0.12	
(b) Treatment need	One surface filling	No of teeth	164	188	0.335
		No of children	61	60	
	Two surface filling	No of teeth	81	95	0.189
		No of children	33	30	
	Pulp care and restoration	No of teeth	43	39	0.423
		No of children	15	20	
	Extraction	No of teeth	55	80	0.150
		No of children	24	32	
(c) OHIS			2.42	2.22	0.301

P VALUE \*significant when  $p < 0.05$

**Table-2:** deft/DMFT, treatment needs and Oral Hygiene Index Simplified (OHIS) scores

		Simplified oral hygiene index					
		Group A			Group B		
		Good	Fair	Poor	Good	Fair	Poor
OHIS (%)		24	46	30	24	53	23
Oral hygiene measures (%)	Once a day with help	14.3	64.3	21.4	20.4	55.1	24.5
	Once a day without help	28.6	42.9	28.6	21.9	40.6	37.5
	No cleaning	88.9	11.1	0	0	0	0
Degree of retardation (%)	More than once a day	0	0	0	31.6	68.4	0
	Mild	60	30	10	40	50	10
	Moderate	43.5	34.8	21.7	21.7	60.9	17.4
	Severe	26.8	61	12.2	26.8	58.5	14.6
	Normal	12	36	52	12	36	52

**Table-3:** Percentage distribution of Oral Hygiene Index simplified (OHIS) by oral hygiene measures and degree of retardation for both groups.

All group B in our study had their teeth brushed at least once (81%) or more (19%) times a day which was also seen in a few studies.<sup>4,10</sup> In group A, it was seen that no cleaning was performed in 9% of the children. Of this, majority showed moderate to severe retardation which explains neglect by care takers in the institutional setting. It was seen that the percentage of group A brushing on their own without help was higher (63%). This may be due to lack of motivation, awareness of oral hygiene among care takers, neglect due to non cooperation by child and untrained staff.

In a study by Storhaug, interviews with parents of non institutionalized handicapped children showed that most of the children brushed their teeth alone.<sup>11</sup> The problems reported by parents related to tooth brushing were lack of cooperation or difficulties associated with rinsing, spitting or opening the mouth. This was not the case in our study where, majority i.e. 49% of the group B brushed their teeth with help from a parent. Another study by the same author, published two years later on a sample comparable to our study showed 91% of non institutionalized disabled children had their teeth brushed once daily, in most cases the children brushed their teeth themselves (53%) or with little help (25%).<sup>12</sup> Our study results also differ with that of Gizani S where majority of

handicapped children (86.2%) did not receive any help with tooth brushing.<sup>13</sup> None of the responses were positive for once a week hence it was not considered in the results.

In a study by Murray JJ and McLeod, 66% of the children attending school had visited the dentist.<sup>14</sup> Another study by Storhaug reported that 83% of children had regular dental visits.<sup>12</sup> In our study, though more children in the group B had visited the dentist as compared to group A, the number is still far below that in the above mentioned studies. This may be attributed to more pressing medical issues in the handicapped children, lack of awareness among parents, lack of cooperation by child, and lack of facilities available.<sup>15-17</sup> This lack of access to dental care for the group A, is evident from our study where only 3% had visited a dentist. None of the institutions were attached to a dental health service provider. Our study showed that the mean deft scores of group A (2.77) was significantly lower than those of group B (3.55). For the DMFT score also a similar trend was seen where group A (mean DMFT – 1.68) showed lesser caries experience than group B (mean DMFT-1.93). This is in agreement with few studies done in an institution, which found decreased prevalence of caries due to dietary restriction than those staying at home with fewer opportunities of eating between meals.<sup>15,18,19</sup>

A nationwide survey conducted in 2005, included 7 districts of India, of which one was Maharashtra, revealed mean DMFT score of 1.3 and 1.7 for 12 and 15 year old normal children respectively.<sup>20</sup> Our study suggests similar caries trends as in normal population. Caries prevalence among normal children in Mumbai, Maharashtra as per a study in 1991 showed mean DMFT as 2.52.<sup>21</sup> In the same study he found the prevalence of caries in normal children highest as compared to different handicapped population. Our study agrees with the above study as DMFT scores in our study are also lower for both groups when compared to scores for normal children residing in Mumbai obtained from his study. Our study agrees with few other studies which attributed this difference to environmental conditions i.e. dietary habits, oral hygiene practices etc.<sup>19,21-24</sup> The high caries activity in these children can be attributed to their diet, difficulty in maintaining oral hygiene, poor muscular coordination and muscle weakness interfering with routine oral hygiene procedure.<sup>19</sup>

When component part of the deft and DMFT were analyzed, the decay component occupied all or major part of the index for both group A and group B. This is in accordance with study by Rao DB and Naveenkumar PG.<sup>25,26</sup> This finding shows the lack of conservative approach to the treatment of dental caries as observed in various other studies.<sup>13,14,24,25</sup> It becomes apparent how helpless handicapped children are in regards to dental care. In our study lack of access to dental care was observed, which itself eliminates the possibilities of increased extractions and fillings, resulting in a higher decayed component.

Treatment need for dental caries was assessed where it was seen that in both groups teeth requiring 1 surface restoration was higher than 2 or more surface restorations. This is in accordance with study by Bhavsar JP.<sup>27</sup> Extractions formed an integral part of the treatment need. The group B required higher one surface fillings, two surface fillings and extractions as compared to group A children. Various studies show similar results for handicapped children, but these studies compare them to normal children.<sup>5,15,28</sup> Treatment needs among normal children in Bombay, Maharashtra as per a study in 1991 showed requirement of 199 one surface and 111 two surface fillings.<sup>19</sup> Though no comparative conclusions can be made, the treatment need of normal children exceeds that of children in our study. In a study by Gizani S, 7.9% of non institutionalized handicapped children had sealants placed.<sup>13</sup> In our study, none of the group B children had sealants.

A number of factors explain why there is so much unmet treatment need such as lack of knowledge and motivation about good oral hygiene practices among the concerned authorities, low priority given to dental care in the society, lack of facilities for early and regular oral health checkup and prompt treatment, poor socioeconomic status of the parents and guardians, and cost of treatment.<sup>25</sup>

Institutionalized individuals have been reported to have significantly poor oral hygiene than non institutionalized individuals.<sup>14,29</sup> Our study found similar results though no significant statistical difference was seen. Results for oral hygiene show that in group A 30% showed poor oral hygiene, 46%

showed fair oral hygiene and only 24% showed good oral hygiene. This is in accordance with studies which show that group A children have poor oral hygiene.<sup>14,29</sup> Our study showed that higher number of children fell in the fair (53%) and poor (23%) category that is in agreement with many studies that report poor oral hygiene in non institutionalized handicapped children.<sup>13,29</sup>

The present study shows that, oral hygiene status was significantly associated with the oral hygiene measures used in both groups. In group A, where 9% reported no cleaning, of them 88.9% showed poor oral hygiene. Number of group B who brushed once a day with help had better oral hygiene than group A disabled children who took help while brushing. In group A, we found that as the severity of the mental retardation increases, the number of children having poor oral hygiene decreases. The children that showed normal IQ had significantly better oral hygiene than mild, moderate and severe retardation children as seen in many studies.<sup>5,24</sup> Poor oral hygiene does not always correlate with a poorer dental condition and more caries as seen in our study where though group A children had poorer oral hygiene, their dental caries experience was lower.

## CONCLUSIONS

Institutionalized disabled children showed lower caries experience in both primary and permanent teeth as compared to that of non institutionalized disabled children. Poor oral hygiene was seen in institutionalized disabled children as compared to non institutionalized disabled children. Highly unmet treatment needs were seen regardless of status of institutionalization. Oral hygiene measures used and degree of mental retardation were significantly associated with oral hygiene status in both groups. Lack of access to dental care in this population is evident, as the decayed component formed a major part of the index. The lack of care reflects both, the inability to seek treatment and the attitudes of the persons caring for them on one hand, and the attitudes and abilities of dentists and health care services on the other.

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# Ventilator Associated Pneumonia in a ICU of a Tertiary Care Hospital in India

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## ABSTRACT

**Introduction:** Ventilator Associated Pneumonia (VAP) refers to a type of pneumonia that occurs more than 48–72 hours after endotracheal intubation. Risk factors include prolonged mechanical ventilation, reintubation after extubation. Our aim was to find the incidence of VAP, total days of mechanical ventilation, days of ICU and hospital stay at our institution, proportion of various bacterial pathogens isolated from tracheal aspirate of patients with VAP and their antibiotic sensitivity pattern.

**Material and methods:** A prospective cohort study was conducted on 100 patients who were admitted to medical intensive care unit of SCB Medical college and on ventilatory support for two or more days and were not suffering from pneumonia prior to putting them on ventilator. Endotracheal aspirates were obtained under strict aseptic precautions using a 22-inch Romson's 12F suction catheter with a mucus extractor. Gram staining and biochemical tests for identification and antimicrobial susceptibility test were performed. The patients were classified into four groups named VAP, non VAP, survivors and non survivors. All the data collected were compiled and tabulated.

**Results:** The incidence of VAP in this study was 30%. The association between genders (p value=0.372), age (p value=0.929) and VAP infection was not found to be significant. There was no significant correlation between the primary disease and development of VAP (p value =0.24). Most common organism isolated was *P. aeruginosa*, (9 isolates) followed by MRSA (7 isolates) and most of them were resistant to commonly used antibiotics.

**Conclusion:** VAP patients have higher mortality rate, longer duration of mechanical ventilation and duration of hospital stay than non VAP patients. Early diagnosis of VAP and initiation of appropriate antibiotic treatment is vital to prevent the adverse outcomes.

**Keywords:** ventilator, pneumonia, endotracheal

## INTRODUCTION

Hospital acquired pneumonia also known as nosocomial pneumonia, is defined as the onset of pneumonia symptoms more than 48 hrs after admission to the hospital. Ventilator associated pneumonia (VAP) is a type of nosocomial pneumonia that occurs more than 48–72 hours after endotracheal intubation and receiving mechanical ventilation in ICU. VAP occurs in 9–27% of all intubated patients.<sup>1</sup> Risk factors include prolonged mechanical ventilation, reintubation after extubation. If the infection occurs within 48–72 hrs of intubation then it is called early onset type and after 72 hrs after intubation it is called late onset type VAP respectively.

Delay in initiating appropriate antibiotic therapy can increase the mortality associated with VAP, and thus therapy should not be postponed for the purpose of performing diagnosis.

This initial empirical antimicrobial therapy can be modified based on the knowledge of local microbiological data, patient characteristics, and sensitivity pattern of expected pathogens at the institution.

There is currently no gold standard for diagnosis of VAP. The CDC criteria for diagnosis are as follows

- 1-mechanical ventilation for greater than 48 hrs,
- 2-new or persistent or progressive radiographic infiltrates
- 3-fever greater than 38.5 c
- 4-leukocytosis or leukopenia
- 5-positive culture for endotracheal aspirate

The aim of the study was to find the incidence of VAP, whether any risk factor was there that predispose to VAP development and mortality associated with VAP and secondary outcomes like total days of mechanical ventilation, days of ICU and hospital stay at our institution, proportion of various bacterial pathogens isolated from tracheal aspirate of patients with VAP, and their antibiotic sensitivity pattern.

## MATERIAL AND METHODS

A prospective cohort study was conducted on 100 patients who were admitted to medical intensive care unit of SCB Medical college and on ventilatory support for two or more days and were not suffering from pneumonia prior to putting them on ventilator. After getting the informed consent from the patient relatives, the study was done. Elective tracheostomy was done in some of the patients who were thought to stay for a long period on mechanical ventilation to avoid re-intubation. Patients, who died or developed pneumonia within 48 hrs or those who were admitted with pneumonia at the time of admission and patients of ARDS (Acute Respiratory Distress Syndrome) were excluded from the study.

The baseline evaluations like age, any concomitant diseases, the severity of illness based on APACHE II score during first 24 hours of admission were noted. The diagnosis of VAP was established using clinical pulmonary infection score (CPIS),<sup>3,4</sup> which was evaluated on a daily basis until the patient was on ventilator support. CPIS of greater than six was used as diagnostic criteria for VAP. Early-onset VAP was defined as VAP occurring within the first 72 hours and

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late-onset VAP was defined as VAP occurring after 72 hours after patients put on mechanical ventilation respectively. Endotracheal aspirate was preferred over protected specimen brush (PSB) sampling and broncho-alveolar lavage (BAL), as these techniques are more invasive and studies have shown no mortality benefit of using these over endotracheal aspirate.

Endotracheal aspirates were obtained under strict aseptic precautions using a 22-inch Romson’s 12F suction catheter with a mucus extractor, which was gently introduced through the endotracheal tube for a distance of approximately 25 cm. Gentle aspiration was then performed without instilling saline, and the catheter was withdrawn from the endotracheal tube. After this, 4 ml of 0.9% saline was injected in the endotracheal tube with a sterile syringe to flush the exudates into a sterile container for collection. The samples were immediately taken to the laboratory for processing. Care was taken during the procedure to avoid injury to the tracheal mucosa and hypoxia development. Within 1<sup>st</sup> hr of collection of samples Gram stain preparations were made. Then all samples were inoculated in to 5% blood agar and Mac Conkey agar. Biochemical tests and gram staining was done on isolated colonies. According to clinical laboratory standard institute guideline, antibiotic susceptibility was tested. Initially broad spectrum antibiotic covering all suspected organisms was started in all patients diagnosed with ventilator associated pneumonia till we got the culture and sensitivity report after which antibiotic was changed.

We have studied the incidence of VAP, organisms causing VAP and their sensitivity pattern. We have also studied dura-

tion of mechanical ventilation and duration of hospital stay. The patients were classified into four groups named VAP, non VAP, survivors and non survivors.

**STATITICAL ANALYSIS**

All the data collected were compiled and tabulated. The statistical analysis were done by chi-square test, fisher test and paired t test. The p value was calculated and <0.05 was considered significant.

**RESULTS**

We found that the disease had no predilection for gender as nearly same percentage of males and females are affected and not significant (p value=0.372). Also age did not affected the development of VAP (p- value= 0.929) which was not significant.

Most no. of cases were CVA followed by snake bite, sepsis, meningitis, cardiogenic shock etc. Sepsis contributed most to VAP (58%). CVA patients contributed most to the mortality followed by sepsis. But there was no association between clinical disease and development of VAP and also for mortality.

Out of total 30 VAP patients, most no. of isolates were pseudomonas aeruginosa spp. (30%) followed by methicillin resistant staphylococcus aureus (MRSA). Pseudomonas caused late VAP in all the isolates. All other organisms caused both early and late VAP. Mortality rate was highest in patients infected by acenatobacter baumannii and Klebsiella pneumonie. A total of 10 out of 100 patients required reintubation while receiving mechanical ventilation. Out of the 10 patients 8

Disorder	No. of PTS	VAP(%)	Non-VAP (%)	Chi sqre test-13.87	Survivors (%)	Non survivors (%)	Chi-square test- 14.69
Meningitis	10	3(30)	7(70)	P Value-0.24	9(90)	1(10)	P-Value-0.2
GBS	6	3(50)	3(50)		5(83)	1(17)	
Snake bite	17	3(18)	14(82)		16(94)	1(6)	
Cerebral vascular accident	20	4(20)	16(80)		10(50)	10(50)	
Cardiogenic shock	10	1(10)	9(90)		6(60)	4(40)	
Sepsis	12	7(58)	5(42)		7(58)	5(42)	
Metabolic(ARF/CRF/DKA)	6	2(33)	4(67)		4(67)	2(33)	
Malaria	4	2(50)	2(50)		3(75)	1(25)	
Dengue shock syndrome	3	0	3(100)		2(67)	1(33)	
Poisoning	6	2(33)	4(67)		3(50)	3(50)	
Pancreatitis	3	2(67)	1(33)		1(33)	2(66)	
Hepatic encephalopathy	3	1(33)	2(67)		2(67)	1(33)	
Total	100	30	70		68	32	

**Table-1:** Comparison of diseases with VAP, non VAP, survivor, non survivor

Organism	Total no. of Isolates	% of Isolates	Early VAP	Late VAP	Survivors (%)	Non survivors (%)
Pseudomonas aeruginosa	9	30	0	9	6(66.6)	3(33.3)
MRSA	7	23	2	5	5(71)	2(29)
K. Pneumonia	6	20	2	4	2(33.3)	4(66.6)
A.Baumannii	5	17	2	3	1(20)	4(80)
Enterococii	1	3.3	0	1	1(100)	0
S.Pneumoniae	1	3.3	1	0	1(100)	0
Candida	1	3.3	0	1	1(100)	0
Total	30		7	23	17	13

**Table-2:** Causative organisms in VAP- Frequency, type of VAP, and associated mortality

Category	VAP	Non VAP	P Value	Survivor	Non survivor	P value
Apache II score	21 ±7.02	15.88 ±5.57	<0.0002	14.11 ±3.49	24.43 ±5.56	0.001
Duration of mechanical ventilation (days)	12.66 ± 3.69	5.72 ± 2.58	<0.0001	7.25±3.54	9.0 ±5.57	0.06
Duration of hospital stay( days)	16.1± +/- 3.81	8.7± 3.73	<0.0001	11.20±4.42	10.31 ± 6.24	0.414

**Table-3:** Comparison of apache II score and outcome from ventilator

Organism isolated	Highly sensitive	Intermediate	Resistant
Pseudomonas Aeruginosa(9)	Polymyxin, colistin, meropenem, imipenem	Piperacilin +tazobactam, gatifloxacin	Levofloxacin, ceftazidime, cefoperazone+sulbactam
MRSA(7)	Vancomycin, linezolid	Clindamycin, levofloxacin, gatifloxacin	Oxacillin, methicillin, amoxicillin+clavulanate, erythromycin
Klebsiella Pneumoniae(6)	Polymyxin b, colistin,	Imipenem, meropenem, gatifloxacin	Ceftriaxone, ceftazidime, cefotaxime
Acinetobacter Baumannii(5)	Polymyxin b, colistin,	Imipenem, meropenem	Levofloxacin, cefoperazone+sulbactam, piperacilin+tazobactam
Streptococcus Pneumonia(1)	Vancomycin, imipenem, meropenem	Penicillin, ceftriaxone, ceftazidime	Erythromycin, tetracyclines, ofloxacin, chloramphenicol
Candida Spp.(1)			
Enterococci (1)	Vancomycin, linezolid	Penicillins, cephalosporin	Ofloxacin, gentamycin

**Table-4:** Antibigram of the isolates

developed VAP i.e.80%. (p value =0.0009) which was highly significant. Elective tracheostomy was done in 10 patients and 4 of them developed VAP and 6 did not (p value =0.4814).13 patients (3 Early VAP and 10 Late VAP) out of 30 in VAP category had died whereas in non VAP category 19 patients out of 70 had died (p value = 0.15). So there was no strong correlation of VAP and mortality.

The mean APACHE II score, mean duration of mechanical ventilation and mean duration of hospital stay in VAP group was significantly higher than non VAP group (p value <0.05). Mean APACHE II score was significantly higher in non survivor but mean duration of mechanical ventilation and mean duration of hospital stay had no effect on mortality.

## DISCUSSION

The incidence of VAP in this study was 30%.Gupta et al<sup>1</sup> found it to be 28%.The association between genders(p value-0.372), age (p value-0.929) and VAP infection was not found to be significant which was similar to study done by Gupta et al<sup>1</sup>

Different types of clinical cases were included in our study like CVA, snake bite, cardiogenic shock, meningitis, acute pancreatitis, hepatic encephalopathy and dengue shock syndrome etc (table-1). Patients who needed more days of mechanical ventilation developed VAP more often. So cases of septicemic shock, guillain-barrie syndrome, meningitis, complicated malaria required prolong mechanical ventilation and developed more VAP because of prolong mechanical ventilation. At the same time cases requiring less ventilation like snake bite, cardiogenic shock developed less number of VAP. There was no significant correlation between the primary disease and development of VAP (p value =0.24). This was supported by the study of Gupta et al<sup>1</sup> and Awasthi S et al.<sup>2</sup> CVA patients contributed most to the mortality in our study second being sepsis but the relation between diseases and mortality was not significant (p value= 0.2)

CPIS scoring system was used as a diagnostic tool for VAP identification. Patients with a score >6 were considered to

be affected by pneumonia. Luyt et al<sup>3</sup> and Croce et al<sup>4</sup> found CPIS scoring system a highly sensitive tool to diagnose VAP. Out of the 10 patients, who were reintubated, 8 developed VAP (p value = 0.0009). It showed that reintubation was a definite risk factor for VAP development. Similar results also found by Gupta et al<sup>1</sup>, Panwar et al<sup>5</sup>, Rit et al.<sup>6</sup> This might be because of invasive procedure of intubation was repeated and also duration of ventilation was increased. Another hypothesis for this was that the patient who required re-intubation would have been vulnerable to aspiration in the interval between extubation and re-intubation. Although the incidence of VAP was found to be lower in patients who underwent early tracheostomy (4 out of 10), but was not found to be statistically significant (P - 0.4816).

The most common organism isolated was *P. aeruginosa*, (9 isolates). All were from patients with late-onset VAP. The next most common organism isolated was MRSA (seven isolates, of which five were isolated from patients with late onset VAP) but there was no specific correlation between infecting organism and type of VAP (p value = 0.373). Other common organisms isolated were *K. Pneumoniae*(6 isolates) and *A. baumannii* (5 isolates). Rit et al<sup>6</sup> found the same result.

Antibiotic sensitivity pattern of organisms suggested that most strains of *P. aeruginosa* were resistant to the commonly used beta-lactam antibiotics with 5 (55.56%) isolates being resistant to ceftazidime, cefepime, cefoperazone+sulbactam but they were highly sensitive to antibiotics like polymyxin B, colistin, meropenem, imipenem. All isolated strains of *S. aureus* were MRSA and sensitive to linezolid and vancomycin but resistant to methicillin, oxacillin, amoxicillin+ clavulanic acid, erythromycin etc. Most isolates of *K. pneumoniae* were ESBL producing. One isolate of *K. pneumoniae* was resistant to both the carbapenems used but were sensitive to polymyxin and colistin and resistant to commonly used cephalosporins like ceftriaxone, cefotaxime, ceftazidime. Carbapenem resistance was noted still higher with *A. baumannii*, with 50% isolates resistant to carbapenems but they were sensitive to higher antibiotics like polymyxin b and

colistin. The overall picture suggests that number of drug-resistant strains of various organisms was rising and an important cause of VAP in our setting. Ijaj et al<sup>7</sup>, Krishnamurthy et al<sup>8</sup>, Gupta et al<sup>1</sup> got same antibiogram profile of VAP patients in their studies.

In our study the overall mortality was 32%. Out of that mortality in VAP group was 43.33%, while in non-VAP group, it was 27.14% and the difference was not statistically significant ( $P$  value=0.15). Although VAP was not independently associated with mortality, mortality rate was higher in patients with VAP. In other studies mortality varied from 30% to 50%. The mortality in VAP patients was significantly higher than non VAP patients. Gupta et al<sup>1</sup> and Panwar et al<sup>5</sup>, found same type of result.

Naved et al<sup>9</sup> and Gupta et al<sup>1</sup> took APACHE II score to evaluate the condition of patient at admission and they found that patients with high scores had higher mortality rate thus supporting our study. Mortality was also influenced by the type of organism isolated being highest for infections caused by *A. baumannii* (80%) and *K. pneumoniae* (66.6%).

The mean duration of mechanical ventilation was higher in VAP patients than in non VAP patients ( $p$  value < 0.0001). This showed that there was a highly significant difference between VAP and non VAP patients regarding duration of mechanical ventilation. Gupta et al<sup>1</sup> found that longer duration of ventilation was required in VAP patients than non VAP patients. Awasthi et al<sup>2</sup> mentioned same result in VAP patients of age 1 to 12 yrs. But there was no significant difference in days of mechanical ventilation between survivors and non survivors ( $p$  value = 0.06).

The VAP patients had a longer duration of hospital stay than non VAP ( $p$  value < 0.0001). Dubey et al,<sup>10</sup> Gupta et al<sup>1</sup> found that VAP patients had a longer duration of hospital stay but there was no significant difference between survivors and non survivors regarding total duration of hospital stay ( $p$  value = 0.414).

The mean duration of ICU stay was significantly higher in VAP patients than in non VAP patients ( $p$  value < 0.0001). It increased the cost of treatment which was a very important aspect for patient family in Indian setup.

## CONCLUSION

Demographic profiles like age, gender did not affect the development of VAP neither did the underlying primary disorders of the patients. Patients with high APACHE II score were found to be more vulnerable to VAP. Patients who were reintubated for a number of times were seen to develop VAP more frequently. Most frequent species of bacteria isolated were pseudomonas spp and MRSA. Most of the isolated organisms were resistant to commonly used antibiotics like penicillins, cephalosporins but sensitive to higher and newer antibiotics like polymyxin, colistin, linezolid, vancomycin. Patients with high APACHE II score had more adverse outcome in terms of mortality, duration of mechanical ventilation, ICU stay and hospital stay.

VAP patients have higher mortality rate, longer duration of mechanical ventilation and duration of hospital stay than non VAP patients. Early diagnosis of VAP and initiation of appropriate antibiotic treatment is vital to prevent the adverse

outcomes. Proper hand hygiene and other sterile techniques will prevent spread of infection. Regular fumigation of ICUs and sterilization of ventilators will definitely decrease the incidence of VAP.

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# Seroprevalence and Risk Factors of Hepatitis B Virus Infection among General Population of Srinagar Kashmir

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## ABSTRACT

**Introduction:** About 2 billion people in the world are infected with Hepatitis B virus. The objectives of our study were to find out the prevalence of Hepatitis-B infection, to determine its socio-demographic correlates and to know about the risk factors of Hepatitis B infection in the study population.

**Material and methods:** A cross-sectional, community-based study in the age group of 18 years and above was conducted in Block Hazratbal of District Srinagar. The sample size of 1340 was derived using formula  $n=4pq/l^2$ . After informed consent, 1300 subjects agreed to participate in the study and they were screened for HBsAg using ELISA kits. Relevant information about their demography, socio-economic status and risk factors of Hepatitis B infection was collected on a pre-tested, semi-structured proforma. Statistical analysis was performed using SPSS version 16.

**Results:** There were 1300 participants in our study, out of which 74.6% were females and 25.4% were males. It was a Muslim community with majority (69%) representing the Sunni group. Most of the participants were in the age group of 21-40 years with a median age of 35 years. The prevalence of Hepatitis B infection was found to be 1.2%, with higher prevalence among males. The risk factors such as tattooing, dental procedure, injecting drug use, extra-marital sexual activity, having multiple sexual partners, past history of jaundice and family history of Hepatitis B infection were significantly associated with Hepatitis B infection.

**Conclusion:** According to WHO classification, our study area qualifies as a low prevalence area. Significant risk factors of Hepatitis B infection observed in our study population give us a clue that if timely measures are not taken, we may have to face the epidemic of this deadly disease in the near future.

**Keywords:** Community, HBsAg, Hepatitis B, risk factors, seroprevalence, sociodemography, Srinagar

## INTRODUCTION

Hepatitis B virus (HBV) infection is one of the major global public health problems with nearly 2 billion people infected worldwide, 75 % of whom are Asians.<sup>1</sup> There are about 350 million chronic carriers in the world.<sup>1-3</sup> At least 15-25% of chronically HBV infected people will die due to liver disease, including cirrhosis of the liver and hepatocellular carcinoma worldwide. HBV infection accounts for 5,00,000 to 1.2 million deaths each year. The virus causes 60-80 % of all primary liver cancers, which is one of the three top causes of cancer deaths in the East and SEAR, the Pacific Basin and Sub-Saharan Africa.<sup>4</sup>

HBV is a silent killer disease of the liver with many carriers not realising that they are infected with the virus.<sup>5</sup> Diagnosis is based on clinical, laboratory, and epidemiologic findings. HBV infection cannot be differentiated on the basis of clinical

symptoms alone, and definitive diagnosis depends on the results of serologic testing. Serologic markers of HBV infection vary depending on whether the infection is acute or chronic. HBsAg is the most commonly used test for diagnosing acute HBV infections or detecting carriers.

This viral infection is seen in both the developed and developing regions of the world, with prevalence varying from 0.1% to 20% in different countries.<sup>3</sup> In areas of high endemicity, most people are infected early in life, and the prevalence of hepatitis B surface antigen (HBsAg) carriage is 8% to 20%. In most areas of the world (East and South Europe, South America, the Middle East, Middle Asia, Japan, and Turkey), HBV infection is of intermediate endemicity with HBsAg carriage rate of 2% to 7%. Areas with low endemicity (0.1% to 2%) include the United States, Canada, Western Europe, New Zealand and Australia, where only a minority of people come into contact with the virus, usually as a result of horizontal transmission among young adults.<sup>6-8</sup>

India has intermediate endemicity of Hepatitis B with HBsAg carrier rate between 2-7%. In India, there are 40 million HBsAg carriers and every year about 1,00,000 Indians die due to illness related to HBV infection.<sup>9</sup> This, in the context of large population would spell off a projected increasing burden of infection and liver disease due to HBV in this country in the years to come. In this perspective, the HBV epidemiology becomes relevant not only nationally, but also internationally, because of the possibility that India may soon have the largest HBV infection pool in the world. Hepatitis B virus (HBV) infection is the most common cause of chronic liver disease in the Asia-Pacific region.

Studies are too limited to give a clear picture of the prevalence and pattern of HBV infection at the state level, especially among otherwise healthy individuals. Therefore, the present study was planned to estimate the prevalence of Hepatitis-B infection, to determine its socio-demographic correlates and to know about the risk factors of Hepatitis B infection in the study population.

## MATERIAL AND METHODS

A cross-sectional study on seroprevalence and risk factors of Hepatitis B virus (HBV) infection was conducted in the

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age group of 18 years and above among general population of Block Hazratbal. Block Hazratbal is the field practice area of Government Medical College Srinagar. The duration of study was 2 years from April 2011 to March 2013.

**Statistical methodology:** Sample size for the study was determined using formula,  $n = 4pq / l^2$  where, 'n' is the sample size, 'p' is the estimated prevalence based on previous studies, 'q' = (1-p) and 'l' is the allowable error. Here, p = 3% or 0.03. This was taken from the community based study reported by Chowdhury et al. (2005) in West Bengal<sup>10</sup>, q= (1-0.03) and l =1% (absolute error). Substituting these values in the above formula, 'n' was found equal to 1164. Based on the findings of pilot study, a non-response rate of 15% was taken into consideration. Then, sample size was calculated to be 1340.

Hazratbal is mostly an urban area with small pockets of rural and tribal communities. For administrative convenience, the block is divided into 4 zones namely Hazratbal, Harwan, Nishat and Tailbal. The sample was chosen using multi-stage random sampling. In the first stage, one health centre area was chosen randomly using lottery method from each zone. After using the survey register of year 2010, all the households in selected sub-centre areas were enlisted. Number of households to be enrolled in each area was calculated by probability proportionate to size sampling (PPS). In the second stage, from each of the selected area, requisite number of households were chosen randomly using random number table.

Each selected household was visited and all members of age 18 years and above were enrolled for the study. The households in which the enrolled member was not present at the time of visit, were revisited at least twice to ensure participation. First of all, informed consent was obtained from the participants. A total of 1340 subjects were enrolled, out of which only 1300 agreed to participate in the study. Relevant information about their demography, socio-economic status and risk factors of Hepatitis B infection was collected on a pre-tested, semi-structured proforma. Modified BG Prasad's scale (2010) which is based on per capita monthly income was used for socio-economic status.<sup>11</sup> From each subject, about 3 ml of venous blood sample was taken under all aseptic precautions. The samples were then transported in vaccine carriers to the nearest Primary Health Centre (PHC) having supportive laboratory services within 3 hours. The whole blood samples were centrifuged at 3000 r.p.m for 15 minutes the same day. The serum samples were stored in the Ice-lined Refrigerator (ILR) in the PHC maintaining temperature of 2-8° C. The sera were then transported weekly to the Blood Bank of SMHS Hospital, maintaining cold-chain. The samples were tested for Hepatitis-B surface antigen (HBsAg) using commercial Enzyme-Linked Immuno-Sorbent Assay (ELISA) kits namely Microscreen kits.

**Statistical analysis:** The data obtained was entered into Microsoft Excel and analysed using SPSS 16. Frequencies were obtained using descriptive statistics. Tests of proportions (Chi-square) was used to obtain results. A P-value of less than 0.05 was considered statistically significant.

## RESULTS

There were 1300 participants in our study, out of which 74.6% were females and 25.4% were males. It was a Muslim community with majority(69%) representing the Sunni group. Most of the participants were in the age group of 21-40 years with a median age of 35 years. They were mostly from urban areas and about 66.8% were currently married. 64.8% of the participants were illiterate with majority being housewives. About 16 participants (1.2%) were health workers and therefore at risk of occupational exposure to Hepatitis B infection. Majority of the participants (67.2%) belonged to class II (i.e. having per capita monthly income of Rs. 1644 to Rs. 3287) of modified BG Prasad's scale for socio-economic class.

Prevalence of HBsAg among participants was 1.2%. Out of 15 cases of Hepatitis B infection, 14 were males and only 1 was female. Therefore, HBsAg positivity among males was higher (4.2%) as compared to females (0.1%) and it was found to be statistically significant ( $P < 0.05$ ) (Table 1).

Among the socio-demographic correlates, being a member of Shia sect and unmarried were found to be significantly associated with Hepatitis B infection with *PS*-values of less than 0.05. Prevalence was more in rural (1.4%) as compared to urban areas (1%) but the difference was not statistically significant. None of the participants having a high risk job had Hepatitis B infection (Table 2).

Regarding the risk factors, tattooing, dental procedure, injecting drug use, extra-marital sexual activity, having multiple sexual partners, past history of jaundice and family history of Hepatitis B infection were significantly associated with Hepatitis B infection with *P*-values of less than 0.05. Risk factors such as history of blood transfusion, surgical procedure, needle stick injury, therapeutic injection use, reproductive tract infections and hospitalisation did not show statistically significant relationship with Hepatitis B infection (Table 3).

## DISCUSSION

Hepatitis B is the most common chronic viral infection in humans. In spite of a vaccine available since 1982, the hepatitis B virus (HBV) remains a serious global public health problem. Nearly 350 to 400 million people suffer from this infection globally, and 1 million people per year lose their lives due to complications of this infection.<sup>12</sup>

In our study, about 75% of the participants were females. This could be explained by the fact that males were not present during day time as they were at their places of work. De-

Gender		HBsAg		Total
		Present	Absent	
Male	n	14	316	330
	%	4.2	95.8	100
Female	n	1	969	970
	%	0.1	99.9	100
Total	n	15	1285	1300
	%	1.2	98.8	100

$\chi^2$  (corrected) =33.451, df=1,  $P < 0.001$

**Table-1:** Gender wise prevalence of Hepatitis B infection in participants

Socio-demographic characteristics	Number(%)	HBsAg + (%)	HBsAg- (%)	Chisquare (x <sup>2</sup> )	P-value
Residence	1300 (100)				
Rural	412 (31.7)	6 (1.4)	406 (98.6)	0.173	0.677
Urban	888 (68.3)	9 (1)	879 (99)		
Islamic sect	1300 (100)				
Sunni	898 (69)	6 (0.7)	892 (99.3)	4.708	0.03
Shia	402 (31)	9 (2.3)	393 (97.7)		
Marital status	1300 (100)				
Unmarried	342 (26.3)	8 (2.3)	334 (97.7)	4.394	0.036
Married/widow/widower/divorced	958 (73.7)	7 (0.7)	951 (99.3)		
High risk job	1300 (100)				
Present	6 (0.5)	0 (0)	6 (100)	0.001	1.00
Absent	1294 (99.5)	15 (1.2)	1279 (98.8)		

**Table-2:** Socio-demographic correlates of Hepatitis B infection

Risk factors	Number (%)	HBsAg + (%)	HBsAg- (%)	Chisquare (x <sup>2</sup> )	P-value
Blood transfusion	1300 (100)				
Present	107 (8.2)	2 (1.9)	105 (98.1)	0.063	0.802
Absent	1193 (91.8)	13 (1.1)	1180 (98.9)		
Tattooing	1300 (100)				
Present	4 (0.3)	2 (50)	2 (50)	46.474	<0.001
Absent	1296 (99.7)	13 (1)	1283 (99)		
Surgical procedure	1300 (100)				
Present	429 (33)	2 (0.5)	427 (99.5)	1.831	0.176
Absent	871 (67)	13 (1.5)	858 (98.5)		
Dental procedure	1300 (100)				
Present	337 (25.9)	11 (3.3)	326 (96.7)	15.353	<0.001
Absent	963 (74.1)	4 (0.4)	959 (99.6)		
Injecting drug use	1300 (100)				
Present	2 (0.2)	2 (100)	0 (0)	95.774	<0.001
Absent	1298 (99.8)	13 (1)	1285 (99)		
Needle stick injury	1300 (100)				
Present	19 (1.5)	0 (0)	19 (100)	0.369	0.543
Absent	1281 (98.5)	15 (1.2)	1266 (98.8)		
Therapeutic injection use	1300 (100)				
Present	815 (62.7)	9 (1.1)	806 (98.9)	0.003	0.959
Absent	485 (37.3)	6 (1.2)	479 (98.8)		
Extra marital sexual activity	1300 (100)				
Present	5 (0.4)	3 (60)	2 (40)	105.002	<0.001
Absent	1295 (99.6)	12 (1)	1283 (99)		
Multiple sexual partners	1300 (100)				
Present	12 (0.9)	3 (25.0)	9 (75.0)	41.127	<0.001
Absent	1288 (99.1)	12 (0.9)	1276 (99.1)		
Reproductive tract infection	1300 (100)				
Present	70 (5.4)	0 (0)	70 (100)	0.125	0.723
Absent	1230 (94.6)	15 (1.2)	1215 (98.8)		
Hospitalisation	1300 (100)				
Present	404 (31.1)	6 (15)	398 (98.5)	0.221	0.638
Absent	896 (68.9)	9 (1.0)	887 (99.0)		
Past history of jaundice	1300 (100)				
Present	133 (10.2)	8 (6.0)	125 (94.0)	26.133	<0.001
Absent	1167 (89.8)	7 (0.6)	1160 (99.4)		
Family history of Hepatitis B	1300 (100)				
Present	11 (0.8)	2 (18.2)	9 (81.8)	15.156	<0.001
Absent	1289 (99.2)	13 (1.0)	1276 (99.0)		

**Table-3:** Risk factors of Hepatitis B infection in study participants

spite paying repeated visits to households, our sample comprised of only 25% males. More than half of our participants were in the sexually active age group of 18-40 years. It was a Muslim community and the participants represented either

Sunni or Shia group. Only 1.2% were at risk of occupational exposure to HBV infection. Many studies on the epidemiology of HBV infection have been carried out in India and based on these data, between

3-4% of the Indian population are HBV infected (HBsAg positive). In our study the prevalence of HBsAg was found to be 1.2%. According to WHO classification, our study area qualifies as a low prevalence area (as prevalence was less than 2%). Our finding was almost similar to a study conducted by Gadir et al. in the general population of Central Iran where the prevalence of HBsAg was 1.3%.<sup>13</sup> Aggarwal et al. reported HBsAg prevalence of 2.25% in a study conducted among voluntary blood donors in Northern India.<sup>14</sup> In a population based study by Tandon et al., in Birbhum district of West Bengal, the HBsAg prevalence was about 2.97%.<sup>15</sup> Therefore, low prevalence in our area may be due to the fact that people have low level of exposure to various risk factors of hepatitis B infection. Our study revealed that prevalence of HBsAg was significantly higher in males as compared to females ( $P < 0.001$ ). A study by Aggarwal et al. also reported higher positivity among males.<sup>14</sup> This finding was consistent with the study conducted by Khan et al. in Pakistani Punjab where males were more frequently infected than females with a positivity ratio of 2.14:1.<sup>15</sup> Higher infection in males may be due to their frequent exposure to risk factors such as injecting drug use and multiple sexual partners because of their employment away from their homes. As majority of the female participants are housewives, so they have less exposure to various risk factors.

More than half of our cases were of the age of 18-40 years. Khan et al. also observed higher rates of infection in the age-group of 21-40 years.<sup>15</sup> HBV infection being higher in young respondents may be due to their greater exposures and interaction in society as compared to elders. All the participants were Muslims by religion and majority of them belonged to the Sunni sect (69%) and only 31% were from the Shia sect. However, the prevalence of HBsAg was significantly higher in Shia sect as compared to Sunni sect. This difference could be due to the practice of self-flagellation by the Shia Muslims in the holy Islamic month of Muharram. A metallic chain with multiple knife-lets attached to one end, is used to repeatedly inflict injuries on body. These blood contaminated knife-lets are then dipped in a bucket full of water and many persons may use the same water to remove the blood and then re-use them again. Some participants even shared their knife-lets with other members of their family/community especially during Muharram procession. Same was observed by Iqbal Wani in Kargil, Ladakh where prevalence was 8.2% in Shia Muslims as compared to 4.7% in Sunni Muslims (OR=1.65;  $P=0.347$ ).<sup>16</sup> Unmarried participants had significantly higher HBsAg positivity as compared to married. Similar finding was reported from Bangalore where about 65% of the cases were unmarried.<sup>17</sup> An epidemiological study in Anhui Province of China by Li et al showed higher prevalence among married (7.9%) as compared to unmarried (7.4%).<sup>18</sup> It was seen that unmarried participants especially males had a high risk behaviour of having multiple sexual partners and injecting drug use and as such were more exposed to risk of acquiring hepatitis B infection.

Median per capita monthly income was significantly higher among cases as compared to those with HBsAg negative status. A study from South India reported that about half of the cases were from high socio-economic status.<sup>17</sup> Most of

our cases (7 out of 15) were illiterate and only 5 were high school certified. But relationship of educational status with hepatitis B positivity was not found to be significant. A study by Gadir et al showed significant relationship with education and highest prevalence was reported among illiterates.<sup>13</sup> Occupation-wise, majority of our hepatitis B cases were skilled workers followed by tourist guides and students. None of our case was involved in a high risk job. It was observed that skilled workers (i.e. carpet weavers, embroidery workers etc.) belonged mostly to rural areas and had frequent contacts with quacks for injections and other procedures such as tattooing. Tourist guides had a history of having multiple sexual partners and injecting drug use was seen among students.

Our study found that the prevalence of HBsAg was 50% in those with history of tattooing and it was significantly higher than those who had no exposure ( $P < 0.001$ ). Leila M.M.B. Pereira et al. reported tattooing as a significant risk factor (OR=2.24;  $P=0.015$ ) in Northeast region of Brazil.<sup>19</sup> Similar findings were reported in Nigeria where HBsAg prevalence was 40% in those with tattooing.<sup>20</sup> History of dental procedures was a significant risk factor for hepatitis B in our study population ( $P < 0.001$ ). About 25% of our subjects were exposed to dental procedures and some of them had even visited the quacks (unqualified practitioners) for the same. Khan et al. observed that about 11.2% respondents were exposed to dental procedures in Pakistani Punjab.<sup>15</sup> Another study from Pakistan by Qureshi et al.<sup>21</sup> pointed that dental procedure was a significant risk factor for HBV infection (OR= 2.3; 95% CI: 1.8-3.0). In our study, significant relationship was observed between injecting drug use and seropositivity, with needle sharing present in all users. Alam et al reported the prevalence of HBsAg as 22.4% in IDUs of North West Frontier Province of Pakistan.<sup>22</sup> Needle sharing was observed as a significant risk factor by Eke et al ( $P=0.062$ ).<sup>20</sup> Prevalence of HBsAg was found to be 25% in participants with multiple sexual partners. About 62.5% of hepatitis B cases from Pakistan<sup>23</sup> had more than one sexual partner (OR=1.6; CI:0.9-3.0) and a study from Bangalore also reported multiple sexual partners as a significant risk factor (OR=5.26; CI:1.66-16.64) for hepatitis B.<sup>17</sup> Family history was a significant risk factor for hepatitis B in our study ( $P < 0.001$ ). Similar finding was reported by Li et al. (OR=2.04;  $P < 0.001$ ).<sup>18</sup>

## CONCLUSION

This study, the first community based study on Hepatitis B performed in Srinagar, Kashmir clearly indicates that our community too is no exception to this infection with a prevalence of 1.2% in adults. Therefore, as per WHO classification our study area is a low prevalence area. Significant risk factors observed in our study such as injecting drug use, multiple sexual partners, dental procedures, tattooing etc. give us a clue that we may have to face the epidemic of this deadly disease in the near future, if timely measures are not taken. Keeping in view, the increasing burden of this disease, there is a need to organise health education campaigns targeting both health care workers as well as public, so that they adopt all possible measures to prevent the spread of this fatal infection. Our communication strategy should be effective

enough to bring about change in the behaviour of young and productive population so that they would refrain themselves from adopting such behaviours that make them vulnerable to hepatitis B infection.

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# Prevalence and Factors Influencing Obesity in Children Aged 6-14 Years belonging to Upper Middle Income Group of Lucknow City

Shipra Gupta<sup>1</sup>, Ruchira Rathore<sup>2</sup>

## ABSTRACT

**Introduction:** Children are increasingly become vulnerable to overweight and obesity. High calorie food sedentary life style, physical inactivity, extra munching of calorie dense food like chips during. Obesity is indepently responsible for the occurrence of several dreadful diseases like CVD, Diabetes, orthopaedic, hepatic, pulmonary and renal disorders which increase risk for morbidity and mortality as well as reduced life expectancy. So the necessary treatment is immediately required to limit the condition at childhood stage itself which involves the multidisciplinary approach of dietary management, physical activity enhancement, restriction of sedentary behaviour and at last pharmacotherapy and bariatric surgery if condition is inevitable. The study was done to determine prevalence of overweight and obesity among school going children aged 6 to 14 years belonging to upper middle income group of Lucknow city and to identify factors influencing overweight and obesity.

**Material and methods:** A cross sectional study was conducted. 1862 school children studying in 1<sup>st</sup> to 9<sup>th</sup> standard were studied. Socio demographic, anthropometric, dietary data and physical activity was collected using pre-tested questionnaire.

**Results:** The prevalence of overweight and obesity was 6.19% and 5.10% respectively. Frequent Consumption of soft drinks and food outside home, less physical activity time and watching TV more than 1.5 hrs /day were the significant factors for overweight and obesity.

**Conclusion:** Increased soft drink consumption and food intake outside home should be avoided by children. Physical activity duration must be increased. Health education to teachers, parents and students will help to reduce the prevalence of obesity.

**Keywords:** Childhood obesity, BMI, Epidemiology, Lucknow.

## INTRODUCTION

The prevalence of Obesity is increasing at alarming stage. Childhood obesity has more than tripled in past 30 years. The prevalence of obesity among children aged 6 to 11 years has increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years has increased from 5.0% to 18.1%.<sup>1</sup> According to the National Health and Nutrition Examination Survey (NHANES), approximately 17% of children and adolescents aged 2 to 19 years are obese and they will likely to become obese adults.<sup>2</sup> A another study by Park K et al (2005) revealed that 80% of overweight children were obese adults when they turn 25.<sup>3</sup> Childhood obesity can profoundly affect children's physical health, social, and emotional well-being, and self esteem. It is also associated with poor academic performance and at times may lead to mental illness. 50-80% of obese children will continue as obese adults.<sup>4</sup> Due to difficulty in treatment

of obesity in adults and many long term side effects of childhood obesity, prevention of childhood obesity has now been recognized as a public health priority. With this background in mind, the present study was undertaken to know the prevalence of overweight and obesity and factors influencing it in children of upper middle income group aged 6 to 14 years studying in 1<sup>st</sup> to 9<sup>th</sup> standard in private schools of Lucknow city.

Aims and objectives of the research were to determine the prevalence of overweight and obesity among children belonging to upper middle income group of aged 6-14 years studying in class 1st to 9th in private schools of lucknow and to determine factors contributing to overweight and obesity among the subjects in the study.

## MATERIAL AND METHODS

The present cross – sectional study was conducted among school going children of Lucknow city in academic session 2013-2014. Overall 1826 students (988 boys and 838 girls) of lucknow city aged 6 to 14 years enrolled in class 1<sup>st</sup> to 9<sup>th</sup> were interviewed and examined Urban Lucknow is divided into six zones. These six zones were further sub divided into Cis Gomti and Trans Gomti From Cis Gomti two zones were randomly selected and similarly two zones from Trans Gomti were randomly selected. Further from each zone 2 senior secondary schools were randomly selected from school list provided by DIOS Lucknow So total 4 schools were selected for the study All the students were invited to participate in study. Questionnaire were distributed to all students willing to participate It is advised to fill the Questionnaire by parents to the students upto class 5<sup>th</sup> To determine the minimum required sample size has been calculated using the formula:  $N = \frac{p(1-p)}{d^2}$  were used. (BlandM: Oxford University press)<sup>5</sup> Where P for prevalence of childhood obesity from the previous study in Lucknow i.e., 290 (29%) (NDOC 2015)<sup>6</sup> and d= allowable error of known prevalence ie. d=0.01. Ideally it should be 0.05, but to be on safe estimation with minimum sample size we allowed only 1% (0.01) ceros of prevalence the overall prevalence of child obesity is 29%. Thus, the sample size n=2059 but a total of 1826 subjected partic-

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Age (Yrs)	Boys				Girls			
	n	Non-Obese	Obese	Prevalence percentage	n	Non-Obese	Obese	Prevalence Percentage
6	45	34	11	24.44	38	27	11	28.94
7	56	49	9	16.07	51	44	7	13.72
8	102	95	7	6.86	81	74	7	8.64
9	110	99	11	10.0	97	90	7	7.21
10	125	114	11	8.80	85	77	8	9.41
11	140	130	10	7.14	112	100	12	10.71
12	94	79	15	15.95	90	76	14	15.55
13	146	133	13	8.90	134	117	17	12.68
14	170	152	18	10.58	150	132	17	11.33
Total	988	883	105	10.62	838	737	101	12.05

**Table-1:** Provide table legend

Characteristics	Normal	Overweight and obese
Age (6-14 Years)		
Eating Snacks in between Meals		
Yes (%)	90.26	9.74
No (%)	78.87	21.13
Soft drink consumption/week		
Take more than Once (%)	53.33	46.67
Take Once or No (%)	91.04	9.96
Food outside/Week		
Take more than once	89.28	11.72
Take Once or No(%)	91.11	8.89
Physical Exercise		
Yes (%)	91.06	8.94
No (%)	85.68	14.32
Television Watching		
More than 1.5 hr	66.90	33.10
Less than 1.5 hr	66.74	7.26

**Table-2:** Characteristics of Normal and overweight /obese subjects in years 6 -14.

ipated in the study. Following a random sampling procedure 2000 individuals aged 6 to 14 years were identified to participate in the study. Among them, 1826 subject agreed to participate. The purpose of the study was explained and oral consent was obtained from the participants before enrolling them in the study. A pretested semi-structured questionnaire was used to elicit the information of family and individual characteristics. The questionnaire had 4 sections:

- Section-A : General Information
- Section-B : Physical Activity
- Section-C : Dietary History
- Section-D : Examination

Clinical Examination and anthropometric measurements of height and weight were taken using standard equipments (Stadiometer/Measuring scale and bathroom scale weighing machine) to calculate Body mass Index (BMI). All the instruments used for study were calibrated daily. The data was recorded in the questionnaire under the section 'D' 'Examination' Two Visits were made to each school to ensure complete coverage.

## STATISTICAL ANALYSIS

Data was entered into Microsoft excel sheet and analysis using SPSS/Epi info software. Descriptive statistics like frequency, percentages, measures of central tendency, measures of dispersion and inferential statistical test like Chi-square test, t-test, Spearman correlation coefficient were used. The statistical significance was evaluated at 95% confidence level ( $P < 0.05$ ).

## RESULTS

A total of 1826 (988 boys and 838 girls) school children were included in the study. Utilizing International cut off points for BMI for overweight and obesity by sex between 2-18 years, defined to pass through BMI of 25 and 30kg/m<sup>2</sup> at age of 18<sup>th</sup>.<sup>7</sup> A total of 206 subjects (105 boys and 101 girls) were found to be overweight and obese. The overall prevalence of overweight and obesity was found to be 11.29%. Highest prevalence of overweight and obesity were highest in 14 years age students followed by 13 and 11 years of age There was no significant association between sex and prevalence of overweight and obesity. (Table: 1)

Obese and overweight children take snacks more often in between meals than normal children. Similarly overweight and obese children participate in physical exercise less often than normal children. The results showed more physical exercise did influence change in BMI. Frequently having food outside home and frequent consumption of soft drinks have more prevalence of obesity and overweight than normal weight counterparts indicates that caloric intake is associated with increase in BMI. Television watching hours also have somewhat association with increase in BMI (Table: 2)

## DISCUSSION

In a study done by Flegal KM et al (1999-2000) about 10% of school children aged between 5 to 17 years around the world are overweight out of which 70% grow as to become obese adults.<sup>8</sup> In another study conducted by Lazarus et al. (1996) about 42 million of school children aged less than 5 years are overweight, and of these 35 million are residing in developing countries and girls are proportionately more overweight than boys in both developed and developing countries.<sup>9</sup> In Metropolitan city Delhi Kapil U et al. (2002) found prevalence of obesity of 7.4% while Sharma et al (2005) found 22% overweight and 6% obese students.<sup>10,11</sup>

The present study showed the prevalence of overweight and obesity 6.19% and 5.10% respectively. In boys 5.97% were overweight and 4.66% were obese while in girls 6.44% were overweight and 5.60% were obese. Our results are consistent with previous studies done by Chattwal et al (2008)<sup>12</sup> and by CA Kalpana (2011)<sup>13</sup> in Coimbatore. Several disorders have been linked to overweight and obesity in childhood. Obesity results in considerable morbidity and mortality.

Questionnaire about number of meals in a day consumption of, soft drink and food outside home (junk foods) provide information about subsequent health outcomes as they have special role in leading obesity. In the present study frequency of eating snacks between meals, consumption of soft drinks and junk foods have positive relation with prevalence of overweight and obesity. Thus results correlate well with previous studies which suggest that junk food (food outside home) and soft drink intake tends to be more common among overweight and obese children than among normal weight children.<sup>14</sup> Junk food contains more amount of fat than carbohydrate and protein. Fat is less satiating than carbohydrate and dietary fat is stored more efficiently than carbohydrate or protein which finally results in obesity or overweight.<sup>15</sup> Similarly irregular food intake deleteriously affects nutritional health, reduces energy levels and promotes consumption of high caloric food later in a day.<sup>16</sup>

## CONCLUSION

In all, the study demonstrated that consumption of high fat and high energy foods (junk foods) and soft drinks more than once in a week lead to the overweight and obesity. Prevention of obesity is easier in children than adults. Based on findings it is recommended to reduce the rate of consumption of soft drinks and food outside the home. Eating while watching TV should be discouraged. Increased physical activity like playing outdoor games, cycling should be encouraged in children. Health Education should be given to parents, teachers and children regarding dietary habits and healthy life style. (School Based Intervention).

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# Leptomeningeal Carcinomatosis as an Initial and Sole Manifestation of Papillary Renal Cell Carcinoma

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## ABSTRACT

**Introduction:** Leptomeningeal carcinomatosis (LMC) is an infrequent and devastating complication of systemic malignancy. Although it occurs in 5 – 20% of patients with metastatic cancer, its association with papillary renal cell carcinoma (RCC) is extremely rare. To the best of our knowledge, there are only 3 published case reports of leptomeningeal metastasis occurring in patients with papillary RCC.

**Case report:** Herein, we describe a case of a 45 year old man presenting for the first time with a clinical picture of cauda equina syndrome. MRI spine was suggestive of leptomeningeal carcinomatosis and the diagnosis was confirmed with CSF cytology. Contrast enhanced CT abdomen, revealed a heterogeneous mass arising from the mid pole of left kidney. CT guided biopsy and histopathological examination confirmed the diagnosis of papillary RCC. There was no evidence of any other systemic metastasis.

**Conclusion:** This case illustrates a rare occurrence of LMC as an initial and isolated metastatic manifestation of papillary RCC. Early diagnosis of this condition requires high index of clinical suspicion and an integrated approach using multiple diagnostic modalities.

**Keywords:** Leptomeningeal carcinomatosis, Renal cell carcinoma, Papillary renal cell carcinoma

## INTRODUCTION

Leptomeningeal carcinomatosis (LMC), also known as carcinomatous meningitis (CM) or neoplastic meningitis (NM), is a term used to describe the infiltration of the leptomeninges by malignant cells with or without parenchymal CNS involvement. LMC was first reported by Eberth in 1870 as a rare complication of systemic malignancy.<sup>1</sup> In the recent times, it has become an increasingly frequent complication of various solid tumors (especially cancers of breast, lung and malignant melanoma), and hematological malignancies like leukemia and lymphoma.<sup>2,3</sup> This increase in the incidence has partly been attributed to improved survival of cancer patients and partly to the advancement in imaging modalities, which permit early diagnosis of this condition.<sup>4</sup> Although it occurs in 5 – 20% of patients with metastatic cancer, its association with renal cell carcinoma (RCC) is rare, even more so with papillary RCC.<sup>1,2,4</sup> To date, we are only aware of 3 published case reports of LMC occurring in association with papillary RCC.<sup>4</sup> Herein, we describe a rare case of LMC presenting as a sole manifestation of occult papillary RCC.

## CASE REPORT

A 45 year old male patient was admitted in our hospital with history of lower back pain, weakness of lower limbs, bowel and bladder disturbances since 1 month. He also complained of occasional paraesthesia in the buttocks and feet. Due to

progressive weakness, he was unable to stand or walk since 1 week. There was no significant past or family history. His personal history was significant of smoking. On examination, he had lower motor neuron type of weakness of bilateral lower limbs (Power- Grade 3/5 in both limbs), hyporeflexia and saddle hypoesthesia. Anal sphincter tone was decreased. Babinski sign was negative. Higher mental functions were intact. There were no signs of meningismus and cranial nerve examination was normal. There was no abnormality detected on other systems' examination. A clinical impression of cauda equina syndrome was made. Hemogram revealed mild microcytic-hypochromic anemia (Hb-10.2 gm/dl), while TLC, DLC and platelet count were normal. Urine examination was positive for microscopic hematuria (12-15 RBCs/HPF). Serum biochemistry was within normal limits. X-ray chest and lumbosacral spine were unremarkable. He was further evaluated with MRI lumbosacral spine. On contrast T1 weighted images, there was patchy nodular leptomeningeal enhancement from L1 to L5 (Figure 1). These findings were suggestive of leptomeningeal deposits and the patient was advised to undergo lumbar puncture for CSF examination and further evaluation. CSF analysis showed high protein (10 g/L) and low glucose levels (0.15 mmol/L). CSF viral, bacterial and fungal cultures were negative. CSF cytology was positive for atypical malignant cells. Ultrasound abdomen/pelvis was performed and it revealed an exophytic, hypoechoic mass lesion measuring 3.9 x 3.6cm arising from the mid-pole of right kidney. Further, a CECT abdomen/pelvis was done which confirmed the same findings and demonstrated that the lesion was heterogeneously enhancing and extending into perirenal space (Figure 2). HRCT chest, MRI brain and upper spine were unremarkable. A CT guided biopsy of the lesion was performed and tissue was sent for histopathological examination which revealed papillary cell carcinoma (Figure 3). A bone scan was also performed and was normal.

## DISCUSSION

RCC is the most common type of primary renal tumors and accounts for about 7% of all cancers in men.<sup>4</sup> The most common histological type is clear cell carcinoma, also called

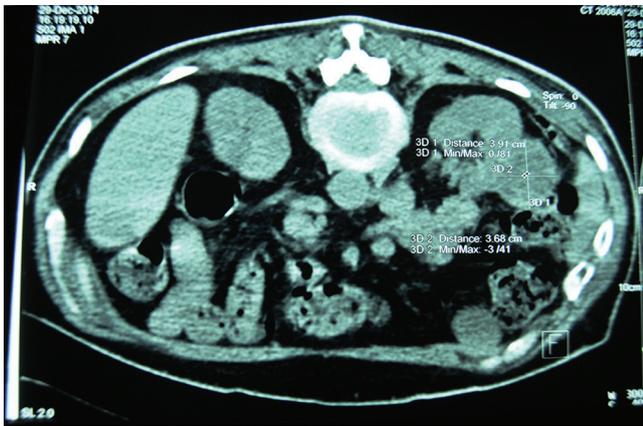
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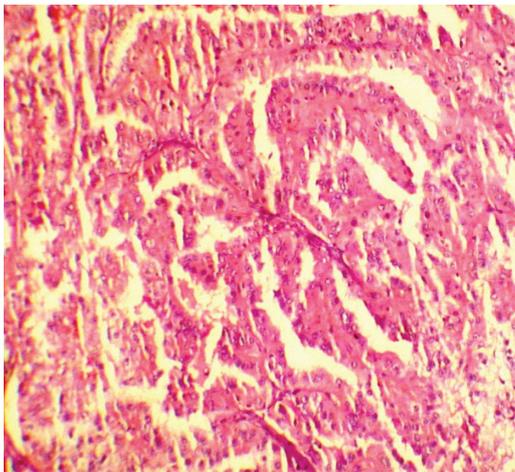
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**Figure-1:** MRI spine (contrast T1 weighted image): Arrows showing patchy nodular leptomeningeal enhancement from L1 to L5.



**Figure-2:** Contrast enhanced CT abdomen demonstrating 3.91 × 3.68 cm heterogeneously enhancing exophytic mass lesion arising from mid-pole of right kidney.



**Figure-3:** Histopathological examination (Hematoxylin and Eosin staining) of the biopsy specimen demonstrating papillary renal cell carcinoma.

conventional RCC, which represents 75–80% of RCC. Papillary (10–15%), chromophobe (5%) and other more rare forms such as collecting duct carcinoma (<1%) comprise the remainder.<sup>4</sup> Although majority of the patients present with localized resectable disease, up to one-third have locally advanced or metastatic disease by the time of diagnosis.<sup>5</sup> The

most common sites of metastases are lung, bone, liver and CNS in decreasing order of frequency. CNS metastasis occurs in approximately 5% of patients with RCC.<sup>6</sup> Most of these CNS metastases occur in the brain parenchyma, while involvement of the leptomeninges is a distinctly rare phenomenon, with only a few documented cases reported in literature.<sup>4,6</sup> On studying these cases, we made a few interesting observations. First, barring a few, nearly all of these patients had clear cell variant of RCC.<sup>4</sup> Second, in all of these cases, RCC was clinically manifest either at the time of diagnosis of LMC or well before it. Third, in most of these cases, patients had evidence of distant metastases elsewhere in the body, including brain parenchyma, lungs or bone. Considering these facts, our case was unique, as the patient presented, for the first time, with cauda equina syndrome consequent to LMC, as an initial and sole manifestation of an occult papillary RCC. Mechanisms of leptomeningeal seeding include haematogenous spread, direct extension from dural or parenchymal metastasis, and/or spread from the venous plexus (from leptomeningeal veins). Haematogenous spread is the most common route. Perineural extension along the epineurium or perineurium of cranial or spinal nerves can occur from paravertebral metastases. Once tumour cells enter the CSF, they can spread along the meningeal surface to distant areas of the central nervous system. Proliferation of malignant cells can lead to formation of bulky masses. Even in the absence of gross evidence of disease, there can be microscopic evidence of disseminated tumour involvement of the leptomeninges throughout the central nervous system.<sup>4</sup> In our case, macroscopic involvement was limited to L1 to L5 level and the patient did not have any other evidence of systemic metastasis, which was rather unexpected. Clinically, multifocal neurologic signs and symptoms are the hallmark of LMC. Manifestations may be consequent to meningeal irritation, raised intracranial tension, cranial nerve or spinal/radicular infiltration and/or associated parenchymal CNS involvement.<sup>2,4</sup> In our patient, the clinical picture was that of isolated cauda equina syndrome. Diagnosis of LMC is a challenging task. CSF cytology and MRI brain/spine are the cornerstones of diagnosing this condition, but neither of them have an adequately high sensitivity. A lumbar puncture may reveal high CSF opening pressure, elevated proteins with reduced glucose in the CSF. The presence of atypical cells in CSF cytology is highly specific for LMC, however false negative rates approaching 40% have been reported. Multiple lumbar punctures may help in achieving sensitivity of upto 90%.<sup>7</sup> A variety of CSF tumor markers have also been studied in patients with LMC but are of limited value due to poor sensitivity and specificity. Among these are CEA (breast, lung, colon and bladder cancer), PSA (prostate cancer), CA-15-3 (breast cancer), CA-125 (ovarian cancer), CA 19-9 (lung cancer), MART-1 and MAGE-3 (melanoma), and  $\beta$ -HCG (choriocarcinoma, embryonal carcinoma, germ cell tumors).<sup>8</sup> Newer techniques including CSF flow cytometry, polymerase chain reaction (PCR) and fluorescence in situ hybridization (FISH) may increase the diagnostic yield of CSF studies.<sup>4</sup> Among neuroimaging imaging modalities, gadolinium enhanced MRI is superior to CECT in detecting LMC. The sensitivity of MRI is about 60 to 70% while that

of CT scan is around 30%.<sup>9</sup> Post-gadolinium T1 images may demonstrate linear or nodular enhancement on the surface of the cerebrum or within the cerebellar folia, basal cisterns, cranial or spinal nerves and nerve roots. Other conditions that may mimic LMC include neurosarcoidosis, chronic meningitis or Guillain-Barre syndrome. Fluid-attenuated inversion recovery (FLAIR) sequences are somewhat less sensitive than T1 gadolinium images, but may detect small abnormalities as bright signals within the subarachnoid space often missed with gadolinium. Contrast-enhanced FLAIR may further improve the sensitivity. A comparison of these three techniques suggests that contrast enhanced T1 images remain the most accurate with a sensitivity of 59% and specificity of 93%, compared to unenhanced FLAIR of 12% and 93%, enhanced FLAIR of 41% and 88%, respectively. Using all three sequences the sensitivity is 65%.<sup>10</sup> Once diagnosed, LMC presents a formidable challenge to the oncologists, with limited therapeutic options and dismal prognosis. Without treatment, median survival of patients with LMC is around 4-6 weeks. Various treatment modalities including systemic chemotherapy, immunotherapy, intrathecal chemotherapy and local irradiation are all palliative and primarily aimed at reducing disability and improving quality of life, with only a marginal effect on prolonging survival.<sup>7</sup>

## CONCLUSION

Our case illustrates a rare occurrence of LMC as an initial and isolated metastatic manifestation of papillary RCC. Early diagnosis of this condition requires high index of clinical suspicion and an integrated multifaceted approach comprising of various imaging and non-imaging modalities. As of date, there is scarce data available on such association and therapeutic options remain limited. With accumulating experience in future, there is a vast scope of improvement in both diagnostic as well as therapeutic modalities in managing this condition.

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# Assessment of Visual Impairment Related Knowledge and Health Care Seeking Behaviour of the Community in the District of Dibrugarh, in India

Nasrin Banu Laskar<sup>1</sup>

## ABSTRACT

**Introduction:** Blindness is a major health problem but has received relatively little attention in worldwide efforts to promote health. Health inequities are related to the level of knowledge about the health conditions and the health seeking behaviour of the community members. So this study was designed to assess the Health care seeking behaviour of the community in conditions related to visual impairment and to identify if any gender differences exists in the care seeking behaviour.

**Material and methods:** A community based cross sectional study was carried out amongst 100 randomly selected community members and 100 patients receiving treatment under the National Programme for Control of Blindness in the district of Dibrugarh, Assam, during the period from July 2010 to June 2011. Sex specific behaviour pattern of the adults was studied by selecting 50 males and 50 females randomly for better comparability. The data was collected using a standardized pre-designed and pre-tested interview schedule.

**Results:** The study revealed that only 42 % of the patients had the knowledge about the causes of blindness, especially cataract and glaucoma. Knowledge amongst the patients regarding the modalities of treatment was adequate (90%) while 69% of them preferred to avail eye care services from Government sector facilities only. Knowledge amongst the females regarding services available for prevention and control of blindness was poorer (18%) as compared to males (32%).

**Conclusion:** For reducing the problem of blindness, knowledge and health seeking behaviour of the community needs to be improved with special attempts to address gender issues.

**Keywords:** Blindness, health seeking behaviour, gender.

## INTRODUCTION

Vision is one of the most cherished senses and most of us can hardly imagine what it would be like to lose it. Blindness is a chronic non-communicable disease, which is a major health problem but has received relatively little attention in worldwide efforts to promote health. Prior to the launch of Vision 2020 there were around 38 million blind people globally, a figure that was expected to increase to approximately 76 million by the year 2020.<sup>1</sup> Later estimates however put the figure at 45 million blind people globally, in 2004, plus another 269 million low vision thus a total of 314 million visually impaired people which represented some 5% of the global population at that time.<sup>2</sup> As per the latest estimate the total number of visually impaired persons in the world upto 2010 was 285 million, representing some 4.2% of the global population.<sup>3</sup>

This rising tide of blindness can be attributed primarily to the demographic transition that has strongly influenced the

health patterns in the developing countries exhibiting a transition from predominance of mortality from infectious and parasitic diseases that are more prevalent among younger age groups, to mortality from chronic non-communicable diseases, more prevalent among adult and elderly population.<sup>4</sup>

In the developing countries infection, malnutrition and lack of eye care give rise to a high proportion of blindness, particularly in the rural population. Thus these countries have blindness rates that are ten to forty times greater than those of industrialized countries, where blindness is mainly due to degeneration and metabolic disorders.<sup>5</sup> Childhood blindness is the second largest cause of blind person years following cataract accounting for about 70 million blind person years globally.<sup>6</sup>

It has been observed that health inequities are related to the level of knowledge about the specific health conditions and social determinants based on gender, socioeconomic status and ethnicity, race, living in a specific geographic region, or having a specific health problem.<sup>7</sup> In fact Needless blindness and poor vision can be eliminated only if people have access to sight saving health care. This ensures social as well as economic progress of a nation.

As no studies have been conducted in this part of the country to assess the visual impairment related health care seeking behaviour, this study was designed to be carried out with the following objectives to assess the Health care seeking behaviour of the community in conditions related to visual impairment and to identify if any gender differences exists in the health care seeking behaviour.

## MATERIAL AND METHODS

The present study was carried out to gain information regarding the health seeking behaviour of the patients with visual impairment and the difference in the health seeking behaviour of the males and females of the adult population of the study district in India.

Before undertaking the study due Ethical clearance was taken from the Institutional Ethics Committee at Dibrugarh; where the study was conducted. Written Informed consent was taken from all the study participants after duly explain-

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ing to them the importance and purpose of the study

### Interview of patients receiving treatment under National Programme for Control of Blindness (NPCB)

The total number of beneficiaries registered under the NPCB in the district was 5000. As patients are a relatively homogeneous group 100 patients receiving treatment under the programme were selected by simple random sampling method from the hospital records maintained with the Medical College and Hospital and were interviewed.

### Interview with the general adult population after sampling

In the study district there are six primary health centres. Out of the six PHCs two PHCs closest to the Medical College were purposively selected considering feasibility issues. For interview with the general adult population the sample size was calculated on the assumption that 50% of the population knows about the programme.

$$\begin{aligned} \text{Sample Size} &= \frac{4pq}{L^2} \\ &= \frac{4 \times 50 \times 50}{10 \times 10} \\ &= 100 \end{aligned}$$

Where:

p = Proportion of population aware of the Programme.

q = 1 - p

L = Allowable error (10% of 'p')

For better comparability 50 adult community members each were randomly selected from each of the two PHC areas beginning from the house nearest to the PHC. To study the sex specific behaviour pattern of the adults, 50 males and 50 females were randomly selected for better comparability. They were interviewed using pre-designed and pre-tested schedule of mixed type which included both open and close ended questions.

In the event of any refusal or reluctance on the part of the community members, to participate, the next house was visited. This sequence of visits continued until the desired sample of 100 was achieved.

## RESULTS

### Knowledge and health seeking behaviour amongst patients

For this study a total of 100 patients registered under the National Blindness Control Programme, undergoing treatment for visual impairment in the Medical College were interviewed. The study revealed that 100 % of the patients were aware of the public health importance of blindness/visual impairment (Table 1). It was observed during the assessment that knowledge about the causes of blindness and visual impairment amongst the patients was not satisfactory. Only 42 % of the patients had the knowledge about the causes of blindness and visual impairment, especially cataract and glaucoma (Table 1). However it was observed during the study that knowledge amongst the patients regarding the modalities of treatment or correction of visual impairment/blindness was adequate (90%) and all patients (100%) were aware about the availability of free surgical treatment in the Government sector. Because of this awareness about the

availability of free service, it was seen that majority of the patients (69%) preferred to avail eye care services from the Government sector only.

### Knowledge and health seeking behaviour of the community

The study revealed that 100 % of the community members, who were assessed during the course of the study, were aware of the social and economic implications of blindness/visual impairment. Knowledge regarding the different causes of blindness was more amongst males (56%) as compared to 32% of the females. 96 % of the females were aware of the correct modalities of treating visual impairment as compared to 88 % of the males. All the community members (100 %) were aware that full treatment was available free of cost. It was observed that awareness about an ongoing Nation Programme for Blindness Prevention and Control was low amongst both the sexes, being lower for females (18%) than males (32%) (Table 2). 66% of the people preferred Government health sector for the treatment of visual impairment. Majority (77%) of the studied individuals considered timely consultation of doctors and proper information as important steps for reducing the burden of blindness in the community. This suggests that there has been a general improvement in awareness level about one's health amongst the community members. However the difference in the knowledge and health seeking behaviour of the males and females were not found to be statistically significant (P=0.96).

## DISCUSSION

Almost similar findings regarding awareness and knowledge of causes of visual impairment was reported by a study conducted by Dandona R, Dandona L, John RK, McCarty CA and Rao GN in Hyderabad,<sup>8</sup> which revealed that awareness of cataract was 69.8% and night blindness 60% but that of diabetic retinopathy was 27.0% while that of glaucoma was only 2.3% amongst the patients.

Another study, conducted in Bhaktapur, Nepal by Thapa SS, Berg RV, Khanal S, Paudyal I, Pandey P, Maharjan *Net al*,<sup>9</sup> also reported very low awareness level about cataract (6.7%) and glaucoma (2.4%) among the study subjects.

In this study it was observed that availability of free surgical services was the main reason for utilization of Government facilities. Similarly Gupta SK and Murthy GV,<sup>10</sup> in their study also observed that easy accessibility, reputation of a facility, competence of its staff and free services were the major reasons that were cited by patients for utilization of

Knowledge/health seeking behaviour	Total number of patients interviewed N (%)
Awareness about Blindness/ Visual impairment	100 (100 %)
Knowledge about Causes of Blindness	42 (42 %)
Knowledge about Modality of treatment	90 (90 %)
Knowledge about Availability of treatment	100 (100 %)
Preference for Govt. sector health facility	69 (69 %)

**Table-1:** Knowledge and health seeking behaviour amongst patients registered under npcbl in the district of dibrugarh

Health Seeking Behaviour	Male (n = 50)		Female (n = 50)		Total Number of Adults (n = 100)	
	Number	%	Number	%	Number	%
Awareness about blindness/visual impairment	50	100%	50	100%	100	100 %
Causes of blindness	28	56%	16	32%	44	44 %
Modality of treatment	44	88%	48	96%	92	92 %
Availability of treatment	50	100%	50	100%	100	100 %
Awareness of NPCB	16	32%	9	18%	25	25 %
Preference for Govt. sector health facility	35	70%	31	62%	66	66 %
Steps for controlling blindness in the community	39	78%	38	76%	77	77 %

**Table-2:** Knowledge and health seeking behaviour of the adult population

service facilities.

A study conducted by Abou Gareeb I, Lewallen S, Bassett K and Courtright P (2000) observed that females in poorer countries have lower knowledge and awareness level about blindness/visual impairment as compared to males resulting in the under-utilization of eye care services by females with subsequent higher prevalence of blindness in them.<sup>11</sup> In this study also females were found to have lower (32%) level of knowledge and awareness about different aspects of blindness/visual impairment as compared to males (56%).

Similar findings were also revealed in a study conducted by Courtright Paul (2002), which concluded that females living in poorer countries utilize eye care services much less than males because of low awareness levels.<sup>12</sup>

These differences in the knowledge level of the two sexes calls for more attention to be given towards narrowing the gender bias and thereby improve the utilization of eye care services by both the sexes. However to date no gender issues have been incorporated into the evaluation, planning and treatment efforts under the programme.

## CONCLUSION

The study reveals the fact that there exists a wide gap in the awareness level of both males and females regarding the problem of blindness and it's control despite community eye health education being an important plank in the National Programme for Control of Blindness in India. This suggests that for reducing the burden of visual impairment upon families, in particular and society, in general, there is an urgent need to improve the health care seeking behaviour of the community, especially addressing issues related to gender discrimination.

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# Evaluation of CSF ADA Levels as a Diagnostic test for Tuberculous Meningitis and its Correlation with Adverse Neurological Outcome

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## ABSTRACT

**Introduction:** Early diagnosis and treatment of TBM is of great importance, thereby a more sensitive diagnostic test is needed to establishing the diagnosis. To evaluate CSF-ADA level as a diagnostic test for TBM and its correlation with poor neurological outcomes.

**Material and methods:** This was a prospective study conducted over one year comprise of 67 patients of TBM in which stage of disease, neurological outcomes, abnormalities on neuroimaging were assessed and CSF parameters were analysed and correlated with CSF ADA levels at the time of admission. Diagnosis of TBM made by using clinicopathological diagnostic criteria of Thwaites for TBM. Stage of disease was assessed by MRC Staging and neurological outcomes during hospitalization were assessed by Modified Rankin Score.

**Results:** Mean CSF ADA for MRC Stage I was  $10.3 \pm 11.29$  while it was  $16.63 \pm 8.24$  for Stage III which was significant ( $p < 0.01$ ). CSF ADA levels significantly correlated with neurological deficit. Mean CSF ADA level was  $15.38 \pm 10.92$ . Using cut off value 10 U/L the sensitivity was 76% and specificity was 85% for diagnosis of TBM. Patients with higher mean CSF ADA values at admission had poor neurological outcomes.

**Conclusions:** CSF ADA level has significant value in diagnosing TBM. CSF ADA levels correlate with stage of disease at time of presentation, neurological outcomes and can be use as a prognostic indicator.

**Keywords:** CSF ADA, TBM, Thwaites Criteria, Modified Rankin Score, MRCS Stage

in T lymphocytes.<sup>4</sup> Detection of CSF ADA activity in the diagnosis of tuberculous meningitis has been reported with good results.<sup>5-7</sup>

The aim of our study was to evaluate the diagnostic role of CSF ADA in tuberculous meningitis and its correlation with the stage of disease, neuroimaging findings and adverse neurological outcomes (mortality and morbidity).

## MATERIAL AND METHODS

This was a non – interventional, hospital based prospective study conducted over a period of one year from July 2011 to August 2012. In this study we included 67 patients of Tubercular meningitis in which stage of disease, neurological outcomes, abnormalities on neuroimaging were assessed and various CSF parameters were analysed and correlated with CSF ADA levels at the time of admission. Patients aged 13 years or more who presented with a clinical picture of meningoencephalitis (Fever, headache, vomiting, neck stiffness, altered sensorium, seizures or focal neurologic deficit) and with CSF abnormalities suggestive of Tuberculous meningitis were included in this study. Patients aged less than 13 years, with haemorrhagic CSF tap, with abnormal CSF finding of non-infective etiology like subarachnoid haemorrhage, peripheral nervous system disease and those with CSF findings suggestive of fungal/ pyogenic/ aseptic meningitis were excluded from the study. A thorough neurological examination was done to diagnose meningitis and its complications. CSF was analysed for Total cell count, differential cell count, total protein, sugar, Gram staining, AFB staining, India ink staining, CSF ADA (adenosine deaminase) levels, *Mycobacterium tuberculosis* culture, fungal culture and CSF tuberculosis-polymerase chain reaction (TBPCR). Neuroimaging (Computed tomographic Scan/ Magnetic Resonance Imaging) was done.

Morbidity and mortality was assessed using the modified Rankin scale (MRS). The modified Rankin Scale<sup>8</sup> is a commonly used scale for measuring the degree of disability. The scale runs from 0-6, running from perfect health without symptoms to death. To label the patients as a case of tuberculous meningitis ‘criteria of Thwaites’<sup>9</sup> was used. This criteria is described as *M. tuberculosis* isolated from CSF or

## INTRODUCTION

Tuberculous meningitis is a common infectious disease of the central nervous system (CNS) in developing countries. Early diagnosis and treatment with Anti Tubercular drugs and active management of the complications are of great importance to prevent the irreversible neurologic sequel and death. CNS tuberculosis accounts for ~5% of extra pulmonary cases and approximately 1% of all cases of tuberculosis, and carries a high mortality and a distressing level of neurological morbidity.<sup>1</sup> This disease responds to chemotherapy; however, neurologic sequelae are documented in 25% of treated cases, in most of which the diagnosis has been delayed.<sup>2</sup>

A definitive diagnosis of tuberculous meningitis depends on identifying *Mycobacterium tuberculosis* in the cerebrospinal fluid (CSF) by direct staining or culture.<sup>3</sup> The diagnosis also depends on the clinical manifestations of sub acute or chronic meningitis with lymphocytic CSF and low CSF glucose levels.<sup>2</sup> However, other forms of meningitis may mimic tuberculous meningitis. Adenosine deaminase (ADA) is an enzyme involved in purine catabolism. It is considered as an indicator of cell-mediated immunity and is found mainly

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Focal neurological deficit	Number of patients	Mean CSF ADA U/L	p value
Hemiparesis	9	22.47±11.03	<0.01
Cranial nerve palsy	7	10.67±6.92	>0.01

**Table-1:** Correlation of CSF ADA levels with focal neurological deficits

MRC stage	No. of patients	Mean CSF ADA U/L	p value
Stage I	9	10.3±11.29	>0.05
Stage II	44	15.89±10.92	<0.01
Stage III	14	16.63±8.24	<0.01
Total	67		

**Table-2:** Correlation of CSF ADA levels with MRC staging at admission

Clinical meningitis with negative Gram and India ink stains, plus sterile bacterial and fungal culture, plus one or more of the following: 1- Cranial CT scan consistent with tuberculous meningitis hydrocephalus, oedema, basal meningeal enhancement 2- Chest radiograph consistent with active pulmonary Tuberculosis and 3- Good response to anti-tuberculosis chemotherapy. These patients were classified based on the disease stages as proposed by the Medical Research Council (MRC)<sup>10</sup> -stage I: fully conscious and no focal deficits; stage II: conscious but with inattention, confusion, lethargy, and focal neurological signs such as cranial nerve palsies; stage III: stuporous or comatose, multiple cranial nerve palsies, or Complete hemiparesis.

These patients were treated for tuberculous meningitis as per the standard protocol. The stage of the disease, abnormalities on neuroimaging, morbidity and mortality during hospitalisation were assessed and correlated with CSF-ADA levels at the time of diagnosis.

## STATISTICAL ANALYSIS

The following Statistical tools were employed to analyze the results obtained from the study- Mean, Standard Deviation, 't' test for independent samples and correlation coefficient.

## RESULTS

A total of 67 patients were included in this study. Among these 42 were male and 25 females. Mean duration of illness at the time of presentation was 42 days. Fever (n-67,100%), headache (n-64, 95.52%) and altered sensorium (n-48, 71.64%) were the commonest symptoms. Neurological deficit present in 9 patients (13.4%) and cranial nerve palsy observed 6 patients (8.9%). At the time of presentation 44 patients (65.67%) were in Medical Research Council Stage II. At the time of discharge 33 patients (49.25%) were in Modified Rankin scale (MRS) Stage 2 (slight disability). 10 patients (14.92%) showed worst outcome-Stage-6 (Died). CSF total cell count ranged from 04 to 800 cells per millilitre cube. 39 patients (58.2%) had CSF glucose values < 40 mg%, mean value was 42.81±35.12. CSF protein concentration ranged from 55.9 to 1600 mg/dl and mean protein concentration was 272.85 ± 226.29mg/dl. CSF ADA level ranged from 4.7 U/L to 75.2 U/L and mean CSF ADA was 15.38± 10.92. 51 patients (76.11%) had CSF ADA level >10 U per litre. Mean CSF ADA in 6 TB PCR positive patients was 13.91±4.58 U/L. 17 patients (25.39%) had hydrocephalus

as a major neuroimaging finding in their CT scan.

We correlated CSF ADA levels with different parameters. Mean CSF ADA value 20.17±11.09 was for patients who presented with duration of illness more than 15 days upto 1 month. There was significant correlation of CSF ADA level with neurological deficits in term of hemiparesis (p<0.01) when compared with the patients who did not had neurological deficit. While other findings we observed such as Cranial nerve palsies had no such correlation (Table 1). CSF ADA levels correlated with medical research council (MRC) staging at the time of admission. At the time of presentation mean CSF ADA levels found to be highest in MRC Stage III -16.63±8.24 (p<0.01) (Table 2). CSF ADA levels also correlated with Modified rankin scale (MRS) at the time of discharge. Patients who were in MRS Stage 4 or 5 had significantly higher mean CSF ADA values than those who were in Stage 1 or 2 (p<0.01) (Table 3). We found an increasing trend of mean CSF ADA values with increase in CSF protein concentration with correlation coefficient of 0.90 showing a positive relationship. We also found a decreasing trend of mean CSF ADA values with increase in CSF glucose concentration. CSF ADA levels also correlated with neuroimaging finding (hydrocephalus, basal exudates, infarcts) which was found to be non significant (p>0.01) when compared with patients who had normal CT scans (Table 4).

## DISCUSSION

In our study 46 patients (68%) presented within one month duration of illness and 28 patients (41.79%) presented within 15 days of illness. Mean duration of presentation was 42 days. CSF ADA levels correlated well with duration of symptoms. Mean value of ADA was 20.17±11.09 for the patients presented with duration of more than 15 days upto 1 month. Ribera et al<sup>5</sup> in there study found that there was a significant rise in levels of ADA during the first 10 days of therapy followed by a gradual decline. We also found similar observations in our study. Ruth M. Rottbeck et al<sup>11</sup> found that fever was present in 66.7% and altered sensorium in 23.8% of tuberculous meningitis patients. S Hosoglu et al<sup>12</sup> found in there study that headache and fever were the most common symptoms, occurring in 92% and 82.5% of cases respectively. In our study we also found that Fever (n-67,100%), headache (n-64, 95.52%) and altered sensorium (n-48, 71.64%) were the commonest presenting symptoms, which is similar to findings reported by Ruth M. Rottbeck et al and S Hosoglu et al. In our study focal neurological deficits was observed in 9 patients (33%) and Cranial-nerve palsy was noted in 7 patients (19%) before the start of therapy. In our study 44 patients(65.67%) were in MRC Stage II at the time of presentation. In study by S. Hosoglu et al<sup>12</sup> at the time of admission 32.0% patients presented in MRC stage I, 39.5% as stage II and 29.5% as stage III while Khanna et al<sup>13</sup> found that at the time of admission, 85.3% patients were in MRC stage III and 13.5% in stage II. The difference

Modified Rankin Scale	No. Of Patients	Mean CSF ADA U/L	p value
Stage 0(Normal)	0	-	-
Stage 1(No Significant- Disability)	16	9.5±11.01	
Stage 2(Slight Disability)	33	16.02±10.99	
Stage 3(Moderate Disability)	2	10.84±5.96	
Stage 4(Moderately Severe Disability)	4	35.18±12.95	<0.01
Stage 5(Severe Disability)	2	15.92±7.04	<0.01
Stage 6(Death)	10	15.43±8.29	<0.01
Total	67		

**Table-3:** Correlation of CSF ADA levels with Modified rankin scale at discharge

CT scan/MRI (brain)	Number of patients	Mean CSF ADA U/L	p value
Hydrocephalus	17	13.34±11.64	>0.01
Basal Exudates	4	16.55±8.69	>0.01
Infarct	8	14.86±7.14	>0.01
Normal	33	14.81±10.92	

**Table-4:** Correlation of CSF ADA with neuroimaging findings

observed in various study may be because of time of referral from primary care hospitals. According to Girgis NI et al<sup>14</sup> the initial stage of disease at presentation was a major prognostic indicator for mortality. In their series, the mortality rate was 18% for medical research council stage I TBM, 34% for stage II, and 72% for stage III.

CSF ADA in the study ranged from 4.7 U/L to 75.2 U/L and mean CSF ADA level was 15.38± 10.92. Mean CSF ADA level in 6 patients who were CSF TB-PCR positive was 13.91±4.58 U/L. Using cut off value of CSF ADA > 10 U/L for the diagnosis of tuberculous meningitis the sensitivity was 76% and specificity was 85%. In our study specificity of estimation of CSF ADA levels was similar to study by Kashyap et al<sup>15</sup> but sensitivity was low probably due to small sample size (n-67) in comparison to their study (n-117). CSF total cell count ranged from 04 to 800 cells per millilitre cube and mean cell count was 133.52±181.16. Mean protein concentration in our study was 272.85 ± 226.29. There was strong correlation of CSF ADA levels with CSF protein levels which ranged from 9.67±9.46 to 27.45± 11.09 U/L. Correlation coefficient of 0.64 showing a positive relationship. Mishra et al<sup>16</sup> also reported significant correlation between CSF ADA levels and CSF protein concentration in their study. Malan et al<sup>17</sup> and Satya Vati Rana et al<sup>17</sup> found a positive correlation of ADA levels in CSF with CSF proteins. Mean CSF glucose value was 42.81±35.12 in our study. CSF ADA levels correlated with CSF glucose levels showing an inverse relationship with correlation coefficient of -0.13 which was not significant. Amulya C Belagavi<sup>6</sup> and Chotmongkol et al<sup>18</sup> also observed similar findings.

In our study 17 patients (25.39%) had hydrocephalus as a major neuroimaging finding in their CT scan followed by infarct (n-8, 14.20%) and basal exudates (n-4, 6.34%). We found that there was no significant correlation of CSF ADA levels with neuroimaging finding of hydrocephalus (p>0.01). This finding was opposite to the finding of Khanna et al<sup>13</sup> who observed hydrocephalus in 16.9% patients, exudation in basal cisterns in 10.8% and infarcts in 4.8% patients and found significant correlation of CSF ADA levels with of Hydrocephalus (p<0.01). Bhargava et al<sup>19</sup> found hydrocephalus in 83%,

cerebral infarction in 28% of patients which was higher to the finding in our study. CSF ADA levels significantly correlated with neurological deficit in terms of hemiparesis (p<0.01) while other findings such as cranial nerve palsies do not had such correlation. According to Jakka S. et al<sup>20</sup> CSF ADA measurements have been found to be useful in predicting poor neurological outcomes (neurological deficit, morbidity and mortality) in tuberculous meningitis cases. Khanna et al<sup>13</sup> also observed that CSF ADA levels were found to be higher in patients of tuberculous meningitis with remnant neurological deficit and in those who expired. In our study mean CSF ADA value was 10.3±11.29 for MRC Stage I, 16.63±8.24 for Stage III and this difference was significant (p<0.01). Patients with advanced stages of tuberculous meningitis had higher CSF ADA values. Khanna et al<sup>13</sup> also found similar results. The outcomes in terms of morbidity and mortality at the time of discharge after an average 15 days of hospital stay were correlated significantly with CSF ADA levels. Patients with higher mean CSF ADA values at admission had poor outcomes (neurological deficit, death, MRS stage4/5/6). Patients who expired had significantly higher CSF ADA values (p<0.01). Similar observation was found by Khanna et al<sup>13</sup> in their study where CSF-ADA levels were maximum for the worst outcome (death), while for the best outcome (no symptom) they were found to be minimum.

## CONCLUSION

CSF ADA level has significant value in diagnosing tuberculous meningitis. A value of >10 CSF ADA level may be regarded as cut of value with good sensitivity and specificity for diagnosing tubercular meningitis. CSF ADA levels correlate with stage of disease at time of presentation, neurological outcomes and can be use as a prognostic indicator.

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# Maternal Mortality from Unsafe Abortion in the Niger Delta. A Five-Year Review

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## ABSTRACT

**Introduction:** Since the dawn of history, women who became Pregnant against their will have been known to employ various means to procure abortion. This attitude respect no culture, religious or political boundaries. It also cuts across age, parity and social class. An estimated 70,000 women die globally as a result, with the majority occurring in the developing world.

**Material and Methods:** The study is a five-year retrospective review of all cases of unsafe abortions managed at the University of Port Harcourt Teaching Hospital, Rivers state, Nigeria between January 1, 1985 and December 31, 1990.

**Results:** During the period under review, there were 12,127 deliveries and 159 maternal deaths; the maternal mortality rate was 1304.46/100.00. Unsafe abortion and its complications ranked fifth accounting for 9.43%. Abortion induced during the second trimester was responsible for more death (55.85%), and sepsis was the major cause of death. More than half of them (53.85%) were adolescent school girls. Many of the induced abortions (46.15%) were carried out by using native herbal preparations, leaf stems and roots.

**Conclusion:** In view of these observations, the provision of facilities for the early termination of unwanted pregnancies by trained individual in safe circumstances is advocated. In order to do this, restrictive abortion laws in Nigeria need to be relaxed. In addition, the inclusion of sex education in secondary school curriculum and extension of appropriate contraception service to school girls that need them should be allowed.

**Keywords:** unsafe abortion, maternal mortality, Niger Delta,

for 22 to 30% of all maternal deaths, in comparison to the worldwide estimate of 13%.<sup>7</sup> It has been suggested that complications of induced abortion may be responsible for nearly a third of maternal deaths in West African countries.<sup>4,6,8</sup>

In addition to maternal deaths, between two million and seven million women who survive unsafe abortion each year sustain long term morbidity; chronic disabilities, sepsis, haemorrhage requiring blood transfusion, uterine and bowel perforation, pelvic abscess, endotoxic shock and renal failure. Long term sequel include ectopic pregnancy, chronic pelvic pain and infertility with grave implications for future reproductive health of the woman.<sup>1,9</sup>

What is particularly worrisome about the scenario of unsafe abortion is that these deaths or disabilities are occurring in spite of the fact that the world has safe, effective and affordable means of preventing unwanted pregnancy. Moreover, there also exist safe and effective means of inducing abortion.<sup>1,10</sup>

The aim of this review is to highlight the factors associated with fatal cases of induced abortion at the University of Port Harcourt Teaching Hospital and to proffer solution to the problem.

## MATERIAL AND METHODS

This was a retrospective review of induced abortion cases as seen at the University of Port Harcourt Teaching Hospital, Rivers state, Nigeria over a five year period (January 1, 1985 – December 31, 1990).

Permission was obtained from the ethics and research committee of the hospital. The names of all patients with abortion and their hospital numbers were obtained from the gynaecological ward as well as the accident and emergency unit. The clinical case records of all these patients were retrieved from the records department and cases of induced abortion were selected from the poll.

The total deliveries, maternal deaths and number of gynaecological admissions during the period of review were also obtained. Information were collected on their socio demographic characteristics, methods used, pattern of clinical presentation and outcome. Due to cultural and religious

## INTRODUCTION

Contraception and sex education are effective in preventing unwanted pregnancies. However, when they fail, as they sometime do, there ought to be legal institution framework for early termination of unwanted pregnancy in safe circumstances.<sup>1</sup>

Unsafe abortion remains one of the most neglected sexual and reproductive health problems in developing countries despite its important contribution to maternal morbidity and mortality.<sup>2</sup> More than a third of about 205 million pregnancies that occur annually are unplanned and about 22% of all these pregnancies end in unsafe abortion. Lack of access to family planning results in some 76 million unplanned pregnancies in developing countries, with 19% ending in induced abortion of which 11% are unsafe.<sup>3,4</sup>

Reliable data on the incidence of unsafe abortion are generally lacking, especially in countries like Nigeria where access to abortion is legally restricted<sup>5</sup>, however, about 20,000 deaths from unsafe abortion is estimated to occur in Nigeria annually.<sup>6</sup> In Ghana, the rate of unsafe abortion is about 31 per 1000 women and abortion related deaths are responsible

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beliefs in our society, permission for autopsy is not often obtained, thus the diagnosis and circumstances surrounding each death are derived from a brainstorming session during the monthly departmental maternal mortality reviews.

Among the fifteen patients that died as result of complications of induced abortion only thirteen case notes could be traced and they formed the basis of this analysis.

## STATISTICAL ANALYSIS

The information obtained was coded and transferred onto a proforma already designed for the study. Data analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 21 software.

## RESULTS

During the period under review there were 12,217 deliveries at UPTH. During the same period, there were 159 maternal mortalities, 15(9.43%) were due to complications of induced abortion. However, only thirteen case notes could be retrieved.

Table 1 shows the socio-demographics characteristics of the patients.

More than half of the patients 7 (53.84%) were below the age of 20, 7(53.84%) were secondary school girls. Unemployed Full time housewives, accounted for 4(30.76%) of the patients that died. No woman with higher education, who was gainfully employed, was noted among the victims. More parous women 7(53.84%) died from induced abortion than nulliparous women.

It is remarkable that medical doctors performed less of the abortions 4(30.76%) that resulted in death Table 2. (46.15%) of the patients used herbal preparation, Roots and leaf steams. 6(46.15%) of the patients died within 24 hours of admission to the hospital. Table 3.

Table 4 shows that septicaemia, pelvic abscess and acute renal failure were the three leading causes of death occurring in 38.46%, 23.07%, and 15.38%, of the patients respectively

## DISCUSSION

Unsafe abortion threatens the lives of a large number of women and constitute a major public Health issue.<sup>11</sup>

In this study, the age group, 15-25 years were mostly affected, this is similar to findings from recent studies.<sup>1,2,12</sup> An increase in the prevalence of premarital sex and the unmet need for contraceptives among this group is very high. The unmet need for contraceptives is due to several factors; including cost, availability, deep-seated cultural values, provider bias and perceived risks of side effects among others.<sup>12,13</sup>

The review also revealed that marital status, educational qualification and unemployment are important socio-demographic factors contributing to illicit abortions.<sup>1,14</sup> While 61.53% of the patients were unmarried, 46.15% were nulliparae, about 53.8% were secondary school students. These findings are similar to other recent works which showed that unsafe abortions are predominantly a problem of adolescents, nulliparae and students.<sup>1,14,15</sup> Single women who seek contraceptive services face the obstacles of social and cultural restriction which makes it difficult for them to obtain effective contraception.<sup>1,16</sup> Evidence suggests that educated women generally have access to safe abortion services no

	No of patients (n=13)	%
Age		
Less 15	3	23.07
15-20	4	30.77
21-25	3	23.07
26-30	2	15.38
31-35	0	0
Above 36	1	7.69
Parity		
0	6	46.15
1-4	4	30.76
Above 5	3	20,07
occupation		
Secondary school student	7	53.84
House wives	4	30.76
Not stated	2	15.38
Marital status		
Single	7	53.84
married	4	30.76
divorce	1	7.69
unstated	1	7.69

**Table-1:** Socio-demographic characteristics of patients

Method	No of patient	Percentage
Insertion of herbal preparation/stem by native doctor	6	46.15
Surgical induction by a doctor	4	30.76
Surgical induction by a nurse	1	7.69
Unstated	2	15.38
Total	13	100.00

**Table-2:** Method of termination of pregnancy

Duration of stay	No of Patients	Percentage
Less than 24 hours	6	46.15
2 days	3	23.07
3 days	1	7.69
17 days	2	15.38
25 day	1	7.69
Total	13	100.0

**Table-3:** Duration of Hospital stay before death

Complication	Number	Percentage
Septicaemia	5	38.46
Pelvic abscess	3	23.07
Acute renal failure	2	15.38
Gangrenous uterus	1	7.69
Genital sepsis	1	7.69
Haemorrhagic shock	1	7.69

**Table-4:** Causes of death

matter the legality, while it is the poor uneducated that resort to unsafe illegal abortion. In our environment unwanted pregnancy is a social stigma especially for unmarried girls who are still in school. The fear of interruptions in education often drives them to seek for induced abortion as demonstrated from our findings.<sup>17</sup>

Unsafe abortion occurs mostly in areas where the abortion-

law is restrictive or liberalized but access to safe abortion is denied. As a consequence, safe abortion services cannot be obtained in public health institutions. Moreover, Information about the abortionist is often withheld and this encourages the proliferation of unskilled practitioners. Majority of identified abortionist in this study and others after it were quacks and non-medical persons.<sup>1,18,19</sup>

In this study, 46.15% of the patients died within 24 hours of admission to the hospital. This suggest that late presentation is a bad prognostic index. This is because induced abortion is illegal and usually performed secretly, patients who develop complications tend to present late when severely ill or in a moribund state.<sup>19,20</sup>

Complications arising from induced abortions are the principal cause of maternal mortality associated with unsafe abortion. In this study, fifteen maternal deaths were recorded from complications of unsafe abortion and this constitutes 9.43% of maternal deaths during the period under review. This was within the range reported for maternal deaths from illegal abortion in some other Nigerian studies.<sup>19,22</sup>

Although the complications that follow unsafe abortion are often multiple, Septicemia is the major complication and the leading cause of death in these patients. It is similar to findings from other parts of Nigeria.<sup>19,23</sup> This could be attributed to the fact that majority of the induced abortion in this study were carried out by medically unqualified personnel in substandard environment using non sterile instruments. Late presentation may have been contributory, this is because induced abortion is illegal, secretly performed, patients who develop complications tend to present late.<sup>19</sup>

Our findings may not be an accurate reflection of the true picture of maternal mortality from unsafe abortion in Nigeria as many of the victims prefer to patronize private hospital and clinics rather than public hospitals to ensure privacy and avoid societal condemnation and stigma.

## CONCLUSION

Unsafe abortion has shown no decline in numbers and rates, our study has shown that induced abortion is a major contributor to maternal mortality in Nigeria as has been widely documented. Most of its victims are single, adolescent school girls. Efforts directed at reducing unintended pregnancy by comprehensive family planning programs, Education of our youths on the dangers of unsafe abortion, liberalization of abortion law and training and retraining of medical personnel on post abortion care will reduce the problem.

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# Effectiveness of Electroconvulsive Therapy (ECT) in Patients with Psychiatric Disorders not Responding to Pharmacological Treatment: a Prospective Study

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## ABSTRACT

**Introduction:** Despite considerable advancement in the pharmacotherapy of psychiatric disorders, there is still a sizeable population of psychiatric patients which does not respond to various psychotropic drugs. Further, no comprehensive study has been carried out in India or elsewhere, which assesses the effectiveness of electroconvulsive therapy (ECT) in pharmacotherapy resistant psychiatric patients. Aim: To assess effectiveness of ECT in pharmacotherapy resistant psychiatric patients at the end of ECT course.

**Material and Methods:** The study was a non-controlled prospective interventional study conducted in Institute of mental health and neurosciences (Government Medical College, Srinagar, India), comprising 56 patients of pharmacotherapy resistant psychiatric disorders. The patients were assessed by Clinical Global Impression (CGI), Montgomery Asberg Depression Rating scale (MADRS), Young Manic Rating Scale (YMRS) and Yale-Brown Obsessive Compulsive Scale (YBOCS) one day after last ECT. Improvement was defined with CGI subscale by comparing the position of patient at admission to projected condition with the therapy.

**Results:** CGI scale revealed that improvement in patients at the end of ECT course was 78%. Quantitative data was analysed by one way Analysis of Variance and qualitative by using Pearson's Chi square test. p value of < 0.05 was considered to be statistically significant.

**Conclusion:** ECT is an effective treatment in pharmacotherapy resistant psychiatric disorders.

**Keywords:** Electroconvulsive therapy (ECT), pharmacological resistant psychiatric disorders, Clinical Global Impression (CGI), Montgomery Asberg Depression Rating Scale (MADRS), Young Manic Rating Scale (YMRS), Yale-Brown Obsessive Compulsive Scale (YBOCS).

terms of dosage, duration, and compliance) fail to produce a significant clinical improvement.<sup>4</sup> Further, mania is considered treatment resistant, when patients do not respond to combination of 2 standard medications for 6 weeks.<sup>5</sup> On the other hand, treatment-refractory OCD generally applies to patients who have failed at least three therapeutic trials of Selective Reuptake Inhibitors [SSRI's + SNRI's] (with clomipramine being one of the SRI trials), the use of at least two atypical antipsychotics as augmenting agents, and treatment with behavioral therapy while on a therapeutic dose of an SRI.<sup>6</sup> The consequences of treatment resistance are devastating for the patients, including poor quality of life, chronic disability, increased risk for medical illness, substance and alcohol abuse and suicide, as well as for families and societies who have to deal with the increasing psychological and financial burden.<sup>6</sup>

ECT is a therapeutic tool which is widely used in India, compared to western countries, especially for treatment resistant psychiatric disorders. Despite its high efficacy and low side effects, it has remained a very controversial treatment. The reason for this could be lack of awareness and knowledge about the use of ECT.<sup>1-3</sup> However in India, 13 to 14 % of patients receive ECT, which is quite greater than western countries. It is heartening to see that many of the psychiatrists in India have positive attitudes towards ECT use in various Psychiatric disorders.<sup>1-3</sup> Further the notion of prophylactic treatment is readily and widely applied to pharmacotherapy, but often ignored with ECT. Maintenance ECT (MECT) has no fixed endpoint, and its purpose is to prevent recurrence of separate episodes of the illness.<sup>7</sup>

The use of ECT has been among one of the main pivots of psychiatric services in the lone mental health institute of Kashmir (India). To the best of the knowledge of the authors, no

## INTRODUCTION

Psychological as well as psychiatric disorders are on a rise in Kashmir from the last two decades. During this period, there have been periods of insurgency and political turmoil, which have further increased psychiatric morbidity.<sup>1,2</sup> Although there have been considerable advances in understanding of pathophysiology of psychiatric disorders and availability of effective therapies for the same, there are still a sizeable number of psychiatric patients, that do not adequately respond to various approved medications. These patients are said to be treatment resistant.<sup>3</sup>

In psychiatry, treatment resistance is defined in different psychiatric disorders in different ways. Depression is usually considered resistant when at least 2 trials with antidepressants from different pharmacologic classes (adequate in

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comprehensive study has been done in India and elsewhere, which assesses effectiveness of electroconvulsive therapy in four groups of pharmacotherapy resistant psychiatric patients (Unipolar depression, bipolar depression, BPAD in mania and OCD) at post ECT follow up. However, Jain et al, 2008 looked at the response to ECT in elderly patients with psychiatric illness in a retrospective study and found that 80 to 90% patients had shown some improvement.<sup>32</sup>

**Materials and Methods:**

**Setting:** This study was carried out in the Institute of mental health and neurosciences, Srinagar, an associated hospital of Government Medical College, Srinagar after getting ethical clearance from ethical committee of Government Medical College, Srinagar. The Hospital serves to whole Kashmir region, along with some adjoining areas of Jammu and Ladakh region, a population of about 12.5 million (census 2011).<sup>8</sup>

**Study design:** The study is a non-controlled prospective interventional study carried over a period of one year and two months (from March 2012 to April 2013).

**Sample size:** 56 patients of pharmacotherapy resistant psychiatric disorders. General information including age, sex, residence, occupation, socioeconomic status, etc. was recorded. The patients were assessed by Clinical Global Impression (Improvement subscale)<sup>9</sup> one day after the last ECT. Individual scales like Montgomery Asberg Depression Rating Scale (MADRS),<sup>10</sup> Young Manic Rating Scale (YMRS)<sup>11</sup> and Yale-Brown Obsessive Compulsive Scale (YBOCS)<sup>12</sup> were used one day before ECT and one day after ECT. Improvement was defined with CGI improvement subscale by comparing the position of patient at admission to projected condition with the therapy. Patient is said to be improved if he/she attains a score of 1 or 2 on CGI-I subscale.

**Clinical Global Impression (CGI)** is a 3-item observer-rated scale that measures illness severity (CGI-S), global improvement or change (CGI-I) and therapeutic response (efficacy index). The improvement section of the instrument has been used more frequently than the therapeutic response section in both clinical and research settings.<sup>9</sup>

**Montgomery Asberg Depression Rating Scale (MADRS)** is 10 point scale that measures the severity of depressive episodes. Each item yields a score of 0 to 6. The overall score ranges from 0 to 60.

**Young Manic Rating Scale (YMRS)** is 11-item scale used to assess disease severity in patients with mania.<sup>11</sup> The scores from each question are added together to form a total score ranging from 0 to 60, with higher scores indicating a greater severity of symptoms.

**Yale-Brown Obsessive Compulsive Scale (YBOCS)** is a 10-item balanced scale designed to rate both the severity and type of symptoms in patients with OCD.<sup>12</sup>

The socio-demographic and clinical data of the patients were recorded in a semi-structured case sheet.

**The inclusion criteria included** Patients of pharmacotherapy resistant psychiatric disorders (both males and females).

**The Exclusion Criteria included** patients who did not give consent, had never received a trial of pharmacotherapy, pa-

tients in whom general anaesthesia was contraindicated and age less than 13 years.

**Electroconvulsive therapy administration:** ECT was administered with brief-pulse, bilateral, modified ECT. Written informed consent was sought from patients and their relatives; those who were considered incapable of consenting had participated with the consent of their closest family member or custodian. Consenting patients underwent physical assessment and investigations as required and were also assessed by an anaesthetist. Motoric seizure of at least 15 seconds was considered to be an effective ECT.

A minimum of 6 and maximum of 12 sessions of ECT were given to patient. ECT was continued till the patient became asymptomatic and scored 1 or 2 on CGI-I, or had shown no further improvement over 2 consecutive ECTs, or did not give consent for further continuation of ECT or had completed a maximum of 12 sessions. All sedative/ hypnotic agents were withdrawn or the dose was reduced before administration of ECT.

## STATISTICAL ANALYSIS

Quantitative data was analysed by using one way Analysis of Variance, Post Hoc tests were used for pairwise comparison of groups and qualitative data was analysed by using Pearson's Chi square test. The p value of < 0.05 was considered to be statistically significant. Data was analysed by using SPSS Version 20.0.

## RESULTS

Table 1 shows age, gender and clinical diagnosis of the studied group and the number of ECTs received by the patients. The mean age of all the studied patients was 39.6(±11.76). 51% were males and 48.2% were females. The most common diagnosis was unipolar depression (53.6%), followed by BPAD in mania (19.7%). 34 (68%) patients had received

	No. of patients	Percentage
Age (in years)		
21-30	14	25%
31-40	15	26.8%
41-50	16	28.6%
51-60	9	17.8%
>60	1	1.8%
Mean = 39.6(±11.76)		
Sex		
Males	29	51.8%
Females	27	48.2%
Clinical Diagnosis		
Unipolar depression	30	53.6%
BPAD in depression	10	17.8%
BPAD in mania	11	19.7%
OCD	5	8.9%
No. of ECTs		
6-9	34	68%
10-12	16	32%
Total	50	100%
Mean=8.22(±2.073)		

**Table-1:** Age, gender and clinical diagnosis of the studied group and number of ECTs received by patients

	Total no. of patients	Improved	Not improved	Chi square	p value	MEAN SCORES (Pre-ECT Score = M1, Post-ECT Score =M2)	Comparison M1 vs. M2
All patients	50 (100%)	39 (78%)	11 (22%)	2.511	0.28		
Patients with Unipolar depression	27 (100%)	21 (77.8%)	6 (22.2%)	1.438	0.487	Mean MADRS M1 = 41.60+4.88(n=30)	Mean difference = 30.193
						Mean MADRS M2 = 11.41+8.13(n=27)	p value = ≤0.0001
Patients with Bipolar depression	9 (100%)	7 (77.8%)	2 (22.2%)	1.438	0.859	Mean MADRS M1 = 41.50+1.07(N=10)	Mean difference = 32.389
						Mean MADRS M2 = 9.11+7.11(N=9)	p value = ≤0.0001
Patients with BPAD in mania	9 (100%)	8 (88.9%)	1 (11.1%)	0.587	0.746	Mean YMRS M1 = 50.09+3.936(N=11)	Mean difference = 37.758
						Mean YMRS M2 = 12.33+8.10 (N=9)	p value = ≤0.0001
Patients with OCD	5 (100%)	3 (60%)	2 (40%)	2.4	0.301	Mean YBOCS M1 = 28.60+3.71(N=5)	Mean difference = 12.50
						Mean YBOCS M2 = 16.10+8.87(N=5)	p value = 0.044

**Table-2:** Global improvement of studied patients, and comparison of mean MADRS scores in unipolar and bipolar depression, YMRS score in mania and YBOCS score in OCD patients at pre ECT(M1) with end of ECT course(M2)

6-9 ECT's, whereas 16 (32%) patients had received 10-12 ECT's. The mean number of ECT's received was 8.22 ( $\pm 2.073$ ).

Table 2 shows global improvement of studied patients, and comparison of mean MADRS scores in unipolar and bipolar depression, YMRS score in mania and YBOCS score in OCD patients at pre ECT(M1) with end of ECT course(M2) improvement of patients according to CGI at the end of ECT course. 39 (78%) patients were found to be improved as per CGI. The p value was 0.28 which is insignificant. Among patients with unipolar depression, 21 (77.8%) patients were found to be improved at the end of ECT course. The p value was 0.487 which is insignificant.

Likewise for patients with BPAD in depression (Bipolar depression), BPAD in mania, and OCD patients, a total of 7 (77.8%), 8 (88.9%), and 3 (60%) patients showed significant improvement, respectively, at the end of ECT as per CGI, with their respective p values being 0.859, 0.746 and 0.301. This table also shows mean MADRS scores in unipolar and bipolar depression, mean YMRS scores in BPAD in mania and mean(SD) YBOC scores in OCD patients.(at pre ECT and at end of ECT).The difference of mean MADRS in unipolar and bipolar depression and mean YMRS score in mania patients between pre ECT (M1) and at the end of ECT course (M2) was statistically significant (p value  $\leq 0.0001$ ). The difference of mean YBOCS score between pre ECT and at the end of ECT course is also significant (p value  $\leq 0.044$ ).

## DISCUSSION

The mean age of the study population was 39.6 ( $\pm 11.76$ ) years, approximately 10 years younger than people receiving ECT's in western world.<sup>13</sup> In our study, out of 56 patients, 50 (89.28%) completed the course of ECT. It was noted that 78% of patients, who completed the course of ECT were reported as improved (as per CGI-I). The finding of the study is in agreement with Moksnes et al (2010)<sup>13</sup>, who found 85.1% of patients receiving ECT improved at the end

of the ECT course. In patients of BPAD in mania, 88.9% had shown improvement at the end of ECT course. The high effectiveness of ECT in mania can be explained by the powerful anticonvulsant properties of ECT. Mood stabilisers used for the treatment of mania have anticonvulsant activities and are quite effective in treatment of mania patients.<sup>14</sup> Among patients with unipolar depression, 77.8% of patients were found to be improved at the end of ECT course. Controlled studies have suggested that up to 70% of patients who failed to respond to antidepressants may respond positively to ECT.<sup>15</sup> However this finding is in contrast to Meddaa et al (2009)<sup>16</sup>, who showed more improvement in the studied group, compared to the findings of the study. The difference in response might be due to the fact that in the study, we had only pharmacotherapy resistant patients and response rate of pharmacotherapy treatment resistant patients to ECT might be low as compared to non pharmacotherapy resistant patients.<sup>17,18</sup>

Among patients with Bipolar depression (BPAD in depression), 77.8% of the patients were improved at end of ECT course. The finding of the study suggests that ECT is highly efficacious in treating depressive symptoms of patients suffering from bipolar depression and not responding to adequate pharmacotherapy trial in the past. This finding of the study is supported by Dabrowski et al (2012)<sup>19</sup>, who found that 73% of the depressive patients with bipolar disorder were fully improved following the course of ECT. In every part of the world, OCD is quite a challenge to treat. It was a pleasant surprise to see that 60% of OCD patients had shown improvement after ECT course. A review of literature regarding OCD treatment shows that use of ECT in treatment resistant OCD is quite sparse. To the best of the knowledge of the authors, only isolated case reports showing efficacy of ECT in OCD have been reported. The primary indications in all case reports for ECT use would be OCD with severe depression.<sup>5</sup> Our finding suggests that ECT is quite effective in controlling obsessive and compulsive symptoms of OCD.

The mechanism for this might be that ECT is believed to increase serotonergic functions, that suggests ECT might be useful treatment in refractory OCD.<sup>20,21</sup> Osso et al (2005)<sup>22</sup> stated that ECT has an anti-obsessional effect and that might explain improvement in symptoms in OCD in the study population.

It was also observed that at the end of ECT course there was significant decrease in mean YBOC score in OCD patients, mean MADRS score in unipolar and bipolar depression and YMRS scores in patients with mania ( p value is  $\leq 0.0001$  ). This finding is in accordance with other studies, in which significant decrease of psychopathological symptoms occur in various psychiatric disorders at the end of ECT.<sup>22,23</sup>

## CONCLUSION

ECT is an effective treatment of pharmacological resistant psychiatric disorders. Further research in this field on a larger group of patients should be done which would reveal more hidden options for treating psychotherapy resistant psychiatric disorders through ECT.

## Limitations

1. Small size of the study group, purposive sampling
2. Selection bias, as the study was conducted in one hospital only

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# Factors Influencing Weekly IFA Supplementation Programme (WIFS) among School Children: Where to Focus Our Attention?

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## ABSTRACT

**Introduction:** Iron-deficiency anaemia is a public-health concern in developing countries. Weekly IFA consumption can significantly reduce prevalence of nutritional anemia among adolescents. Govt. of India launched the WIFS programme in 2012 to reduce prevalence and severity of nutritional anaemia among adolescent population. Research was done to study factors influencing weekly IFA supplementation programme at selected schools in rural Pondicherry and to explore perceptions regarding weekly IFA supplementation programme qualitatively.

**Material and methods:** A school based cross-sectional study was conducted during July-Dec 2013 in selected government schools of Bahour commune in rural Pondicherry. After obtaining permission from school headmasters, total 240 school children (both boys and girls from 9<sup>th</sup> and 10<sup>th</sup> standards) were interviewed. Pre-tested proforma in local language was used and multi-stage sampling technique was followed for quantitative data collection. Qualitative information was collected through 6 FGDs. Data was analysed using SPSS version 17.0 and Anthropac 4.98.1/X software.

**Results:** 47.2% children were consuming IFA tablets regularly, 52.8% were consuming occasionally or rarely. Stomach pain (41.7%), nausea and vomiting (24.5%) and disliking of tablets (22.3%) were predominant causes for IFA tablet refusal. Reduced fatigue (43.7%), increased appetite (41.1%) and improved concentration (37.7%) were cited as major benefits of IFA tablets. Gender, type of family, parents' education and occupation were not associated with consumption of IFA tablets. Girls perceived that IFA tablets causes weight gain, and may have side effects like bad taste, pain abdomen and giddiness. Boys considered that these tablets were not necessary and has side effects like stomach pain and nausea and often throw away tablets. Occasional unavailability of IFA tablets, poor awareness regarding importance of IFA tablets, and casual program implementation were other important factors.

**Conclusion:** Creating awareness regarding importance of IFA supplementation and careful program implementation including regular supply of IFA tablets should be considered to make WIFS programme successful.

**Keywords:** Adolescent, Anaemia, School children, Iron Folic Acid

among school children can be prevented by deworming, iron supplementation and proper diet.<sup>1</sup>

The prevalence of anaemia (girls Hb <12 gm% and boys (Hb <13 gm %) according to NFHS-3<sup>2</sup> (2005-2006), was more than 55% among both adolescent boys and girls. In this direction, Government of India launched the *Weekly Iron and Folic Acid Supplementation* (WIFS) Programme in year 2012 to reduce prevalence and severity of nutritional anaemia among adolescent age group population. WIFS is also supposed to reach out-of-school boys and girls in the age group of 10-19 years through the platform of anganwadi centers (located in every village). This strategy involves a 'fixed day-Monday' approach for IFA tablet distribution among children. Teachers in schools and anganwadi workers for non-school going children (AWWs) are supposed to ensure the ingestion of IFA tablets by the children.<sup>3</sup>

According to WIFS programme, IFA tablet containing 100 mg elemental iron and 500 microgram folic acid will be supplemented for 52 weeks in a year. In addition to IFA supplements, Albendazole tablets for de-worming will also be administered twice a year to the same target group.<sup>3,4</sup>

Objectives of the research were to study the factors influencing weekly iron and folic acid supplementation at selected schools in rural Puducherry and to explore the perceptions regarding weekly iron and folic acid supplementation programme among school children, teachers and parents qualitatively.

## MATERIAL AND METHODS

### Quantitative data collection

A school based cross-sectional study was conducted during July-Dec 2013 in selected two government schools of Ba-

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## INTRODUCTION

Iron deficiency anaemia is a public health concern in most developing countries. Nutritional anaemia result in impaired physical growth, poor cognitive development, reduced physical fitness, decreased concentration, weakness, and menstrual irregularities among girls affecting physical and mental health of school children. The common causes of iron deficiency are incorrect dietary habits, infections, infestations and menstrual blood loss among girls. Anaemia

hour commune in rural Pondicherry (Vanidhasan Government Higher Secondary School, Seliamedu and Kasthuribai Government School, Bahour). After obtaining permission from school headmasters, students from 9<sup>th</sup> and 10<sup>th</sup> standards from selected 2 schools and willing to participate in the study were included as study subjects. Considering prevalence of anemia among adolescent population as 65.3%<sup>5</sup>, (calculated sample size 207) a total 240 school children (30 boys and 30 girls from 9<sup>th</sup> and 10<sup>th</sup> standard from both the schools) were interviewed. Boys and girls from each standard and school were selected systematically.

The purpose of the study was explained and permission was obtained from headmasters of the respective schools. The subject confidentiality was assured and maintained during and after information collection. Health education was imparted to school children regarding importance of IFA tablet consumption and iron rich foods, adverse effects of iron deficiencies. Referral was facilitated to those children with clinical anemia for hemoglobin estimation and further management.

The quantitative data were collected by trained medical professionals using a pre-designed and pre-tested proforma in local language (Tamil) during afternoon hours in the respective schools. Information on background characteristics, symptoms suggestive of anaemia, consumption of IFA tablets, and problems faced due to IFA tablet consumption by school children were obtained. Clinical examination was done to assess signs suggestive of iron deficiency anaemia among school children. It took approximately 18-20 minutes to complete one study proforma.

#### Qualitative data collection

Qualitative data about perceptions of school children, teachers and parents regarding benefits and problems of weekly iron and folic acid supplementation programme were collected in a triangulated manner in the form of focus group discussion (FGD) [PRIA guidelines were used]<sup>6</sup>, free listing and pile sorting exercise [Dawson 1993].<sup>7</sup> For this purpose two semi-structured FGDs each with school boys, girls and teachers (total 6 FGDs) till point of exhaustion (around 40-45 minutes each) were conducted by study investigator. FGDs were supervised by faculty from Dept. of Community Medicine with more than five years of experience in qualitative research. FGDs included 8-12 purposefully selected participants who can talk freely and were willing to participate.

#### DATA ANALYSIS

Quantitative data was analyzed using Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chi-

cago, Illinois, USA) version 18.0. The data were presented in the form of numbers, distribution, and percentages.  $p < 0.05$  was considered as statistically significant. The content analysis of FGDs, free listing and pile sorting exercise were undertaken using ANTHROPAC 4.98.1/X computer software.<sup>8</sup>

#### RESULTS

Total 240 school children were interviewed, 120 were girls and 120 were boys. The mean age of study children was  $14.5 \pm 2.4$  years. 46.7% of mothers and 40.8% fathers of study children were educated till primary level only (less than seven years of schooling). Among the total children, 75.8% belonged to nuclear family and 24.2% children were from joint families. Gender, type of family, parent's education and occupation were not associated with consumption of IFA tablets.

Table 1 show various symptoms suggestive of anaemia as perceived by school children. 26.3% of the school children had easy fatigability, followed by difficulty in concentration (22.9%) and giddiness (15.8%). Among total 240 children, 117 boys and 116 girls, total 233 (97.1%) were taking tablets. Among those children 45.8% were consuming IFA tablets regularly. Among the children with regular consumption of IFA tablets, proportion of boys (73%) was double in number when compared to girls (37%). This is reverse in occasional conception of IFA tablet (37 boys and 64 girls). 51.3% were consuming occasionally (42.0%) or rarely (9.2%). 179 (76.8%) children were consuming IFA tablet after meals and 54 (22.5%) children were consuming without meals or before meals. There is no marked difference between boys (28%) and girls (26%) in consuming the IFA tablets without meals.

After consuming IFA tablets, 63.4% children could perceive positive effects of IFA tablets, 16% told that no positive benefits were noticed and 20.6% said that they couldn't assess. Table 2 shows one fourth of the children had stomach pain (24.2%), 14.2% children perceived nausea followed by disliking (12.9%) the IFA and headache (7.1%). Nearly 7% were not consuming due to bad taste and black coloured stools. 10% were due to other reasons like sickness, fear of weight gain, leave from school, non-availability of tablets and consuming antiepileptic drugs.

Children who were consuming IFA tablets, 28.3% perceived reduced fatigability and increased appetite (25.8%), followed by one fourth of the children reported improved concentration (24.6%). Reduced giddiness (10.4%) and menstrual regulations (10.4%) and reduced white discharge were also reported by the children.

Symptoms	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	p value
Easy fatigue	32 (26.7)	31 (25.8)	63 (26.3)	0.883
Inability to concentrate	28 (23.3)	27 (22.5)	55 (22.9)	0.877
Giddiness	15 (12.5)	23 (19.2)	38 (15.8)	0.157
Worm in stools	10 (8.33)	10 (8.3)	20 (8.3)	-
Occasional palpitation	8 (6.7)	11 (9.2)	19 (7.9)	0.473
Eating mud / non-food items	3 (2.5)	4 (3.3)	7 (2.9)	0.701
Others	-	7 (5.8)	7 (2.9)	-

(Multiple options possible)

**Table-1:** Symptoms suggestive of iron deficiency anaemia among school children

Reasons	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	p value
Stomach pain	26 (21.7)	32 (26.7)	58 (24.2)	0.366
Nausea/vomiting	13 (10.8)	21 (17.5)	34 (14.2)	0.139
Headache	6 (5)	11 (9.2)	17 (7.1)	0.208
Bad taste	9 (7.5)	4 (3.3)	13 (5.4)	0.154
Black colour stools	-	3 (2.5)	3 (1.3)	-
Don't like	8 (6.7)	23 (19.2)	31 (12.9)	0.004
Not necessary	4 (3.3)	12 (10)	16 (6.7)	0.038
Others	6 (5)	9 (7.5)	15 (6.3)	0.424

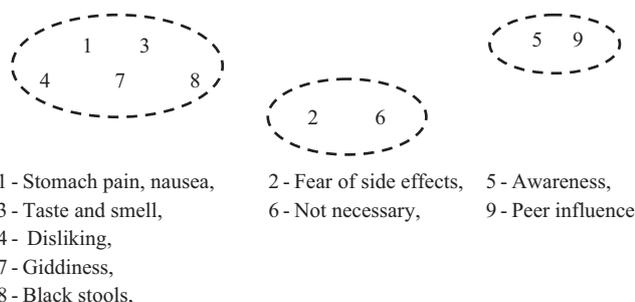
(Multiple options possible)

**Table-2: Reasons narrated by school children for not consuming IFA tablet**

Benefits	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	P value
Reduced fatigue	48 (40)	20 (16.7)	68 (28.3)	<0.001
Increased appetite	31 (25.8)	31 (25.8)	62 (25.8)	-
Improved concentration	36 (30)	23 (19.2)	59 (24.6)	0.051
Reduced giddiness	17 (14.2)	8 (6.7)	25 (10.4)	0.057
Menstrual regulation	-	25 (20.8)	25 (10.4)	-
Others	-	1 (0.8)	1 (0.4)	-

(Multiple options possible)

**Table-3: Benefits perceived by school children after consuming IFA tablets**



**Figure-1:** Two dimensional hierarchical cluster analysis: Barriers of IFA consumption

Among 240 children, 28.8% were found to be pale during general examination; among boys 20.8% had pallor and 36.7% girls were found to be pale. This difference was statistically significant (Chi-square value 7.34, p value <0.001). Among all children with pallor 36.2% were boys and 63.8% were girls.

Among the total 240 children, 233 were consuming IFA tablets (97.1%), among them 71.7% didn't have pallor, remaining 28.3% had pallor; whereas, among non-consuming children 42.9% had pallor and 57.1% didn't have pallor. But this difference was statistically not significant (p value 0.403). Thus, there was no significant association between consumption of IFA tablets and pallor; the probable reason could be, even though they are not consuming IFA tablet, the fulfillment of their iron requirement is being achieved by adequate intake of iron rich foods and already staying healthy.

**Qualitative findings**

Factors influencing weekly IFA supplementation programme and the perceptions regarding this programme among school children, teachers and parents were explored qualitatively in a triangulated manner in the form of 2 Focus Group Discussions (2 with boys and 2 with girls and 2 with teachers), and free listing and pile sorting exercise.

Girls perceived that IFA tablets produce side effects like ab-

dominal pain, nausea, giddiness, bad taste and causes weight gain. Boys considered that these tablets were not necessary and have side effects like stomach pain and nausea and often they threw away tablets. Occasional unavailability of IFA tablets, poor awareness, and casual program implementation were other important issues raised during FGDs.

**Free listing**

Factors responsible for not consuming IFA tablets as per discussion with school children (with descending Smith's S value, as per Salience analysis, which accounts for frequency of mention by participants) were stomach pain, fear of side effects, bad taste, disliking, poor awareness among students and their parents, not necessary, giddiness, black coloured stool and peer influence.

**Pile sort analysis**

School children could identify 3 broad categories of barriers for IFA consumption among both boys and girls during the study. First broad category of factors responsible for barrier of IFA consisted of stomach ache and nausea, metallic taste, disliking and giddiness. Second group consisted of fear of side effects of IFA tablets and thinking of IFA was not necessary. Third group consisted lack of awareness and peer influence on not consuming tablets (Figure 1). Thus, participants could enumerate different set of factors which acted as barriers for IFA consumption in the study area.

**DISCUSSION**

Adolescence is a period of transition from childhood to adulthood. It is characterised by rapid physical, biological and hormonal changes resulting in psycho-social, behavioural and sexual maturation.<sup>9</sup> Adolescence is a period of rapid growth and this will lead to increased iron requirement. Failure to fulfill this iron requirement leads to iron deficiency anaemia.

Nutritional anaemia is a major preventable public health problem in both developing and under developed countries.

During adolescence, anemia is prevalent in both sexes but more among girls, especially during menarche. Iron deficiency anemia among females is one of the major risk factors for infant mortality, maternal mortality and preterm birth. It is becoming increasingly evident that the control of anaemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured in the adolescent females prior to marriage.<sup>10</sup> The reasons for the high incidence of anaemia among adolescent girls include increased iron requirements because of growth, menstrual loss, discrepancy between high iron need for haemoglobin formation and low intake of iron containing foods, erratic eating habits, dislike for foods which are rich in iron, like green leafy vegetables, iron absorption inhibitors in food (phytates /tannins).<sup>11</sup>

In our study among 240 children, 97.1% were consuming IFA tablets. 45.8% children were consuming IFA tablets regularly. 51.3% were consuming occasionally or rarely. Stomach pain (24.2%), nausea and vomiting (14.2%) and disliking of tablets (12.9%), bad taste, headache, were predominant causes for IFA tablet refusal. Fears of weight gain, sickness, leave days, non-availability of tablets were also reported as barrier for IFA conception. These findings were supported by a study conducted by Rajshree et al<sup>1</sup>, where 66% of study population discontinued IFA tablets due to side effects which were mainly vomiting, gastric problem and giddiness. About 50% girls, who participated in the initial phase (2000-2005) of *Adolescent Girls Anaemia Control Programme*, reported some undesirable effects such as black stools, nausea, giddiness, heartburn and vomiting. The incidence of side effects declined as the programme matured. For example in Gujarat state, the reported side effects have come down from 30% during initial phase to 14% at programme end line. It was also supported by UNICEF intensified technical support to state governments for effective IEC strategy, monitoring and evaluation of *Adolescent Girls Anaemia Control Programme* during consolidation phase (2006-2010).<sup>9</sup>

In the present study, among 240 children, 28.8% were found to be pale (36.2% were boys and 63.8% were girls) during general examination; among boys 20.8% had pallor and 36.7% girls were found to have pallor. This difference was statistically significant (Chi-square value 7.34, p value <0.001). In comparison, NFHS-3<sup>2</sup> data showed that more than 55% of adolescent girls in India and boys were anaemic. Our study findings are comparable with a study conducted in Nepal by Singh et al,<sup>12</sup> which documented that 29.7% adolescent girl and 22.4% adolescent boys were anaemic. It also documented that irregular eating habits and lower consumption of animal source foods contributes to development of nutritional anemia. In both these studies girls were having higher incidence of anemia. Higher proportion of anaemia (78.75%) among adolescents was observed by another study conducted in Chennai by Premalatha et al.<sup>13</sup> This study also concluded that though initiation of iron fortification has been initiated by Govt. of India, it should be in commonly reachable vehicles like salt, sugar and available for all, which doesn't demand individual co-operation.

Similarly, higher proportion of anaemia was also noticed by Sharatha et al in Pondicherry, where out of 300 college students, 228 (76%) were anaemic, 32.3% students gave history

of passing worms in stool. In our study, only 8.3% reported passage of worms in stools. This could be due to supplementation of IFA tablet and bi-annual deworming in schools through WIFS programme; whereas, this provision is not in institutions and they also added that in the same institution most of the students were staying in hostels and have a modified dietary pattern.<sup>14</sup>

Children who consumed IFA tablets, 63% (151) could perceive positive effects of IFA tablets, 16% communicated that no positive benefits were noticed, and 20.6% said that they couldn't assess. Similarly, study conducted in Ahmedabad by Rajshree et al<sup>1</sup> also observed that nearly 47% of the subjects were unaware of positive effects.

Reduced fatigue (43.7%), increased appetite (41.1%) and improved concentration (37.7%) were cited as major benefits of IFA tablets. Similar benefits were also obtained from a study conducted in Wardha district by Dongre et al.,<sup>15</sup> they also documented that weekly IFA tablet consumption can significantly reduce prevalence of nutritional anemia (from 73.8% to 54.6%) among adolescent girls. In addition, improvement in awareness regarding iron-rich foods among mothers of children was also observed in the same study.

Relatively similar benefits were documented in *Adolescent Girls Anaemia Control Programme* also. About 80% of girls who were covered under this programme perceived various benefits and they reported that do not feel tired, can concentrate better on their studies, do not fall sick, not feeling sleepy, feeling healthier, having more energy, having regular menstrual cycle and reduced abdominal pain during menstruation. This programme became an important platform for intersectoral convergence among key government departments and UNICEF programmes to empower adolescent girls, reduce gender and social inequities, and break the inter-generational cycle of under nutrition and deprivation in India.<sup>9</sup> So documented benefits under this programme, supports our study findings on perceived benefits by school children after IFA consumption.

During the FGD with school children, even though the IFA supplementation programme was going well, we observed that nutritional health education sessions were not conducted regularly (monthly interval - as it is stated in WIFS operational framework manual)<sup>16</sup> to school children by nodal teachers. Children were unaware of benefits of IFA tablets and these issues were supposed to be insisted by teachers. Also nodal teachers could have consumed the IFA in front of students to get their confidence and reassurance (as per manual).

In this survey, we observed that 76.8% children were consuming IFA tablet after meals and 23.5% were consuming without meals also. Since approximately one-fourth children were consuming IFA in empty stomach, it is important to educate the students to consume the tablet after meals, so that majority of the gastric side effects can be avoided. On the other hand, after health education sessions, children were also insisting that nutritional health education session should be conducted by doctors or health staffs instead of non-health worker such as teachers. This can also be suggested to health department, because students had been strictly handled or warned instead of getting aware by teachers. Thus,

problems like students not showing interest in IFA tablets could be rectified easily.

Discussion with teachers revealed that, on the whole teachers were not comfortable with this programme because the programme is time consuming, pressured by government, overloaded with extra work like maintaining and issuing the IFA tablets, often thrown away tablets by students even after giving instructions, issues with the side effects of the tablets and mainly they raised the issue that they were not the health staff to do all these work. So keeping this in mind, as government is giving incentives for health worker (e.g. under family planning and institutional delivery programmes), incentives can also be given to the teachers especially nodal teachers for successful implementation of this programme.

## CONCLUSION

Most of the school students consume IFA tablets under WIFS programme, although irregularly and inadequately. Barriers of IFA tablet consumption like side effects, lack of awareness among students and irregular supply of tablets should be considered. Iron fortification of foods and/or changing composition of iron preparation to avoid side effects may also be considered in future.

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# Observation of Changes in Liverfunction Tests and Oral Manifestations in Cirrhosis of Liver

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## ABSTRACT

**Introduction:** Liver has got multiple functions and hence its insufficiency in a cirrhosis patient gives rise to involvement of various symptoms. The aim of the present study is to diagnose patients with clinical, oral and pathological test.

**Material and Methods:** 60 cases of liver cirrhosis were selected irrespective of age and sex and were included in the study group. They were divided into group I and depending on the cause of cirrhosis and 40 normal patients as controls were observed with detailed clinical examination, liver function test, renal function test and oral manifestations.

**Result:** In study group I and II liver function test like serum bilirubin, ALT, and prothrombin time as compared to control group were found to be significantly elevated whereas serum albumin was significantly reduced. More than 50% cases developed renal failure. The oral hygiene was poor presenting with caries, extractions, calculus and periodontal problems with more in group I patients.

**Conclusion:** These observation can elucidate in diagnosing hepatorenal disease and its outcome. Also the screening and management of oral manifestations prior to organ transplantation can overcome complications after transplantation like septicemia and others.

**Keywords:** cirrhosis, liver function test, serum, hepatorenal, oral manifestations

## INTRODUCTION

Medical practitioners since time immemorial have identified the liver as one of the important organs of the body, along with the heart and brain. It was the roman anatomist, Galen who made the liver, the principal organ of the human body, arguing that it emerged first of the organs in formation of fetus.<sup>1</sup>

Liver has got multiple functions and hence its sufficiency in a cirrhosis patient gives rise to a complex syndrome which includes disturbance of nitrogen metabolisms, bile formation, coagulation opathies, disturbances of nervous systems, circulatory system, renal system and endocrine system. Liver disease largely affects the water and electrolyte equilibrium. It is known since the times of Austin Flint (1863) who made specific reference to kidney function in cases of cirrhosis of liver. He found that the patients with cirrhosis exhibit avid sodium retention with oliguria, with urinary output of about 300cc to 500cc.<sup>2</sup>

Also, with the consideration of the oral cavity, liver dysfunction in the form of mucosal membrane jaundice, bleeding disorders, petechiae, increased vulnerability to bruising, gingivitis, gingival bleeding (even in response to minimum trauma),<sup>3,4</sup> foetor hepaticus (a characteristic odor of advanced liver disease), cheilitis, smooth and atrophic tongue, xerostomia, bruxism and crusted perioral rash.<sup>5</sup> In these patients,

chronic periodontal disease is a common finding. As commented by Friedlander,<sup>6</sup> this is believed to be the result of ethanol induced peripheral autonomic neuropathy giving rise to alterations in salivary metabolism and secretion.

There is water and electrolyte disturbances in cases of cirrhosis although the cause is not known, Eissenmenger et al and Rickett et al have given their opinion that the patients of liver disease with ascites have hypernatraemia. The sodium retention is due to increased activity of the mineralocorticoid hormones from adrenal glands. But merely this hormonal basis is not enough to explain the water and electrolyte disturbances found in cirrhosis cases. Abnormal renal regulation of water and electrolytes occur commonly leading to impaired diuresis and dilutional hyponatraemia.<sup>7</sup>

In the state of Jharkhand the practice of alcoholism is rampant. Various genetic and hereditary factors increase the susceptibility to develop cirrhosis of liver. In view of the fact that there is paucity of work on cirrhosis of liver and the fact that cirrhosis is the major cause of mortality and morbidity in this part of the country, this work was undertaken.

The patients of cirrhosis admitted in different units of Medicine Department were included in the study. The renal function as monitored by recording daily urine output, routine examination of urine plasma and urine creatinine estimation of sodium, potassium, chloride, blood urea and GFR.

In Jharkhand there is a huge reservoir of patients of cirrhosis due to conventional causes and over and above due to practice of alcoholism. A study pertaining to cirrhosis of liver, hence would be of increasing relevance and utility in this part of the country. Therefore the aim of the present work was to diagnose patients with cirrhosis of liver with respect to clinical, oral manifestations, Radiological and pathological tests.

## MATERIAL AND METHODS

This study was done on patient of cirrhosis due to different etiologies with their altered renal functions and electrolytes, chemistry admitted in Rajendra Institute of Medical Sciences.

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es Ranchi, Jharkhand. Prior to the start of the study an ethical clearance was obtained from the ethical review committee. Forty healthy people of both sexes of same age groups and socioeconomic status were selected. The subjects included in this group were medical students, interns, house physicians, nurses, paramedical students and attendants of the patients admitted in different units of Medicine Department, were kept as control.

60 patients of cirrhosis of liver were selected as subjects for study among the patients admitted in the different units of the Department of Medicine in Rajendra Institute of Medical Sciences Ranchi.

Study group- 60 patients

Control groups- 40 patients

The study group was further divided in to two groups:

- I. Cirrhosis due to alcoholic liver disease -40 cases
- II. Cirrhosis due to miscellaneous causes- 20 cases
  - a. Due to viral hepatitis-18 cases
  - b. Due to heavy metal poisoning- 2 cases

#### Inclusion criteria

Following patients were included in this study, those who were above 50 years of age and giving consent

#### Exclusion criteria

Patients with cardiac failure, on diuretic therapy, chronic kidney disease, on drugs like SSRI,TCA,MAO, INHIBITORS etc which alter renal profile and electrolytes.

Patients undergoing hemodialysis and peritoneal dialysis, recent trauma, surgery, and burns. Infants children and adolescent were excluded and only adult cases were included to avoid bias of research work.

The selections were made on the basis of detailed history and clinical examinations. The diagnosis of all patients were made through clinical examination and investigations done.

#### Oral Manifestations

Oral examination was done for Oral manifestations such as the presence of gingivitis (assessed by Papilla bleeding index - PBI), dental caries, edentulism, and dental hygiene (using OHIS assessed by Green and Vermillion index 1964), were performed prospectively in patients with chronic liverdisease and controls. The patients who were in coma and unconscious and did not showed signs of recovery were excluded from the study.

#### Estimation of Blood Urea

##### Diacetyl Monoxine Method

This technique employing for reaction have been devised for determining urea. Reagents used were Sodium tungstate- 10% sulphuric acid- 2/3N, Diacetyl monoxine 2% solution, sulphuric acid-phosphoric reagent, shock standard solution of urea 250mg%. 0.1 ml of blood was taken into 3.3 ml of water 0.3 ml of 10% sodium tungstate and 0.3 ml of 2/3 N sulphuric acid was added. Both mixed well and centrifuged. Now 1 ml of supernatant fluid was added to 1 ml of water. 0.4 ml diacetyl monoxine and 1.6 ml of sulphuric acid-phosphoric acid added to the mixture. This was placed in boiling water bath for 30 minutes. It was cooled and read against a water blank at 480 millimicrons.

Calculation-  $Mg \text{ urea} / 100 \text{ ml} = \frac{\text{Reading of unknown} \times 100 \times 0.25}{\text{Reading of the standard} \times 0.25}$

#### Estimation of serum creatinine

Reagents used were Sodium tungstate- 5%, sulphuric acid- 2/3N solution, stock standard 1 mg creatinine per 100 ml, standard creatinine solution 0.04N mg/ml, picric acid 0.04 N Solution and Sodium hydroxide 0.75 N Solution. 2 ml of diluted serum with 2 ml of distilled water was taken.

The calculation was made as follows:

The value of creatinine /100cc the value of creatinine of diluted urine X 100 mg% 24 hours creatinine in urine  

$$= \frac{\text{the urinary output in cc} \times \text{value of of urinary creatinine}/100\text{cc}}{100}$$

#### Estimation of serum- sodium, potassium and urinary sodium

It was done by Flame photometry using E.E.L flame photometer.

Principle of flame photometer: The solution is passed carefully through photometer. The solution evaporated in the flame and the salt dissociated to give neutral atoms, some of this, though only very small proportions move in a higher energy state. An orange filter is used for determining sodium the intensity of D-line (589 million core) being read. Potassium is determined by using a deep red filter such as III ford 609 emitting light at 404.4 and 766.5 millimicron.

#### Diagnostic criteria for renal failure in cirrhosis-

- a. Urine output less than 400ml/24 hours
- b. Serum creatinine exceeding 0.2 mmol/L i.e 2.2 mg/100 ml

Renal failure not responding to volume expansions, urinary sodium level below 10 mEq/L or 2 mEq/L in patients receiving diuretics a specific gravity above 1.020RFI and FENa (Fractional excretion of filtered sodium) less than 1 are used to explain " Functional renal failure or hepatorenal syndrome".

#### Diagnostic criteria for acute tubular necrosis

1. Specific gravity of urine below 1.010.
2. Urinary sodium above 20 mEq/L.
3. R.F.I and FENa above 1.

## RESULTS

Table 1 shows the age distribution in study and control group, in the age group of 15-22 years, 5 cases (8%) were taken, 9 cases (14%) belonged to the 23-32 years age group, 16 cases (28%) belonged to the 33-43 years age group and the maximum number of patients were of 45 years and above age. 30 patients or 50% patients belonged to this age group. Table 2 shows liver function test in study and control group. A statistically significant correlation was found in group I and II in the liver function tests.

Table 3 shows a significant correlation in the renal function test in group I and II. In study group II the mean level of serum bilirubin was 17.68±4.74mg% SGPT 239.62 ±72.30 IU/L prothrombin time 47.5 ±6.65 sec. serum albumin 2.93±0.55 mg% where as in control group the value recorded were serum bilirubin 0.65±0.13 mg% SGPT 28.05±4.87 IU/L prothrombin time 13.85 ± 0.5 sec., serum albumin 4.03±0.21 gm%.

The oral manifestations were seen for gingivitis, dental caries, toothedentualism. Group I and group II showed poor oral

hygiene as compared to controls with more number of patients suffering from dental caries, missing teeth and gingivitis in group I. In group II 2 patients were observed with gingival staining (plumbism) due to lead poisoning.

## DISCUSSION

Cirrhosis is the end result of hepatocellular injury that leads to both fibrosis and nodular regeneration throughout the liver which causes severe impairment of liver function. Disorder of cardiac, respiratory and renal functional impairment may also develop. Hepatic encephalopathy may also develop as an end result.

Cirrhosis can result from almost all forms of liver injury e.g by viral hepatitis alcoholism and hepatitis due to drugs. The mortality of patient with renal failure is high. Previous

studies, have also reported high incidence of morbidity and mortality.<sup>8</sup> Kalso –Castellob while studying the fluid and electrolyte disturbances in terminal stage of cirrhosis cases, demonstrated that electrolyte disturbance in cirrhosis cases can be life threatening and must be recognized early and treated.<sup>9</sup> The present study has been undertaken to study the changes in renal function and serum electrolyte level in cirrhosis of liver as well as to analyse the oral changes in relation to the liver disorders.

Hence it was evident that in study group I (alcoholic hepatitis) liver functions parameters were more significantly raised ( $p < 0.001$ ) while prothrombin time was raised significantly. However the serum albumin level was low as compared to control group. Similar observation of liver function tests were recorded in group II patients. Allen J. A rief et al (1973) in their study showed almost similar data for the liver function test in cases of advanced liver disease.

The hepato renal syndrome in acute renal failure of unknown cause developing in patients with chronic liver disease results due to a combination of redistribution of fluid between intra and extracellular compartments and intrarenal events, reducing renal blood flow (activation of the rennin- angiotensin system) and increased in vasoconstricting prostaglandins.

Prognosis of hepato renal syndrome is poor and depends on recovery of hepatic function with other relevant management.

Forty (40) normal individual with regards to their renal

Age in years	Study Group		Control Group
	n(%)		n(%)
15-22	5(8)		4(10)
23-32	9(14)		8(20)
33-43	16(28)		12(30)
45 and above	30(50)		16(40)
Sex	Study Group		Control Group
	Group I	Group II	
Male	30	16	30
Female	10	4	10

**Table-1:** Showing the age and gender distribution in study and control group.

Group	Range	Mean	± SD	S.E(d)	“t” value	‘P’ Value
Control group (no=40)						
Serum bilirubin(mg%)	0.4-0.8	0.65	0.13			
S.G.P.T(ALT)	20-35	28.05	4.87	-	-	-
Prothrombin Time	12-14	13.85	0.5			
Serum albumin(gm%/100ml)	3.8-4.5	4.03	0.21			
Study Group: I (no=40)						
Serum Bilirubin(mg%)	7.4-14.5	10.8	2.86	0.9	11.27	0.003
S.G.P.T(ALT)	90-305	139.4	59.20	18.75	5.93	0.002
Prothrombin Time	25-32	29	2.82	0.9	17.22	0.006
Serum albumin(gm%/100ml)	2-3.9	2.83	0.38	0.14	8.5	0.005
Study Group: II (no=40)						
Serum Bilirubin(mg%)	10.2-25.6	7.68	4.74	0.75	22.70	0.002
S.G.P.T(ALT)	120-350	239.62	72.30	11.48	18.42	0.003
Prothrombin Time	34-56	47.5	6.65	1.05	32.04	0.004
Serum albumin(gm%/100ml)	2.0-4.0	2.93	0.55	0.098	11.22	0.006

**Table-2:** Showing liver function test in control and study group I,II.

Group	Range	Mean	±SD	S.E	T value	P value
Study group I (40)						
Blood Urea	20-106	45.95	20.68	3.38	5.78	0.002
Serum creatinine	1.2-4.4	2.68	0.83	0.137	14.23	0.003
G.F.R	40-116	88.8	21.12	3.62	6.31	0.006
Study group I (40)						
Blood Urea	22-58	35.8	11.03	3.60	2.61	0.004
Serum creatinine	0.8-3.3	2.06	0.66	0.21	6.3	0.002
G.F.R	68-114	90.1	19.76	6.40	3.36	0.004
Study group I (40)						
Blood Urea	20-40	26.4	4.0	-	-	-
Serum creatinine	0.5-1.0	0.73	0.18	-	-	-
G.F.R	100-116	111.65	6.32	-	-	-

**Table-3:** showing renal function test in cases of advanced stage cirrhosis in both study and control group

Study groups	Caries (mean±SD)	Extraction (mean±SD)	DI (mean±SD)	CI (mean±SD)	OHI (mean±SD)	PBI (mean± SD)	Gingival staining (n)
Group I	4.26±3.8	6.2±8.4	2.06±0.2	2.19±0.3	2.5±1.3	2.2±1.2	-
Group II	3.89±2.3	8.8±5.4	2.01±0.1	2.12±0.2	2.1±1.1	2.1±0.8	2
Control	1.58±1.8	3.01±4.2	1.04±0.6	0.63±0.6	1.47±0.8	1.86±0.7	-

Table-4: Oral manifestations

function was studied. The mean value for blood urea, serum creatinine and GFR were 26.4, 0.73, 111.65 respectively in control group.

In study group comprising 60 cases of cirrhosis of liver (mainly viral origin) renal failure was observed in 31 cases. This is in accordance with the observation of Wilkinson et al<sup>11</sup> and Rig Larsen and Plazoo<sup>12</sup> who showed that renal failure occur in cirrhosis cases were about 62% and 55% respectively.

To access the renal function, blood urea, serum creatinine, GFR, were measured in the study group and the mean level, were compared with the mean level of the control group. The mean level of blood urea in group I cases was 45.96% (±SD20.68%). This was found to be significantly higher than the mean blood urea level of control group, which was 26.4mg% (±SD4.0%). Similarly the mean serum creatinine level in group I was 2.68mg% (±SD0.83%) which was significantly higher than the mean serum creatinine level to the control group 0.73 mg% (±SD0.18mg %). t being 14.23, p<0.01.

The mean GFR in group I was 88.8ml/ mm (±SD21.12) which was lower than the mean GFR of control group (111.65ml/mm) SD ±5.11. This was statistically significant. In group II cases all the parameters studied to assess the renal function varied significantly from the normal.

Untreated oral diseases (including dental problems) can lead to infections and sepsis and may cause many complications in transplanted patients.<sup>13</sup> In the literature bacterial sepsis is the most common cause of deaths, after transplantation, occurring during the first postoperative months and the risk of infection also increased by the over-immunosuppression of these patients. A potential source of infection may be dental foci. The present study also included the oral manifestations as generally there is neglect of dental health in liver disorders. Concerning dental caries we registered carious teeth in 71% of the hepatitis patients, while there is one study with 67% affected patients.<sup>13</sup> The average of dental caries was higher in group I than group II

(4.26±3.8 in group I, 3.89±2.3 in group II as compared to the controls 1.58±1.8) (Tabl 4).

About the presence of dental plaque the average of DI was 2.06; 2.01 in hepatitis group, compared to 1.04 in control (Table 4). Which is similar to the Barbero et coworkers.<sup>14</sup> They observed in 85% of patients with hepatitis poor oral hygiene, in 45% periodontitis and in 15% gingivitis catarrhalis. Barbero, 1996). Also the calculus index in hepatitis group I and II was 2.19, 2.12 which reflects that the majority of patients had subgingival calculus. In controls we detected the average value of calculus index 0.63 (Tabl. 4). Some authors reported the same as our findings.

Measures of oral hygiene, dental care, and periodontal parameters were worse and the number of teeth requiring treatment

was higher in hepatitis patients with cirrhosis than in healthy subjects<sup>15</sup> Regarding the results from Papilla bleeding index the Mean in hepatitis patients was 2.2 and 2.1, compared to the value in controls with 1.86. This infers that moderate gingivitis was present in liver cirrhosis patients. The present study indicates a neglect in oral hygiene with increased rate of decayed teeth and edentulism. The same conclusion was mentioned by J Guggenheimer et al,<sup>14</sup> which established that the presence of 2 or more carious teeth and/or 2 or more teeth that were mobile due to periodontal disease were indicators of severe dental disease as well as neglect of oral health.

## CONCLUSION

Liver cirrhosis is a major disorder observed in the present study. This work might help in managing the cases of cirrhosis and serve as a guide to establish sophisticated technique for the effective management of such patients. This may also be of immense help to those patients of cirrhosis of liver who have lost all hope of leading a fruitful life. Oral hygiene is often neglected so this study included screening for oral manifestations. The monitoring of oral health by dentists before transplantation and the achievement of specific protocols of prophylaxis are helpful in the prevention of complications after transplantation in these patients. These facts again pose the question of the place of dentists in the global medicine, especially their principal role not only in oral health, but also in successful liver transplantation.

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# Antibacterial activity of the essential oils of *Syzygium aromaticum* (L.) Merr. Perry (Clove), *Myristica fragrans* Houtt. (Nutmeg) and *Zingiber officinale* Roscoe (Ginger) against clinical isolates of *Clostridium difficile*: An *in vitro* study

Sherin Justin<sup>1</sup>, Beena Antony<sup>2</sup>

## ABSTRACT

**Introduction:** Treatment options for *Clostridium difficile* other than vancomycin and metronidazole have always been a challenge. Emergence of hypervirulent and resistant strains of the organism demands newer drugs with less side effects. The study was intended to investigate the antibacterial potential of the essential oils of *Syzygium aromaticum*(L.)Merr.Perry (Clove), *Myristica fragrans* Houtt. (Nutmeg) and *Zingiber officinale* Roscoe (Ginger) against clinical isolates of *Clostridium difficile*.

**Material and Methods:** The essential oils of clove, nutmeg and ginger were prepared by Neo-Clavenger's method. The screening of the essential oils for their antibacterial activity was done by disc diffusion method against both toxigenic and non toxigenic isolates of *Clostridium difficile*. Minimum inhibitory concentration of the oils was also determined against the isolates by agar dilution method.

**Results:** 100% of both toxigenic and non toxigenic isolates of *Clostridium difficile* showed sensitivity to clove oil by disc diffusion method. 100% of toxigenic isolates, 93.33% of non toxigenic isolates were sensitive to nutmeg oil and 85% of toxigenic isolates, 80% of non toxigenic isolates exhibited sensitivity towards ginger oil by disc diffusion method. The minimum inhibitory concentration range of clove oil was 1.25µl/ml to 2.5µl/ml; both nutmeg oil and ginger oil was 2.5µl/ml to 10µl/ml.

**Conclusions:** All the three essential oils used in the study exhibited good *in vitro* antibacterial activity towards the clinical isolates of *Clostridium difficile*. This promising finding could be utilized in development of new treatment options for the organism.

**Keywords:** Agar dilution method, *Clostridium difficile*, essential oils, minimum inhibitory concentration

## INTRODUCTION

*Clostridium difficile* (*C. difficile*) is an anaerobic, Gram positive spore forming bacillus. The organism has been held responsible for 90% of pseudomembranous colitis (PMC) and 20-25% of antibiotic associated diarrhoea (AAD).<sup>1</sup> The epidemiology of the organism has been showing a drastic shift over the last decade from being a nosocomial pathogen to a community-acquired one.<sup>2</sup>

Antibiotics like clindamycin, penicillin, ampicillin, cephalosporins, fluoroquinolones and even vancomycin and metronidazole which are the main treatment options for the organism have been implicated in *C. difficile* associated disease (CDAD).<sup>3</sup> Treatment options for *C. difficile* infection (CDI) other than vancomycin and metronidazole still remain

a challenge. The mutant hypervirulent strain, NAP1/BI/027 (North American Pulse-field gel electrophoresis type 1 /restriction endonuclease analysis BI/ribotype 027) which was responsible for the outbreaks of CDAD in many parts of the world has driven much attention towards the pathogen.<sup>4</sup>

Emergence of more resistant and virulent strains of *C. difficile* has created an increasing need for new therapeutic options other than antibiotics with no side effects and easy availability. As a stepping stone in the development of alternative drugs against *C. difficile*, the essential oils of common herbs like clove (*Syzygium aromaticum*(L.) Merr.Perry), nutmeg (*Myristica fragrans* Houtt.) and ginger (*Zingiber officinale* Roscoe) which are routinely used for gastrointestinal problems as grandmother's remedies were tried on the pathogen in the present study. The importance of essential oils has been highlighted in literature by various authors.<sup>5,6</sup> A variety of volatile molecules present in essential oils like terpenes, terpenoids, phenol-derived aromatic and aliphatic compounds could be responsible for their bactericidal, virucidal and fungicidal action.<sup>6</sup>

Though it has been widely accepted that antibiotic usage is the main predisposing factor for CDI, studies analyzing herbal treatment options for *C. difficile* is lacking in literature except the one which proved the antibacterial activity of Manuka honey.<sup>7</sup> Our study which demonstrates the *in vitro* antibacterial action of the essential oils of clove, nutmeg and ginger by disc diffusion and their Minimum Inhibitory Concentration (MIC) determination by agar dilution may prove as an aid in development of future therapeutics for *C. difficile*.

## MATERIAL AND METHODS

### Isolation and identification of *C. difficile*

The study was conducted in a tertiary care teaching hospital of coastal Karnataka, South India. Stool samples of 563 pa-

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tients with diarrhoea who were admitted in various wards like Medicine, Paediatrics, Surgery, Oncology and Orthopaedics were collected from January 2012 to December 2014. The study was approved by the Institutional Ethics Committee (Ref. No FMMC/ IEC/ 816/ 2012).

The patients admitted to the above mentioned wards with diarrhoea were included in the study. The clinical history and drug use of the patients were recorded. Written informed consent was taken from the patients during the study. Consent was taken from the guardians of the patients in case of minors.

Sterile wide mouthed containers were used for the collection of faecal samples and the samples were processed immediately. The stool samples were cultured on cycloserine cefoxitin fructose agar (CCFA) and anaerobically incubated at 37° C for 48 hours for the isolation of *C. difficile*.<sup>8</sup> The colonies on the plate were confirmed as *C. difficile* by Gram stain, morphology and characteristic odour and then subjected to latex agglutination (with Oxoid *C. difficile* Test Kit, DR 1107A, UK) and biochemical reactions.<sup>8,9</sup> Enzyme immunoassay (EIA) was performed using Premier Toxins A and B (*C. difficile*) EIA kit M/S Meridian Bioscience, Europe on all the stool samples for detection of the toxins A and B of *C. difficile*.

The colonies confirmed as *C. difficile* were then analyzed by polymerase chain reaction (PCR) using Applied Biosystems Simpli Amp Thermal Cycler by Life technologies for the detection of toxin A and toxin B genes. Toxin A gene detection was done using two primer pairs, primers NK3 and NK2; primers NK11 and NK9.<sup>10</sup> Primers NK104 and NK105 were employed to detect toxin B gene.<sup>10</sup>

*C. difficile* ATCC 43593 was used as the control strain throughout the study.

From 563 stool specimens, 113 (20.07%) *C. difficile* isolates were obtained by culture and confirmed by latex agglutination and biochemical reactions. Out of 113 *C. difficile* isolates, 54 (47.79%) isolates were toxigenic by toxigenic culture.<sup>11</sup> The remaining 59 (52.21%) were non toxigenic isolates.

#### Preparation of essential oils of Clove, Nutmeg and Ginger

Clove, nutmeg and ginger were purchased from a reputed store in Mangalore. Flower buds, fruits and rhizome of clove, nutmeg and ginger respectively were submitted for authentication to National Ayurvedic Dietetics Research Institute [Central Council for research in Ayurveda and Siddha, Department of AYUSH, Ministry of Health and Family Welfare, Government of India], Bangalore. The authentication number of the herbs are given in table 1.

The essential oils of clove, nutmeg and ginger were prepared at the Department of Pharmacognosy, Manipal College of Pharmaceutical Sciences, Manipal University, Manipal. The oils were extracted by Neo-Clavenger's method using Clavenger's apparatus. Clove, nutmeg and ginger were

shade dried and reduced to coarse powder.

100 g of the coarse powder (clove/nutmeg/ginger) mixed with 60ml of glycerol, 300 ml of distilled water and a few small pieces of porcelain was placed in the distillation flask of the apparatus. The flask was connected to the still head and was heated with frequent agitation, until ebullition started. The distillation was continued till the lower part of the condenser was cold. After a few hours of distillation, heating was discontinued and the volume of oil in the graduated portion of the tube was read off. The distillation was continued again, till the volume of oil did not differ in the two successive readings. The boiling was stopped, the oil was separated and collected in a sterile vial. The total yield of volatile oil content in the herbal product was noted.

#### In vitro antibacterial action of essential oils of Clove, Nutmeg and Ginger.

A total of 65 isolates of *C. difficile* (20 toxigenic isolates and 45 non toxigenic isolates) were subjected to disc diffusion technique as a screening test to determine the antibacterial efficacy of the three essential oils.

##### i. Disc diffusion technique

A 48 hour old culture of *C. difficile* isolates in Viande-Levure (VL) broth, the turbidity of which was adjusted to McFarland 0.5 standard ( $1.5 \times 10^8$  colony forming units/ml) was swabbed onto Brucella blood agar plates. 1 ml from each of the three undiluted essential oils was added to separate sets of 100 sterile discs (Whatmann No.1 filter paper) of 6mm diameter. The prepared discs were then placed on the inoculated Brucella blood agar plates and the zones of inhibition in millimeters were measured after anaerobic incubation in Hi gas-pak jar at 37° C for 48 hours using BD GasPak EZ Anaerobe container system with Indicator. *C. difficile* ATCC 43593 was also employed in parallel. As a negative control, dimethyl sulfoxide (DMSO) incorporated disc was included. The procedure was done in triplicate. The results were graded depending on the diameter of the zones of inhibition.<sup>12</sup> 9 mm – 12 mm → 1+, 13 mm – 16 mm → 2+, 17 mm – 20 mm → 3+, >20 mm → 4+

##### ii. Determination of MIC of the essential oils using Agar Dilution method

MIC was determined for the essential oils of Clove, Nutmeg and Ginger using 40 isolates of *C. difficile* (20 toxigenic isolates and 20 non toxigenic isolates) by the agar dilution method according to Wadsworth-KTL anaerobic bacteriology manual sixth edition and Clinical and Laboratory Standards Institute (CLSI), M100-S23 document.<sup>8,13</sup>

##### a. Preparation of inoculum

One tube with 2ml VL broth was used for the inoculation of each isolate of *C. difficile*. The broths after inoculation were incubated anaerobically for 48 hours and then the turbidity of the broths was adjusted with sterile VL broth to 0.5 McFarland standard. This served as the inoculum.

Common name	Scientific name	Family	Part of the herb used	Authentication No.
Clove	<i>Syzygium aromaticum</i> (L.)Merr.Perry	Myrtaceae	Flower buds	RRCBI-MUS/108
Ginger	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Rhizome	RRCBI-AP/5020
Nutmeg	<i>Myristica fragrans</i> Houtt.	Myristicaceae	Fruit	RRCBI-MUS/02

Table-1: Details of the herbs used for extraction

### b. Preparation of media

Brucella blood agar base supplemented with vitamin K1 and hemin was prepared in sterile bottles such that each bottle contained 17 ml of the agar. The autoclaved, molten agar was cooled to 48°C in a water bath.

### c. Preparation of dilutions of essential oils

Dilutions of the three essential oils were prepared in DMSO.<sup>8,13</sup> The concentration of each of the undiluted essential oils was supposed to be 1000 µl. First, each of the undiluted essential oils was diluted as 1 in 10 dilution (1ml essential oil+9ml DMSO) and then proceeded with the dilutions as given in the table 2. Thus the concentration of the respective oil in the first agar plate was 10µl/ml of media, in the second plate was 5 µl/ml of media and in the last plate was 0.3125 µl/ml of media. 2ml from each dilution of the essential oils was used for the agar dilution.

### d. Agar dilution method

2ml from respective dilution of the essential oils and 1ml of sterile lysed sheep blood were added to 17ml of molten and cooled Brucella blood agar base to obtain 1:10 dilution (Each bottle contained 2ml from respective essential oil dilution + 17ml Brucella blood agar +1ml of sterile lysed sheep blood). The bottles were mixed thoroughly and poured into petridishes. After the plates were set, they were placed in 37°C incubator for 30 minutes for the evaporation of excess moisture. The organisms (inoculum prepared as above) were spot inoculated onto the marked area in the plates which had varying concentrations of the essential oils. Two Brucella blood agar plates without essential oils were also inoculated out of which one was growth control (incubated anaerobically) and the other was aerobic contaminant control (incubated aerobically). All the plates remained at room temperature for 10 minutes for the inoculum to be absorbed. Then the test plates and anaerobic growth control plate were incubated in anaerobic atmosphere at 37°C for 48 hours. Aerobic contaminant control plate was aerobically incubated at 37°C for 48 hours. MIC was interpreted as the lowest concentration of essential oil yielding no growth.<sup>8</sup>

The procedure was carried out for each of the three essential oils against 40 isolates of *C. difficile*. MIC of the essential oils was also determined with *C. difficile* ATCC 43593.

## STATISTICAL ANALYSIS

Data was analyzed by frequency percentage and Chi-square test.

## RESULTS

A total of 65 isolates of *C. difficile* (20 toxigenic isolates and 45 non toxigenic isolates) were subjected to in vitro antimicrobial action of essential oils of clove, nutmeg and ginger by disc diffusion technique. The sensitivity and resistance pattern exhibited by the toxigenic and non toxigenic isolates towards the three essential oils are given in table 3. The sensitivity pattern of the isolates towards the three essential oils varied between 1+ to 4+ grades as demonstrated in table 3. MIC determination was done for clove oil, nutmeg oil and ginger oil against 40 isolates of *C. difficile* (20 toxigenic isolates and 20 non toxigenic isolates). The results are presented in table 4.

## DISCUSSION

Newer antibiotics and antibiotic resistant organisms are in a continuous evolution process. Modern era is in search of drugs which have lesser side effects and easy availability. As a preliminary study in the development of alternative treatment options against *C. difficile*, the essential oils of clove, nutmeg and ginger which are known to be antidiarrhoeal remedies in traditional medicine were tried on the pathogen. Though many investigators have reported the antibacterial effect of the above three essential oils against various bacteria, the studies on *C. difficile* are lacking.

Prabuseenivasan and colleagues had demonstrated strong antibacterial activity of clove essential oil using disc diffusion method.<sup>14</sup> They also determined the MIC using agar dilution method.<sup>14</sup> Another study showed that the essential oil of Clove was more effective compared to their aqueous extracts at different concentrations.<sup>15</sup> Nearly 89% of the clove essential oil is composed of eugenol, its main bioactive compound.<sup>16</sup>

The antibacterial effect of essential oil of Ginger was determined in a study from Sudan by disc diffusion method.<sup>17</sup> Nutmeg has been used for mouth-sores, diarrhoea, intestinal weakness and as anti-inflammatory drug.<sup>18</sup> The effectiveness of the Nutmeg oil against both Gram positive and Gram negative bacteria was proved in a study.<sup>19</sup> It was found that the oil of nutmeg had the highest antibacterial activity when compared to its ethanolic and aqueous extracts.<sup>19</sup> Thanoon and colleagues demonstrated the antibacterial action of Nutmeg oil against *Staphylococcus aureus*.<sup>18</sup> In the study, the antibacterial activity of Nutmeg oil was determined by disc diffusion method.<sup>18</sup>

In our study, the screening of antibacterial activity of the

Essential oils					
Step	Concentration in microliter (µl)	Source	Volume in milliliter (ml)	Diluent in milliliter (ml)	Final concentration at 1:10 dilution in Agar (µl/ml)
	100	1:10 dilution of undiluted essential oil	-	-	10
1	100	1:10 dilution of undiluted essential oil	2	2	5
2	100	1:10 dilution of undiluted essential oil	1	3	2.5
3	100	1:10 dilution of undiluted essential oil	1	7	1.25
4	12.5	Step 3	2	2	0.625
5	12.5	Step 3	1	3	0.3125

**Table-2:** Preparation of dilutions of essential oils to be used in agar dilution susceptibility tests (using 1 in 10 dilution of undiluted oils as the starting concentration).

Extracts	Total no. of isolates tested	Total no. of Toxi-genic isolates tested	Total no. of Non toxi-genic isolates tested	Toxigenic isolates				Non toxigenic isolates			
				Sensitive isolates		Resistant isolates	Sensitive isolates		Resistant isolates		
Ginger oil	65	20	45	1+	3		17(85%)	3(15%)		1+	6
				2+	3	2+			9		
				3+	8	3+			16		
				4+	3	4+			5		
Nutmeg oil	65	20	45	1+	5	20(100%)	0(0%)	1+	6	42(93.33%)	3(6.67%)
				2+	4			2+	6		
				3+	9			3+	12		
				4+	2			4+	18		
Clove oil	65	20	45	1+	1	20(100%)	0(0%)	1+	7	45(100%)	0(0%)
				2+	7			2+	11		
				3+	3			3+	8		
				4+	9			4+	19		
				$\chi^2 = .316, P = .854, NS$				$\chi^2 = 1.024, P = .599, NS$			
Key: 9mm – 12mm → 1+, 13mm – 16mm → 2+, 17mm – 20mm → 3+, >20mm → 4+											

**Table-3:** In vitro antimicrobial action of essential oils against *C.difficile* by Disc diffusion

Essential oils	Nature of the isolates	Concentrations in microliter/milliliter ( $\mu\text{l/ml}$ )					
		10 $\mu\text{l/ml}$	5 $\mu\text{l/ml}$	2.5 $\mu\text{l/ml}$	1.25 $\mu\text{l/ml}$	0.625 $\mu\text{l/ml}$	0.3125 $\mu\text{l/ml}$
Nutmeg oil (1 in 10)	No. of Toxigenic isolates inhibited	20	16	9	0	0	0
	No. of Non toxigenic isolates inhibited	20	16	7	0	0	0
Ginger oil (1 in 10)	No. of Toxigenic isolates inhibited	20	8	8	0	0	0
	No. of Non toxigenic isolates inhibited	20	8	8	0	0	0
Clove oil (1 in 10)	No. of Toxigenic isolates inhibited	20	20	20	5	0	0
	No. of Non toxigenic isolates inhibited	20	20	20	3	0	0
Essential oils		MIC					
Nutmeg oil (1 in 10)		2.5 $\mu\text{l/ml}$ - 10 $\mu\text{l/ml}$					
Ginger oil (1 in 10)		2.5 $\mu\text{l/ml}$ - 10 $\mu\text{l/ml}$					
Clove oil (1 in 10)		1.25 $\mu\text{l/ml}$ - 2.5 $\mu\text{l/ml}$					

**Table-4:** Details of the number of isolates of *C.difficile* inhibited at various concentrations of essential oils. (Total number of isolates = 40; Toxigenic isolates = 20, Non toxigenic isolates = 20)

essential oils was done by disc diffusion technique and the MIC of the oils was determined by agar dilution method.<sup>8,13</sup> All the three essential oils employed had exhibited good in vitro antibacterial activity towards the clinical isolates of *C. difficile* and there was no significant difference in their action among toxigenic isolates ( $\chi^2 = .316, P = .854, NS$ ) or non toxigenic isolates ( $\chi^2 = 1.024, P = .599, NS$ ) by disc diffusion method. The MIC range of clove oil was 1.25 $\mu\text{l/ml}$  to 2.5 $\mu\text{l/ml}$ ; both nutmeg oil and ginger oil was 2.5 $\mu\text{l/ml}$  to 10 $\mu\text{l/ml}$ . The MIC values of the present study are in fact promising in development of therapeutics for *C. difficile*.

The only limitation of our study was that we did not do a compositional analysis of the essential oils because it was beyond the scope of the study. But our study is novel in its concept since studies analyzing herbal remedies against *C. difficile* is sparse in literature. The present study would signal new therapeutic options to be tried on the pathogen by future researchers.

## CONCLUSION

Herbal drugs can serve as alternative to synthetic medicine.

Our study demonstrated that essential oils of clove (*Syzygium aromaticum* (L.) Merr. Perry), nutmeg (*Myristica fragrans* Houtt.) and ginger (*Zingiber officinale* Roscoe) have the potential for progression into future therapeutics of *C. difficile*. Further in vivo and in vitro studies are warranted before implementation of these herbs in clinical use.

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# Study of Pathogens in High Vaginal Swab and CUL-DE-SAC Aspirate in Women with Pelvic Inflammatory Disease and Infertility

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## ABSTRACT

**Introduction:** PID is a common gynaecological problem characterised by infection and inflammation of uterus, Fallopian tubes, ovaries and adjacent structures in women. Multiple species of bacteria which are common in different anatomical regions of female genital tract and responsible for causing PID. PID is mainly a disease of sexually active menstruating women. Pelvic infections have risk of causing tubal scarring, ectopic pregnancy, and chronic pelvic pain. Infertility and its associated stigma compounds the need to study this issue in developing countries.

**Material and Methods:** 150 samples of high vaginal swab and cul de sac aspirate were taken from clinically suspected cases of PID and infertility. Samples were examined at Microbiology department. All samples were examined for any bacterial and fungal infection by means of Gram's staining, motility test and biochemical tests.

**Results:** Out of these 150 cases, 114 cases were of pelvic inflammatory disease and 36 cases were of women seeking medical advice for infertility. Max. number of cases reported in PID and Infertility were found in age group of 26-35 yrs. The predominant organism isolated in PID was E.Coli (30.30%), CONS (22.72%), Staphylococcus (15.15%) followed by Klebsiella (13.63%) and Pseudomonas (9.09%). Among infertility gram positive Staphylococcus (24.32%) was most predominant followed by Klebsiella (21.62%) and then the E. coli (13.51%), Candida (21.62%) and Trichomonas (10.81%).

**Conclusion:** The present study has shown that PID is a polymicrobial infection. The study has also shown that incidence of PID and infertility have also associated with age, clinical sign and symptoms and complications of pregnancy.

**Keywords:** pelvic inflammatory disease, high vaginal swab, E. coli, Staphylococcus, Candida.

## INTRODUCTION

Pelvic inflammatory disease (PID) is a clinical syndrome characterised by infection and inflammation of uterus, Fallopian tubes, ovaries and adjacent structures in women.<sup>1</sup> In India PID is a common gynaecological problem, other than the chronicity of lower abdominal pain in women, Infertility and its associated stigma compounds the need to study this issue in developing countries.<sup>2</sup> Few studies suggest that 24-32 percent women in India suffer from PID.<sup>3</sup>

The concept of etiology of PID has changed considerably in past few years. Although it is well established that Gonococcal (*N. gonorrhoea*) and Chlamydial (*C. trachomatis*) are major pathogens causing PID but currently there is rising incidence of non-gonococcal and non-chlamydial PID worldwide. Pathogens commonly implicated among aerobes are particularly E.Coli, Klebsiella, Staphylococcal, Streptococcus, proteus species etc.

The vaginal bacterial flora consists of a highly complex array of micro-organisms. The complex ecosystem can be disturbed by different endogenous and the exogenous factors.<sup>4,5</sup> PID is mainly a disease of sexually active menstruating women. Pelvic infections are the most important cause of tubal infertility. It is essentially caused by body overreacting to an infection.

Women with PID have a 20 percent chance of developing infertility from tubal scarring, a 9 percent chance of having an ectopic pregnancy, and an 18 percent chance of developing chronic pelvic pain.<sup>6</sup>

There is paucity of information on PID due to the fact that clinical diagnosis of PID is difficult and laboratories criteria of testing is also neither highly specific nor sensitive. However, the natural genital flora of females is so varied that determining actual causative agent is difficult.

The objective of this study is to isolate and identify the causative organism of PID and infertile women of reproductive age.

## MATERIAL AND METHODS

This study was carried out in the Department of Microbiology, Patna Medical Collage, Patna. 150 cases selected for this study were taken from O.P.D. and wards of the Department of Obstetrics and Gynaecology PMCH, Patna from August 2013 to September 2014.

Patients selected having sign and symptoms suggestive of Pelvic inflammatory disease as chronic pelvic pain, fever and abnormal vaginal discharge and also women seeking treatment for infertility. High vaginal swab and Pouch of Douglas aspirate were collected. Then the specimen were examined by direct smear examination under microscope and then put

S. No.	Age	PID (No-114)	Infertility (No-36)
1.	Below 25	16 (14.03%)	6 (16.66%)
2.	26-35	55 (48.24%)	20 (55.55%)
3.	36-45	31 (27.19%)	10 (27.77%)
4.	>45	12 (10.52%)	0 (0%)

**Table-1:** Agewise distribution of cases of P.I.D. and infertility

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S. No.	Organisms Isolated	PID (Suspected cases)	Infertility
1.	No Bacteria Grown	22 (19.29%)	10 (27.77%)
2.	Escherichia coli	40 (30.30%)	5 (13.51%)
3.	Coagulase Negative Staphylococcus [CONS]	30 (22.72%)	2 (5.40%)
4.	Staphylococcus aureus	20 (15.15%)	9 (24.32%)
5.	Klebsiella	18 (13.63%)	8 (21.62%)
6.	Pseudomonas	12 (9.09%)	1 (2.7%)
7.	Candida	8 (6.06%)	8 (21.62%)
8.	Trichomonas vaginalis	1 (0.75%)	4 (10.81%)
9.	Gardenerella/ Mobiluncus (clue cells)	3 (2.27%)	0 (0%)

**Table-2:** Incidence of different microorganism with P.I.D. and infertility cases.

up for culture. The samples were inoculated on Nutrient agar, Blood agar and MacConkey agar plates with gentle surface streaking. These culture medias were then incubated at 37°C for 24-48 hours. After 24 hours of incubation, isolated colonies were picked up and Gram's staining was done. Motility test and other biochemical tests were done for further identification of bacterial isolates.

Wet mount preparation was made for isolation of Trichomonas vaginalis. Bacterial vaginosis was diagnosed by Amsel's criteria. Germ tube test was performed for isolation of Candida.

## RESULTS

Out of these 150 cases, 114 cases were of pelvic inflammatory disease and 36 cases were of women seeking medical advice for primary and secondary infertility. High vaginal swab were taken from 139 patients and pouch of Douglas aspirate taken from 11 cases.

Max. number of cases reported in PID and Infertility were found in age group 26-35 yrs. i.e. 48.24% and 55.55% respectively, showing good relation with the optimum reproductive life (Table 1).

In present study significant growth obtained in 118 samples, 22 out of 114 PID cases and 10 out of 36 infertile cases showed no bacterial growth (Table 2).

The predominant organism isolated in PID was E.Coli (30.30%), CONS (22.72%), Staphylococcus (15.15%) followed by Klebsiella (13.63%) and Pseudomonas (9.09%). Among fungal Candida was mostly seen, besides Trichomonas and Bacterial vaginosis was also reported.

Among infertility picture was totally different with gram positive Staphylococcus (24.32%) was most predominant followed by Klebsiella (21.62%) and then the E. coli (13.51%), Candida (21.62%) and Trichomonas (10.81%) was also reported in significant cases.

## DISCUSSION

The present study showed age wise distribution of cases revealed that the maximum number of women seeking treatment were young, sexually active females of age group 26-35 yrs. Our findings concur with such findings reported earlier.<sup>7-9</sup>

This study also showed that in PID cases the predominant organism isolated was E.Coli, coagulase negative staphylococcus (CONS) and staphylococcus aureus followed by Klebsiella and Pseudomonas. Among fungal isolates candida cases were reported along with one case of protozoan as

Trichomonas vaginalis, and few cases of bacterial vaginosis was diagnosed. Most other workers elsewhere have also isolated bacteria and fungal isolates from PID cases.<sup>10,11</sup>

Among infertility cases in present study, Staphylococcus aureus was the predominant organism isolated and the Klebsiella outnumbered E.Coli. This study is also in accordance with other workers elsewhere.<sup>12</sup>

Among fungal isolates, Candida reported in significant cases of infertility followed by Trichomonas vaginalis.<sup>11,13</sup>

## CONCLUSION

The present study has shown clearly that PID is a polymicrobial infection. Multiple species of bacteria which are common in different anatomical regions of female genital tract and responsible for causing PID. The study has also shown that incidence of PID and infertility have also associated with age, parity, clinical sign and symptoms and complications of pregnancy.

Thus the rising incidence of Pelvic inflammatory disease demands that the patients with gynaecological and obstetrical problems must be investigated thoroughly, frequently and regularly.

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# Comparative Study of Lipid Profile in Patients with Carcinoma Breast Attending a Tertiary Care Hospital of Western Maharashtra

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## ABSTRACT

**Introduction:** Cancer of breast is one of the greatest problem which India is facing. There are many studies done to study association between role of diet and blood lipids. Moreover there are multiple factors both, environmental and genetic which do play a role in evolution of carcinoma breast.

The present study was undertaken to find if any association exists between alterations in lipid profile in carcinoma breast of local population.

**Material and methods:** A total of ninety one patients with various stages of breast cancer who were being treated at the department of surgery, during Nov 2013 to June 2015 were recruited in the present study. One hundred healthy volunteers were included as controls. Patients were categorized according to age and body mass index with their respective controls. Serum lipid profile was performed in all the cases and control groups using fasting blood samples. Total cholesterol, HDL-cholesterol and Triglycerides were measured by standard kit methods and LDL cholesterol was calculated using Fried Wald's formula.

**Results:** Serum Total Cholesterol, HDL Cholesterol and LDL Cholesterol have been observed to be significantly elevated in controls when compared with those of cancer patients ( $p=0.05$ ,  $0.007$  and  $0.011$  respectively). Triglycerides did not show any significant alteration between that of the cases studied and the controls ( $p=0.30$ ), though the value was more in controls than in cases.

**Conclusion:** This preliminary study has shown a significant alteration in serum lipid profile of breast cancer patients and healthy group in the local female population. The interesting observation of low levels of HDL cholesterol and high levels of LDL cholesterol, Total Cholesterol and Triglycerides in controls rather than in cases, needs further evaluation by extending the investigation further on and also extending the study on larger study group. This result could be partly explained by the fact that low cholesterol in cases is the result of the effect of cancer rather than not on the cause of cancer.

**Key words:** Lipid profile, Cancer Breast.

## INTRODUCTION

India is the country of diversity, which accounts for variation in the health care infrastructure. The health care facility pattern in India is heterogeneous, there are some regions where basic health facility have yet to reach. There are also some regions where people are aware of breast cancer. Carcinoma breast is commonest cancer in urban and rural females.<sup>1,2</sup> Many women do not present themselves for check up at hospitals or medical because of varied reasons like illiteracy, monetary reasons and lack of knowledge. There are many patients who present themselves late when the disease has progressed to metastatic stage and at this stage they come

to seek treatment.<sup>3,4</sup> Lots of efforts are needed both from the health systems as well as from local population for early diagnosis of cancer breast. Alone India accounts for 100,000 cases of breast cancer annually.<sup>5,6</sup> One of the study conducted in New Delhi showed<sup>7</sup>, the histo-morphological types seen in breast cancer patients shows that invasive ductal carcinoma not otherwise specified (IDC NOS) was found to be the most common type (88%) followed by infiltrating lobular carcinoma (3.7%), colloid carcinoma (1.1%), ductal carcinoma in situ (DCIS) (1.1%), and metaplastic types (0.9%).

Low serum high-density lipoprotein cholesterol (HDL-C) is an important component of the metabolic syndrome and has recently been related to increased breast cancer risk in overweight and obese women. Breast cancer patients are known to be at increased risk for developing other chronic diseases including cardiovascular disease. Studies by different investigators have shown a correlation between increased dietary fat or hypercholesterolemia and the occurrence of breast cancer. The results have demonstrated an unfavourable lipid profile in untreated breast cancer patients with high atherosclerosis indexes.<sup>8</sup>

Low cholesterol increases the cancer risk association suggesting that lower cholesterol was not the cause but the result of cancer.<sup>9</sup> It also affects various signaling pathways and proteins, either by direct conjugation to proteins (ie, sonic hedgehog), or by modifying the activities of membrane proximal signaling pathways and proteins such as the cell survival kinase, AKT.<sup>10,11</sup> Certain signal transduction pathways seem to be highly sensitive to manipulations in circulating cholesterol levels.<sup>12,13</sup>

We planned to undertake the study to compare the levels of circulating lipids in cancer and control patients with the aims and objectives to estimate the biochemical parameters such

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as Serum lipid profile (Total Cholesterol, Triglyceride, HDL, LDL) in cancer breast patients and normal healthy controls.

## MATERIAL AND METHODS

The study was carried out at SKNMC and GH, a tertiary level teaching hospital. The study was conducted for a period from Nov 2013 to June 2015. Ethics clearance was obtained from institutional ethics committee and informed consent was obtained from the patients and all GCP guidelines were followed for the study. A total of 191 individuals (91 cases and 100 controls) were selected for the study. Histopathological confirmed cases from age 25-70 years were included in study. Inclusion criteria was Age matched individuals and patients other than breast cancer in the hospital served as controls. Exclusion criteria included seriously ill patients, first degree relatives of cases, pregnant women and women with gynecological problems. Detailed history as per performa, height, weight measurement was done. Structured questionnaire for finding of the risks factors was asked to the patients. Two ml of fasting venous blood was collected in plain bulb and serum was separated by centrifugation and analyzed on the same day for lipid profile, that is Total Cholesterol (TC), Triglycerides (TG), high density lipoprotein (HDL) and low density lipoprotein (LDL).

Weight was measured using standard electronic weighing scale. Blood lipid profile was done using biochemistry analyser. Serum Total Cholesterol was estimated by CHOD-PAP method, Serum Triglycerides by GPO-PAP method, HDL Cholesterol by PEG precipitation method and LDL Cholesterol in mg/dl was calculated by subtracting HDL + TG/5 from the Total Cholesterol.

## STATISTICAL ANALYSIS

Statistical data was analysed using appropriate tests. Continuous data was computed as mean  $\pm$  standard deviation (SD). The Student's t-test was applied for comparison of mean values and  $\chi^2$  statistics was used for qualitative data.

## RESULT

Out of the total of 191 individuals studied, The maximum age in case of cases was 50 years as compared with the controls where the age was 46 years this was statistically significant. The Body mass index in case of cases was 24.2 as compared with the control which was 26.6. This was statistically not significant. Total Cholesterol in cases of cases is 165 mg/dl as compared with the control which is 176. This was statistically significant. Total Triglyceride in case of cases is 135 mg/dl as compared with controls which is 143 mg/dl. This was statistically not significant.

High Density lipoproteins in cases of cases is 43 mg/dl as compared with the control which is 52mg/dl. This was statistically highly significant. Low Density Lipoprotein in cases of cases is 180 mg/dl as compared with the control which is 198 mg/dl. This was statistically significant. Very Low Density Lipoprotein in case of cases is 27 mg/dl as compared with controls which is 28 mg/dl. This was statistically not significant. Table 2 illustrates a correlation between total cholesterol and HDL and LDL in cases of Cases.

## DISCUSSION

Several previous studies have investigated the association between cholesterol levels and breast cancer risk. Indians are more likely to consume energy-dense foods and less likely

to consume recommended amounts of fruits and vegetables, which increases the risk of obesity, cancer, and other conditions including dyslipidemia. In our study, we demonstrated a statistically significant difference in the levels of Total Cholesterol, Triglycerides and HDL cholesterol, which were less in cases as compared with controls.

In the study conducted by Adana A. Llanos et al demonstrated a statistically significant reduction in breast cancer risk among African American women with high levels of total cholesterol. Furthermore, a significant increase in breast cancer risk among women with low HDL levels was observed. These data support an inverse association between cholesterol levels, which has been previously reported.<sup>14-19</sup> The Italian study by Fiorenza et al reported significant differences in mean levels of total cholesterol (181 vs 204 mg/dL), HDL (49 vs 57 mg/dL), and LDL (107 vs 124 mg/dL) among breast cancer cases and controls, which were similar to our findings. Additionally, and maybe more importantly, they indicated that HDL levels were even lower among patients with metastatic disease. Our observation that low HDL levels may be associated with an increased risk of breast cancer is in line with the hypothesis that high HDL levels may elicit a protective effect. HDL transports circulating cholesterol within the arteries back to the liver for excretion and/or re-utilization. It is therefore plausible that as Total Cholesterol levels increase, potentially stimulating increases in HDL levels, breast cancer risk subsequently decreases (and vice versa) However, our finding of an inverse association between LDL and breast cancer cannot be as easily explained. Fiorenza et al also demonstrated a significant inverse association between LDL, and breast cancer risk.<sup>20</sup> and suggested this association might be due to increased activity of the LDL receptor, which promotes the removal of LDL from circulation, thereby reducing breast cancer risk. Gaard et al<sup>21</sup> indicated that this association may be an indication that LDL levels are affected by the presence of the disease, rather than by influencing its development although more data are needed to determine the biological mechanisms for the

Char-acters	Control		Cases		P value
	N	Mean (SD)	N	Mean (SD)	
AGE	100	46( $\pm$ 11)	91	50( $\pm$ 13)	0.0295*
BMI	100	26.6( $\pm$ 7.2)	91	24.2( $\pm$ 7.3)	0.072 NS
TC	100	176( $\pm$ 42)	91	165( $\pm$ 40)	0.05*
TG	100	143( $\pm$ 52)	91	135( $\pm$ 63)	0.300 NS
HDL	100	52( $\pm$ 25)	91	43( $\pm$ 16)	0.007**
LDL	100	198( $\pm$ 51)	91	180( $\pm$ 42)	0.011 *
VLDL	100	28( $\pm$ 10)	91	27( $\pm$ 12)	0.39 NS

NS = Not significant, \* = p<0.05 significant, \*\* = p<.001 Highly significant, Values in bracket shows SD.

**Table-1:** Showing baseline characters of the participants:

Total cholesterol	HDL
	0.189123
	LDL
	0.84166

**Table-2:** Showing correlation of total cholesterol and HDL and LDL (cases)

effect of plasma cholesterol and the HDL and LDL lipoproteins on breast cancer, several reasons as to why there may be an inverse association have been proposed. A biologically plausible explanation for the association between cholesterol and breast cancer is through the production of cholesterol. Decreased levels of HDL have been reported to be associated with increased levels of cytokines.<sup>22,23</sup> which have been shown to be related to both obesity and breast cancer.

## CONCLUSION

The multifaceted nature of the complex metabolic pathways in which cholesterol participates allows this lipid to play multiple roles in cancer progression. It is also to know more in details about the cause and effect relationship. Further studies on the detailed mechanisms of cholesterol effects on cancers are warranted, and could lead to new avenues for therapeutic intervention, particularly in controlling progression to late stage disease.

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# The Relationship between Blood Lipid Profile and Acne in Non-obese, Non-PCOS Patients

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## ABSTRACT

**Introduction:** Acne vulgaris is a common skin disorder affecting adolescents and young adults. Its pathophysiology includes increased sebum production and sebum analysis in some studies have shown increased triglycerides and wax/cholesterol esters in acne patients. But is this local alteration of surface lipids and seborrhoea associated with any alteration of lipid profile in acne patients.

**Material and methods:** 150 acne patients and 80 age and sex matched controls were included in study. Fasting lipid profile of acne patients was compared with controls. GAGS was used for grading acne.

**Results:** The predominant acne grade was grade I (54.67%). 45.34% of Acne patients had deranged lipid profile compared to 30% in controls. Total cholesterol was raised in 17.33% of Acne patients compared to 5% in controls, while the HDL was low in 10.67% of Acne patients compared to 10% of controls. LDL was raised in 8% of Acne patients and 2.5% of the controls. Triglycerides were raised in 33.34% of Acne patients and 20% of controls. Total cholesterol/HDL ratio was raised in 34.67% of Acne patients compared to 15% of controls. There is a statistically significant difference in the level of Total cholesterol, VLDL, triglyceride and total cholesterol:HDL ratio between acne patients and controls. There is a statistically significant rise in levels of LDL, VLDL, Triglyceride and TC/HDL and decrease in levels of HDL with the severity of acne.

**Conclusion:** Acne patients are more likely to have some abnormality in lipid profile, particularly patients with severe acne. The abnormal lipid profile should be considered in disease pathogenesis and maybe even in treatment.

**Keywords:** Acne, lipid profile, severity, non-PCOS, non-obese

observed in skin surface lipids of acne patients.<sup>6</sup> It seems that  $\beta$ -oxidation of linoleic acid is specific of sebocytes and that it is correlated with their differentiation.<sup>7</sup> Sebum analysis in some studies have shown increased triglycerides and wax/cholesterol esters in acne patients.<sup>8</sup> But is this local alteration of surface lipids and seborrhoea associated with any alteration of lipid profile in acne patients. Alteration in lipid profile of acne patients is not well known, but few studies in both male and female acne patients have shown some alterations. The aim of this study is to evaluate the association of acne with lipid profile.

## MATERIAL AND METHODS

The study was conducted in Sher-i-Kashmir Institute of Medical sciences Hospital. 150 cases of acne in age group of 12-35 years and 80 age and sex matched healthy controls attending Dermatology Clinic between 1<sup>st</sup> August 2015 to 1<sup>st</sup> October 2015 were included in the study.

### Exclusion criteria

1. Obesity
2. History of cardiovascular disease
3. History of dyslipidemia or drugs that affect lipid metabolism
4. Female subjects with PCOS, history of oral contraceptives or hormonal therapy

Informed consent was taken from the subjects. Ethical clearance was obtained from the institute's ethical clearance committee. Acne grading for each patient was performed by only one dermatologist based on Global Acne Grading System (GAGS).<sup>9</sup>

This system considers six locations on the face, chest and upper back, with a factor for each location based roughly on the affected surface area, distribution and density of pilosebaceous units. Each grade was calculated as the sum of the local scores for the face, chest and upper back [Table 1]. The subjects chosen in this study were interviewed, and each completed consent and a questionnaire form that contained information about their age, sex, weight, height, personal history of acne, personal or family history of dyslipidemia,

## INTRODUCTION

Acne is chronic inflammatory disease of pilosebaceous unit and is clinically characterized by seborrhoea, open and closed comedones, papules and pustules and in severe cases nodules, deep pustules and pseudocysts. The condition starts after puberty and is a common skin disorder in adolescents and young adults.<sup>1</sup> Though excess sebum production is considered prerequisite for development of acne other factors involved in the pathogenesis include hypercornification of the pilosebaceous duct, colonization of pilosebaceous duct with *Propionibacterium acnes* and local release of inflammatory mediators.<sup>2</sup> Acne subjects not only excrete more sebum the secretion rates have been seen to correlate well with the severity of acne.<sup>3</sup> Triglycerides (40-60%), wax esters (19-26%) and squalene (11-15%) are major components of sebum.<sup>4</sup> Squalene which is a non-polar hydrocarbon and most unsaturated molecule is present in unusually high levels in sebum.<sup>5</sup> Decreased concentration of linoleic acid has been

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Location	Factor
Forehead	2
Left cheek	2
Chin	1
Right cheek	2
Nose	1
Chest and upper back	3

Calculation: Each type of lesion is given a value depending on severity: no lesions=0, comedones=1, papules=2, pustules=3 and nodules=4. The score for each area (local score) is calculated using the formula: Local score=Factor×grade (0-4). The global score is the sum of local scores and acne severity was graded using the global score. A score of 1-18 is considered mild, 19-30, moderate; 31-38, severe; and >39, very severe

**Table-1:** The global acne grading system

Parameters	Controls	Acne patients	P-value
TC	151.25±32.40	167.87±38.04	0.0011*
HDL	50.10±12.72	50.4±9.66	0.8414
LDL	78.45±16.56	80.49±31.16	0.5859
VLDL	20.65±5.99	25.04±12.91	0.0044*
TG	112.70±36.62	127.45±59.91	0.0456*
TC/HDL	3.18±0.81	3.43±0.96	0.0486*

Data are presented as mean±SD, \*represents P<0.05.

**Table-2:** Comparison of lipid profile between controls and acne patients.

before blood samples were collected. Subjects were fasting 12–14 hr at the time of blood withdrawal. Venous blood specimens were collected in ethylenediaminetetraacetic acid (EDTA) tubes, then immediately centrifuged using low speed refrigerated centrifuge 1500. In suspected cases of PCOS hormonal profile and ovarian ultrasonography was done. The American Association of Clinical Endocrinologists (AACE), American College of Endocrinology (ACE), and Androgen Excess and PCOS Society (AES) released guidelines were used in the diagnosis of PCOS.<sup>10</sup> Patients with Body Mass Index more than 30 kg/m<sup>2</sup> were excluded from the study.

**Dyslipidemia:** National Cholesterol Education Programme (NCEP) guidelines<sup>11</sup> were used for definition of dyslipidemia as follows:

**Hypercholesterolemia** – serum cholesterol levels ≥200 mg/dl (≥5.2 mmol/l).

**Hypertriglyceridemia** – serum triglyceride levels ≥150 mg/dl (≥1.7 mmol/l).

**Low HDL cholesterol** – HDL cholesterol levels <40 mg/dl (<1.04 mmol/l).

**High LDL cholesterol** – LDL cholesterol levels ≥130 mg/dl (≥3.4 mmol/l) calculated using the Friedewald equation.

**High VLDL** →50mg/dl

**High total cholesterol to HDL-C ratio:** This is defined as total cholesterol to HDL ratio of ≥4.5.

TC, HDL, and TG were determined using an enzymatic colorimetric test, which measured oxidase and peroxidase activities. LDL and VLDL values were calculated by the Friedewald formula

## STATISTICAL ANALYSIS

Results were collected, tabulated and statistically analyzed by SPSS version 11. Data were described in terms of mean ± SD, frequencies and relative frequencies. For comparison Student's t-test and ANOVA (F-test) was used. P< 0.05 was considered to be statistically significant.

## RESULTS

230 subjects, aged from 12 to 35 years, were enrolled in this study. One hundred and fifty were newly diagnosed untreated acne patients from both sexes, attending Dermatology Clinic in Sher-i-Kashmir Institute of Medical sciences Hospital, with 80 age and sex matched healthy controls.

Age of the subjects varied between 12 to 35 years. The predominant acne grade was grade I (54.67%), followed by grade II (40%) and grade III (5.33%). 45.34% of Acne patients had deranged lipid profile compared to 30% in controls. Total cholesterol was raised in 17.33% of Acne patients compared to 5% in controls, while the HDL was low in 10.67% of Acne patients compared to 10% of controls. LDL was raised in 8% of Acne patients and 2.5% of the controls. VLDL was raised in 8% of Acne patients but none of controls. Triglycerides were raised in 33.34% of Acne patients and 20% of controls. Total cholesterol /HDL ratio was raised in 34.67% of Acne patients compared to 15% of controls. There is a statistically significant difference in the level of Total cholesterol, VLDL, triglyceride and total cholesterol: HDL ratio between acne patients and controls, as shown in Table 2.

The lipid profile, particularly Triglycerides showed progressive derangement with the severity of Acne. There is a statistically significant rise in levels of LDL, VLDL, Triglyceride and TC/HDL and decrease in levels of HDL with the severity of acne, as shown in Table 3, Fig. 1.

## DISCUSSION

Acne vulgaris is a chronic inflammatory disease of pilosebaceous unit. It has a multifactorial pathogenesis, but excess sebum production is considered prerequisite for the development of acne.<sup>4</sup>

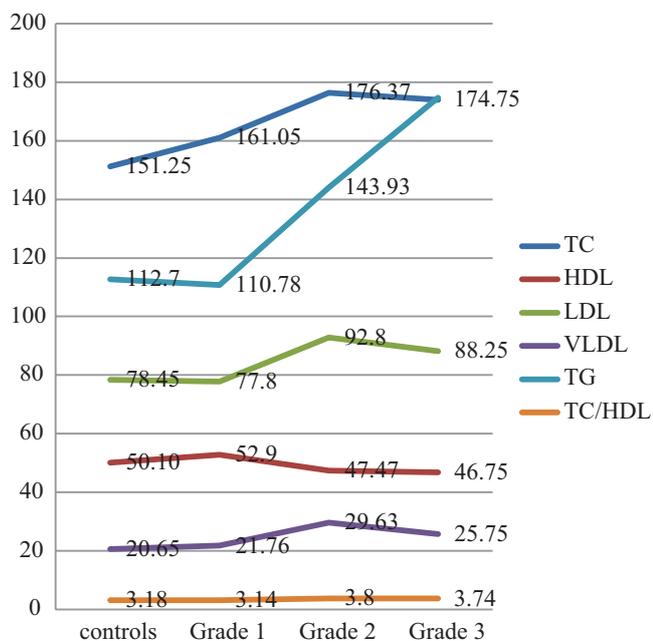
Current study showed increase in levels of total cholesterol, VLDL, triglycerides and TC/HDL ratio in acne patients compared to controls. HDL and LDL were comparable in both groups. Jaing et al in their study found increased ratio of total cholesterol and triglycerides in acne patients.<sup>12</sup> Similarly Abulnaga and Arora et al in their study conducted on female patients found increased levels of cholesterol in acne patients.<sup>13,14</sup> But unlike these studies LDL levels were comparable in both groups in our study, the finding consistent with study conducted by Vergani et al.<sup>15</sup>

Almost all cholesterol enters sebocytes by the LDL receptor mediated endocytosis and its synthesis within sebocytes is interrupted at the level of squalene.<sup>16</sup> Increased serum Total cholesterol levels may affect the development of acne vulgaris by increasing androgens, as both adrenal and gonadal androgens are synthesized from plasma cholesterol.<sup>14</sup> Exogenous fatty acids from lipoproteins is released within cells by lipoprotein lipase, which has been shown to be expressed in sebaceous glands at mRNA level, de novo synthesis oc-

Parameters	Grade I	Grade II	Grade III	P-value
Total cholesterol	161.05±36.11	176.37±39.78	174.00±34.04	0.053
HDL	52.90±9.42	47.47±9.67	46.75±2.96	0.002*
LDL	77.80±23.4	92.80±38.09	88.25±22.64	0.014*
VLDL	21.76±11.26	29.63±14.02	25.75±8.95	0.001*
triglyceride	110.78±45.57	143.93±71.04	174.75±41.05	0.000*
TC/HDL	3.14±0.91	3.80±0.91	3.74±0.82	0.000*

Data are presented as mean ± SD, \* represents P<0.05.

**Table-3:** Comparison of mean lipid levels in different grades of acne.



**Figure-1:** Change in mean levels of lipids with severity of acne

curs to lesser extent. Free fatty acids are mostly translocated to the cytoplasm through active mechanism involving a six member Fatty Acids Transport Protein (FATP) family, in particular FATP4. FATP4 also acts as very long-chain acyl-CoA synthetase, finding which implies that sebaceous glands have capacity to sequester dietary cholesterol and fatty acids from serum.<sup>16</sup> There are also studies claiming that sebum production is increased by the consumption of dietary fat.<sup>17</sup>

In our study both triglyceride and VLDL were raised in acne patients compared to controls. VLDL cholesterol is produced in liver and released in bloodstream to supply body tissues with triglyceride. In a study conducted by Apostolas et al it was seen that triglycerides are increased in the sebum of acne patients.<sup>8</sup>

In current study except total cholesterol all parameters showed statistically significant rise with severity of acne, particularly triglycerides and TC/HDL ratio. HDL levels showed statistically significant decrease with severity of acne. Vergani and Finzi et al had similar observation in their study where patients with severe acne had significantly reduced levels of HDL compared with healthy individuals.<sup>15</sup> Similar observations were made by Cunha et al in their study on female patients.<sup>18</sup> Pigatto et al in their study found that HDL levels even returned to normal at the end of treatment with Isotretinoin.<sup>19</sup>

## CONCLUSION

In conclusion, acne patients are more likely to have some abnormality in lipid profile, particularly patients with severe acne. The abnormal lipid profile should be considered in disease pathogenesis and maybe even in treatment.

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# Hallervorden Spatz Syndrome: A Case Report

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## ABSTRACT

**Introduction:** Hallervorden-Spatz syndrome, now known as pantothenate kinase-associated neurodegeneration (PKAN), is an autosomal recessive disorder causing progressive extrapyramidal dysfunction and dementia. It is characterized by progressive degeneration of basal ganglia, globus pallidus and reticular part of the substantia nigra, produced by iron accumulation. The characteristic MRI brain pattern of HSD shows the “eye of the tiger” pattern.

**Case report:** Here we report 3 siblings where diagnosis was missed till MRI showed classic imaging findings. Till date, all patients with PKAN mutation whether classic or atypical had classic MRI findings suggesting thereby that MRI served as an important tool to predict mutation status. Treatment is symptomatic and requires combined effort of pediatrician, neurologist, ophthalmologist, physiotherapist, occupational therapist, geneticist and speech therapist.

**Conclusion:** This report is to sensitize clinicians regarding this entity and to differentiate it from other static and progressive neurological illnesses.

**Keywords:** Eye of tiger appearance, Dystonia, Neurodegeneration, PKAN

## INTRODUCTION

Hallervorden – Spatz disease is a rare neurological disorder which was earlier known as Neurodegeneration with brain iron accumulation.<sup>1</sup> It was 1<sup>st</sup> described by Hallervorden and Spatz in 1922<sup>2</sup> and characterised by familial brain degeneration with iron accumulation. A defect in pantothenate kinase 2 producing gene located in chromosome 20p13-p12.3 is reported in most of the cases, hence also termed as pantothenate kinase associated neurodegeneration (PKAN).<sup>3</sup> We report presence of this syndrome in 3 siblings (including two cousins) in a family with classic MRI findings.

## CASE REPORT

11 years old boy came to our department with abnormal posturing of head and limbs and difficulty in walking since last 4 years. Parents noticed that since 5 years of age he had history of frequent falls which later progressed to stiffness and abnormal posturing in lower limbs progressing to the upper limbs. There was history of seizures (generalized tonic clonic) since last 3 days. For last 1 year he has developed contractures at ankle, knee, elbow and wrist joint. Patient also developed twitching movements of face and drooling of saliva. He had progressive decline in scholastic performance and cognitive functions. Presently child was completely bedridden and produces some sounds only. He was constantly crying, not able to sleep, feed himself as well as swallow food or tell about urine and stool.

Patient was born vaginally, immediately cried at birth with no history of neonatal jaundice. His pre and post birth history was uneventful and attained developmental milestones at ap-

propriate age till 5 yrs of age. Family history revealed same complaints in 2 cousin siblings i.e. children of maternal aunt and paternal uncle. On examination of index case child was thin built, malnourished with healed scar marks present on forehead and was irritable. There was generalised hypertonia with lead pipe rigidity and marked dystonic posturing which increased on activity with presence of facial dystonia and oromotor dyskinesia. Spasticity was noticed in tendoachilles, hamstrings and adductor muscles. There was hyperreflexia with bilateral extensor plantar response. Speech disturbances including dysarthria and drooling was also present. Cranial nerves and sensory system examination was normal. The two cousins, 8 years female and 10 years male child in family also had history of recurrent falls and injuries on forehead but severity was less. Onset was at 5-6 years of age in all three of them. There were relatively infrequent episodes of dystonic posturing with slow gait due to presence of contractures. Their speech had minimal spontaneity and was dysarthric and sluggish. Female child was less affected. No history of seizure and cognitive dysfunction in both of them. Laboratory tests revealed no abnormality. MRI brain revealed area of hyperintensity within a region of hypointensity in medial globus pallidus bilaterally on T2 images -“eye of the tiger” pattern (Figure 1). Genetic studies could not be done due to financial reasons. Peripheral smear did not show acanthocytosis. Eye examination did not reveal Kayser-Fleischer ring and retinitis pigmentosa. Serum electrolytes, iron, copper and ceruloplasmin levels were normal. Patient was given symptomatic treatment for spasticity with trihexphenidyl and baclofen, sodium valproate was given for seizures and clonazepam to reduce irritability. Physiotherapy treatment was also started. Seizures controlled and tone as well as spasticity decreased with significant improvement in sleep and oral intake after few weeks of treatment. On follow up the child is now accepting semisolids, no drooling with significant decrease in oromotor dyskinesia and generalized dystonias.

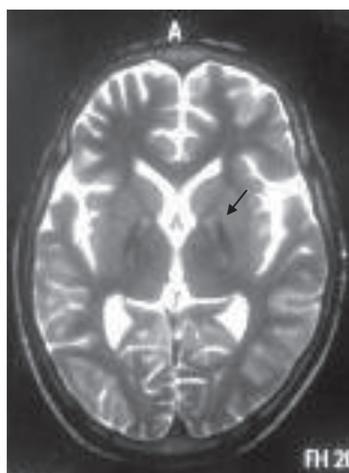
## DISCUSSION

Hallervorden – Spatz syndrome encompasses a group of rare neurodegenerative disorders with an incidence of 1-3/1,000,000 based upon observed cases in population. Clinical features include early onset of progressive dystonia and intellectual impairment.<sup>4</sup> Dystonia, dysarthria, rigidity

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**Figure-1:** T2W axial MRI images show the classic “eye-of-the-tiger” sign, with marked hypointensity in the medial globus pallidus with a small area of central hyperintensity.(arrow)

and choreoathetosis is seen in 98% of cases, cortical tract signs in 25%, cognitive decline in 29%, optic atrophy in 3% and acanthocytosis in 3% cases. Hayflick et al<sup>1</sup> classified NBIA<sup>5,6</sup> in different groups on basis of age of onset and gene defect. The classical form, with PANK2 mutation, is characterized by early onset, rapid progression and presence of the typical eye-of-the-tiger sign. Our case had classic age of presentation and progression was also typical of the disease. Although seizures occur rarely in classic disease but were present in our case.

The eye-of-the-tiger sign on the MRI scan and clinical findings has contributed to a diagnosis of HSD for this patient. The characteristic MRI findings are symmetrical hyperintense signal changes in the anterior medial globus pallidus with surrounding hypointensity in the globus pallidus on bilateral sides on T2 – weighted images.<sup>7,8</sup> Management is usually symptomatic. Drugs used for spasticity and dystonia are baclofen and trihexphenidyl. Other therapies for relieving dystonia are intramuscular botulinum toxin, intrathecal baclofen, stereotactic pallidotomy,<sup>9</sup> bilateral thalamotomy and deep brain stimulation.<sup>10</sup>

## CONCLUSION

PKAN should be considered in differential diagnosis of early onset cognitive impairment and dystonia. The ‘eye of tiger’ sign is fairly specific and hence can be used to identify patients for PANK 2 genetic testing and has accurately identified presymptomatic siblings of affected children.

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# Study of Incidence and Risk Factors for Surgical Site Infection after Cesarean Section at First Referral Unit

Priyanka Dahiya<sup>1</sup>, Vinita Gupta<sup>2</sup>, Seema Pundir<sup>3</sup>, Dolly Chawla<sup>4</sup>

## ABSTRACT

**Introduction:** Infection is the most common cause of mortality and morbidity in pregnant women during cesarean section. Hence this study was undertaken to study the incidence of SSI after cesarean section at first referral units and identify micro-organisms as well as risk factors leading to it.

**Material and Methods:** This prospective observational study was conducted over 300 pregnant women undergoing emergency (group1) and elective cesarean section (group2) irrespective of the indication. Pregnant women with pre-existing skin infection at surgical site were excluded from study. Patient history, general physical and systemic examination, investigations and other details were taken into consideration. Antimicrobial prophylaxis included injection Ceftriaxone one gram I.V., 30 minutes before making skin incision. Preoperative skin preparation was done with chlorhexidene gluconate, five percent povidone iodine. Post operatively injectable antibiotics were given for three days followed by oral medication, check dressing done on fourth post operative day. Diagnosis of SSI was made on basis of signs and symptoms. The women who developed these were taken as case and who did not develop SSI after 30 days were treated as control. The qualitative variables were expressed in terms of frequency and percentages. Chi-square test / Fischer exact test were used.

**Results:** The incidence of SSI in our study was 9%. Incidence of SSI was high in low socio-economic class, unbooked status, irregular visits and with leaking per vaginum of more than 24 hours, duration of surgery more than one hour, prolonged labor, pre-operative antibiotic prophylaxis ( before two hours of surgery). Most of the organisms were gram negative (56.53%) and were found sensitive to Aminoglycosides and resistant to Cephalosporins.

**Conclusion:** SSI rates need to be lower down especially in lower socio-economic class. Prophylactic antibiotics should be chosen principally on basis of efficacy against the usual exogenous and endogenous microorganisms known to cause infectious complication in each clinical setting, as well as their safety profile and cost.

**Keywords:** Antimicrobial prophylaxis, Cesarean section, Infection, Surgical site.

from 3-15%.<sup>2</sup> It delays the recovery, prolongs hospitalization, necessitate readmission, adds to hospital bills and other morbidities as well as mortalities.

This study was undertaken to study the incidence of SSI after cesarean section at first referral units and identify micro-organisms as well as risk factors leading to it.

## MATERIAL AND METHODS

After approval from the institutional ethics and scientific committee, this prospective observational study was conducted over 300 pregnant women undergoing emergency and elective cesarean section irrespective of the indication. Pregnant women with pre-existing skin infection at surgical site were excluded from study. All 300 women were randomized into two groups of 150 each, those planned for elective cesarean (Group 1) and those requiring emergency cesarean section (Group 2) for four days. Daily vitals charting was done, self retaining urinary catheter removed on second day and detailed history, general physical and systemic examination, indication for cesarean, investigations, any history of local site hair removal, intrapartum details/dai handling, surgical details were taken into consideration. Antimicrobial prophylaxis included injection Ceftriaxone one gram I.V.,30 minutes before making skin incision. Preoperative skin preparation was done with chlorhexidene gluconate, five percent povidone iodine and alcohol containing product. Post operatively inj. Ceftriaxone was given I.V. and second dose after 12 hours, inj. Metronidazole 100 ml I.V. eight hourly for three days followed by oral medication check dressing done on fourth post operative day. Diagnosis of SSI was made on basis of signs and symptoms which included pain, fever, localized swelling, induration, dehiscence, overlying skin changes and exudative purulent discharge. The women who developed these were taken as case and who did not develop SSI after 30 days were treated as control.

Those having SSIs were readmitted, daily dressings and broad spectrum antibiotics were started. Before initiating any treatment, the discharge (serous, blood mixed or purulent) from the surgical incision site were collected with sterile cotton swab and sent to our hospital's microbiology department for culture and drug sensitivity. Blood and urine

## INTRODUCTION

A surgical site infection is defined as an infection which occurs at the incision/operative site (including drains) within 30 days after surgical procedure if no implant is left in place/ within one year if an implant is left in place. The infection must appear related to the surgical procedure. According to CDC's National Nosocomial Infection Surveillance system 38% of all nosocomial infections in surgical patients are SSI. Cesarean section falls in clean-contaminated wounds category.<sup>1</sup> SSI is the second most common infectious complication following cesarean section after UTI. It's incidence ranges

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samples were collected for culture as and when possibility of septicaemia was noted as per standard method.

Indian authors have obtained a prevalence of around 24.2% of SSI after cesarean section.<sup>3</sup> Detailed record analysis of our hospital substantiates this number of infection rate. Hence, taking the prevalence rate to be 24.2% and assuming error of ±5%, the minimal sample size required was 282. The level of significance was assumed to be 5%. However, we rounded it of to 300. The statistical formula used for sample size collection is:

$N = (1.96)^2 * pq / d^2$  where, 1.96 is tabulated standard normal distribution value at 5%, 'p' is prevalence rate (0.242), 'q' = 1-p = 0.758 and 'd' is margin of error (0.05). To evaluate the correlation of quantitative variables affecting the infection they were expressed in terms of mean ± S.D. and unpaired 't' test / Mann-Whitney test were used. The qualitative variables were expressed in terms of frequency and percentages and chi-square test / Fischer exact test were used. A p-value < 0.05 were considered statistically significant. Statistical package for social science (SPSS) version 15.0 software were used for statistical analysis.

**RESULTS**

The incidence of SSI in our study was 9%. 96.2% SSIs were superficial and 3.7% were deep SSI. Majority of the infection (62.96%) were in low socio-economic class. We found women with unbooked status, irregular visits and with leaking per vaginum of more than 24 hours, duration of surgery more than one hour (n=92.59%, p=0.001) more prone to SSIs. Among other risk factors pregnancy induced hypertension, anemia, pre-term delivery, prolonged labor (≥12 hours), multiple vaginal examinations (more than three), pre-operative antibiotic prophylaxis (before two hours of surgery) were strongly associated with SSI. While studying microbiological and drug susceptibility, we found most of the organisms were gram negative (56.53%) most common organism isolated was *E.coli* (25.93%) followed by coagulase negative *Staphylococcus epidermidis* (22.2%). Most Gram negative organisms were found sensitive to Aminoglycosides and resistant to Cephalosporins, Clavulanic acid and fluoroquinolones. Gram positive were mostly sensitive to Clavulanic acid, cephalothin and levofloxacin, and resist-

ant to ampicillin, gentamycin and erythromycin.

**DISCUSSION**

In India, the incidence of postoperative infectin in various hospitals ranges from 10 to 25%.

In our study, majority of women were in the age group 21 to 25 years(EL-50%, EM-53.33%). There was no significant variation in age group. The p-value was 0.412, although Devjani et al found increasing age as a risk factor significantly associated with SSI.<sup>3</sup>

In our study majority of women in both the groups(EL 64%, EM 68.67%) were in lower middle class and so was SSI(62.96%), but p-value (0.001) was only significant for lower socio-economic class, supported even by Oslen et al.<sup>4</sup> This may be linked to poor hygiene and nutrition.

Our study supports the notion that Emergency CS is an important predictor of SSI as compared to Elective surgery.<sup>5,6</sup> 16.67% women developed SSI in elective group and only 1.33% in emergency group (p<0.001). This might be the outcome of already ruptured membranes in emergency CS or multiple attempts of home delivery by a local mid-wife, increased exogenous bacterial contamination, lack of timely antibiotic prophylaxis

Pregnancy induced hypertension has positive association with increased risk of SSIs as it is associated with low vitality and thus predisposes to infection. In our study 29.63% of infected and 4.03% of uninfected women had PIH (p <0.001), it is further supported by Kirby et al and Kofman.<sup>7,6</sup> Anemic women are more prone to SSI (p<0.001) due to frequent association with other co-morbidities and irregular follow up. Preoperative anemia as an important predictor of infection has been proved by several other studies as well.<sup>8-10</sup> It diminishes resistance to infection and is also associated with puerperal sepsis.

While correlating uninfected women, SSI women and type of labor, spontaneous and induced labor had more risk of SSI (p-value was 0.001,0.003,0.001 respectively) as is reported by other authors also. Prolonging labor and multiple per vaginum examinations also predisposes to SSI.<sup>11</sup>

Antibiotic prophylaxis in surgical patients has always been a matter of debate. For prophylactic antibiotic the current recommendation states that antibiotic must be given before two hours of skin incision, so as to attain high tissue levels during surgery.<sup>12</sup> However at many centers the antibiotics have been withheld until after the clamping of umbilical cord. Our study supports the current concept (p=0.001) in accordance with two other studies.<sup>13</sup>

Several studies have supported the use of blood products and development of postoperative SSI.<sup>3</sup> Allogenic blood prod-

	n	%
Case (infected)	27	9.0%
Control (uninfected)	273	91.0%
Total	300	100

**Table-1:** Distribution of women with infection and without infection.

Systemic factors		Uninfected		Infected		p- value
		N	%	n	%	
UTI		0	0.00	0	0.00	-
Fever		0	0.00	1	3.70	0.001
PIH		11	4.03	8	29.63	0.001
Past history	GDM	1	0.37	0	0.00	0.376
	Hypothyroidism	2	0.73	0	0.00	0.328
	T.B.	1	0.37	0	0.00	0.376

**Table-2:** Distribution of women with systemic association in uninfected and infected groups.

Hb (gm/dl)	Uninfected		Infected		P – value
	n	%	N	%	
<11	129	47.25	18	66.67	0.027
>11	144	52.75	9	33.33	
Total	273	100	27	100	
Mean ± S.D.	10.88 ± 1.67		10.17 ± 1.86		
P - value	0.018				

**Table-3:** Distribution of women with anemia in infected and uninfected group.

Interval of prophylactic antibiotic	Uninfected		Infected		P - value
	n	%	N	%	
<2 hours	154	56.41	6	22.22	0.001
>2 hours	119	43.59	21	77.78	0.001
Total	273	100	27	100	
Mean±S.D.	2.01± 1.21		3.19 ± 2.06		
P - value	0.001				

**Table-4:** Distribution of women with interval of prophylactic antibiotic in uninfected and infected groups.

ucts have immunomodulatory effects that may increase the risk of nosocomial infections.<sup>14</sup> It is also possible that the transfusion of blood products acts as a marker of a number of co-morbidities and other SSI risk factors, which independently places them at inherently greater risk of infections. With each hour of surgery, the infection rate almost doubles. The finding relates to pharmacokinetics of antibiotic prophylaxis and to the greater bacterial wound contamination that occurs in lengthy clean-contaminated surgeries. In our study, 92.59% of patients with prolonged duration of surgery exceeding an hour got infected which was statistically significant ( $p=0.001$ ). Devjani et al found 53.3% of patients with prolonged duration of surgery exceeding 45 minutes got infected. Lilani et al reported a rate of 38.46% for surgeries that lasted more than two hours. Johnson et al classified duration of LSCS into  $\leq 30$  minutes and 31-60 minutes and found increased SSI in lated group.<sup>15</sup>

We also studied other factors like pre-operative WBC count, blood group, methods of preoperative preparation, obesity but none of them had significant p-value.

Most of the organisms isolated were Gram negative (56.52%) comparable with other literatures available.<sup>16,3</sup> Most common organism in our study was *E.coli* (25.93%) which is in contrast to NNSI survey (1997-2001) that reported *Staph. aureus* (47%) including MRSA and *Staph. epidermidis* as most common organisms causing SSI.

## CONCLUSION

A proper assessment of risk factors that predispose to SSI and their modification may help reduce SSI rates. Employing strict infection control policies by a functional infection control committee would bring the level of SSI to an acceptable level. This committee should be able to monitor surveillance studies with a view to issuing guidelines to circumvent established risk factors. Operation theatre discipline should be strictly followed. Frequent antimicrobial audit and qualitative research could give an insight into the current antibiotic

prescription practices and the factors governing the same.

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# The Retreatment of a Mandibular Canine with Bifurcated Root

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## ABSTRACT

**Introduction:** Treatment of any endodontic case requires meticulous diagnosis and treatment plan especially keeping in mind the possible anatomic variations that can be encountered.

**Case report:** This paper reports a case of a failed root canal treatment due to inability to identify a bifurcated root of mandibular canine.

**Conclusion:** Identifying the bifurcated root of mandibular canine by careful examination of preoperative radiograph before starting the retreatment, resulted in successful outcome.

**Keywords:** Mandibular canine, Bifurcated root, Anatomic variation and Retreatment.

## INTRODUCTION

Endodontic treatment success like any other medical treatment, relies on removing the foci of infection. This is primarily achieved by a good biomechanical preparation. To achieve this goal, the dentist should acquire knowledge of morphologies of different teeth. Such a background knowledge will prevent any errors in debridement like missed canal. Inadequately treated and missed canal impact the outcome of root canal. The classic studies like the Washington study associate 3% cases of endodontic failures to missed canals.<sup>1</sup> However more recent studies report a higher incidence. Hoen and Pink evaluated 1100 failing endodontic cases and found a 42% incidence of missed canals associated with failure cases.<sup>2</sup> The difference in incidence is because of the different methodologies of investigations. Hoen and pink clinically evaluated these cases under magnification of at least 3.25 power.<sup>2</sup>

## CASE REPORT

A 53 year old female reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in the left lower front tooth. The patient was referred from Department of Periodontology. Patient gave history of root canal treatment from a private clinic three months back after which she continued to have discomfort in her lower front tooth and got treatment in Periodontology department for pockets in relation to the same tooth.

Clinical examination revealed a restored 33. The tooth was tender on percussion. Radiograph revealed widening of periodontal ligament space. Also after meticulous examination of the root outline on the periapical radiograph, a second root was suspected.

Under rubber dam isolation the retreatment was initiated on 33. The guttapercha obturating material was removed and the canal explored with number 8 and 10 K files to locate the second canal. The first few attempts were not successful, after which it was decided to enlarge the canal with a thin tapering bur to the mid root level. After enlarging the coronal half of the root canal, the canal was again explored. A second

root canal was located lingual to the first canal. The root of 33 was thus dividing at the junction of middle and apical one third. The working length radiograph confirmed bifurcation of canal at this level. Biomechanical preparation was done with a combined hand and rotary Protaper instruments. Copious irrigation with 1% sodium hypochlorite was done during treatment.

In the first visit the canals were dried and access cavity was closed with temporary restorative material Cavit (3M ESPE AG, Seefeld, Germany) and patient was recalled after two days. In the second visit metapex intracanal medicament was placed in the root canals and patient recalled after three weeks. Obturation was completed with F2 protaper Gutta Percha points and AH plus sealer. The access cavity was closed with glass ionomer cement (Fuji IX; GC Corp, Japan). The tooth was asymptomatic after first visit and continued to remain so after treatment.

## DISCUSSION

Procuring knowledge of various root canal variations that can be encountered and meticulous diagnosis can prevent many root canal treatment failures. An important reason for failure to identify canal variations is inability to meticulously study the preoperative radiograph.<sup>3</sup> Examine the preoperative radiograph for any abrupt change in radiolucency of root canal and the outline form of the root. Carefully observe the direction your patency file takes when you explore a root canal. Unusually positioned orifices and off centered working length files also warrant looking for more canals.<sup>4</sup> Mandibular canines are the teeth which in 98.3% cases have a single root. In 92.2% cases the root has a single root canal, 4.9% cases have two canals and one foramen and 1.2% have two canals and two foramen. A study on 830 extracted human mandibular canines found only 1.7% teeth with two roots and two separate canals.<sup>5</sup> Cases have been reported in literature with two rooted canine.<sup>6-8</sup> A case has been reported of mandibular canine with two roots but three canals in literature.<sup>9</sup>

In the present case the patient repeatedly visited dentist for three month, to relieve pain in her root canal treated tooth. The correct diagnosis and treatment alleviated her pain. Thus

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Figure-1: Preoperative radiograph 33



Figure-2: Working length radiograph



Figure-3: Post Obturation Radiograph 33

it is important to treat every tooth uniquely or else it will lead to failure of endodontic therapy.

## CONCLUSION

Morphological variations in pulpal anatomy must always be considered before beginning treatment. Knowledge about handling such cases should be acquired for a successful treatment outcome. Also careful clinical and radiographical examination is essential for a successful endodontic treatment.<sup>10</sup>

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# Sialendoscopy - An Investigative and Therapeutic Approach to Obstructive Salivary Gland Pathology

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## ABSTRACT

The major salivary glands are most commonly affected by inflammatory and obstructive conditions. Sialadenitis secondary to non-neoplastic obstructive pathologies including sialoliths, strictures, stenosis, mucous plugs and ductal polyps, remains the most common disorder of the salivary gland. Among the major salivary glands, submandibular salivary gland is commonly affected by obstructive pathologies like sialoliths, due to the torturous course of Wharton's duct, the higher calcium, phosphate levels and the increased mucoid nature of the secretion contained within the dependent position of the submandibular glands. Sialendoscopy is a relatively new technique that allows endoscopic intraluminal visualization and instrumentation of the salivary ductal system. Thus, sialendoscopy has a dual role of diagnosis and therapeutics. This technique provides an alternative to traditional surgical approaches that require the excision of a salivary gland for the treatment of common nonneoplastic pathologies. Sialendoscopy is complementary to diagnostic techniques such as plain X-ray films, ultrasound, computed tomography (CT) scan, magnetic resonance sialography, and conventional sialography, which are usually advised for evaluating the salivary ductal system. Thus, this paper aims to provide an overview of Sialendoscopy, as an investigative and therapeutic approach to obstructive salivary gland pathology.

**Keywords:** Salivary glands, Sialadenitis, Sialendoscopy, Sialoliths.

## INTRODUCTION

Major salivary gland infection and obstructive diseases present a diagnostic and therapeutic challenge.<sup>1</sup> Obstructive sialadenitis with or without sialolithiasis represents the main inflammatory disorders of salivary glands.<sup>2</sup> Conservative treatment is the first line of therapy in such cases. However, conservative therapy fails in up to 40% of people with sialadenitis; in which case the recommended treatment is excision of the involved salivary gland.<sup>3</sup> Sialendoscopy is a recently developed technique allowing diagnosis and treatment during the same procedure. It was described for the first time in the early 1990s by Katz. Sialendoscopy uses semi-rigid or rigid miniaturized endoscopes with optical fibers providing high-quality images to explore the parotid and submandibular salivary ducts. For diagnostic purposes, sialendoscopy is superior to imaging for obstructive pathologies. The uncalcified stones, stenosis, polyps, mucosal plugs and foreign bodies often missed by imaging methods, can be visualized by this technique. When used for therapeutic purposes, sialendoscopy is a minimally invasive and non-traumatic surgical technique enabling endoscopic stone removal, stricture dilatation and salivary gland lavage.<sup>4</sup>

## Indications:<sup>5</sup>

- Non-neoplastic obstructions such as sialoliths, stenosis, mucous plugs, strictures and ductal polyps.
- Sialendoscopy can be effective in patients with radioiodine-induced sialadenitis.
- Patients with refractory symptoms from any pathology, not responding to conservative management may benefit from interventional sialendoscopy.

## Contraindications:<sup>3</sup>

- Sialendoscopy is contraindicated during acute infections. The use of endoscope during such conditions, increases the risk of ductal perforation and potential spread of infection into the head and neck soft tissues.
- Relative contraindications include, patients with microstomia or trismus.

## Advantages of sialendoscopy:<sup>5</sup>

- Performed as an ambulatory out-patient procedure in one visit.
- High cure rate.
- Avoids facial nerve damage.
- Lower morbidity.
- No radiation exposure.
- No scar formation.

## Disadvantages of sialendoscopy:<sup>6</sup>

- Mobility of the endoscope is limited at the distal end of the gland.
- Convoluted portions of the salivary duct are impassable with a rigid endoscope.

## Technique of sialendoscopy

Instrument: Sialendoscope

Sialendoscope can be rigid, semi rigid or flexible. However, semi rigid endoscope is commonly used. They are available as both diagnostic and therapeutic scopes. Sialendoscopes are available in diameters ranging from 0.9 to 1.6 mm. (Fig 1) Additionally, a number of miniature instruments such as wire baskets, balloon dilators, grasping forceps, micro drills, biopsy forceps, and guide wires are available for therapeutic purposes.<sup>7</sup> (Fig. 2, 3, 4 and 5)

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## Procedure

Diagnostic sialendoscopy is usually performed under local anaesthesia. About 20–30 min before starting the procedure, a sterile gauze piece soaked in lignocaine, is placed over the floor of mouth in submandibular gland sialendoscopy or along the upper gingivobuccal sulcus in parotid sialendoscopy. Therapeutic procedures like removal of duct calculus, dilatation and stenting of the ductal strictures are preferably done under general anaesthesia. However, local anaesthesia may be considered in selected cooperative subjects and in patients who are unfit for general anaesthesia. Patient is placed supine with head fixed on a head rest and turned towards the surgeon.<sup>7</sup> The patient's mouth is kept open either with a retractor, bite block, or a dental splint. Identification of the papilla is facilitated by the use of magnification with a microscope or surgical loupes. In addition, massage of the gland to express saliva allows the localization of the papilla.<sup>5</sup> Once identified, the orifice of the duct is progressively dilated with dilatation probes to match the diameter of the endoscope. For Wharton's duct, the papilla is lifted from the frenulum with dissecting forceps, for Stenon's canal, the cheek is retracted anteriorly to pass the curvature above the masseter muscle. The endoscope is then introduced within a fine diagnostic sheath with an operator channel connected to a foot-controlled automatic irrigation system to dilate and washout the gland. The ductal system is explored as far as possible. If an anomaly is encountered, the diagnostic sheath is replaced by a therapeutic sheath with two operator channels, one connected to the irrigation system and the other for instruments. Sialoliths are removed with a Dormia basket or grasping forceps. Large sialoliths are broken down with hand-held micro bur. Laser fibers can be used as well through the interventional channels for intraductal laser fragmentation of stones. Flushing or lavage of the gland is done to expel mucous plugs. Strictures within the main duct are dilated with dilatation probes, while those within the duct ramifications are dilated with a balloon probe. Stenoses are treated with metallic dilators or with balloon catheters<sup>6</sup> Sialendoscopy with irrigation of the duct with or without injection steroids has been shown to be effective in treating Juvenile recurrent parotitis.<sup>3</sup> At the end of the procedure, the entire ductal system is reexamined. A 0.75 mm diameter catheter will then be inserted to prevent retractile strictures during the healing process.<sup>4</sup> Although, sialendoscopy pose substantial benefits, it has a few minor complications. Gland swelling post-operatively is expected and usually resolves in approximately 24-48 hours. This is particularly important to consider in submandibular procedures, as swelling could cause airway compromise.<sup>8</sup> Consequently, when performing bilateral submandibular gland procedures, it is important to examine the gland and oral cavity after completing one side and determine whether it is safe for the patient to proceed with the contralateral gland. One of the more serious iatrogenic complications is avulsion of the duct. This complication can be prevented by avoiding excessive traction on the stone while it is engaged in the wire basket. If duct avulsion or a major ductal tear occurs, subsequent gland excision could be necessary.<sup>5</sup> Lingual nerve paresthesia can occur in up to 15% of patients undergoing transoral combined proce-



Figure-1: Sialendoscope with dilator probes



Figure-2: Wire basket



Figure-3: Balloon catheters



Figure-4: Tissue graspers



Figure-5: Micro bur

dures in the immediate post-operative period and resolves with time.<sup>9</sup> The development of a post-operative stricture has been reported.<sup>10</sup> Taking care not to cause trauma to the duct or papilla during the procedure minimizes the risk of this complication. In addition, in the event the duct is traumatized, placement of a salivary stent for up to 2 weeks can help prevention of subsequent ductal or papillary stenosis. Salivary fistulas, sialoceles, minor ductal tears, development traumatic ranulas, minor bleeding, and infection have been reported.<sup>11</sup>

## CONCLUSION

The clinical application of sialendoscopy is a breakthrough in management of salivary gland disorders, as it has a dual role in diagnosis and treatment of salivary gland ductal obstructions. It is an organ preserving technique which proves to be safe and effective and should be considered as treatment of choice for patients with obstructive pathology. Sialendoscopy is technically challenging and requires sequential learning. Availability of new miniaturised instruments for therapeutic purposes and enhanced optical resolution would increase the efficacy and precision of sialendoscopy in the management of salivary gland pathology.

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# Immunological Response in Neonatal Septicemia

Varun Dwivedi<sup>1</sup>, R. Murthy<sup>2</sup>, S. Sao<sup>2</sup>

## ABSTRACT

**Introduction:** Newborns are at increased risk of infection due to genetic, epigenetic and environmental factors. Herein we examine the roles of the neonatal humoral immune system in host defense against bacterial infections. IgG, IgM and IgA concentrations from birth to 1 month of age, and the incidence of acute infectious processes were determined in 87 full terms and in 133 preterm infants by the single radioimmunodiffusion technique in a prospective study.

**Material and Methods:** The study was conducted with the objective to know the immunological response in neonatal septicemia cases and serum from the suspected cases of neonatal sepsis from March 2013 to August 2015. 220 neonates included 133 early onset neonatal septicemia cases and 87 late onset neonatal septicemia cases. Humoral immune response was studied by quantitative estimation of serum immunoglobulins IgG, IgM and IgA by single radial immunodiffusion (SRID).

**Results:** Among 220 full term neonates in whom humoral immune response was studied. 133 (60.45%) were early onset septicemia cases and 87 (39.54%) were late onset septicemia cases. Infants born at term showed significantly higher IgG levels than preterm babies.

**Conclusion:** In both early onset neonatal septicemia and late onset neonatal septicemia decreased IgA levels and increased IgG levels were observed in statistically significant number of cases.

**Keywords:** Immunoglobulin in newborns, Neonatal septicemia

## INTRODUCTION

It is well recognized that the primary immunoglobulin (IgG) of the newborn is the maternal IgG. IgG1, IgG3 and IgG4 readily cross the placenta and play an important role in protecting the developing fetus. On the other hand, IgM is the first immunoglobulin class produced in a primary response to an antigen, and it is also the first immunoglobulin to be synthesized by the neonate. IgA is the predominant immunoglobulin class in external secretions such as breast milk, saliva, tears, and mucus of the bronchial, genitourinary, and digestive tracts.<sup>1</sup>

Neonates have also been shown to have phagocytic, cellular as well as humoral defects. Specifically, they have quantitative as well as qualitative deficiency in their humoral immunity.<sup>2-5</sup> There are literatures available on studies on quantitative estimation of serum IgG, IgM, IgA in full term and preterm neonates with septicemia. In most of studies quantitative estimation of serum IgG, IgM, IgA was done by single radial immunodiffusion technique.<sup>6-11</sup>

The present study was designed to know the incidence of immunological response in neonatal septicemia, their concentration in early onset septicemia and late onset septicemia.

## MATERIAL AND METHODS

The study was carried out from March 2013 to August 2015 in the Department of Microbiology, Chhattisgarh institute of medical sciences (CIMS), Bilaspur (C.G.). Ethical clearance was taken from the institution ethical board.

The study population 450 cases of clinically diagnosed neonatal septicemia admitted in the Neonatal Intensive Care Unit (NICU) of CIMS, Bilaspur.

Cases were classified into two major categories -

**Early onset septicemia:** Those presented within first 72 hours of life

**Late onset septicemia:** Those presented after 72 hours of life

All the cases included in the study were examined for general physical examination as well as systemic examination to find out the clinical profile of the cases.

Among 450 neonates in the present study, humoral immune response was studied in 220 full term neonates. These 220 neonates included 133 early onset neonatal septicemia cases and 87 late onset neonatal septicemia cases. Humoral immune response was studied by quantitative estimation of serum immunoglobulins IgG, IgM and IgA by single radial immunodiffusion (SRID) as per S.L. Pole (1984).<sup>12</sup>

Agar (150mg) dissolved in barbitone buffer (PH 8.6, 0.05M), admixed with optimum standardized quantity of antibody (agar antibody mixture gel) is casted on glass plate or slide. Wells are then punched out at proper distance. These wells are charged with antigen to be quantitated. The antigen in the well and antibody in the gel then diffuse in double dimension to form circular precipitate in form of ring. The diameter of the ring is directly proportional to the quantity of antigen.

## STATISTICAL ANALYSIS

SPSS version 21 was used to generate tables and graphs. Descriptive statistics was used to infer results.

## RESULT

Among 220 full term neonates in whom humoral immune response was studied. 133 (60.45%) were early onset septicemia (EOS) cases and 87 (39.54%) were late onset septicemia (LOS) cases. The immunoglobulin IgG, IgM and IgA levels were compared in the early onset septicemia cases and late onset septicemia cases.

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Amongst 220 cases of neonatal septicemia, out of 133 EOS cases IgG levels were decreased in 24 (18.04%) cases, normal in 40 (30.07%) and increased in 69 (51.87%) cases (table-1).

Amongst 220 cases of neonatal septicemia, out of 87 LOS cases IgG levels were normal in 28 (32.18%) cases and increased in 59 (67.81%) cases. IgG levels less than 800 mg/dl (decreased) were not observed in LOS (Fig. 1).

Amongst 220 cases of neonatal septicemia, out of 133 EOS cases IgM levels were decreased in 22 (16.54%) cases, normal in 103 (77.44%) and increased in 8 (6.01%) cases (table-2).

Amongst 220 cases of neonatal septicemia, out of 87 LOS cases IgM levels were decreased in 22 (25.28%) cases and normal in 65 (74.71%) cases. IgM levels more than 16 mg/dl were not observed in LOS (Fig. 1).

Amongst 220 cases of neonatal septicemia, out of 133 EOS cases IgA levels were decreased in 62 (46.61%) cases, normal in 42 (31.57%) and increased in 29 (21.80%) cases (table-3).

Amongst 220 cases of neonatal septicemia, out of 87 LOS cases IgA levels were decreased in 32 (36.78%) cases, normal in 40 (45.97%) cases and increased in 15 (17.24%) cases (Fig. 1).

**DISCUSSION**

S Sadana *et al*<sup>6</sup> in the study of 40 neonates with suspected septicemia reported IgG levels of 302mg/dl to 2125 mg/dl. Noor Suryani M.A. *et al.* reported mean ±SD levels of 725±620 mg/dl in their study. Ahmed S.S. *et al.* in their study of 60 preterm neonates reported mean ±SD levels of 529.16±147.73 mg/dl. In our study we have found, Among 220 cases of neonatal septicemia, out of 133 EOS cases IgG were in the range of <800 mg/dl in 24(18.04%) cases, 800-1200 mg/dl in 44(30.07) cases and 1200 mg/dl were observed in 69(51.87) cases. In LOS group no case showed levels less than <800 mg/dl, 800-1200 mg/dl in 28(32.18%) cases, >800 mg/dl in 59(67.81) cases. These findings are comparable to Sadana S. *et al.*<sup>6</sup>

BVS Krishna *et al*<sup>9</sup> in the study of 57 cases reported IgM levels between 8-93 mg/dl with ≥20 mg/dl in 22 cases and <20 mg/dl in 35 cases. Sadana S. *et al.* in their study reported IgM level of 1.92 mg/dl to 436.9 mg/dl in neonatal septicemia. Noor Suryani M.A. *et al.* reported mean ±SD levels of 14± 11 mg/dl in septicemic neonates. In our study we have found, Among 220 cases of neonatal septicemia, out of 133 EOS cases IgM were in the range of <6 mg/dl in 22(16.54%) cases, 6-16 mg/dl in 103(77.44%) cases and 16 mg/dl in 8(6.01%)cases. In LOS cases IgM were in the range of <6mg/dl in 22(25.28%) cases, 6-16mg/dl in 65(74.71%) cases. Levels more than 16mg/dl were not observed. These findings are comparable to Krishna B.V.S. *et al.*<sup>9</sup> and Sadana S. *et al.*<sup>6</sup>

Noor Suryani MA *et al*<sup>13</sup> reported mean ±SD levels of 19±2 mg/dl. SS Ahmed *et al*<sup>14</sup> reported mean ±SD levels of 5.34±2.24 mg/dl. Sadana S. *et al.* reported IgA levels of 1.18 mg/dl to 118.9 mg/dl. In our study we have found, among 220 cases of neonatal septicemia, out of 133 EOS cases IgA levels were in the range of <1 mg/dl in 62(46.61%) cases,

Immunoglobulin levels		EOS N=133	LOS N=87
IgG	<800 mg/dl	24(18.04%)	00(0.00%)
	800-1200 mg/dl	40(30.07%)	28(32.18%)
	>1200 mg/dl	69(51.87%)	59(67.81%)

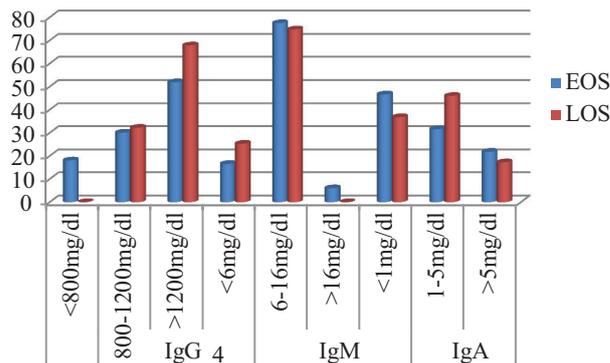
Normal IgG levels 800-1200 mg/dl  
**Table-1:** Immunoglobulin G levels in EOS and LOS

Immunoglobulin levels		EOS N=133	LOS N=87
IgM	<6 mg/dl	22(16.54%)	22(25.28%)
	6-16 mg/dl	103(77.44%)	65(74.71%)
	>16 mg/dl	8(6.01%)	0(0.00%)

Normal IgM levels 6-16 mg/dl  
**Table-2:** Immunoglobulin M levels in EOS and LOS

Immunoglobulin levels		EOS N=133	LOS N=87
IgA	<1 mg/dl	62(46.61%)	32(36.78%)
	1-5 mg/dl	42(31.57%)	40(45.97%)
	>5 mg/dl	29(21.80%)	15(17.24%)

Normal IgA levels 1-5 mg/dl  
**Table-3:** Immunoglobulin A levels in EOS and LOS



**Figure-1:** Humoral immune response in EOS and LOS

1-5mg/dl in 42(31.57%) cases and >5mg/dl in 29(21.80%) cases. In LOS cases IgA were in the range of <1mg/dl in 32(36.78%) cases, 1-5mg/dl in 40(45.97%) cases and >5 mg/dl in 15(17.24%) cases.

**CONCLUSION**

Statistically significant number of cases in both early onset neonatal septicemia and late onset neonatal septicemia categories showed decreased IgA levels indicating compromised mucosal immunity while the IgG levels were found to have increased.

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# Bilateral Ovarian Teratomas- A Case Report

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## ABSTRACT

**Introduction:** Ovarian teratoma is a common tumor, accounting for 20% of adult and 50% of pediatric ovarian tumors. Bilateral ovarian teratomas are relatively rare,

**Case Report:** A 17 year old female patient presented with complaints of pain in the lower abdomen of three months duration. We have done computed tomography and magnetic resonance imaging and found out bilateral ovarian lesions with classical findings.

**Conclusion:** These imaging modalities give a clear cut road map for surgical approach. Our patient was operated upon and is on follow up now.

**Keywords:** Bilateral, pain in the lower abdomen

## INTRODUCTION

Bilateral ovarian teratomas are relatively rare, occurring in 10-15% of all ovarian tumors. We are presenting a case of bilateral ovarian teratoma referred to the Department of Radiology for magnetic resonance imaging of the pelvis as clinical assessment was not clear. Both ovaries showed cystic masses with areas of calcifications on ultrasonography. With the help of advanced imaging modalities like computed tomography and magnetic resonance imaging, it was possible to delineate the extent and depict the relationship of the lesion with the adjacent organs. Patient was operated upon and histopathology confirmed the diagnosis.

Ovarian teratoma is a common tumor, accounting for 20% of adult and 50% of pediatric ovarian tumors.<sup>1,2</sup> Clinical assessment is difficult and unreliable, ultrasonography (USG) has been an accepted method for diagnosis. USG combined with Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) gives valuable information regarding site, size, number and nature of lesions with their relation to surrounding structures. Due to its multiplanar imaging capabilities, MRI can localize lesions to the anatomic location. In addition, additional imaging modalities like CT can be used as an imaging guide for fine needle aspiration cytology (FNAC) if required. We are presenting the case of a young girl with bilateral tumour. We will discuss radiological and histopathological findings.

## CASE REPORT

A 17year old female patient presented with complaints of pain in the lower abdomen of three months duration. There was no history of fever or menstrual abnormalities. Clinical examination revealed a 26week size mass which was firm in consistency, mildly tender and not-mobile. Lab findings showed elevated erythrocyte sedimentation rate (ESR) 58mm/hr, carcino embryogenic antigen (CEA) 125 57.45 u/ml, A clinical diagnosis of an adnexal cyst was made. Previous USG revealed a 25x15x10cms complex cystic ovarian mass suspected to be dermoid, for which she took ayurvedic

treatment.

The patient was referred for a MRI examination of abdomen and pelvis and the following sequences: Axial tesla 1 weighted image (T1WI), tesla 2 weighted image (T2WI), coronal short T1 inversion recovery (STIR), sagittal-T2WI. MRI revealed features of bilateral germ cell tumor terato-dermoid and in view of elevated CEA levels torsion or rupture was considered.

MRI images showing the largest of the three locules in the midline of pelvis measuring 16x10x9.6cm having a solid heterogenous component along the posteriolateral left inferior wall. Multiple thin linear hypointense bands were seen within the cyst [Figure-1]. Sagittal and axial postcontrast T1WI images showed a smaller locule on the superoleft lateral aspect of the largest locule measuring 4.5x5.3x2.8cms [Figure-2]. Another locule on the supero right lateral aspect of the largest locule measuring 11.6x9.6x9.1 cms is seen having fat and fluid components showing as fluid-fluid levels.

CT of the pelvis was carried out to demonstrate calcifications. A CT topogram showing chunks of calcifications in the pelvis at the level of L3 vertebral body on both the sides and 10<sup>th</sup> thoracic vertebral body on the right side [Figure- 3]. Axial plain CT images demonstrating fluid fluid levels in one of the locules and calcific components in all the three locules [Figure- 4]. In view of the MRI and CT findings of multiloculated cysts, fat-fluid levels, calcific components, a diagnosis of bilateral germ cell tumor was made.

The patient was operated upon and the per-operative findings showed bilateral ovarian teratomas/dermoid. There was no free fluid in the peritoneum. Right sided salphingo-oophorectomy and left sided cystectomy was done. Histopathological examination (HPE) revealed cyst wall lined by keratinized squamous epithelium with underlying sebaceous glands, hair shafts and sweat glands. The HPE confirmed findings of MRI, teratoma arising from left ovary and mature cystic teratoma from the right ovary.

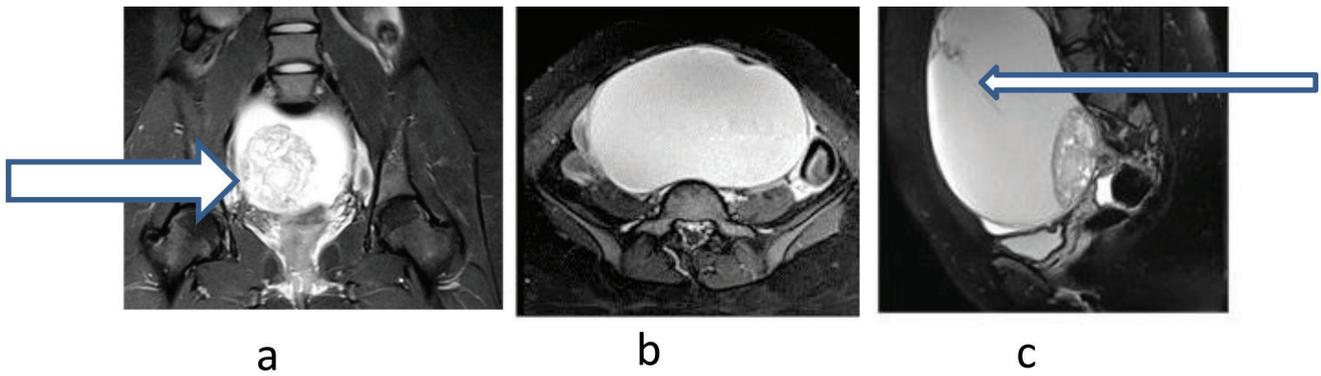
## DISCUSSION

The word teratoma or dermoid is derived from Greek “teras” means monster, it was first time in 1863 mentioned by Virchow.<sup>3</sup> But before this in 1831 Leblanc used dermoid in

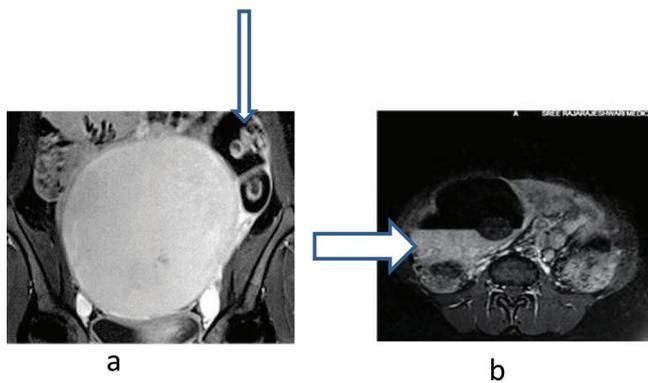
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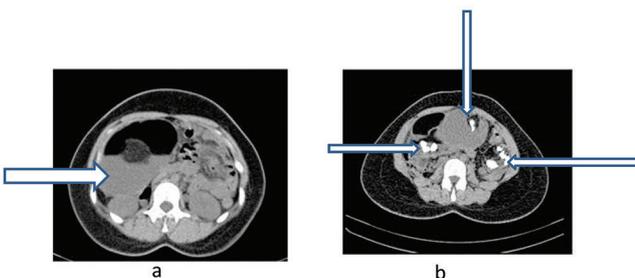
**Figure-1** a,b,c: MRI - images showing the largest of the three locules and a solid heterogenous component (thick arrow) multiple thin linear hypointense bands were seen within the cyst. (thin arrow)



**Figure-2** a,b: MRI – images showing a smaller locule (thin arrow) bigger locule is having fat and fluid components shows fluid-fluid levels. (thick arrow)



**Figure-3** CT topogram showing chunks of calcifications in the abdomen. (arrow).



**Figure-4** a,b: CT images demonstrating fluid fluid levels in one of the locules(arrow) and calcific components in all the three locules (arrows).

vetterinary cases.<sup>4</sup> Most common in sacrococccgeal (57%), sacro- coccygeal followed by mediastinal is 3%. Most common gonadal location is ovary followed by testis.<sup>5</sup> Cells differentiate along various germ lines, essentially recapitulating any tissue of the body. Examples include hair, teeth, fat, skin, muscle, and endocrine tissue. Teratomas have been reported to contain hair, teeth, bone and, very rarely, more complex organs or processes such as eyes,torso, and hands, feet, or other limbs.<sup>4-7</sup> Teratomas are thought to be present at birth (congenital), but small ones often remain undiscovered until much later in life.

Ovarian teratoma is a common tumor, accounting for 20% in adult and 50% of pediatric age.<sup>1,2</sup> An ovarian dermoid cyst (DC) or a benign cystic teratoma is a benign tumor arising from germ cells.<sup>1</sup> Dermoids are composed only of dermal and epidermal elements, whereas teratomas have additional mesodermal and endodermal elements. Ectodermal tissues (skin derivatives and neural tissue) are invariably present, mesodermal tissue (fat, bone, cartilage, muscle) is present in 90% of the cases and endodermal tissue (gastrointestinal and bronchial epithelium, thyroid tissue) is seen in majority of cases. Adipose tissue is present in 75% and teeth are seen in 31% of cases.<sup>8</sup>

It is the most common tumor seen in women below 30yrs of age.<sup>9</sup> Mature cystic teratomas account for 15% of all ovarian neoplasms specially in patients younger than 20 years. Bilateral involvement is seen in 10-15% of cases.<sup>10</sup> Conventional radiographs may show calcific components within the pelvis. Ultrasound is the preferred imaging modality since it is sensitive to calcifications, fluid and fat components. Typically an ovarian dermoid is seen as unilocular cystic adnexal mass with diffusely or partially echogenic mass with posterior or acoustic shadowing owing to the sebaceous materials and hair follicles, calcific components maybe seen. Mural hyper echoic Rokitansky nodules and presence of fluid-fluid levels which represents sebaceous material floating on fluid may be seen. If there is any internal vascularity on colour Doppler then further workup has to be done to exclude malignancy. CT is sensitive in the demonstration of fat- fluid level, calcification, Rokitansky nodules, and tufts of hair. The presence of most of the above tissues is diagnostic of ovarian cystic teratomas in 98% of cases. MRI is reliable in detecting benign ovarian masses and in identifying dermoid sand is sensitive to fat components. The diagnosis of a mature cystic teratoma can be confirmed when lipid structures are

demonstrable within the mass and is easily done with chemical shift-selective technique. Ovarian teratomas can be associated with complications such as torsion 16%, rupture 1%–4%, infection 1%, autoimmune hemolytic anemia less than 1%.and malignant transformation in 1-2% to squamous cell carcinoma is the commonest.<sup>1</sup> Rupture can be spontaneous or after torsion when they are bigger than 10 cm, it may lead to shock or hemorrhage with acute chemical peritonitis. Persistent, small leak over a long period of time can lead to granulomatous peritonitis.<sup>4</sup>

As per Gonzalez system: grade (0) - mature (benign), grade (1)- immature, probably benign, Grade (2)- immature, possibly malignant (cancerous), Grade (3) frankly malignant. If frankly malignant, the tumor is a cancer for which additional cancer staging applies. Our case was grade 1 and is on follow up.

They secrete beta human chorionic gonadotropin ( $\beta$ HCG), thyroxine or alpha-fetoprotein (AFP) under some circumstances AFP can be used as a diagnostic marker specific for the presence of yolk sac cells within the teratoma. These cells can develop into a frankly malignant tumor known as yolk sac tumor or endodermal sinus tumor.

## CONCLUSION

We would like to conclude by saying that USG is diagnostic in smaller lesions. To know organ of origin we need to do CT or MRI for clearly seeing outlines and a clear picture of involvement of any nearby structure before surgery. These imaging modalities give a clear cut road map for surgical approach. All cases should be followed - up, close observation, scanning and measurement of AFP and  $\beta$ HCG levels.

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# Prevalence of Pterygium in a Tertiary Care Hospital, Hyderabad

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## ABSTRACT

**Introduction:** Pterygium is a common condition in the general population. Geographical variations are common with pterygium. It can affect any age group. It is a fleshy and vascular growth that originates from conjunctiva, gradually approaching the cornea and causing impairment of vision. Clinical picture varies from asymptomatic stage to astigmatism. The present study is to know the prevalence of pterygium in a tertiary care hospital with relation to demographic and other variables. It is also to assess the mode of treatment and recurrence rate.

**Material and methods:** The study was conducted in Malla Reddy Institute of Medical Sciences, Hyderabad for one year. All the patients attending to Ophthalmic Department OP were screened for the study. In the exclusion criteria, children below 3 years were taken. The pterygium cases that needed treatment for their impaired vision were admitted to the hospital and provided treatment. The details of the cases were collected through a pre-designed questionnaire and compiled in excel. Data of patients who reported to hospital during July 2014 to June 2015 were included in the study.

**Results:** Total 398 cases registered during the study period. Out of reported cases 279 were treated medically in the outpatient department. 68 cases were admitted for surgical treatment. Simple excision was done in three cases. Excision and limbal conjunctival autograft was done in 65 cases. Recurrence of pterygium was observed in 3 cases.

**Conclusion:** Low recurrence rate was observed with conjunctival autograft transplantation.

**Keywords:** Pterygium, Astigmatism, Geographical variations

## INTRODUCTION

Pterygium (Surfer's eye) is a common ophthalmic condition seen in day to day practice.<sup>1,6</sup> It is fleshy and vascular growth originating from conjunctiva. It commonly grows from the nasal side of the conjunctiva. In the initial phase, it is asymptomatic and as it grows it causes blurred vision by inducing astigmatism till it crosses the pupillary area completely obstructing light and causing loss of vision. The fleshy growth has distinctive areas of cap, head and body. Exposure to sunlight, low humid conditions and dust are the precipitating factors for pterygium.<sup>2-4</sup> The aetiology of the condition is multiple ranging from geographical variations to genetic involvement.<sup>5,6</sup> Positive immunohistochemical staining is observed in epithelial cells of pterygium.

The underlying pathology of pterygium is elastotic degeneration of collagen and fibrovascular proliferation.

Majority of pterygium cases are asymptomatic and do not require any treatment. The cases approach ophthalmologist mainly for cosmetic purpose. The patients may have dryness of conjunctiva and as the pterygium increases, induced astigmatism with blurred vision.

The treatment varies from conservative treatment to surgical

treatment with adjunctive therapy like strontium plaque therapy or mitomycin-c.

The present study was to assess the magnitude of the problem in attending hospital cases and percentage of cases with defective vision. The study was also to estimate the relationship of pterygium with demographic and other variables. Types of treatment modalities in this hospital and their outcomes were analysed.

## MATERIAL AND METHODS

The study was conducted in Malla Reddy Institute of Medical Sciences, Hyderabad. Total duration of study was one year. During one year period, the number of patients attending OP of Ophthalmic Department were taken for study i.e 398, excluding children below three years of age. Obtaining prior ethical approval and consent from patients they were screened for the study. The patients with visual impairment were admitted to the hospital for further treatment. The IP patients were examined and further investigations were done for managing the cases. Demographic and other data were obtained through a pre-designed format.

## STATISTICAL ANALYSIS

All the data was compiled in Microsoft office excel sheet and tables were generated. Descriptive statistics were used to infer results.

## RESULTS

During the study period, total number of patients with pterygium who attended OP were 398. 68 of the total cases were admitted to the hospital for surgical treatment.

Table 1 shows the distribution of pterygium cases as according to sex. 131 (38%) males and 215 (62%) females attended hospital for pterygium treatment.

Table 2 shows the distribution of cases as per their age. The age groups who attended hospital for pterygium treatment were from 10 years to 80 years but the common age group of cases with pterygium was in the 30-60 years (74%). 87% of the study group have defective vision. 9 out of 68 cases seeking surgical treatment were with normal visual acuity.

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Table 3 shows the distribution of cases as per age wise. 62% of cases reported were in the age group of 40-60 years. 2 cases of recurrence were observed in 30-40 years age group and one in 50-60 years age group.

## DISCUSSION

The study was conducted in a tertiary care hospital. Total number of cases who attended for pterygium was 398 during 2014 to 2015. 279 cases were treated medically. 68 cases were admitted for surgical treatment. Among the patients 26 were males and 42 females. Three fourth of the cases were in the age group of 30 years to 60 years. 13% of the cases attending OP for consultation did not have any defective vision.

Among the cases admitted for surgery, simple excision was done in three cases and in the remaining 65 cases limbal conjunctival autograft was done. The common mode of treatment for symptomatic pterygia was excision with limbal conjunctival autografting.<sup>7,8</sup> The cases were followed up for one year from the day of operation. In the simple excision cases, all the three cases recurred subsequently whereas in limbal conjunctival autograft cases none of them reported with recurrence.<sup>9-12</sup> In the present study, none of them developed neither intraoperative nor post operative complications. Development of infection, defective vision due to astigmatism can be expected in surgical procedures with delayed wound healing.<sup>13-15</sup>

Sex	Defective vision no.	Normal vision no.
Male	131	20
Female	215	32
Total	346	52

**Table-1:** Sex wise distribution of pterygium cases with defective vision

Age	Defective vision no.	Defective vision %	Normal vision no.	Normal vision %
10-19	1	0.29	0	0
20-29	5	1.45	3	5.77
30-39	41	11.85	7	13.46
40-49	152	43.93	25	48
50-59	87	25.14	7	13.46
60-69	36	10.40	5	9.62
70-79	25	7.23	4	7.69
Total	346	100	52	100

**Table-2:** Age wise distribution of pterygium cases with defective vision

Age	Medical no	Medical %	Surgical no	Surgical %	Recurrence No	Recurrence %
<10 Years	0	0	0	0	0	0
10-19	0	0	1	1.47	0	0
20-29	0	0	5	7.35	0	0
30-39	33	11.83	8	11.76	2	66.66
40-49	126	45.16	26	38.24	0	0
50-59	71	25.45	16	23.53	1	33.33
60-69	29	10.39	7	10.29	0	0
70-79	20	7.17	5	7.35	0	0
Total	279	100	68	100	3	100

**Table-3:** Distribution of treated cases as per age group wise

B.D. Allan et al, conducted a cross sectional study in 85 patients and in 93 eyes followed up over 6 months period post operatively and found 6 recurrences (6.5%) and 4 of them with minor recurrences. Main complications found in their study were wound dehiscence, Tenon's granuloma and conjunctival cyst. In the present study no recurrences were found with limbal conjunctival autograft.

Karalezile A. et al observed that conjunctival autografting after pterygium excision had very low rates of recurrence compared with other techniques. The surgeon's skill and experience affect the recurrence rate, which varies between 2-39% with this technique.

D de Wit et al, studied in 12 patients and in 15 eyes; cosmesis was excellent in all the cases. Visual acuity improved and no intra-operative and post-operative complications were observed. Similar findings were observed in the present study.<sup>16</sup> Kenneth R et al in their study found that limbal conjunctival autograft is with minimum recurrence rate compared to other methods and more cost effective. Present study has also confirmed the similar type of results. With simple excision the recurrence was very high hence, limbal conjunctival autograft is found to be a better alternative.

## CONCLUSION

The excision of pterygium with conjunctival autograft transplant is highly efficient in terms of low recurrence rate. In the present study more number of females compared to males attended hospital with pterygium. Health seeking behavior of females could be one of the reasons for high in number.

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# Comparison of Fascia Iliaca Compartment Block with Intramuscular Diclofenac Sodium Acute Pain Relief in Emergency Room in patients with Fracture Femur

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## ABSTRACT

**Introduction:** Fracture of femur occurs commonly in adult population following major trauma. The condition is not only severely painful unless immobilized, but also leads to massive hemorrhage and shock states if not treated early. This prospective randomized trial was undertaken to compare the efficacy of fascia iliaca compartment block in providing pain relief when compared to conventional method of pain relief by administering NSAID in emergency department settings.

**Material and Methods:** After institutional ERB approval, 60 cases that presented to emergency department with suspected fracture femur were randomized in two groups to receive fascia iliaca compartment block or intramuscular diclofenac sodium. The results were compared in terms of VAS score at rest and after 15 degrees hip flexion and the duration of analgesia post-procedurally.

**Results:** The VAS score were significantly lower and the duration of analgesia was significantly greater in patients managed with fascia iliaca block compared to intramuscular diclofenac injection.

**Conclusion:** The pain following fracture of femur can be managed more effectively using simple technique like fascia iliaca block with minimal discomfort and side-effects than diclofenac sodium.

**Keywords:** Fascia iliaca compartment block, diclofenac sodium, acute pain services, fracture femur

## INTRODUCTION

Patients with fracture femur are in severe pain upon arrival at emergency department (ED). The pain is further aggravated during movement for orthopedic examination, radiological investigations and shifting to operation theatre or ward.<sup>1</sup> Pain treatment in elderly patients with fracture femur is traditionally based on systemic opioids or more commonly non-steroidal anti-inflammatory drugs like intramuscular diclofenac.<sup>2</sup> Use of opioids is associated with side-effects like hypotension and urinary retention especially in frail and elderly patients while the use of intramuscular diclofenac may lead to gastritis, gastrointestinal bleeding and inadequate analgesia.<sup>3</sup> Nerve blocking techniques for providing analgesia in fracture femur cases include femoral nerve block, 3-in-1 block and epidural catheter placement. Disadvantages of neuraxial block are the potential for motor blockade that makes the ambulation difficult or impossible and sympathetic blockade that may lead to hypotension and cardiovascular instability.<sup>4</sup>

Peripheral nerve block involves the injection or infusion of a short or long-acting local anaesthetic (LA) along the peripheral sensory nerve, motor and sympathetic nervous plexus. Peripheral nerve blocks including femoral nerve block

require elicitation of paresthesia or use of nerve stimulator making them technically demanding and expensive.<sup>5,6</sup>

Fascia iliaca compartment block (FICB) is a safe, effective and easily learned procedure.<sup>7</sup> It results in blockade of femoral nerve, obturator nerve and lateral cutaneous nerve of thigh with a single injection without eliciting paresthesia. The FICB is devoid of any major side effects. Only a single case of transient polyneuropathy following FICB has been reported till date.<sup>7</sup>

However, there is paucity of FICB literature in context to Indian population. Therefore, the present prospective, randomized study was designed to evaluate the analgesic efficacy of single-shot FICB for acute pain management and to compare it with intramuscular diclofenac sodium in adults with fracture femur in the emergency department.

## MATERIAL AND METHODS

After obtaining approval from institutional ethics committee and written informed consent, 60 patients of either sex belonging to ASA physical status I/II, aged between 50-70 years with suspected fracture femur were included in this study just after their arrival in the emergency department. Patients with history of chronic opioids or NSAID treatment or within the last 6 hours, any substance abuse, body mass > 35, infection or open wound at injection site, psychoneurotic disease or neurologic deficit, haemodynamic instability, associated head injury, allergies to local anaesthetics, Glasgow coma score < 15, blood coagulopathy or on anti-coagulant medication were excluded from the study.

Patients were randomly assigned to one of the two groups of thirty each using a computer generated randomization chart. Group F patients (n=30) received FICB with 0.5% bupivacaine (0.4ml/ kg ideal body weight diluted with 0.9% saline to make a total amount 40 ml) and Group D patients received 75 mg diclofenac sodium intramuscularly. The diagnosis of fracture femur was based on trauma mechanism, thigh pain and deformity. Patient's height was measured in centimeters

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and ideal body weight was calculated as under:

Males Weight = Length (cm) – 100

Females Weight = Length (cm) – 105

After proper disinfection, a skin wheal was raised with 23G needle by infiltrating 1 ml 2% lignocaine. The puncture site was marked 1 cm caudal to junction of lateral one-third with medial two-thirds of the inguinal ligament (Fig. 1).

The plexus block needle was inserted and advanced at a 90 degree angle to the skin. The first loss of resistance was felt as the needle's tip crossed the fascia lata. The needle was advanced further at the same angle until the second loss of resistance was felt as the fascia iliaca was pierced. The angle to the skin was then decreased to 30degrees and the needle was advanced 1 cm cephalad (Fig. 2).

The drug was injected after negative aspiration of blood to rule out intravascular needle placement, over one minute period and firm pressure was applied manually, just distal to the puncture site. If there was swelling in the groin after injection, the region was massaged. Both of these manipulations were performed to encourage cephalad distribution of the injected solution.

The procedure time was the time taken from point of disinfection to the withdrawal of needle after drug administration. The intensity of pain was measured on a 10 cm Visual Analogue Scale (VAS) in which 0 represented no pain and 10 represented the worst possible pain. VAS was recorded just before the block then at 10 minutes intervals till 30 minutes and 1 hour after the procedure at rest. VAS was also recorded with passive hip flexion of approximately 15 degree at 30, 60 minute after the procedure as well as before the procedure. Sensory block was evaluated using cold perception loss in the lateral, medial and internal part of the thigh at 0, 10, 20 and 30 minute after the intervention in group F. Similarly, in this Group, response to pin prick was noted in the lateral, medial and internal part of the thigh. A complete block was defined as block in all the three parts of the thigh (lateral, medial, internal), a partial block was defined as a block in one or two parts, and a block failure was defined as no sensory block in any part of the thigh. In case of block failure, rescue analgesia was provided with intramuscular morphine 0.1 gm/ kg body weight and the patient was excluded for further comparison. Thirty minutes after performing the block, the patients were taken to radiology department for X-ray confirmation of the fracture.

Any adverse effects, if any like nausea, vomiting, toxicity to local anaesthetic, haematoma formation, etc. was noted. Systolic blood pressure less than 90 mmHg or more than 20 % decrease as compared to baseline value was considered as significant hypotension, while heart rate below 50 beats per minute or more than 20% decrease as compared to baseline was taken as bradycardia and managed accordingly. Total duration of analgesia was taken as the time from the loss of cold perception to the demand for more analgesia by the patient in FICB group. In group D, it was the time from injection to the demand for more analgesia after a relatively pain free interval.

Demographic data and VAS was expressed as median and 25th to 75th percentile (interquartile range, IQR). Test for significant differences between groups was done with

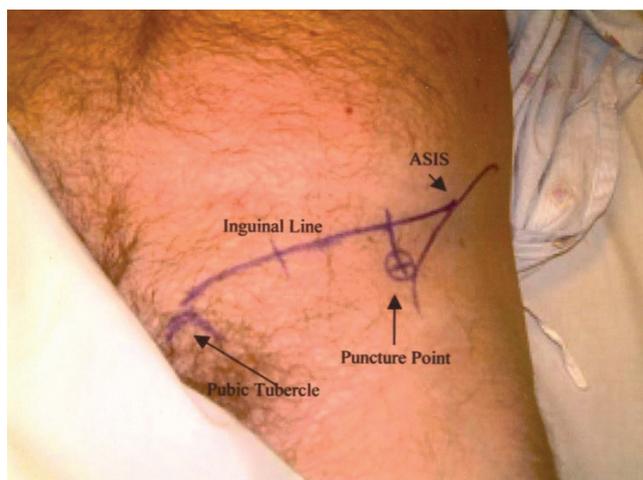


Figure-1: Surface Landmarks for FICB



Figure-2: Needle insertion technique for FICB (pen holding fashion)

Mann-Whitney U test. The comparisons of efficacy according to sensory spread were done with Wilcoxon test. A value of  $P < 0.05$  was considered statistically significant. All data analysis was conducted with SPSS for Windows version 16.1 (SPSS Inc., Chicago, IL).

## RESULTS

A sixty patients of either sex between 50-70 years of age having ASA physical status of grade I and II were evaluated in this prospective randomized trial with suspected fracture femur. Group F (n=30) received Fascia iliaca compartment block with 0.5% bupivacaine ( $0.4 \text{ ml kg}^{-1}$  dead body weight diluted with 0.9% saline to make a total amount 40 ml). Group D (n=30) received 75mg intramuscular diclofenac sodium in the gluteal region.

Both the groups were statistically comparable regarding age, height, weight and sex distribution. ( $P > 0.05$ ). (Table-1)

All the patients had a femoral fracture which was confirmed on radiological investigation. Out of total 30 patients in group F, 22 patients (73.3%) had fracture in upper third, 5 patients (17.7%) middle third and in the remaining 3 patients (10%) lower third of femur was fractured. (Fig. 1) out of group D 28 patients had # upper 1/3 and 2 patient had # middle 1/3.

Demographic Data	Group F (n=30)	Group D (n=30)	P-value
Mean Age (Range) (in years)	61 (57-67.25)	61.5 (54.75-68)	0.70
Gender (M/F)	18/12	17/13	0.56
Mean Weight (Range) (in Kg)	64.5 (53-75)	61 (56-70)	0.92
Mean Height (Range) (cm)	164.5 (157-175)	163 (158-170)	0.52
ASA Grading I/II	17/13	12/18	0.62
Values have been mentioned as median (interquartile range)			
<b>Table-1: Demographic Distribution</b>			

Group	Before	10 min+	20 min+	30 min+	60 min+
F	8	7	3	2	1
D	7.5	7	5	3	3
P-value	0.710	0.837	0.001	0.000	0.000
All values are median values of VAS score in the respective group.					
<b>Table 2: The Comparison of VAS score before and after the intervention in between the two groups at rest</b>					

Group	Before	30 min+	60 min +
F	9	2	1
D	9	6	6
P-value	0.871	0.000	0.000
All values are median values of VAS score in the respective group.			
<b>Table-3: The comparison of VAS scores before and after 15° passive hip flexion in between the two groups</b>			

	Group F	Group D	P value
Time (in hours)	9 (8-10.2)	5.5 (4.8-7)	<0.01
<b>Table-4: Duration of Analgesia</b>			

### Quality of block

Complete block was registered in 25 of total 30 (83.3%) patients in group F, partial in four cases and failed in one case. The medial part of thigh corresponding to femoral nerve sensory distribution was blocked in 80% cases at 10 minute and in 96.7% cases at 30 minute after FICB. The lateral part of thigh was blocked in 70% cases after 10 minutes and in 83% of the case after 30 minutes. The internal part of thigh which is supplied by obturator nerve was blocked in 56.7% cases at 10 minute and in 80% of the cases after thirty minutes. There was no change in sensory blockade between 30 minute and 60 minutes after performing FICB suggesting that peak sensory blockade was achieved at or before 30 minutes after the block. However, the pain scores improved further in FICB group after 60 minutes when compared to that after 30 minutes. There was no difference in pain relief when compared to different location of femoral fracture i.e. upper, middle of lower third of femur.

The VAS scores before the procedure at rest (median values) were statistically comparable in both the group i.e. 8 (7-8) in FICB and 7.5 (7-8) in diclofenac group ( $p=0.756$ ). After 10 minutes of intervention, the median VAS score was same in both the groups i.e. 7 ( $p=0.466$ ). After 20 minutes, in group F, median VAS score was 3 (2-3) and 5 (5-6.2) in diclofenac group. There was a statistically significant difference when these groups were compared ( $P=0.01$ ). After 30 minutes the VAS score was 2 (1-2) in group F and 3 (1.8-3.6) in group D

with  $P$ -value  $<0.01$ . After 60 minutes, median VAS score for group F was 1 (1-1.3) and 3 (2-3) for group D with  $P<0.01$ . (Table 2).

Pain assessed by VAS score with passive hip flexion before the procedure was same in both the groups i.e. (8-9). After 30 minutes, it was 2 (2-3) in group F and 6 (5-7) in group D. The difference was a statistically significant when these groups were compared ( $P <0.01$ ) (Table 3).

All values are median values of VAS score in the respective group.

The duration of analgesia was significantly longer in group F than diclofenac group when both the groups were statistically compared  $P <0.01$  (Table 4).

The median time of completion of FICB technique was 4 minutes (3m 55s- 4m 25s) with minimum of 3minutes and 30 seconds and a maximum of 5 minutes 15 seconds. No side-effects (hypotension, bradycardia, signs or symptoms of local anaesthetic toxicity, vascular punctures and paresthesia) were observed in FICB group. However, in diclofenac group two patients reported abdominal pain while another two had an episode of vomiting within an hour of intramuscular injection (table 5).

### DISCUSSION

Bone fractures are very painful and inadequate pain relief causes deleterious effects on all body systems by increasing blood levels of stress hormones. Adequate pain relief is also important in modifying the physiological stress response. Provision of effective analgesia is important not only for humanitarian reasons but also because pain may have negative impact on recovery.

Adequate pain relief benefits the patient not only by reducing metabolic and endocrine stress response, but also by decreasing incidence of pulmonary, cardiovascular and thrombo-embolic complications. Unmanaged pain, both acute and chronic, can affect mental status and might precipitate delirium, especially in elderly patients with hip fractures.<sup>8,9</sup>

The present study had a success rate of (83.3%) for FICB. Review of literature revealed a range of successful blocks from 67-96%.<sup>7,14,16</sup> Hence, the percentage of successful blocks in the present study was comparable to literature. Study done by Reavley *et al*<sup>10</sup> and Wallace *et al*<sup>11</sup> compared the efficacy of iliaca block with 3-in-1 block and found that FIB was superior in terms of duration of post-operative analgesia and reductions in analgesic consumption. Complete block was registered in 25 of total 30 (83.3%) patients in FICB group, it was partial in four cases and there was no effect in one case. Complete block primarily depends upon whether the obturator nerve is blocked-which may be difficult to obtain and unpredictable. The difficulty is that, although injected anaes-

Group	Hypotension	Bradycardia	Perioral numbness, convulsion	Nausea, vomiting	Paresthesia, vascular puncture	Abdominal pain
F	Nil	Nil	Nil	Nil	Nil	Nil
D	Nil	Nil	Nil	2	Nil	2

**Table-5:** Side effects in both the groups

thetic entering the iliac fascia blocks the femoral and LFC nerves, sufficient anesthetic do not always migrate proximally to block the obturator nerve, which lies on the internal edge of the psoas muscle in a separate plane.<sup>12-14</sup> However, this success rate can be further improved with use of ultrasound guided FICB and modified FICB. In FICB, sensory block of inner part of thigh is an early predictor of optimal pain relief for femur fractures. In patients with a proximal femur fracture, hip flexion is usually limited to 15 degrees. However after a successful FICB, hip flexion can increase up to 53 degrees due to analgesia and relaxation of the quadriceps muscle.<sup>15</sup> We analyzed the VAS scores prior and later to hip flexion in both the groups to evaluate the efficacy of both the interventions, but did not evaluate the increase in hip flexion as an end-point in our study as was done by Dochez *et al.*<sup>15</sup>

Total time to Perform the FICB was (median) 4 minutes which was comparable with other studies (4 to 5 minutes).<sup>16-18</sup> FICB provides an additional margin of safety since the needle is inserted into an area away from the femoral nerve and vessels.<sup>19</sup> No clinically significant adverse effect was reported with FICB. No clinically significant side-effect was observed in FICB group in our study, while in diclofenac sodium group 2 patients had nausea and vomiting and two other registered complains of abdominal pain. This can be explained by drug induced gastritis which is a well known and common side-effect of diclofenac sodium.<sup>20</sup>

A limitation of this study is that the effectiveness of the block is not tested by independent observers. However, due to practical and logical reasons it was not possible to add multiple observers as this could have lead to observer bias.

## CONCLUSION

In conclusion this study demonstrated that FICB is a simple, inexpensive and effective method of emergency department analgesia for cases presenting with fractures of femur.<sup>7</sup>

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# Outcome of Tuberculosis in Patients with Diabetes Mellitus Treated with the Revised National Tuberculosis Control Programme Regimen-A Study from Kerala, South India

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## ABSTRACT

**Introduction:** Multiple studies have shown a clear association between Tuberculosis and Diabetes Mellitus. This study aimed at exploring the outcome of both Pulmonary and Extra Pulmonary Tuberculosis in patients with Diabetes Mellitus treated with the Revised National Tuberculosis Control Programme Regimen

**Material and Methods:** A prospective study to summarize evidence for the impact of Diabetes Mellitus on Tuberculosis was performed. This study includes 100 patients of Diabetes Mellitus (DM) with newly diagnosed Pulmonary Tuberculosis (PTB) or Extra Pulmonary Tuberculosis (EPTB). Patients included in the study were put on directly observed treatment, short course (DOTS) three times a week as per the Revised National Tuberculosis Control Programme (RNTCP) guidelines.

**Results:** Sixty four patients had PTB (64%) and 36 patients had EPTB (36%). Of the 61 PTB cases analysed 41 patients were smear positive (67%) and 20 patients were smear negative (33%). Of the EPTB cases, cervical lymphadenitis with 12 cases (33.3%) predominated followed by pleural effusion with 11 cases (30.5%).

Of the 41 smear positive PTB patients, 90% converted to sputum negative status at the end of 2 months (except one case of death) The remaining 10% of the patients received an extra month of intensive phase and these were sputum negative at the end of 3 months.

**Conclusion:** This study shows lower FBS levels in patients with unilateral chest lesions than bilateral lesions. The gain in the body weight and decrease in FBS level during the progression of the treatment is reported. Another important finding of this study is that FBS levels, sputum grading and chest lesions are correlated and the patients with unilateral chest lesions in the X ray had lower FBS levels in comparison to those with bilateral lesions. All these observations indicate that a poor control of DM was associated with more severe forms of PTB.

**Keywords:** Tuberculosis, Diabetes mellitus, Revised National Tuberculosis Control Programme.

## INTRODUCTION

Tuberculosis (TB) still remains a major cause of morbidity and mortality worldwide. Around one third on the world's population is estimated to be infected by the bacillus *Mycobacterium tuberculosis*, approximately nine million people develop the disease each year, almost two million die annually from the disease.<sup>1,2</sup> The role of Diabetes Mellitus (DM) in the prognosis of Pulmonary Tuberculosis (PTB) and Extra Pulmonary Tuberculosis (EPTB) is a point of interest among various categories of researchers.

Previous studies mostly made in high burden countries have

established an important association between DM and PTB. Late diagnosis, improper and inadequate anti tuberculosis therapy (ATT) and immuno deficiency states including DM add insult to the injury.

The global burden of DM is on the rise, the prevalence is estimated to reach 438 million by 2030 and more than 80% of the adult cases will be in the newly developed or developing countries.<sup>3</sup> The dual curse of these two diseases may have an impact on the outcome of treatment. India, among other Asian countries is well known for the prevalence of DM and also TB. The course of TB remains variable especially so when associated with conditions like DM and this study conducted in Kerala, the diabetic capital of India may bring to light the relevance of such co-morbidities.

This study aimed at explaining the outcome of both Pulmonary and Extra Pulmonary Tuberculosis in patients with Diabetes Mellitus. It also intended to study the outcome in relation to duration of DM, age of patients, radiological extent and microbial load and assess the sputum conversion period.

## MATERIAL AND METHODS

Jubilee Mission Medical College, a tertiary care referral institute caters to patients from three districts of Kerala, namely – Palakkad, Malapuram and Thrissur. This prospective study included 100 patients of DM with newly diagnosed pulmonary or extra Pulmonary TB. Owing to various reasons 3 cases were excluded from the final analysis. Ethical approval was received from the Institutional Ethics Committee. Written informed consent was obtained from every patient.

Patients included in the study were put on directly observed treatment, short – course (DOTS) three times a week as per the Revised National Tuberculosis Control Programme (RNTCP) guidelines. At the end of the initial intensive phase

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(IP) of treatment, if the sputum smear was positive, the IP was extended by an additional month. Patients with central nervous system and spine involvement were given a total of 9 months of treatment.

Diagnostic and follow up sputum smear examination was done in quality assured designated microscopic centres in the district. All patients were considered to have DM if they reported the disease or a history of intake of anti diabetic drugs, or had a blood glucose value of > 130 mg/dL for fasting blood sugar (FBS) or >200 mg/dL for random blood sugar (RBS) or for post prandial blood sugar (PPBS) during diabetic screening. Blood glucose estimation was done during all visits using the fully automatic biochemical analyser in optimum laboratory conditions with the instruments being periodically calibrated. X-rays were done in all visits for PTB cases and lesions were described as unilateral, bilateral or normal x-rays chest. Sputum for AFB examination was done in relevant cases during all visits. Final outcome of treatment was declared as cured, lost to follow up, treatment failure.

**Sample size estimation:** Sample size was calculated at a population size of 10,000 at 95% confidence level. With 10% error the calculated sample size was 88. Ten percent cases were added for probable lost follow up and the sample size thus obtained was 97.

**Inclusion and exclusion**

**Inclusion Criteria:** All newly diagnosed PTB or EPTB patients with Diabetes Mellitus who gave informed consent and were ready for follow up.

**Exclusion Criteria:** Patients above 80 years of age, who had a past history of TB, pregnant women and patients with decompensated cardiac, hepatic or renal disease were excluded from the study

**STATISTICAL ANALYSIS**

Data entry, cleaning and storage was done using Microsoft EXCEL 2007 software package. Mean, median and proportions were calculated using SPSS version 20. Chi-square test were used for compared proportions.

**RESULTS**

A total of 100 patients of TB with DM were included in the

study. Only one patient was lost to follow up and two patients had alternate diagnosis while on treatment. Hence 3 cases were excluded and the final analysis was made on 97 cases. These excluded cases were from PTB category. One patient died during the study period. There was only one patient with HIV in the study and hence we have not reported any significance to it.

Out of the total 100 cases of study 67 patients were male and 33 females. Sixty four patients had PTB and 36 patients had EPTB. The age and sex wise distribution of the patients is given in the table 1. Majority of the patients (both PTB and EPTB) were in the age group of 40- 60yrs. Of the 61 PTB cases analysed 41 patients were smear positive (67%) and 20 patients were smear negative (33%). Of the EPTB cases, cervical lymphadenitis with 12 cases (33.3%) predominated followed by pleural effusion with 11cases (30.5%).

Since the study contains only diabetic patients their duration of illness is presented. Nearly quarter of the patients in both categories was on either oral hypoglycemic agents (OHA) or on insulin therapy for more than 5 years (Table 2). However, the majority of the cases were from 1-5 years. Eighty percent of the sputum +ve PTB patients had Hb A<sub>1c</sub> levels of between 6 – 12 %. The FBS at the time of presentation was between 130- 300mg/dL in 65% of patients probably indicating that a poor control of DM was associated with more severe forms of PTB. All of them were brought down to normal level of blood glucose during the course of treatment.

Regarding the grading of sputum positive patients 42.5% had a grading of 1+, 27.5% had a grading of 3+, 25% of the patients had a grading of 2+ and only 5% of the patients had scanty bacilli in their sputum (Table 3). Of the 41 smear +ve PTB patients, 90% converted to sputum negative status at the end of 2 months (except one case of death) The remaining 10% of the patients received an extra month of intensive phase and these were sputum negative at the end of 3 months. Out of the 36 cases of EPTB put on analysis 12 had treatment up to 9 months and reported as cured. Of these cases 5 had poor control of diabetes.

The mean weight of the patients at the time of presentation was 55.66 Kg which steadily increased to 60.58 Kg on the third visit. Meanwhile the average FBS was 188.76 mg/dL at the time of presentation and steadily decreased to 125. 74 mg/dL on the respective third visit (Fig 1). Out of the 61 PTB

Age in years	PTB 64 cases		EPTB 36 cases		Total 100	
	Male	Female	Male	Female	Male	Female
<40	5	2	1	2	6	4
40 – 60	26	9	13	6	39	15
> 60	15	7	7	7	22	14
Total	46	18	21	15	67	33

**Table-1:** The age and sex wise distribution of the patients

TB type	Duration of Diabetes Mellitus					Total
	< 1yr	1- 5 yrs	5- 10 yrs	10 -15	>15 yrs	
PTB	12	33	8	6	2	61
EPTB	12	14	4	4	2	36
Total	24	47	12	10	4	97

**Table-2:** Duration of treatment for DM in years

cases analysed 45 had unilateral lesions in the chest X ray and their average FBS level was 178 mg/dL. The remaining 16 had bilateral lesions in the chest X ray and their average FBS level was 257 mg/dL. When the FBS levels, sputum grading and chest lesions were correlated the patients with unilateral chest lesions in the X ray had lower FBS levels in comparison to those with bilateral lesions (table 4)

**DISCUSSION**

Different studies<sup>4-6</sup> have shown causal relationship between DM and impaired host immunity to TB. DM diminishes the Th1 response which plays a crucial role in TB. Furthermore, neutrophils in patients with diabetes have reduced chemotaxis and oxidative killing potential than those of non diabetic controls<sup>5</sup>, and leucocyte bactericidal activity was reduced in people with diabetes, especially those with poor glucose control taken together, it may be concluded that DM directly impairs the innate and adaptive immune response necessary to counter the proliferation of TB.

Patients with poor glycemic control as suggested by high Hb A<sub>1c</sub> and FBS levels at the time of inclusion in the study had more severe forms of PTB. This study shows lower FBS levels in patients with unilateral chest lesions than bilateral lesions. In a similar study from India<sup>6</sup> also reported this association of poor glycemic control and severity of PTB (Table 3) The gain in the body weight and decrease in FBS level during the progression of the treatment as reported in this study is clearly in accordance with the above reports and confirms that better glycemic control is essential for the effective control of TB. Another important finding of this study is that FBS levels, sputum grading and chest lesions are correlated and the patients with unilateral chest lesions in the X ray had lower FBS levels in comparison to those with bilateral lesions. All these observations show a clear association between TB and DM.

This study was carried out in India which has a high burden of both TB and DM. Kerala is considered to be the diabetic capital of India. The prevalence of DM in TB patients in Kerala is 44%.<sup>7</sup> This is a unique study as it includes patients from peripheral health facilities incorporated into the RNTCP programme. This study had certain limitations. The patients were not followed up after completion of their treatment for a long period. Hence the relapse rates were not known. Other co-morbidities like COPD, smoking etc were not taken into account which could have influenced the outcome of the treatment.

Certain actions need to be taken to strengthen the diabetic care at peripheries also in managing the TB patients. We need to strengthen our care to tackle this dual curse. In 2011, the World Health Organization and the International Union against tuberculosis and lung disease reported the association between TB and diabetes and calling for increased collaboration between TB and diabetes control efforts.

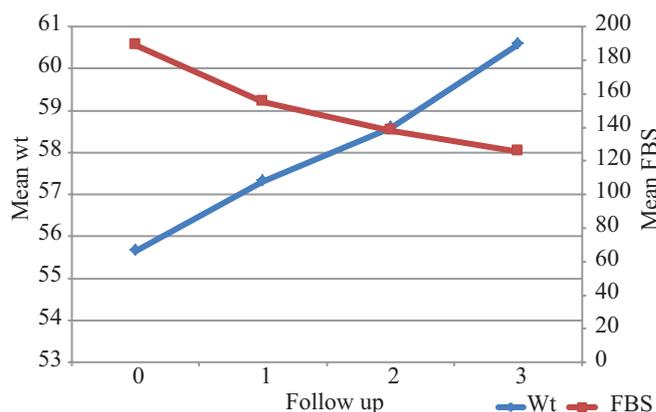
Diabetes and TB represent a critical intersection between communicable and non communicable diseases in some of the world's present countries. As the prevalence of non communicable diseases (NCD) continues to rise, the effects of NCD's on the prevention and treatment of infectious diseases will likely become more evident.<sup>8</sup> Diabetic patients should

Glycemic control	PTB sputum grading			
	Scanty	1+	2+	3+
DM in years				
<1	1	3	5	6
1-5	0	10	3	1
5-10	1	4	2	4
10-15	0	0	1	0
>15	0	0	0	0
DM control method				
Diet	0	0	1	0
OHA	2	10	8	8
Insulin	0	5	2	3
Insulin + OHA	0	2	0	0
DM - FBS level				
<130 mg/dL	0	3	3	4
130-300 mg/dL	2	11	8	5
300-500 mg/dL	0	2	0	2
>500 mg/dL	0	1	0	0
DM - HbA <sub>1c</sub> in percent				
<6	0	1	1	2
6-12	2	14	9	9
>12	0	2	1	0

**Table-3:** Range of glycemic control and PTB sputum grading

Sputum grading	Lesion in chest X ray	DM-FBS average level	
		130-300 mg/dL	300-500 mg/dL
Scanty	Unilateral	215 mg/dL	-
	Bilateral	199 mg/dL	-
1 +	Unilateral	192 mg/dL	-
	Bilateral	-	353 mg/dL
2 +	Unilateral	149 mg/dL	-
	Bilateral	154 mg/dL	-
3 +	Unilateral	171 mg/dL	-
	Bilateral	201 mg/dL	-

**Table-4:** Correlation of FBS levels, sputum grading and chest lesions



**Figure-1:** Glycemic control and body weight

remain part of the DOTS structure after completion of TB treatment to ensure optimal follow up and rapid detection of possible relapses. The programme regimen should develop educational materials for patient education especially so amongst diabetics explaining them their risk of developing active TB. Symptoms of cough for more than 2 weeks, fever, anorexia, weight loss should be clearly highlighted to such

patients so that they can seek early TB screening.

Recent reports on DM and TB indicate a global interest on this dual curse. However, in developing countries, the outcome of TB in patients with DM cannot be overlooked. Hence, probably better awareness among patients and integrated programme care should be aimed at in order to cure this deadly dual combo.

## CONCLUSION

Patients with TB should be screened for Diabetes Mellitus. Similarly patients with Diabetes Mellitus should be regularly screened with X ray chest and sputum AFB whenever clinically indicated. DOTS programme should incorporate free treatment strategies for comorbid diseases especially DM because of the strong correlation between the two. As patients with poorly controlled DM had more severe forms of PTB stringent measures to control blood sugars should be advocated. A high degree of patient awareness and integrated health care programmes would be effective in combating this dual curse.

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# Community Acquired Pneumonia, Detection and Prevention– A Hospital Based Descriptive Study

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## ABSTRACT

**Introduction:** Community acquired pneumonia (CAP) is one of the commonest pulmonary infection in adults and it has been recognised as a common and potentially lethal condition which poses a challenge for the treating physician in all over the world. The present study was under taken to study the mode of presentation, its clinical features bacteriological and radiological features for earlier detection of the disease and to prevent complication arising out of it.

**Material and methods:** A descriptive and prospective study about community acquired pneumonia was conducted among 50 consecutive patients admitted in medicine ward in the department of Medicine KIMS Bhubaneswar during the period 2013 to 2014. Chi-square and Fisher exact test were used with  $p < 0.05$  as significant value.

**Results:** Majority of the patients were in the age group of above 50 years comprising 52 % and sex wise majority were males comprising 86%. The commonest presentation was fever, cough and expectoration (100 %), 60% had chest pain and 50% had dyspnoea.

**Conclusion:** Community acquired pneumonia was more common in people over 50 years and more common in men with commonest presenting symptom was cough expectoration dyspnoea and chest pain. Bacteriological analysis revealed 70% Gm + bacteria and empiric and specific antibiotics were main stay of treatment with good clinical outcome and no mortality was encountered in the present study.

**Keywords:** Chronic obstructive pulmonary disease; Community-acquired pneumonia; Lung Disease

## INTRODUCTION

Community-acquired pneumonia (CAP) is one of considerable reason of morbidity and mortality in adults. It is defined as an infection of the lung parenchyma that is not acquired in a hospital, long-term care facility, or other recent contact with the health care system.<sup>1</sup> There are many aspects that leads to the development, disease progression and severity of chronic obstructive pulmonary disease (COPD). Some factors are largely controlled by an individual's genes while others are greatly influenced by harmful environmental hazards. Thus, there emerge two types of risk factors that attributes to the development of COPD: environmental risk factors and genetic risk factors. Smoking remains the major environmental factor that leads to COPD as well as significantly worsens the condition.<sup>2</sup>

The promotion of fluoroquinolones and newer macrolides for the treatment of CAP has been introduced due to concerns of antibiotic resistance and the emergence of new pathogens such as Chlamydia pneumoniae.<sup>3</sup> The aim of initial management in CAP patient is on early initiation of appropriate empirical antibiotics and identification of the pathogen.<sup>4</sup> The present study was under taken to study the mode of

presentation, clinical features, bacteriological and radiological features for earlier detection of the disease and to prevent complication arising out of it.

## MATERIAL AND METHODS

A descriptive and prospective study about Community acquired pneumonia was conducted among 50 patients attending MOPD or admitted in Medicine ward KIMS Bhubaneswar during the period 2013 -2014. Before the study the protocol was approved by ethical committee of KIMS Medical College Bhubaneswar. In order to avoid any problem in the study and to guarantee full cooperation of the participants informed consent was obtained from all the patients before their participation. Therapeutic strategies adopted in this study included drugs and invasive procedures. There was no mortality in this study. Detailed clinical examination related to mode of presentation like consolidation, effusion respiratory distress and other constitutional signs were vividly analysed. Patients were subjected to routine laboratory. X-ray investigative procedures and also subsequently reviewed after they have recovered from their illness for compression.

## STATISTICAL ANALYSIS

Statistical analysis was conducted using SPSS 11.0. Chi-square and Fisher exact test were used with  $p < 0.05$  as significant value.

## RESULTS

The study consisted of 50 patients, 43 were males (86%), 7 were females (14%) (Figure 1). Among males 58% were above 50 years of age and among females 84% above 50 years of age (Figure 2). Associated risk factor (table 2) for CAP were analysed like (hypertension, diabetes, COPD) and it was found that ACP is more common in patients having COPD. Out of the clinical signs (pallor, icterus, clubbing, edema, lymphadenopathy) clubbing was noted in frequently comprising 22% and pallor in 3% of cases. All patients had fever, cough and expectoration (100%), chest pain 66%, dyspnoea 50% (table 4). Signs of consolidation were observed in 68% of cases. Mild leucocytosis particularly neutrophilia was observed. Sputum analysis revealed gm positive organism (70%). 26% were gram negative and mixed accounted for 4%. X-Ray Chest revealed right middle and lower

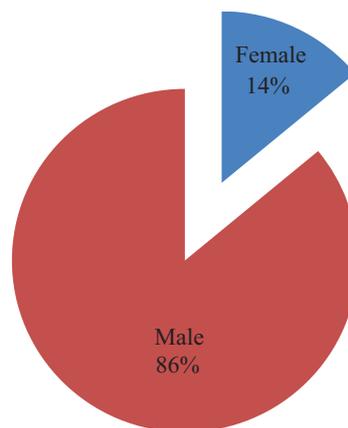
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Clinical features	Age ≤ 50 years (n=26)		Age >50 years (n=24)		Total (n=50)	
	No.	%	No.	%	No.	%
Fever	26	100	24	100	50	100
Cough	26	100	24	100	50	100
Expectoration	26	100	24	100	50	100
Dyspnoea	5	26	20	83.3	25	50
Chest Pain	20	76.9	13	54.2	33	66
Inference	Dyspnoea is significantly more common in elderly CAP patients (21.0 times more with p<0.001) and chest pain is more common in younger CAP patients (2.82 times more with p=0.090)					

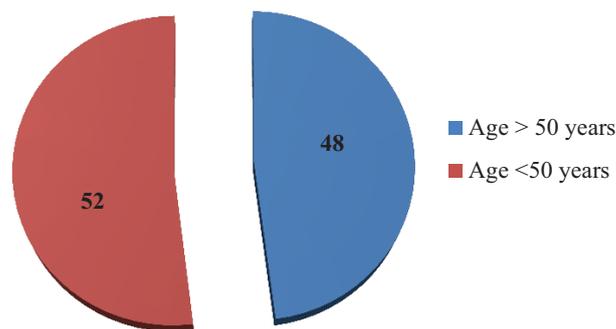
**Table-1:** Presentation clinical features in CAP Patients



**Figure-1:** Distribution according to gender of patients

Risk factors	Age ≤ 50 years (n=26)		Age >50 years (n=24)		Total (n=50)	
	No.	%	No.	%	No.	%
Hypertension	-	-	-	-	-	-
DM	1	3.8	1	4.1	2	4.0
PTB	-	-	-	-	-	-
COPD	1	3.8	10	41.7	11	22.0
Inference	Hypertension, DM and PTB are not risk factors for CP. The CAP is significantly more common in the patients with COPD (p<0.001)					
DM –Diabetes Melitus, PTB –Pulmonary Tuberculosis, COPD –Chronic Obstructive Pulmonary Disease						

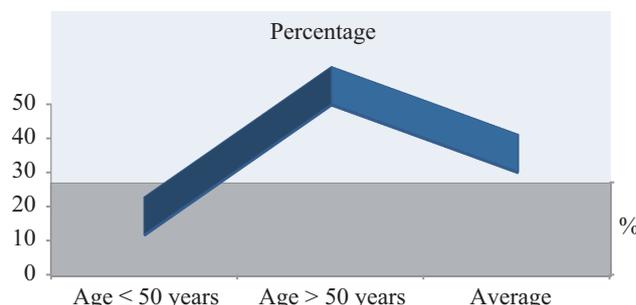
**Table-2:** Presentation of risk factors in CAPD Patients



Age –Pie Chart Showing >50 yrs 48% <50yrs 52%.  
**Figure-2:** Distribution according to age of patients

Signs	No of patients	%
VF	50	100
BBS	50	100
VR	50	100
WP	50	100
VF – Vesicular Braeth sound, BBS –Bronchial Breath Sound, VR-Vocal Resonance, WP-Whispering Pectprolique Adventitial Sound		

**Table-3:** Systemic examination findings



**Figure-3:** COPD with Age in Years

GPE	Age ≤ 50 years (n=26)		Age >50 years (n=24)		Total (n=50)	
	No.	%	No.	%	No.	%
Pallor	1	3.8	2	8.3	3	6.0
Icterus	-	-	-	-	-	-
Clubbing	1	3.8	10	41.7	11	22.0
Lymphadenopathy	-	-	-	-	-	-
Edema	-	-	-	-	-	-
Inference	Clubbing Significantly more common in CAP the patients with (p<0.001 )					

**Table-4:** Presentation of GPE in CAP patients

lobe affection 40%.

## DISCUSSION

The age group in this study varied from 27- 80 years and most of them were between 30-60 years of which 58% were above 80%.The incidence of CAP was more common in men 86% compared to females where their percentage were

only 14%.It is well documented that pneumonia is a commonly occurring disease in the community and its incidence increases with increases in age.<sup>5</sup> In the present study of 50 cases it was found that males outnumbered female with a percentage of 86% as compared to 14% in female which can be attributed to indulgence to alcohol and smoking by males more than females (alcohol, smoking) and these are the predisposing factors. Alcohol consumption is known to affect both systemic and pulmonary immunity, predisposing the patient to pulmonary infections.<sup>6</sup> Lim WS et al<sup>3</sup> conducted a hospital based study of community acquired pneumonia aetiology in adults and found that 50.6% were men and the mean (SD) age was 65.4 (19.6) years. COPD is worth mentioning as it is the most common predisposing cause which leads to patient more vulnerable to CAP. The presenting complaints observed was fever, cough, expectoration was seen in 100% of cases, followed by chest pain comprising 66%, lastly dyspnoea in 50% of cases. Torres A et al<sup>7</sup> evaluated risk factors for community-acquired

pneumonia in adults in Europe and reported that the overall annual incidence of CAP in adults ranged between 1.07 to 1.2 per 1000 person-years and 1.54 to 1.7 per 1000 population and increased with age (14 per 1000 person-years in adults aged  $\geq 65$  years). Men had higher incidence than women and also incidence was higher in patients with chronic respiratory disease and HIV. Smoking, alcohol abuse, being underweight, having regular contact with children and poor dental hygiene increases the risk of CAP. The presence of comorbid conditions which increases the risk of CAP are chronic respiratory and cardiovascular diseases, cerebrovascular disease, parkinson's disease, epilepsy, dementia, dysphagia, HIV or chronic renal or liver disease. Study by de Roux A et al<sup>6</sup> revealed that *S pneumoniae* was found to be significantly more common in patients with alcohol misuse as well as found that current alcohol abuse was associated with severe CAP.

The present study observed that all patients recovered with the conventional approach, there was no mortality. Clinical progress was confirmed with resolution of X-Ray features and signs of improvement. The limitation of the present study was that it was a hospital based study conducted in a tertiary care centre and thus not exactly reflect the incidence in the community. The sample size was small and also less number of females were enrolled in the study because they seek or get less medical attention. Community based studies should be undertaken to find out more data regarding etiopathogenesis and other relevant predisposing factors. The etiologic pathogen responsible for most cases of CAP is *Streptococcus pneumoniae*. Other less common pathogens are *Haemophilus influenzae* and *Chlamydia pneumoniae*, as well as oral anaerobes, *Staphylococcus aureus*, *Legionella pneumophila*, *Moraxella catarrhalis*, and Hantavirus. However, in about 50% of cases diagnosed with CAP, no identifiable pathogen is identified. Thus, diagnosis and management is often based principally upon clinical factors, none of which appears definitive in identifying the causal agent. Initiation of immediate and appropriate treatment strategy is important, as early treatment of CAP has been shown to be associated with improved and better outcomes.<sup>8</sup>

## CONCLUSION

In the present study fever, cough with occasional chest pain, expectoration were common presenting complaints. Dyspnoea, clubbing, whispering pectorilique were common clinical signs that was observed. Laboratory test were consistent with leucocytosis, anaemia raised ESR. Elderly persons more in the age group of above 50 years and, with increased male preponderance were found to be more affected. Indulgence in alcohol as well as smoking, underlying illness like COPD increases the risk of acquiring CAP.

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# Comparative Study of Oral Iron and Intravenous Iron Sucrose for Anaemia Prophylaxis in Pregnancy

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## ABSTRACT

**Introduction:** According to WHO it is estimated that ~56 million pregnant women are anaemic, among which 75-80 % have iron deficiency anaemia. Even the most optimal diet is not sufficient to meet the increased iron demands in pregnancy, therefore iron supplementation is a must during pregnancy. The first choice in the treatment is oral iron because of its effectiveness, safety, and lower cost. However there are problems with oral intake such as poor compliance. Hence a predetermined dose of parental iron given intermittently may have an advantage. Keeping this in mind, this study has been designed to compare the efficacy of daily oral iron supplementation and fixed schedule of intravenous iron sucrose given in pregnancy for anaemia prophylaxis.

**Material and methods:** 200 patients between 16 – 20 weeks of gestation with singleton pregnancy and Hb level 8-11 gm/dl attending antenatal OPD were recruited and divided in two groups. Group A was given oral iron tablets containing 100mg of elemental iron. Group B was given a total of 1000 mg of intravenous iron sucrose divided into five doses of 200 mg each at weekly intervals. Estimation of haemoglobin was started 4 weeks after commencement of iron therapy and then repeated every 4 weeks till 36 weeks of gestation, pre-delivery and postpartum.

**Results:** Haemoglobin repeated at term and postpartum did not show significant difference in the two groups. In group A incidence of nausea and vomiting was significant while in group B incidence of superficial thrombophlebitis was significant.

**Conclusion:** The increment in haemoglobin with iron sucrose was comparable with oral iron. No significant differences were found in immediate postpartum maternal haemoglobin levels. Side effects noted in the study were minimal.

**Keywords:** Oral iron, intravenous iron, anaemia prophylaxis

## INTRODUCTION

Iron deficiency anaemia is the most common nutritional deficiency anaemia world wide with prevalence maximum among pregnant and postpartum women.<sup>1</sup> The prevalence of iron deficiency anaemia in developing countries is approximately 52%.<sup>2</sup> Iron requirement is not evenly distributed throughout pregnancy. In first trimester there is saving of iron due to cessation of menstruation (0.56 mg/day), with the requirements maximum during the latter half of pregnancy.<sup>3</sup> Degree to which iron deficiency anaemia develops depends upon the pre-pregnancy iron stores and physiological changes of iron metabolism during pregnancy. Haemodynamic changes include generalized vasodilatation, plasma volume expansion, increase in red cell mass.<sup>4</sup> Some studies suggest that during early pregnancy there is some decrease in erythropoietic activity, reticulocyte count.<sup>5</sup> A rise of serum ferritin may be observed.<sup>4,6</sup> In the latter half of pregnancy iron de-

mand and oxygen consumption increases progressively. Although iron requirement decreases during the first trimester it increases to 4 to 6 mg during the second and third trimester.<sup>7</sup> Maximum haematological changes- red blood cell expansion occurs during the later half of pregnancy<sup>8</sup>, therefore during the last 6-8 weeks of pregnancy iron demand may go upto 10 mg/d.<sup>9</sup> Even the most optimal diet is not sufficient to meet the increased iron demands in pregnancy<sup>7</sup>, therefore iron supplementation is a must during pregnancy

According to WHO it is estimated that ~56 million pregnant women are anaemic, among which 75-80 % have iron deficiency anaemia.<sup>10</sup>

The Government of India in the National Nutritional Anaemia Control Programme has recommended that all pregnant women should be given one tablet of iron and folic acid containing 100mg elementary iron and 0.5mg folic acid in the second half of pregnancy for at least 100 days. Intravenous iron therapy is reserved for a small number of patients in whom oral treatment fails. Severe systemic adverse effects associated with iron dextran and iron-sorbitol-citric acid complex limited the use of intramuscular iron. However, iron sucrose is reported to be safe and effective for the management of anemia, and it can be administered without a test dose.

Compliance and absorption of drug is an issue with oral iron. Hence a predetermined dose of parental iron given intermittently may have an advantage. This study was designed to compare the efficacy of daily oral iron supplementation and fixed schedule of intravenous iron sucrose given in pregnancy for anaemia prophylaxis.

Aims and objectives of the research were to compare oral iron tablets and intravenous iron sucrose for anaemia prophylaxis in pregnancy, to look for any significant side effects resulting from respective iron intake and to evaluate whether a limited dose schedule parenteral iron sucrose can be an alternative to daily oral iron throughout pregnancy for anaemia prophylaxis.

## MATERIAL AND METHODS

A prospective interventional study was conducted in Dr. D.Y. Patil Medical College, Hospital and Research Center,

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Pimpri, Pune for the period of August 2013 to September 2015.

Study was conducted on 200 patients attending antenatal OPD of Dr D.Y. Patil Medical College Hospital and Research Center, Pimpri, Pune

#### Inclusion Criteria

1. Singleton pregnancy between 16 – 20 weeks of gestation.
2. Hemoglobin level 8-11 gm/dl.

#### Exclusion Criteria

1. Pregnant women with hemoglobin level < 8gm/dl and >11 gm/dl
2. Any medical disorder like tuberculosis, thyroid disease, diabetes, liver or kidney disease.
3. Multiple gestation.
4. Any obstetrical complicating factors like pre-eclampsia/eclampsia.

#### Methodology

A prospective interventional study was carried out at a tertiary care teaching hospital between August 2013 to September 2015. Ethical committee clearance was obtained before commencing the study. All patients were enrolled after a duly signed informed consent. 200 patients between 16 – 20 weeks of gestation with singleton pregnancy and Hb level 8-11 gm/dl attending antenatal OPD were recruited based on inclusion and exclusion criteria. Medical disorder like tuberculosis, thyroid disease, diabetes, liver or kidney disease were excluded.

A thorough history followed by clinical examination of all cases was carried out and antenatal investigations as per our institution protocol were undertaken. The cases were randomly divided into two groups of 100 each by randomly generated numbers.

Group A was given oral iron tablets containing 100mg of elemental iron and 500 microgram folic acid daily throughout pregnancy.

Group B was given a total of 1000 mg of intravenous iron sucrose divided into five doses of 200 mg each at weekly intervals.

These patients continued taking 5 mg folic acid tablets daily throughout pregnancy. All adverse events after each infusion of iron sucrose were identified. Patients on oral iron therapy were asked regarding compliance, tolerance and side effects. Compliance was ensured in the oral iron group by history taking and enquiring colour of stools. Suitable dietary advice was given to both the groups. Estimation of haemoglobin was started 4 weeks after commencement of iron therapy and then repeated every 4 weeks till 36 weeks of gestation.

Haemoglobin levels in both the groups were compared and requirement of additional therapy if any was also assessed. After this haemoglobin level was investigated at the time of admission for delivery and 48 hours after delivery unless indicated earlier for intrapartum/postpartum complications.

#### STATISTICAL ANALYSIS

Tables were generated with the help of Microsoft office software. Results were tabulated and statistically analysed according to chi-square test and Z test.

#### RESULTS

Both groups were matched for age, parity and dietary history. On comparing haemoglobin level between group A and group B at recruitment, successive follow up and at term and delivery, it was found that haemoglobin at recruitment between group A and group B did not show any significant difference and haemoglobin compared at successive visits showed significant improvement in both groups.

Haemoglobin repeated at 28-32 weeks and 35-36 weeks in group A and group B showed some statistical significance with improvement greater in group B with P value <0.05 and Z value of 2.02. However there was no clinical difference in between the two groups. but haemoglobin repeated at term and postpartum did not show significant difference (P >0.05) between the two groups.

The results of haemoglobin comparison are tabulated below in table 1.

No major adverse effects were noted in the study. In group A incidence of nausea and vomiting was significant while in group B incidence of superficial thrombophlebitis was significant. In group A 2 patients complaints of giddiness, 1 patient complaint of headache and 1 patient complained of pain in abdomen. Headache and pain was on and off. In group B 3 patients complained of fever and 2 patients complained of chills as tabulated in table 2. All side effects were conservatively managed.

#### DISCUSSION

Oral iron is the first choice for anaemia prophylaxis and treatment in mild iron deficiency anaemia, however compliance is an issue. In such cases injectable iron therapy may have its place.

Iron sucrose has been reported to be safe and effective during pregnancy.<sup>11</sup> In this study mean haemoglobin at recruitment did not show any significant difference between group A and group B. Haemoglobin in both group at successive visits showed significant improvement with a slight edge in group B at 28-36 weeks. The result of this study was in accord-

Hb. (gm%) at	Group A (n=100)		Group B (n=100)		Z Value	P Value
	Mean	SD	Mean	SD		
Recruitment	10.19	0.64	10.16	0.44	0.33	>0.05
20 – 24wks	10.45	0.69	10.42	0.50	0.38	>0.05
28 – 32wks	10.48	0.67	10.64	0.38	2.01	<0.05
35 – 36wks	10.59	0.55	10.73	0.49	1.99	<0.05
Term	10.76	0.58	10.89	0.61	1.51	>0.05
Post partum	9.73	1.09	9.83	0.64	0.77	>0.05

**Table-1:** Comparison of Haemoglobin level in group A and group B

Side effects	Group A (n=100)	Group B (n=100)	Z Value	P Value
Nausea	5	0	2.29	<0.05
Vomiting	4	0	2.04	<0.05
Chills	0	2	1.43	>0.05
Fever	0	3	1.76	>0.05
Giddiness	2	0	1.43	>0.05
Headache	1	0	1.01	>0.05
Pain in abdomen	1	0	1.01	>0.05
Superficial thrombophlebitis	0	8	2.95	<0.005

**Table-2:** Side effects wise distribution of cases in A and group B

ance with a study conducted by Bayoumeu in 2002.<sup>12</sup> and by Gabriela et al in 2009.<sup>13</sup> However a study conducted by AL RA (2005) to compare the efficacy of intravenous iron to oral iron in the treatment of anemia in pregnancy showed that hemoglobin from baseline was significantly higher in the intravenous group compared to the oral group at each measurement.

Side effects noted in this study were minimal. The high tolerance of iron sucrose has been partly attributed to slow release of iron from the complex and also due to the low allergenicity of sucrose. Till date, one death has been reported with intravenous iron sucrose injection.<sup>14</sup> The explanation given for this was because of very slow infusion (1-2 h) free radicals released from the iron sucrose may have caused the death. The injection should be given within 15-20 min or up to 200 mg can be given as slow IV bolus over 2-3 min.

The cost of therapy of injectable iron sucrose is known to be higher when compared to oral iron tablets. Moreover iron tablets with folic acid are provided free of cost to antenatal mothers under the national family welfare program of the government. Therefore cost is an important limiting factor in using iron sucrose injection for anaemia prophylaxis in pregnancy not withstanding its advantages in the long run.

## CONCLUSION

The increment in haemoglobin with iron sucrose was comparable with oral iron. No significant differences were found in immediate postpartum maternal haemoglobin levels, birth-weight and Apgar score of neonates. Side effects noted in the study were minimal. Compliance can be ensured with the injectable iron group, however the cost of injectable iron is more compared to iron tablets. If cost is not a limiting factor limited dosage schedule of iron sucrose as prescribed in the study is a safe and effective alternative to daily oral iron taken throughout pregnancy for anaemia prophylaxis in pregnancy.

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# Effect of Pranayama and Eye Exercises on Visual Acuity of Medical Students: A Case Control Study

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## ABSTRACT

**Introduction:** In current century of information technology, use of electronic gadgets has increased and also the no of ocular complaints also increased. Regular practice of relaxation techniques like pranayama and certain eye exercises are found to be useful in relieving these systems and also improving the visual acuity as such. Aim to study the effect of pranayama and eye exercises on visual acuity.

**Material and Methods:** This study was done on 60 medical students, divided into study and control groups equally. Study group subjects performed kapalabhati pranayama and eye exercises regularly for eight weeks while control group participants did not participate in any kind of exercise. Snellen's chart was used to test the visual acuity to test the effect of pranayama and eye exercises.

**Results:** There was significant improvement in visual acuity in subjects practicing pranayama and eye exercises. Visual acuity values in study group in right eye before and after intervention were  $34.30 \pm 20.28$  and  $30.70 \pm 21.89$  respectively. Values in left eye were  $34.60 \pm 20.08$  and  $30.46 \pm 21.62$  respectively. In control group the values were  $32.60 \pm 20.37$  and  $32.30 \pm 20.44$  for right eye respectively and  $31.10 \pm 19.22$  and  $30.90 \pm 19.15$  for left eye respectively.

**Conclusion:** The present study suggests that pranayama along with eye exercises can be used as potential non-pharmacological measure for visual acuity improvement.

**Keywords:** Visual acuity, pranayama, eye exercises, Snellen's chart

## INTRODUCTION

In the current century, information technology has become the boon for the overall development of a person. But it has got certain disadvantages also if used excessively. Excessive television watching, spending lot of time on social networking sites on mobile and computer has increased the eye complaints. Most of the people visit ophthalmologist with common ocular complaints like itching, redness, burning, tearing of the eyes, headache, double vision, eye strain and blurred vision.<sup>1,2</sup> In India, the major symptoms related to the computer use reported by the ophthalmologists are headache, eyestrain, tiredness and burning sensation, watering and redness.<sup>3</sup> Depth perception is the function of binocular vision which gives us an idea regarding size and distance of the objects to enable us move around them. Both of our eyes and its connections to brain and extra ocular muscles work in coordination to produce complicated visual images and messages. All of us in our routine activities often need to respond immediately to different simple as well as complex conditions like the simple responses to the doorbell in home to the traffic signals on the road. These muscles can get fatigued. Thus it is necessary for us to do regular exercise in

order to keep these muscles healthy, like any other muscle in the body.<sup>4</sup> Yoga is an ancient Indian technique which includes practice of specific postures, cleansing practices, regulated breathing exercise and meditation. A combination of yoga practices along with other eye relaxation techniques reduced symptoms of visual strain reflecting in betterment of visual acuity. Yogic exercises are supposed to strengthen all the extraocular muscles and help in preventing eye strain. Yoga has been shown to improve ocular symptoms in people who use computers for prolonged hours.<sup>5</sup> Even a short program of yogic exercises of six weeks was found to be effective in enhancing emotional well-being and handling of stress among employees of a workplace.<sup>6</sup> It has been reported that one month yoga training resulted in improvement in mirror tracing tasks.<sup>7</sup> In 1900, Dr. William H. Bates, a New York ophthalmologist noted how much his own eyes ached. It reminded him how often his patient complains of eyestrain and headaches even after they had responded well to medical treatment. In his office, he rested his elbow on his desk and cupped his palms over his eyes. After ten minutes his eyes stopped aching and he felt mentally refreshed. Uncupping his eyes, he found that objects in his room seemed much clearer and brighter. His observation led him to evolve his 'method of eyesight training' described in his bestselling book of 1919, *Better Eyesight without Glasses*. Various websites mentioned simplified eye exercises and their usefulness on eyes including claims like improvement in vision. But definitive studies in this regard are lacking. We planned this study with the objective to study the effect of pranayama along with Bates eye exercises on visual acuity.

## MATERIAL AND METHODS

### Study Design

Present study was carried out in Physiology Department at reputed Medical College of Mumbai. Total 60 healthy subjects (both male and female) who were in the first year MBBS, in the age group of 18–30 years belonging to sim-

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ilar socio-economic status were recruited in the study. All the study participants were staying in college hostel having similar eating and sleeping patterns. The study subjects were selected according to following preset inclusion and exclusion criteria.

#### Inclusion Criteria

1. Indian subjects with or without refractory error
2. Both male and female subjects.
3. Subjects in 18-30 years of age.

#### Exclusion Criteria

1. Subjects with colour blindness.
2. Subjects with organic diseases like glaucoma, eye infections, eye injury, malignancy, post surgery for refractive errors, squint.
3. Subjects suffering from medical conditions known to impact cognitive functioning like neurological disorders, head injuries, cardiovascular diseases and diabetes.
4. Subjects not willing to give written consent.

All the participants were briefed in detail regarding the nature of study and written informed consent was obtained from each of them. Study was approved by the Institutional ethics committee.

Two groups were created viz: study and control group. Subjects were divided randomly into two groups; containing 30 subjects (18 male and 12 female) each. Visual acuity values were recorded from all the study participants before starting the study. Participants of study group were taught eye exercises and kapalbhathi pranayama. They performed eye exercises and pranayama 2 times a day for (total one hour) 8 weeks regularly under supervision. Participants from control group were busy with their daily activities without exercise. Visual acuity was recorded from all the participants at the end of 8 weeks to see the effect exercises on vision.<sup>8</sup>

#### Study Procedure

Study group participants practiced the following exercise techniques regularly as per protocol for a period of 8 weeks.

**1. Palming and Visualization with Kapalbhathi:** Warm the hands by rubbing palms over each other. Both the eyes should be covered and closed with the palms to allow the fingers to cross on the forehead. The hands should be cupped to prevent any pressure on eye balls. Person should open the eyes and see if any light is getting in or not. The warmth of the hands along with blocking out all external light, relaxes the pair of tensed eyeballs.

**Kapalbhathi:** Along with palming, subjects need to exercise the diaphragm by exhaling suddenly and rapidly through both the nostrils. Inhalation is automatic and passive process. The air should be exhaled from the lungs with a rapid and forceful inward stroke of the abdominal muscles. The abdominal stroke should be complete and the air should be expelled forcefully. During inhalation, no conscious expansion is required and the abdominal muscles should be relaxed. Exercise should be performed in three phases, each consisting of 20 to 30 strokes a minute. A little rest pause can be taken in between. Throughout the exercise, the thoracic muscles should be kept contracted.<sup>9</sup> Subject need to practice it for 5–10 minute sessions, at least twice a day. If this becomes unpleasant, one can shift palming for a period of 15

breaths, up to 20 times a day. Palming may also help when the eyes become tired and blurred.

**2. Blinking:** Subjects are told to make a routine of blinking regularly, once or twice per 10 seconds. It helps in cleaning and lubricating the eyes particularly in glass and contact lens wearers.

**3. Near and far focusing with Kapalbhathi:** Subject should hold index fingers or two pencils, in front of the face—one should be at 7.5 cm away and other at arm's length. Subject need to focus on one with eyes open, then blink and focus on other. It should be repeated several times whenever opportunity arises. Subjects should practice kapalbhathi pranayama along with focusing exercise.

**4. Shifting with Kapalbhathi:** It is necessary to shift the eyes to avoid eye strain. Staring is harmful for our eyes. One should not stare continuously at an object. Subject need to pretend that he/she is looking at the center of a giant clock with face should be straight ahead. Head should be still all the time, subject has to look as far as possible towards the 12 O'clock position, look for 2 seconds, then move the gaze clockwise at 3' O'clock, then 6' O'clock, then 9' O'clock and back to 12' O'clock position. At every position subject has to hold his/her vision for two seconds and should expire in three bouts with contraction of abdominal muscles. i.e., Kapalbhathi. This cycle should be repeated anticlockwise. Subject has to practice this three times clockwise and three times anticlockwise, alternately.

**5. Splashing:** Every morning subjects have to splash close eyes 20 times first with warm water and then 20 times with cold water. Repeat the procedure in the night by splashing the closed eyes 20 times first with cold water and then 20 times with warm water. This stimulates the circulation of blood.<sup>8</sup>

#### Outcome Measures

##### Acuity of vision

It is the degree to which the details and contours of objects are perceived. We have measured the acuity of vision of all the subjects using Snellen's chart.

**Snellen's chart** – in 1875 Snellen created a new set of chart that used six meters as the standard measurement distance. It is a chart used for testing distant vision which is tested by the ability of the subject to recognize test letters on the chart. The test Block letters which are black on white background are of different sizes. Each line of letters has a figure of 60, 36, 24, 18, 12, 9, 6 and 5 meters noted beside it. The chart is so designed that each letter a normal individual can read at a required distance, subtends a visual angle of 5 minutes. The width of each stroke of the letter being 1 minute and the lines in the letter are also separated by 1 minute of arc. Thus the 'minimum separable' in a normal individual corresponds to a visual angle of approx. 1 minute. If the subject, who stands at 6 meters (20 feet) distance reads the chart with one eye at a time and can read no further than the '24 meters' line, his visual acuity is 6/24. It means a letter which can be read by a normal individual at 24 meters is being read at a distance of 6 meters only. Normal visual acuity is 6/6 or 6/5.<sup>10,11</sup>

Intervention	Right Eye			Left Eye		
	Mean	Std Dev	SEM	Mean	Std Dev	SEM
Before Exercise	34.30	20.28	2.61	34.60	20.08	3.66
After Exercise	30.70	21.89	2.82	30.46	21.62	3.94
P value=0.00 (S)			P value=0.00 (S)			

**Table-1:** Visual Acuity findings in Study group

Intervention	Right Eye			Left Eye		
	Mean	Std Dev	SEM	Mean	Std Dev	SEM
Before Exercise	32.60	20.37	3.71	31.10	19.22	3.51
After Exercise	32.30	20.44	3.73	30.90	19.15	3.49
P value=0.55 (NS)			P value=0.69 (NS)			

**Table-2:** Visual Acuity findings in Control group

## STATISTICAL ANALYSIS

The statistical analysis was done using Data Analysis tool of Microsoft Excel and Systat 12 (Systat Software, Inc. Chicago). The statistical significance was considered at probability value less than 0.05.

## RESULTS

Thirty subjects were enrolled in both study group and control group. Visual acuity in study group in right eye before and after intervention was  $34.30 \pm 20.28$  and  $30.70 \pm 21.89$  respectively. Whereas visual acuity in left eye were  $34.60 \pm 20.08$  and  $30.46 \pm 21.62$  respectively.

In control group the values were  $32.60 \pm 20.37$  and  $32.30 \pm 20.44$  for right eye respectively and  $31.10 \pm 19.22$  and  $30.90 \pm 19.15$  for left eye respectively. Paired t test was applied for statistical analysis. Result suggested that there was statistically significant improvement in visual acuity score in study group participants whereas the results were statistically non-significant in control group subjects. Findings suggest that practicing pranayama and eye exercises helps to improve vision reflected in visual acuity.

## DISCUSSION

In the present study Snellen's chart was used to check visual acuity in normal healthy subjects and to see the effects of pranayama and eye exercises on visual acuity. Results suggested that there was significant improvement visual acuity in subjects practicing pranayama along with eye relaxation exercises as compared with control group.

Our study results are comparable with that of Shirley Telles et al, they studied the visual discomfort in 291 professional computer users before and after yoga, their results suggested that the yoga practice reduce visual discomfort, while the group who had no yoga intervention showed an increase in discomfort at the end of sixty days.<sup>12</sup>

Rosemary Gaddum Gordon, D.B.O, M.A. published the article in 1995 in which he mentioned that: The extra ocular muscles need to be flexible and energized in order to maintain clear accurate focus. As we relax, muscles soften and rest. This allows them to return to their more natural state and move more freely. Vision is a function of both body and mind. Developmentally the eye is an extension of the brain, and it's the mind that sees. As a result of this body-mind connection the eyes only relax fully when the mind is relaxed. The mind relaxes when it is focused on just one thing

at a time.<sup>13</sup> Study conducted by M Ashok Kumar et al on 30 medical students concluded that yoga eye exercises shown objective as well subjective improvement in ocular health of study participants after 6 weeks of exercise.<sup>14</sup>

The extra ocular muscles need to be flexible and energized to preserve clear and accurate focus. As we relax, muscles relax. This enables them to return to their natural state and move freely. Vision is a function of body as well as mind. Developmentally the eye is an extension of the brain, and it's the mind that sees. As a result of this body-mind coordination the eyes only relax completely when the mind is relaxed. The mind relaxes when it is focused on just one thing at a time.<sup>15</sup> Significant positive results of our study are may be due to improvement in blood supply and nutrients to all the extraocular muscles which controls the movements of the eye. A regular exercise of extraocular muscles restores the normalcy of the eyeball in relation to size and shape which is the most important for normal vision.

## CONCLUSION

The results of the present study suggest that practice of pranayama along with eye exercises for 8 weeks improves the visual acuity. In contrast, the control group subjects who had not practiced pranayama do not show any improvement in the visual acuity. It suggests that pranayama along with eye exercises can be used as potential non-pharmacological measure for visual acuity improvement.

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# Marascuilo Method of Multiple Comparisons (An Analytical Study of Caesarean Section Delivery)

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## ABSTRACT

**Introduction:** From last three decades it was observed that the trend of caesarean section delivery is increasing in Indian community. Further this trend is not uniform for its States. This rate differ from place to place with respect to urban, rural, tribal community and also with respect to type of institution either government or private. Techniques in inferential statistics are applied to assess these differences. In order to analyse the proportions of CS, statistical inference i.e. Z-test, Chi-square test and Marascuilo's methods are applied.

**Material and methods:** While sampling, in order to ensure the inclusion of villages, urban areas and tribal (Adivasi) regions two stage sampling is adopted. Observations and records from hospitals were used for collecting data. The data collection from these health care institutions was undertaken from 1 Jan 2009 to 31 December 2009. Data was analyzed on SPSS 22.

**Results:** Rejecting the null hypothesis of equality of proportions by chi square test concluded that not all population proportions are equal. Because the result of the chi square test for equality of proportions does not specifically focus the significantly different pairs, there is need to use a multiple comparisons procedure that is the Marascuilo procedure which enables us to make comparisons between all pairs of groups.

**Conclusion:** The rate of caesarean section is high in urban private sector and very low in tribal areas. A difference is statistically significant in all fifteen comparisons involving 6 population proportions.

**Keywords:** Caesarean section, Proportion, Marascuilo procedure.

## INTRODUCTION

A Caesarean section is the technical name for delivering a baby by operating the mother under anesthesia rather than allowing normal labor and delivery. It is recommended in cases where there is distress due to wrong positioning of the baby in the womb, obstruction or due to many more reasons. In few years we observed that there is remarkable increase in the rate of caesarean section (CS) in both developed and developing countries. India is also showing the same increasing trend. The study is carried out to investigate the real reasons for this increasing trend. The reasons for the said phenomenon are either medical or nonmedical. Several studies have shown that the rate of CS differ from place to place and from region to region. Therefore, we carried out a multicentre, large sample, cross sectional study to analyse the CS rate in Nasik division in Maharashtra state during the year 2009. WHO recommended that no region should have a CS rate over 10–15%.<sup>1,2</sup> Based on a survey by the World Health Organization (WHO) on methods of delivery during the period 2007–08, the rates of CS in Asian countries was 27%.<sup>3</sup>

The aim of our study was to estimate the overall CS rate in Maharashtra, and to describe the factors associated with the increased CS rate in Region.

## MATERIAL AND METHODS

The study population comprised women who gave birth during the period 1<sup>st</sup> January 2009 to 31<sup>st</sup> December 2009. Total 61 hospitals from 5 districts of Nasik region namely Nasik, Ahmadnagar, Dhule, and Jalgaon and Nandurbar comprise the sample. The data include hospitals from rural areas (26), urban areas (35), Private Hospitals (31) and Government Hospitals (30) which includes municipalities, autonomous hospitals and Medical colleges. We selected 61 Maternity hospitals and number of deliveries in the hospitals from the registers that occurred during 2009, excluding miscarriages or termination of pregnancy before 28 gestational weeks. The sampling method for each population is simple random sampling. The samples are independent. The overall rate of CS in the Nasik division was estimated as 20.74 %.

## STATISTICAL ANALYSIS

Statistical hypothesis testing is an essential component of biological and medical studies for making inferences and estimations from the collected data in the study; however, there are several methods to study the phenomenon under consideration. In order to compare CS rates in different regions we can have different test procedures such as Chi-square test for testing independence of attribute, Z test for testing equality of two proportions and Marascuilo's test for testing equality of several proportions. We compare these methods for inference and Marascuilo method is better as it provides the magnitude of variation in the pairs of proportions.

The method applied for testing the homogeneity of proportions is based on the chi-square distribution via contingency tables.<sup>4</sup> To test the null hypothesis of no difference in the proportions among the 6 populations, when we have samples from 6 populations, we can test whether there are significant differences in the proportion of CS for these populations using a contingency table approach. We construct the contingency table has two rows and 6 columns.

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$H_0: p_1 = p_2 = \dots = p_6$  against the alternative that not all 6 population proportions are equal

$H_a$ : Not all  $p_i$  are equal ( $i=1,2,\dots,6$ ), we use the following test statistic:

$$\chi^2 = \sum (fo - fc)2 / fc$$

Where  $fo$  is the observed frequency in a given cell of a  $2 \times 6$  contingency table, and  $fc$  is the theoretical count or expected frequency under the assumption that region, institution and mode of delivery are independent. The critical value is obtained from the  $\chi^2$  distribution table with degrees of freedom  $(2-1)(6-1)=5$ , at a given level of significance. We estimate the single overall proportion of CS under  $H_0$  by pooling the results of all the samples as  $p^- = (11317)/(72995) = 0.155$

Estimate of proportion of Normal Deliveries is  $1 - p^- = 0.845$ . Multiplying these two proportions by the sample sizes used for each lot results in the expected frequencies of CS and Normal deliveries. We use the observed and expected values from the tables to compute the  $\chi^2$  test statistic. Table for computing the test statistic

If we choose a 0.05 level of significance, the critical value of  $\chi^2$  with 5 degrees of freedom is 11.0705. ( $P$  value  $< 0.001$ ). Calculated value exceeds this critical value, we reject the null hypothesis. That is proportions of CS are significantly different in rural, urban and in adivasi areas. In order to compare the two population proportions  $Z$  test is applied.<sup>5</sup> Here we are testing equality of CS proportions (Categorical data) in different areas. According to area of residence the two groups are rural and urban, and according to place of delivery we can categorize the institution as government or private hospital. A random sample is drawn from each of the category as mentioned above. Here the Null hypothesis is the proportions do not differ significantly. Differences in the baseline characteristics between two groups were tested using  $Z$  test for proportions. Categorical data were expressed in proportions and the differences in proportions between the two groups were examined using the  $Z$  test.  $H_0: P_1 - P_2 = 0$ , where  $P_1$  is the proportion from the first population and  $P_2$  the proportion from the second. The null hypothesis tends to be that there is no difference between the two population proportions; or, more formally, that the difference is zero. Since the null hypothesis states that  $P_1 = P_2$ , we use a pooled sample proportion ( $p$ ) to compute the standard error of the sampling distribution.

$$P = (p_1 * n_1 + p_2 * n_2) / (n_1 + n_2)$$

Where  $p_1$  is the sample proportion from population 1,  $p_2$  is the sample proportion from population 2,  $n_1$  is the size of sample 1, and  $n_2$  is the size of sample 2.

Standard error (SE) of the sampling distribution difference between two proportions is SE.

$$SE = \text{SQRT} \{ P * Q * [(1/n_1) + (1/n_2)] \}$$

The test statistic is a  $Z$ -score defined by the following equation.

$$Z = \frac{p_1 - p_2}{\sqrt{P * Q * [(1/n_1) + (1/n_2)]}}$$

The  $p$ -value is the probability of observing a sample statistic as extreme as the test statistic. We use normal probability table to assess the probability associated with the  $Z$ -score.

Since we have a two-tailed test, the  $p$ -value is the probability that the  $Z$ -score is less than or greater than calculated test statistics calculated Statistic. We use the Normal probability tables to find  $P$ -value. Since the  $P$ -value is less than the significance level (0.001), we cannot accept the null hypothesis. The results for different proportions are compared in the following table

The third method for comparing multiple proportions is the Marascuillo procedure for testing equality of proportions.<sup>6</sup>

The Marascuillo procedure enables us to simultaneously test the differences of all pairs of proportions when there are several populations under investigation.<sup>7</sup> In the Marascuillo Procedure the step one is to compute differences  $p_i - p_j$  for all possible pairs such that  $i \neq j$ . We have six samples of size  $n_i$  ( $i=1, 2, \dots, 6$ ) from 6 populations. We compute the differences  $p_i - p_j$ , (where  $i$  is not equal to  $j$ ) among all  $6(6-1)/2 = 15$  pairs of proportions. The absolute values of these differences are the test-statistics. The second step is to compute test statistics that is to pick a significance level and compute the corresponding critical values for the Marascuillo procedure from

$$r_{ij} = \sqrt{(\chi^2_{1-\alpha/2, k-1}) * \left[ \frac{p_i(1-p_i)}{n_i} + \frac{p_j(1-p_j)}{n_j} \right]}$$

The third step is to compare each of the 15 test statistics against its corresponding critical  $r_{ij}$  value. Those pairs that have a test statistic that exceeds the critical value are significant at  $\alpha$  level of significance.

For an overall level of significance of 0.05, the critical value of the chi-square distribution having five degrees of freedom is  $\chi^2_{(0.05,5)} = \text{Chi}(0.05,5) = 11.0705$ . Calculating the 15 absolute differences and the 15 critical values leads to the following summary table 4.

## RESULTS

For comparison of equality of population proportions three methods are applied. The results of the three tests are summarized as follows. Chi-square test for independence of two attributes namely locality and mode of delivery is carried out, the critical value of  $\chi^2$  with 5 degrees of freedom is 11.0705. ( $P$  value  $< 0.001$ ). Calculated value exceeds this critical value, we reject the null hypothesis. That is proportions of CS are significantly different in rural, urban and in adivasi areas. Secondly  $Z$  test is applied to check pair wise differences in population proportions. This yields that area wise and institution wise proportions of CS are significantly different. Earlier we carried out a test for six population proportions for equality of six proportions of CS deliveries in rural, urban, backward areas and in private and government hospitals. The results led to rejection of the null hypothesis of equality. By rejecting the null hypothesis we concluded that not all regions are equal with respect to the proportion of CS deliveries. However, it does not tell us which sectors caused the rejection. Marascuillo procedure allows comparison of all possible pairs of proportions. By applying this test a difference is statistically significant as its value exceeds the critical range value. Except  $p_1$  (rural government) and  $p_6$  (tribal government), all the comparisons involving 6 populations significantly different from each other as far as proportions of CS is concern. The proportions differ significantly

Areas	Urban Gov	Rural Gov	Urban Private	Rural Private	Tribal Gov Urban	Tribal Gov Rural	Total
$f_o$ ( CS)	6240	1948	1614	412	940	163	11317
Normal	22561	21428	3440	1016	10541	2692	61678
Total	28801	23376	5054	1428	11481	2855	72995
$f_e$ ( CS)	4465.249	3624.168	783.5621	221.3943	1779.991	442.6335	11317
$f_o - f_e$	1774.751	-1676.17	830.4379	190.6057	-839.991	-279.633	
$(f_o - f_e)^2 / f_e$	705.3894	775.2234	880.1182	164.0989	396.3982	176.6583	3097.886**

**Table-1:** Calculation of Chi- Square Statistic

	Rural		Urban		Pooled Estimate P	Q = 1 - P	I Z I	P Value
	$p_1$	$n_1$	$p_2$	$n_2$				
Government	0.083	23376	0.217	28801	0.157	0.843	41.6373 <sup>a1</sup>	< 0.001
Private	0.289	1428	0.319	5054	0.313	0.687	2.21974 <sup>a2</sup>	0.02643*
	Government		Private					
	$p_1$	$n_1$	$p_2$	$n_2$				
Rural	0.083	23376	0.289	1428	0.095	0.905	25.653 <sup>b1</sup>	<.001
Urban	0.217	28801	0.319	5054	0.232	0.768	15.9525 <sup>b2</sup>	<0.001
	Rural		Urban					
Adivasi Government	$p_1$	$n_1$	$p_2$	$n_2$				
	0.057093	2855	0.081874	11481	0.077	0.923061	4.44641 <sup>a3</sup>	<0.001

a1 : Proportion of cesarean section in Government Hospitals in rural and urban do differ significantly, a2 : Proportion of cesarean section in Government Hospitals in rural and urban do differ significantly, b1 : Proportion of cesarean section in Private And Government Hospitals in rural differ significantly, b2 : Proportion of cesarean section in Private And Government Hospitals in urban differ significantly, a3 : Proportion of cesarean section in Government Hospitals in rural and urban area of Nandurbar do differ significantly.

**Table-2:** Proportions of cesarean section deliveries by regional and institution characteristics.

Type of Region	Proportion $p_i$	Observed Proportion	1- $p_i$	Sample size $n_i$
Rural Govt	$p_1$	0.08333	0.9167	23376
Rural Private	$p_2$	0.288515	0.7115	1428
Urban Govt	$p_3$	0.216659	0.7833	28801
Urban Private	$p_4$	0.319351	0.6806	5054
TribalGovt Rural	$p_5$	0.057093	0.9429	2855
TribalGovt Urban	$p_6$	0.081874	0.9181	11481

**Table-3:** Region wise Caesarean Section proportions.

	Difference	Value	Critical range	Significant
1	$p_1 - p_2$	0.205185	0.00602	Yes
2	$p_1 - p_3$	0.133329	0.03989	Yes
3	$p_1 - p_4$	0.236021	0.00605	Yes
4	$p_1 - p_5$	0.026237	0.02183	Yes
5	$p_1 - p_6$	0.001456	0.01119	No
6	$p_2 - p_3$	0.288515	0.00058	Yes
7	$p_2 - p_4$	0.030836	0.02183	Yes
8	$p_2 - p_5$	0.231422	0.03458	Yes
9	$p_2 - p_6$	0.206641	0.03989	Yes
10	$p_3 - p_4$	0.102692	0.00811	Yes
11	$p_3 - p_5$	0.159566	0.00809	Yes
12	$p_3 - p_6$	0.134785	0.00808	Yes
13	$p_4 - p_5$	0.262258	0.02183	Yes
14	$p_4 - p_6$	0.237477	0.02182	Yes
15	$p_5 - p_6$	0.024781	0.00853	Yes

**Table-4:** Calculations by Marascuilo's procedure.

in rural and urban areas. This difference is still persistent in private and government hospitals. The proportions of CS in rural government hospitals and that in urban adivasi areas are almost same and equal to 8 percent.

## DISCUSSIONS

According to area of residence there has been substantial upward trend in the rate of caesarean section delivery in Nasik division of Maharashtra compare to Normal delivery. Results from the table-3 shows that increased CS rates in urban areas as compare to rural areas. Further in private hospitals this rate is still increasing when compared with the Government hospitals. Previous studies have shown that at the national level, C-section make up about 9 percent of all deliveries but with huge regional variations, and also, a large rural-urban differential. Clearly, as private facilities have expanded, so has the rate of operated deliveries. There have been similar findings in studies conducted in other states of India like West Bengal and Kerala.<sup>8,9</sup> The study results point that the proportion of CS in four clusters is significantly different. This is tested using Chi – Square test in Table -1. A difference is statistically significant if its value exceeds the critical range value. That all the comparisons involving 6 populations significantly different from each other as far as proportions of CS is concern. Results indicate that private hospitals are largely responsible for this increased CS. According to the above data deliveries by cae-

sarean sections (CS) are 3 to 10 times more prevalent in private institutions compared to government institutions. There exists a wide gap in the accessibility of health facilities between the rural and urban areas. According to Leonard K L et al (2007) the high incidence of Caesarean Section in the private facilities points towards failing public health facilities.<sup>9</sup> Despite the heightened attention towards reducing Maternal Mortality and Morbidity through various programs and schemes the public health services fail to address the important aspect of reducing out of pocket expenditure for accessing healthcare services as private sectors has more number of deliveries. The indications for carrying out caesarean section also seem to follow a demand driven trend, where pregnant mothers tend to opt for the seemingly painless method of caesarean section. Ready availability and advanced operative and anesthetic techniques further strengthen the supply side of Caesarean sections and hence lead to irrational overutilization of this crucial emergency procedure.<sup>10</sup>

## CONCLUSION

For comparing the equality of various population proportions Z-test, Chi-square test and Marascuilo's test are applied. The Marascuilo procedure as described above is a test that addresses the issue of multiple comparisons for proportions when we want to test which specific proportions are different from each other after rejecting the null in an overall chi-square test. The Marascuilo procedure compares all pairs of proportions, which enables the proportions possibly responsible for rejecting  $H_0$  to be identified.

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# A Clinical Study on the Correlation Between Axial Length, Intraocular Pressure and Central Corneal Thickness in Myopic Eyes

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## ABSTRACT

**Introduction:** Myopia or short sightedness, is that form of refractive error wherein parallel rays of light come to a focus in front of the sentient layer of the retina when the eye is at rest; the eye is thus relatively too large, and the condition is the opposite to that of hypermetropia. Aims and objectives of the research were to find out whether there is a correlation between axial length, intraocular pressure and central corneal thickness in myopic eye and to find out whether the degree of myopia can be correlated with axial length, intraocular pressure and central corneal thickness in myopic eye.

**Material and Methods:** A prospective study was conducted in Silchar Medical College and Hospital, Assam for 1 year. Total of 200 eyes of 100 myopic patients attending the Out-patient department of Ophthalmology were included in the study.

**Result:** Overall mean (SD) myopic refractive error was found to be  $-4.41 \pm 3.23$  D with range of  $-1.00$  D to  $-17.00$  D. The overall mean axial length was  $24.06 \pm 1.74$  mm. The overall mean intra ocular pressure in the patient was found to be  $15.50 \pm 2.00$  mm of Hg with range of 12-20 mm Hg. The overall mean (SD) central corneal thickness in myopic eyes was found to be  $0.509 \pm 0.026$  mm.

**Conclusion:** The effect of myopia on the axial length, the intraocular pressure and the corneal thickness are interrelated and are important determinants of myopia.

**Keywords:** Axial length, Intraocular pressure, Central corneal thickness, Myopia

## INTRODUCTION

When Nero (Nero Claudius Drusus Germanicus, The Roman Emperor, 37AD-68AD) watched Rome burn, the chances are he was seeing a blurred picture through narrowed lids, as contemporary historians tell us his eyes were "dull and weak." Since he committed suicide at 31 yrs of age, it is not likely that the weakness was presbyopia; thus Nero is the most infamous of myopes.<sup>1</sup>

Myopia or short sightedness, is that form of refractive error wherein parallel rays of light come to a focus in front of the sentient layer of the retina when the eye is at rest; the eye is thus relatively too large, and the condition is the opposite to that of hypermetropia.<sup>2</sup> Myopia is measured by the spherical power in diopters of the diverging lens needed to focus light onto the retina, which can be expressed as the spherical equivalent or refraction in the least myopic meridian.<sup>3,4</sup> Myopia is one of the most common refractive error. Normally the total refractive power of the eye, which is the additive power of the cornea and lens modified slightly by the depth of the anterior chamber, maintains a relationship with axial length of the globe such that their overall impact renders the refractive state of the eye to be emmetropic.

Myopia results when there is an excess of corneal power or lens power or both or when the axial length of the globe is longer than that which is compatible with the total refractive power of the eye. Myopia may be simple or pathological. In simple myopia the refractive changes are brought about by variations within the optical system, an increased Curvature of the cornea or the lens surface, a high refractivity of the lens, or a greater axial length of the globe.<sup>5</sup> Simple myopia is considered as physiological error not associated with any disease of the eye. Poor vision for distance, asthenopic symptoms, half shutting of the eyes are the usual complains and prominent eyeballs, deep anterior chamber, slightly large and sluggishly reacting pupils, normal fundus, refractive error usually not exceeding  $-6$  to  $-8$  D are found on examination.

Pathological myopia is that type of myopia which is accompanied by degenerative changes occurring particularly in the posterior segment of the eye. It is usually associated with lengthening of the antero-posterior length of the eyeball. The presenting symptoms are defective vision, muscae volitantes, and night-blindness. The signs are prominent eyeball, large cornea, deeper anterior chamber, slightly large pupil with sluggishly reacting to light. The fundus changes are large and pale optic discs, myopic crescent, degenerative changes in retina, choroids, macula and fovea (eg. Foster-Fuch's spot, cystoid degeneration) posterior staphyloma, degenerative changes in vitreous.<sup>6</sup>

Other varieties are curvature myopia, index myopia, and traumatic myopia.

Etiologies of myopia have been attributed partially to hereditary and partially to environmental factors and both are believed to have a substantial impact on the magnitude of the myopic problem. In majority of cases, myopia is axial and it is certain in higher degree. That is due to an increase in the anterior-posterior diameter of the eye.<sup>2</sup> It has been stated that per millimeter change in axial length, the refractive state of the eye varies by 3 diopters and per millimeter change in radius of curvature of the cornea the refractive change is 6 diopters.<sup>7</sup>

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Intraocular pressure is the pressure maintained inside the eyeball in normal condition which is exerted by the volume of solid and liquid contents of the eye and elasticity of its coat. The normal range of the intraocular pressure in human is 10-20mm Hg. Myopia is considered to be a risk factor for primary open angle glaucoma. Myopes tend to have slightly higher intraocular pressure as compared to emmetropes.

The normal cornea has a central thickness of approximate 0.52mm and peripheral thickness of approximate 0.67mm.<sup>8</sup> In myopia there is enlargement of the globe which is associated with corneal thinning. Myopic cornea is 0.018mm thinner than the normal. Optical treatment of myopia constitutes prescription of appropriate (concave) lenses, contact lenses; meanwhile surgical treatment of myopia is becoming more popular nowadays. LASIK (Laser in-situ Keratomileusis) is one of the most popular and effective surgical techniques used especially to correct myopia. Corneal thickness is an important factor for refractive surgeries such as RK, PRK and LASIK. LASIK is a refractive surgery in which central corneal thickness is reduced by excimer laser.<sup>9,10</sup> Correction of high myopia usually causes loss of corneal thickness which may induce corneal ectasia. Hence, central corneal thickness is an important determinant in myopia.

The axial length, the intraocular pressure and the central corneal thickness are interrelated and are important determinants of myopia. As the myopia is more common and universal, it is necessary to know the correlation of these factors in myopic eyes, which will increase our understanding, and knowledge and its further management.

In the present study an attempt has been made on the group of myopic patients attending the Department of Ophthalmology, Silchar Medical College and Hospital, Assam, to evaluate whether there is a correlation between axial length, intraocular pressure and central corneal thickness in myopic eyes and whether the degree of myopia can be correlated with axial length, intraocular pressure and central corneal thickness in myopic eyes.

## MATERIAL AND METHODS

A total of 100 subjects visiting Department of Ophthalmology, Silchar Medical College and Hospital, Assam, were included in the study (based on inclusion and exclusion criteria), for the period of 1 year. Study was conducted after due approval of ethical committee. Patients were informed about the study and written consent was taken prior to their inclusion in the study.

**Criteria for selection of cases:** Patients with equal and more than 1 diopter of myopic refractive error (refraction in the least myopic meridian) and age group of 5 years and more were selected in this study.

**Sample calculation:** The Assumed Population Prevalence (P) = 25%<sup>11</sup>, CI 95%, Precision of +/- 0.09, Sample Size was estimated at 100.

**Exclusion criteria:** Congenital or acquired ocular anomalies; History of surgery or trauma; Systemic or other ocular diseases of the posterior segment of eye.

The cases were evaluated in detail by History taking; Ocular

examination; Visual acuity testing with Snellen's chart; Retinoscopy and post mydriatic test; Keratometry; A - scan biometry ( Axial length measurement); Tonometry (Goldman applanation tonometer); Pachymetry (Central corneal thickness measurement) and Fundus examination.

## STATISTICAL ANALYSIS

Microsoft excel, Student t-test were used for statistical calculations and P value was corrected with Bonferonni adjustment where required. P value less than 0.05 was taken as statistically significant.

## RESULTS

Out of 100 patient 51 were male and 49 were female. Overall mean (SD) myopic refractive error was found  $-4.41 \pm 3.23D$  with range of  $-1.00 D$  to  $-17.00 D$ .

The overall mean axial length was  $24.06 \pm 1.74$  mm. Axial length of male was greater than that of the Female but it was not statistically significant. Older age group was seen to have lesser axial length than younger age group. It was found that axial length was more in high degree than that of low degree of myopic eyes. There was statistically significant negative correlation of axial length with myopic error.

The overall mean intra ocular pressure in the patients was found to be  $15.50 \pm 2.00$  mm of Hg with range of 12-20 mm Hg. Intraocular pressure of Male was greater than that of the Female but it was not statistically significant. There was positive significant correlation of age and intraocular pressure. There was statistically significant negative correlation of intra ocular pressure with myopic error.

In the study the overall mean(SD) central corneal thickness in myopic eyes was found to be  $0.509 \pm 0.026$  mm. Central corneal thickness of Male was greater than that of the Female but it was not statistically significant. In the study it was found that the central corneal thickness was greatest in 15-24 years and was lowest in 5-14 years. Central corneal thickness was found less in high degree myopia ( $0.479 \pm 0.022$  mm) than that of moderate ( $0.518 \pm 0.017$  mm) and low degree ( $0.518 \pm 0.022$  mm) myopia.

## DISCUSSION

The mean age of the patients was  $28.48 \pm 12.29$  years, range 6-54 years. Overall mean (SD) myopic refractive error was found  $-4.41 \pm 3.23D$  with range of  $-1.00 D$  to  $-17.00 D$ . Mean myopic refractive error in male was  $-4.46 \pm 3.42 D$  where as in female it was found to be  $-4.35 \pm 3.05 D$ .

In the current study overall mean axial length was found to be  $24.06 \pm 1.74$  mm (range 21.01 to 31.53). It was  $24.15 \pm 1.80$  in male and  $23.96 \pm 1.67$  in female. Meanwhile, it is well agreed that women tend to have a shorter axial length.<sup>12</sup>

In the current study it was seen that the mean axial length in older (45-54 years) age group was  $23.38 \pm 0.72$  mm which was less than that ( $24.86 \pm 1.89$ ) of the younger group (5-14 years). Older people were likely to have shorter axial length than young participants.<sup>13</sup>

It was found in the present study that the axial length was more in high degree than that of low degree myopic eye (Table - 1).

The Difference in mean axial in the three groups (low degree, moderate degree and high degree) was found statistically sig-

Degree of myopia	Axial length (in mm)
Low Degree( $\leq 3$ D)	23.16 $\pm$ 1.14
Moderate Degree(-3D to -6D)	23.77 $\pm$ 0.88
High Degree( $\geq 6$ D)	26.40 $\pm$ 1.70

**Table-1:** Axial length and degree of myopia

nificant. There were also found statistically significant negative correlation (correlation coefficient  $r = -0.823878331$ , p value  $< 0.001$ ) of axial length with myopic error. The refractive status of the eye is mainly dependent on the axial length. In general, the higher the myopia is, the longer the eyeball.<sup>14</sup> There were also similar significant correlation of the axial length with myopia was found in previous studies as per with present study. [Shu-wen Chang et al (2001).<sup>15</sup>

In the current study the overall mean intra ocular pressure in myopia found was 15.50 $\pm$ 2.00 mm of Hg (range 12-20 mm Hg). The mean intra ocular pressure in myopic eye was similar to that of the present study in most of the previous studies. Becker et al. in their study reported a mean intra ocular pressure of 15.35mm Hg.<sup>16</sup>

It was seen in the current study that the mean intraocular pressure increases with the age. The study conducted by Abdulla MI and Hamdi M<sup>17</sup> also agreed that the intraocular pressure increases in the older myopes.

In the present study the mean intraocular pressure was found less in low degree (14.69 $\pm$ 1.92 mm Hg) of myopic eye than that of moderate (16.12 $\pm$ 1.64 mm Hg) or high degree (16.27 $\pm$ 2.07 mm Hg) myopia, which was statistically significant. There were also found statistically significant negative correlation (Correlation Coefficient  $r = -0.222104148$ , p value  $< 0.05$ ) of intra ocular pressure with myopic error. Though there was no such type of correlation seen while degree of myopic error was considered. Abdulla MI and Hamdi M<sup>17</sup> had similar observation in their studies.

In the current study the overall mean central corneal thickness in myopic eye was found to be 0.509 $\pm$ 0.026 (range of 0.442-0.578 mm). The mean value in the current study was lower than the value of most of the past studies for myopic eye except that of Nazim Yacoub Mohamed et al.<sup>18</sup> whose values were lower than our value. It was difficult to comment whether the mean central corneal thickness was thinner than normal population as no control was recruited in the current study. Central corneal thickness was higher in males (0.510 $\pm$ 0.031 mm) than females (0.508 $\pm$ 0.020 mm) but was statistically significant. In the current study it was found that the mean central corneal thickness was greater in 15-24 years age group (0.527 $\pm$ 0.016 mm) and lowest in 5-14 years age group (0.497 $\pm$ 0.033 mm).

In the present study the mean (SD) central corneal thickness was found less in high myopia (0.479 $\pm$ 0.022 mm) than that of moderate (0.518 $\pm$ 0.017 mm) and low degree (0.518 $\pm$ 0.022 mm) myopia. The difference in the mean central corneal thickness in between low degree and high degree and between moderate degree and high degree were found statistically significant however between low degree and moderate degree it was not significant. Statistically significant positive correlation (correlation coefficient,  $r = 0.6398762$ , p value  $< 0.001$ ) were also found between central corneal thickness and myopic error. While the degree of myopia was consid-

ered, the correlation was found to be stronger on shifting from low degree to high degree.

The effect of myopic error on central corneal thickness has been reported by many investigators but results are conflicting. Some found that myopic subject have a thicker [Kunert et al. 2003<sup>19</sup>] others a thinner central corneal thickness [Von Bahr (1948)<sup>20</sup>] While yet others found no correlation between central corneal thickness and myopia [Ehlers and Tanaka et al. 1996<sup>21</sup>].

In the current study it was found that the axial length was not correlated with the intraocular pressure (correlation coefficient,  $r = 0.13246706$ , p value  $> 0.01$ ), while degree of myopia was considered negatively correlated in low degree (correlation coefficient,  $r = -0.223532526$ , p-value  $< 0.01$ ) but not correlated in moderate degree (correlation coefficient,  $r = -0.070705173$ , p-value  $> 0.10$ ) and high degree (correlation coefficient,  $r = 0.069433832$ , p value  $> 0.10$ ) Lee AJ et al, (2004)<sup>22</sup> also found that the intraocular pressure was not correlated with the axial length ( $r = 0.030$ ). On the other hand Parssinen (1990)<sup>23</sup> found positive correlation between IOP and axial length among the boys.

In the current study it was found that the intraocular pressure was not correlated with the central corneal thickness, though positive value was found (Correlation Coefficient,  $r = 0.016554215$ , p-value  $> 0.10$ ). While degree of myopia was considered, though positive values were found in all groups of myopia, but it was again statistically insignificant. The correlation Coefficient was 0.176762006 (p-value  $> 0.05$ ) in low degree, 0.178167601 (p-value  $> 0.1$ ) in moderate degree and 0.237887392 in high degree (p-value  $> 0.1$ ) respectively, the correlation of the intraocular pressure and the central corneal thickness has been reported by many investigators, majority of them found positive correlation.

Foster PJ (1998)<sup>24</sup> in a Mongolian population aged 10-87 years found significant positive correlation between intraocular pressure and the central corneal thickness. Andrew J. Morgan et al. (2002)<sup>25</sup> found that IOP was correlated significantly with central corneal thickness ( $r = +0.374$ ,  $p = 0.010$ ), such that a change of 10 micro meter in Central Corneal Thickness was equivalent to a 0.30mmHg change in measured IOP.

On the other hand Nemesure B et al. (2003)<sup>26</sup> in there study among the predominantly black population found the intraocular pressure was not associated with Central Corneal Thickness in this population.

Roomasa Channa et al. (2009)<sup>27</sup> also reported no statistically significant correlation between Central Corneal Thickness and IOP ( $r = 0.158$ ,  $p = 0.12$ ). In the present study it was found that the axial length was negatively correlated with the central corneal thickness (Correlation Coefficient,  $r = -0.430533391$ , p-value  $< 0.001$ ). While degree of myopia was considered it was also negatively correlated in high degree (Correlation Coefficient,  $r = -0.48585669$  p-value  $< 0.001$ ). But in low degree it was positively correlated (Correlation Coefficient,  $r = 0.288438522$  p-value  $< 0.01$ ) and in moderate degree it was not correlated (Correlation Coefficient,  $r = 0.12916611$ , p-value  $> 0.10$ ). Shu-wen Chang et al. (2001)<sup>28</sup> also found that the cornea tend to be thinner in eyes with longer axial length.

## CONCLUSION

The effect of myopia on the axial length, the intraocular pressure and the corneal thickness has been reported by many investigators and these are interrelated and are important determinants of myopia. Based on our findings, it can be concluded that the myopic refractive error and the axial length seem to have a significant correlation as such that with the increase of myopic refractive error there was increase of the axial length and it was evident in all the degrees of myopia.

The myopic refractive error and the intra-ocular pressure seem to have a significant correlation as such that with the increase of myopic refractive error there was increase of the intra-ocular pressure, however there was no such type of correlation seen while the degrees of myopia was considered. The intra-ocular pressure also correlated with the age of the patient as such that with the increase of age there was increase of the intra-ocular pressure.

The myopic refractive error and the central corneal thickness seem to have a significant correlation as such that with the increase of myopic refractive error there was decrease of the central corneal thickness. While the degrees of myopia were considered, this correlation was found to be stronger on shifting from low degree to high degree.

The intra-ocular pressure did not seem to have any correlation with the axial length and the central corneal thickness in myopic eyes.

There seem to have a significant correlation between the axial length and the central corneal thickness in higher degree of myopia, as such that more the axial length thinner the central corneal thickness.

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# Effect of Injectable Valproate Loading in Addition to Oral Valproate in Acute Mania - Observational Study

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## ABSTRACT

**Introduction:** Injectable valproate loading has been used in control of status epilepticus. Its use in mania is very limited and is not explored adequately. Injectable valproate is used sparsely in clinical setting to control mania. Present research was planned to study the effect of Injectable valproate loading in addition to Oral valproate in acute mania patients and compare its effects with only oral valproate use.

**Material and Methods:** The observational study was conducted on patients between 18 to 65 years of age, who fulfilled the criteria for bipolar disorder current episode mania, according to International classification for diseases 10<sup>th</sup> ed. (ICD-10) in visiting the Department of Psychiatry M.G.M medical college Indore and Mental Hospital, Indore. In this study Injectable valproate was used in addition to oral valproate to achieve faster serum concentration and faster results.

**Results:** Control of manic symptoms (fall in YMRS score) was faster in patients loaded with additional injectable valproate and oral dosing when compared with only oral dosing and this was statistically significant from day 3. Minimal side effects of nausea and somnolence were seen and there was no statistically significant difference between the two groups in this regard. No severe adverse events were reported. Limitations of the study are being discussed.

**Conclusion:** Injectable Valproate loading, with oral dosing is faster and has robust antimanic action when compared with oral valproate alone. It is not associated with additional adverse effects.

**Keywords:** Valproate, Injectable Valproate, Oral Valproate, Mania

- To study the Clinical profile of sample and compare illness characteristics in both groups.
- To study the Efficacy of Injectable valproate loading in addition to Oral valproate over oral valproate in acute mania patient by YMRS.
- To study the adverse effect profile of Injectable valproate loading in addition to Oral valproate over oral valproate in acute mania patient and compare the differences between the two study groups.

## MATERIAL AND METHODS

This was an Observational study. Oral valproate and injectable valproate in addition to oral valproate was used alternately in admitted new acute mania patients to make two groups of patients.

**Study population:** 10 Patient between 18 to 65 years of age, who fulfilled the criteria for bipolar disorder current episode mania, according to International classification for diseases 10<sup>th</sup> ed. (ICD-10) in Department of Psychiatry M.G.M medical college Indore and Mental Hospital, Indore. Sample size was based on the inclusion and exclusion criteria.

**Inclusion criteria:** Ten consecutive patients that presented to the department with mania, of 18-65 years age group, who fulfilled the ICD-10 criteria for bipolar affective disorder, manic episode and who or their legally acceptable representatives (LAR) provided written informed consent were included.

**Exclusion criteria:** Patients with an organic brain syndrome, patients with a significant history of previous liver and renal diseases, severe medically ill patient and patients with deranged liver and kidney functions, intoxicated patients, and pregnant and lactating women were excluded.

## Tools

1. Semi-structured data entry Performa
2. ICD-10.MINI-6 - for diagnosis
3. Young mania rating scale (YMRS) and clinical global impression (CGI) -for severity assessment:

## Procedure

Protocol was approved by departmental scientific committee. Patient meeting inclusion criteria were admitted in hospital and after detailed evaluation diagnosis was confirmed

## INTRODUCTION

Valproate has emerged as a drug of primary choice for the treatment of acute mania. It can be administered in high doses as an oral loading therapy.<sup>1</sup> In some studies injectable valproate was found to be more efficacious and better tolerated than oral valproate, as it reduced manic symptoms more rapidly than oral valproate.<sup>2</sup> Achieving therapeutic level of valproate by oral route in blood may need many days. Injectable valproate loading in addition to Oral valproate in acute mania may be helpful in rapidly achieving therapeutic level in blood for early response. Therapeutic levels of valproate needed to control mania are not well established, but clinical observation is that higher the dose of valproate better is the control. Side effects of valproate often limit its dose escalation.

Research was aimed to study the effect of Injectable valproate loading in addition to Oral valproate in acute mania patients and compares its effects with only oral valproate use. Further objectives were

- To study socio demographic profile of the sample and compare to find any statistical differences.

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in each case. Alternate patients were advised injectable valproate and oral valproate in dose 20mg/kg/day in one group and only oral valproate in same dose in other group, for first 2days. Injectable valproate was given intravenously in a drip of normal saline over six hours and oral valproate was given PO in two divided dosage as CR preparation. After day two, oral valproate was given in dose 20mg/kg/day for next 5 days. Olanzapine 10mg/day was given for 7 days. During Hospital stay, if needed, injectable antipsychotic (Haloperidol) and injectable Benzodiazepines (Lorazepam) were given in emergency to manage patient on basis of clinical judgment. Young mania rating scale (YMRS) was administered at admission and on day 3 day 5 and day 7 where as clinical global impression (CGI) was administered at admission and day 7.

### STATISTICAL ANALYSIS

The analysis was done using computer program SPSS v16 and ANOVA was applied to find statically significant differences in two the groups.

### RESULTS

All patients were male with mean age of 34.2 years, most of them married, employed, literate, belong to middle socio-economic status and reside in urban setting. There were no statistical differences in these parameters between the two groups. (table-1)

**Clinical profile:** Average total duration of illness was 7.2 years and current episode duration was 1 month with past history of >3 episodes in 5 patients (50%). Average YMRS score was 36.9 and CGI score was 5.2 at onset. In clinical course of study most of patient required 1wk hospital stay. All above parameters matched statistically in both groups. (Table-2)

**Outcome:** Maximum reduction in YMRS score was on 2nd day of injectable plus oral valproate use. During this period oral Olanzapine 10mg/day was used in all patients and injectable Antipsychotic (Haloperidol) was used in 7 out of 10 (70%) individuals. Injectable Lorazepam was needed in 6 patients (60%). Use of injectable haloperidol and lorazepam was statistically higher in the oral group. Adverse effect e.g. nausea, and somnolence were reported in 5 out of 10 (50%) patients and no serious adverse effect were reported in any individual. There was no statistical difference in adverse events between the two groups (table-3). Reduction in YMRS between 1 to 3 days in injectable plus oral valproate treatment group was  $22.4 \pm 2.6$  points and maximum reduction in symptoms was seen on day two. Reduction in YMRS between 1 to 3 days in oral valproate treatment group was  $10.0 \pm 3.2$  points. This difference was statistically significant. Reduction in YMRS between 3 to 5 days in injectable plus oral valproate treatment group was  $7.2 \pm 1.0$  points. Reduction in YMRS between 3 to 5 days in oral valproate treatment group was  $3.2 \pm 1.8$  points. This difference was statistically significant. Reduction in YMRS between 5 to 7 days in injectable plus oral valproate treatment group was  $3.8 \pm 1.3$  points. Reduction in YMRS between 5 to 7 days in oral valproate treatment group was  $5.4 \pm 0.9$  points. This difference was statistically significant and the drop was more in oral valproate treatment group, meaning oral valproate started its action between 5 to 7 days. (Table-3; Figure - 1)

### DISCUSSION

Antimanic efficacy of oral valproate has been apparent on the fourth day of treatment in some studies<sup>3</sup> and in single dose in some reports.<sup>4</sup> In our study statistically significant effects were seen between days 5 to 7 for oral valproate when compared with use of injectable valproate along with oral

	IV Valproate Loading with oral valproate (N=5)	Oral Valproate	p value	Level of significance (p value <0.05)
Age (mean age)	34.2±4.5	31.4±11.30487	0.621	N.S.
Sex			1.000	N.S.
Male	4(80%)	4(80%)		
Female	1(20%)	1(20%)		
Marital status			0.545	N.S.
Married	4(80%)	3(60%)		
Unmarried	1(20%)	2(40%)		
Education Status			0.580	N.S.
Primary	3(60%)	2(40%)		
Higher secondary	2(40%)	3(60%)		
Occupation			0.608	N.S.
Unemployed	1(20%)	1(20%)		
Self employed	3(60%)	0(0%)		
Unskilled	1(20%)	4(80%)		
Residence			0.545	N.S.
Rural	1(20%)	2(40%)		
Urban	4(80%)	3(60%)		
Family type			0.580	N.S.
Nuclear	2(40%)	3(60%)		
Joint	3(60%)	2(40%)		
Total family Income			0.580	N.S.
<5000	3(60%)	2(40%)		
>5000	2(40%)	3(60%)		

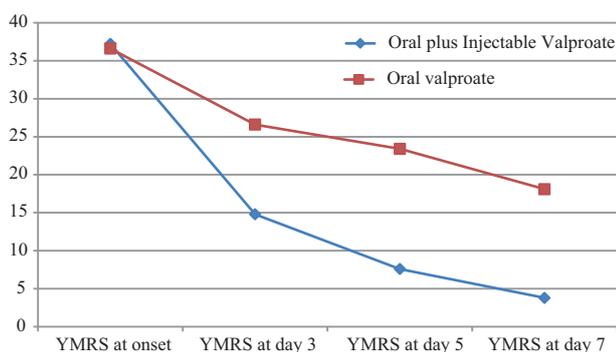
Table-1: Socio-demographic characteristic

S.N.	IV Valproate Loading (N=5)	Oral Valproate	p value	Level of significance (p value <0.05)
Total duration of illness(In Year)	7.2±1.3	31.4±11.3	0.667	N.S.
Duration of current episode			1.000	N.S.
<1month	4(80%)	3		
>3month	1(10%)	2		
H/o manic episode in past			0.580	N.S.
>3episode	3(60%)	2		
<3episode	2(40%)	3		
Family H/O psychiatric illness			1.000	N.S.
No	4(80%)	4		
Yes	1(20%)	1		
H/o Rapid cycling			0.347	N.S.
No	4(80)	5		
Yes	1(20%)	0		
YMRS score at onset	37.2±5.4	36.6±4.7	0.856	N.S.
CGI score at onset	5.0±0.7	5.4±0.8	1.000	N.S.

**Table-2: Clinical Profile**

S.N.	IV Valproate Loading (N=5)	Oral Valproate	p value	Level of significance (p value <0.05)
Reduction in YMRS1(1-3days)	22.4±2.6	10.0±3.2	0.0001	Significant
Reduction in YMRS(3-5days)	7.2±1.0	3.2±1.8	0.003	Significant
Reduction in YMRS(5-7days)	3.8±1.3	5.4±0.9	0.053	Significant
Reduction in CGI(1-7days)	3.8±0.8	2.2±0.8	0.016	Significant
Antipsychotic use			0.040	Significant
No	3(60%)	0		
Yes	2(40%)	5		
Antipsychotic dose	12.0±5.7	20.0±3.5	0.029	Significant
BZP use			0.004	Significant
No	4(80%)	0		
Yes	1(20%)	5		
BZP dose	4.4±2.6	9.6±2.2	0.009	Significant
Duration of Hospitalization			0.009	Significant
<1wk	3(60%)	2		
>2wk	2(40%)	3		
ADR			0.580	N.S.
No	3(60%)	2		
Yes	2(40%)	3		

**Table-3: Outcome measures**



**Figure-1:** Comparison of YMRS scores from onset to day 7, between oral plus injectable valproate and oral valproate treatment groups

valproate dosing where clinical and statistical improvement in control of mania was seen between 1 to 3 days. It has been observed that injectable valproate is more efficacious and better tolerated than oral valproate as it reduces manic symptoms more rapidly than oral valproate i.e. on day

3 and day 7.<sup>2,6</sup> Injectable valproate in addition to oral dosing has not been studied previously.

Our study show similar outcome like previous studies on cursory look, but reduction of symptom on clinical rating score is more robust in this observational study without any increase in adverse effect. This is apparently because of addition of effects of oral as well as injectable valproate and the fact that total per day dose was much higher, in fact double than in other studies. Maximum loading Dose of 30mg/kg/day of valproate has been recommended.<sup>10</sup> Paucity of side effects in this study is also remarkable and is attributable to use of injectable valproate.

Pharmacokinetic profile of intravenous loading, a quick saturation of plasma binding of proteins and a rapid achievement of peak concentration of valproate which is 22% higher than those obtained with equivalent oral dose, have been proposed reasons for its rapid onset of action over oral valproate loading.<sup>1</sup>

A rapid initial increase in peak concentration might be needed to reduce certain intracellular changes before compen-

satory down regulation of synaptic receptor and transmembranous transducing system can occur.<sup>5</sup> Therapeutic serum levels of 50 micrograms /dl have been achieved on day 3 and day 4 of oral valproate loading.<sup>7,8</sup>

Further intravenous valproate may cause a rapid saturation of plasma binding protein which could increase the initial serum concentration of the unbound drug and thus result in rapid attainment of high cerebral valproate level.<sup>1</sup> This is better alternative to usual saturation schemes used in oral valproate loading.<sup>9</sup>

Initial load of oral valproate is bound to carnitine in liver to form a valproate carnitine complex, which is responsible for valproate's hepatotoxicity. Injectable valproate loading bypasses this to rapidly increase serum levels, where oral dosing of valproate traps the valproate in liver.

In summary, injectable valproate loading with oral valproate is more efficacious and well tolerated when compared with oral valproate loading alone.

### Limitations of study

Although statistical significances were obtained, this is a small sample size. A study with larger sample size is awaited. This is a short term study and clinical outcome for oral valproate needs to be studied over longer periods till robust clinical improvement is also seen in this group. This study is observational clinical study, for more evidence a double blind randomized control study is needed along with comparison of oral valproate loading and injectable valproate separately (three groups).

Serum valproate level was not measured in this study. Effects of oral olanzepine and injectable haloperidol and lorazepam were not studied in this study. They must have contributed to effect as well as side effect in this study. Hepatic profile before and after administration of valproate was also advisable in any further planned study.

### CONCLUSION

Injectable valproate loading in addition to oral valproate dosing starts its action on day two and is superior to only oral valproate dosing. It continues to be superior in action over day 3 to 5 and produces statistically significant better outcome in control of mania. Oral valproate dosing starts its action between 5 to 7 days and improvement during this period is statistically better than injectable plus oral group but injectable plus oral group is still superior in total drop in YMRS. Both treatments are associated with minimal adverse events and well tolerated with no severe adverse events.

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# Oral Manifestations of Chronic Kidney Disease-An Overview

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## ABSTRACT

Kidney disease is a worldwide public health problem, with increasing incidence and prevalence, high cost, and poor outcome. Chronic Kidney Disease involves an irreversible loss of renal function. Chronic Renal failure can give rise to a large spectrum of oral manifestations, affecting the hard or soft tissues of the mouth. The majority of affected individuals have disease that does not complicate oral health care; nevertheless, the dental management of such individuals does require that the clinician understand the multiple systems that can be affected. The dental care of these patients can be complex, given the medications associated with the disease and the medical conditions that result from inadequately functioning kidneys. The present article aims to provide an overview, detailing the current knowledge of the oral and dental aspects of renal failure.

**Keywords:** Chronic, Renal, Dental Care, Oral manifestations.

## INTRODUCTION

As technology and medicine advances, the oral health care professionals also have to attain a holistic approach to the management of patients with complex medical problems. Among all the systemic disorders, diseases of the renal system pose a major cause of morbidity and mortality worldwide,<sup>1</sup> as the kidneys are vital organs for maintaining a stable internal environment i.e homeostasis.<sup>2</sup> India, is now becoming a major reservoir of chronic diseases like diabetes and hypertension. This burden is expected to rise and thus, health care professionals need to take care of them, as 25 to 40% of these subjects may develop CKD and ESRD,<sup>3</sup> CKD is the 12th leading cause of death and 17th cause of disability.<sup>3</sup>

### Chronic Kidney Disease (CKD)

Chronic Kidney Disease is defined as structural or functional abnormalities of the kidney, with or without decreased GFR, manifested by pathological abnormalities or markers of kidney damage, including abnormalities in the composition of the blood or urine or abnormalities in imaging tests. (GFR <60ml/min/1.73m<sup>2</sup> for three months or more, with or without kidney damage).<sup>4</sup>

Based on mode of onset, renal diseases are classified as acute and chronic kidney disease. The principal renal condition that the dentists are likely to encounter is patient with CKD and occasionally nephrotic syndrome and renal transplant. Various causes for CKD include hypertension, diabetes, glomerular nephritis, interstitial nephritis, pyelonephritis etc.<sup>1</sup>

Progressive loss of kidney function, ultimately results in clinical syndrome which is denoted as uremia. The systemic signs of renal failure and uremia such as hematologic changes, bone metabolism changes and alterations in immune status can be significant to the dental practitioner.<sup>5</sup> (Table 1)

### Stages of CKD

Among individuals with chronic kidney disease, the stage is defined by the level of GFR, with higher stages representing lower GFR levels (Table 2).<sup>6</sup>

### Medical Management of Patient with Renal Failure

The treatment of renal failure comprises of dietary changes, correction of systemic complications and dialysis or renal graft receipt. Due to the chronic nature of the disease, the treatment is often a long time affair. Moderate amounts of proteins and carbohydrates should be included in the diet to minimize nitrogenous waste products. Fats should be re-

Signs	Symptoms
Peripheral edema	'Restless' legs
Rise in blood pressure (hypertension)	Leg cramps
Pericardial effusion	Ankle edema
Confusion, coma, lethargy	Loss of libido
Renal osteodystrophy	Feeling cold
Pallor due to anemia	Pruritus
Bruising due to platelet dysfunction	Insomnia

**Table-1:** Signs and symptoms of renal failure and uremia

CKD Stage	Definition
1	Normal or Increased GFR, some evidence of kidney damage reflected by microalbuminuria, proteinuria and hematuria as well as radiologic or histologic changes
2	Mild decrease in GFR (89-60ml/min per 1.73m <sup>2</sup> ) with some evidence of kidney damage reflected by microalbuminuria, proteinuria and hematuria as well as radiologic or histologic changes
3	GFR 59-30 ml/min per 1.73m <sup>2</sup>
3A	GFR 59 to 45 ml/min per 1.73m <sup>2</sup>
3B	GFR 44 to 30 ml/min per 1.73m <sup>2</sup>
4	GFR 29- 15 ml/min per 1.73m <sup>2</sup>
5	GFR < 15 ml/min per 1.73m <sup>2</sup> , when renal replacement therapy in the form of dialysis or transplantation has to be considered to sustain life
The suffix p has to be added to the stage in proteinuric patients (proteinuria > 0.6g/24h)	

**Table-2:** Classification of CKD based on GFR

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stricted. Repeated blood transfusions are required to improve the anemia. By assessing the level of serum calcium and serum alkaline phosphatase at regular intervals, the development of hypercalcemia and its metastatic complications can be prevented. Massive doses of Vitamin D is required to treat Renal rickets osteomalacia. Hyperphosphatemia can be prevented by limiting phosphate containing foods (e.g. milk, cheese, eggs) and use of phosphate binding drugs, such as aluminum hydroxide gel (30-60 ml) given after meals. Intercurrent infection, if any, should be promptly treated with a suitable antibiotic. Anabolic steroids (e.g. nandrolone 25 mg intramuscularly once or twice a week) are useful and help to bring down the raised blood urea level. Hypertension and related cardiovascular complications should be treated on the usual lines, low doses of digoxin should be used in case of associated cardiac failure. Chlorpromazine can be used for control of nausea and vomiting. Gastric lavage with solution of sodium bicarbonate may be helpful. Uremic diarrhea should be treated by high bowel wash with plain water. Bland antidiarrheal drugs, such as pectin or kaolin, may be used. Renal failure is a debilitating disease carrying high mortality as well as morbidity. It needs long term treatment like continuation of life long renal replacement therapy in the form dialysis or the renal transplantation and thus keeping a huge economic burden as well social stress on patients and their families.<sup>7</sup>

### Dialysis

Dialysis is a method by which waste products of metabolism are mechanically washed out of blood. Dialysis is of two types:

1. Extracorporeal or hemodialysis
2. Intracorporeal or peritoneal dialysis.<sup>7</sup>

## ORAL MANIFESTATIONS

Oral cavity is the mirror of systemic health. Chronic renal failure (CRF) is one such disease which presents with a spectrum of oral manifestations, often due to the disease itself and treatment.<sup>8</sup>

The plethora of oral manifestations observed in chronic renal failure and associated therapies are like altered taste, gingival enlargement, xerostomia, parotitis, enamel hypoplasia, delayed eruption, various mucosal lesions like hairy leukoplakia, lichenoid reactions, ulcerations, angular cheilitis, candidiasis etc.<sup>9</sup>

With growing awareness about the inter-relationship between dental and medical problems, the role of dentist has become pivotal in overall health care of patients with CKD and also to render services for the oral findings of such diseases.<sup>9</sup>

### Uremic Stomatitis

Uremic stomatitis can be seen due to presence of markedly elevated levels of urea and other nitrogenous wastes in the blood stream of chronic renal failure patients which can be abrupt in onset. It is clinically represents as white plaques distributed predominantly on the buccal mucosa, floor of the mouth and tongue.<sup>10</sup> (Fig. 1). Patients usually complain of pain, unpleasant taste and burning sensation with the lesions, and the clinician may detect an odor of ammonia or urine in the patient's breath. The clinical appearance occasionally

mimic oral hairy leukoplakia.<sup>10</sup> Uremic stomatitis can be of four types such as Erythematous, Ulcerative, Hemorrhagic and Hyperkeratotic.<sup>11</sup>

### Dry mouth

Xerostomia or dry mouth, is a frequent and important complaint among dialysis patients.<sup>12</sup> There are several reasons for the prevalence of dry mouth. The decreased salivary flow may be due to direct uremic involvement of salivary glands, chemical inflammation, dehydration, mouth breathing and also from the restricted fluid intake, irrespective of whether the patient is diabetic or not. The other conditions that may cause dry mouth in uremic patients are retrograde parotitis, metabolic abnormalities and use of diuretics.<sup>8</sup>

### Taste change

The cause of metallic taste in uremic patients has been reported to be due to urea content in the saliva and its subsequent breakdown to ammonia and carbon dioxide by bacterial urease. The change in taste can also be due to metabolic disturbance, the use of medication, diminished number of taste buds and changes in the salivary flow and composition. Another study reports that high levels of urea, dimethyl and trimethyl amines and low levels of zinc might be associated with decreased taste perception in uremic patients.<sup>8</sup>

### Mucosal Petechiae and Ecchymosis

This manifestation may be due to bleeding tendency because of abnormal thrombocyte function and a decrease in platelet factor III. It may also relate to the anticoagulants used during hemodialysis. The association between the prevalence of petechiae and ecchymosis and serum anticoagulant level require further studies.<sup>13</sup>

### Renal Osteodystrophy

A frequent long-term complication of renal disease is renal osteodystrophy, a spectrum of bone metabolism disorders associated with different pathogenic pathways. These changes comprise bone demineralization with trabeculation and cortical loss, giant cell radiotransparencies or metastatic calcifications of the soft tissues. The patients are at increased risk of fracture during dental treatments, such as extractions.<sup>14</sup> Diffuse involvements of the jaws occur with significant frequency and radiographic alterations of the facial skeleton may represent one of the earliest signs of the disease.<sup>15</sup> In

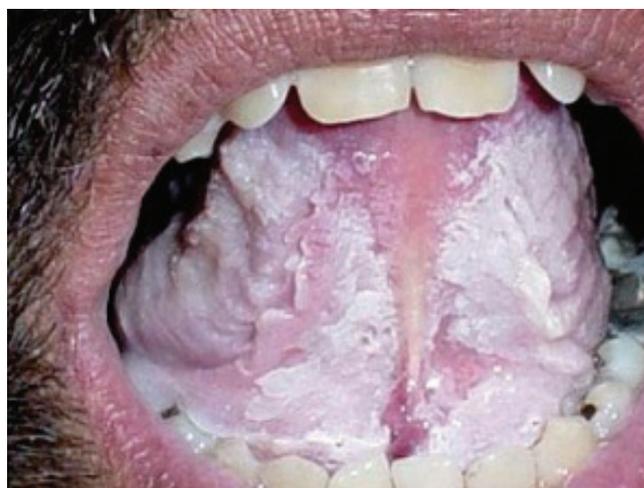


Figure-1: Uremic Stomatitis

some patients, marked jaw enlargement and malocclusion may occur.

- Delayed eruption
- Enamel hypoplasia
- Loss of the lamina dura
- Widening of the periodontal ligament
- Severe periodontal destruction
- Tooth mobility
- Drifting
- Pulp calcifications

### Candidiasis

Oral candidiasis will affect 20 to 30% transplant patients (Fig 2).<sup>16</sup> Candidal infection may present as angular cheilitis, pseudomembranous or erythematous ulceration or chronic atrophic infection.<sup>17</sup> Prevention is effective in the early post transplant period with antifungal lozenges or solutions. Treatment depends on severity; lozenges may cure mild infections, but oral antifungal (1% topical clotrimazole) may be required. Viral infection, such as herpes simplex virus used to be common in transplant recipients; the use of antiherpetic agents, such as acyclovir (5%) has significantly reduced the frequency of these infections.<sup>12</sup>

### Mucosal Lesions

In renal patients who are receiving dialysis and renal transplant oral mucosal lesions, particularly white patches and ulceration have been noticed. In particular, lichenoid reactions and oral hairy leukoplakia can occur due to immunosuppressive drugs. Epstein-Barr virus (EBV) has also been detected with uremia, which can resolve with correction of the uremia. White patches of the skin are called as “uremic frost” can be seen patients with CKD due to deposition of urea crystals on the epithelial surfaces following perspiration.<sup>18</sup> It can be occasionally seen intraorally, due to saliva evaporation.

### Periodontal Disease

Gingival hyperplasia, increased levels of plaque, calculus, gingival inflammation and increased prevalence and severity of destructive periodontal diseases can be seen in patient's with CKD. Calcium channel blockers and calcineurin inhibitors, commonly used in treatment of renal disease can lead to gingival hyperplasia in CKD patients. Gingival overgrowth caused by these drugs can be severe, involving the interdental papilla, marginal and attached gingiva and treatment frequently involves surgical resection. However, improved oral hygiene has been reported to either decrease the incidence or delay the onset of gingival hyperplasia. Gingival bleeding, petechiae and ecchymosis, result from platelet dysfunction and due to the effects of anticoagulants in CKD patients. Periodontal problems with attachment loss, recession and deep pockets can also occur.<sup>19</sup>

### Oral Malignancy

An increased susceptibility to epithelial dysplasia and carcinoma of the lip attributable to the treatment following renal transplantation has been postulated. The increased risk of malignancy in CRF probably reflects the effects of iatrogenic immune suppression, which in turn increases mucosal susceptibility to virus-related tumors, such as Kaposi's sarcoma or non-Hodgkin lymphoma.<sup>20</sup>



Figure-2: Oral Candidiasis

## DENTAL CONSIDERATIONS

The main management problems in renal failure include the following:

### Bleeding Tendencies

Careful hemostasis should be ensured, if oral surgical procedures are necessary. Dental treatment is best carried out on the day after dialysis when there has been maximal benefit from dialysis and the effect of the heparin has worn off. The hematologist should be first consulted. Should bleeding be prolonged, desmopressin may provide hemostasis for up to 4 hours. If this fails, cryoprecipitate may be effective, has a peak effect at 4 to 12 hours and lasts up to 36 hours. Conjugated estrogens may aid in hemostasis: The effect takes 2 to 5 days to develop, but persists for 30 days.<sup>21</sup>

### Infections

They are poorly controlled by the patient with renal failure, especially if the patient is immunosuppressed, and may spread locally as well as giving rise to septicemia. Infections are difficult to recognize as signs of inflammation are masked. Hemodialysis predisposes to blood borne viral infection, such as hepatitis virus.<sup>21</sup>

Antimicrobials consideration include erythromycin, cloxacillin, fucidin and can be given in standard dosage.

Penicillin, metronidazole and cephaloridine should be given in lower doses, since very high serum levels can be toxic to the central nervous system. Benzyl penicillin has significant potassium content and may be neurotoxic and therefore contraindicated. Patients should be considered for antimicrobials prophylaxis before extraction, scaling or periodontal surgery for those with polycystic kidney, those receiving peritoneal dialysis, since bacteremia can result in peritonitis. Aspirin and other nonsteroidal anti-inflammatory analgesics should be avoided, since they aggravate gastrointestinal irritation and bleeding associated with renal failure. Their excretion may also be delayed and they may be nephrotoxic, especially in the elderly or in renal damage or cardiac failure. Some patients have peptic ulceration, which is further contraindication to aspirin. Even COX-2 inhibitors may be nephrotoxic and are best avoided. Antihistamines or drugs with antimuscarinic side effects may cause dry mouth urinary retention. Fluorides can safely be given topically for caries prophylaxis. Systemic fluorides should not be given,

because of doubt about fluoride excretion by damaged kidney. Antacids containing magnesium should not be given as there may be magnesium retention. Antacids containing calcium or aluminium bases may impair absorption of penicillin and sulphonamides.<sup>21</sup>

### Hypertension

Many renal patients are on antihypertensive therapy, digoxin and diuretics which may also complicate management.

### Local Anesthesia and Conscious Sedation

Local anesthesia is safe unless there is severe bleeding tendency.

*Conscious sedation:* Relative analgesia may be used. Midazolam is preferable to diazepam because of the lower risk of thrombophlebitis.<sup>22</sup>

### General Anesthesia

Renal failure is complicated by anemia, which is the contraindication to general anesthesia, if the hemoglobin is below 10gm/dl. Some of the difficulties with general anesthesia are the patients with chronic renal failure which are highly sensitive to the myocardial depressant effects of anesthetic agents and may develop hypotension at moderate levels of anesthesia. Isoflurane and sevoflurane are safer. Induction with thiopentone followed by very light general anesthesia with nitrous oxide is generally the technique of choice.

To reduce dry mouth, recommended use of alcohol-free mouthwashes or saliva substitute is advocated.

All universal precautions should be followed as incidence of Hepatitis B and C are higher among dialysis patients.<sup>23</sup>

## CONCLUSION

A proper examination of the oral cavity in patients with CKD is invaluable to diagnosis at an early stage of multi-system disease. Therefore, these patients should be routinely evaluated for oral lesions and treated accordingly. The dental management of patients with renal disease is complicated by systemic consequences of renal failure particularly anaemia, bleeding tendency, cardiovascular or endocrine diseases, but with the use of proper treatment protocols, the dental management in these patients can be effective and safe. A simple routine examination of the oral cavity should become the norm for all clinicians caring for renal patients.

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# A Comparative Study of Abdominal Versus Non Descent Vaginal Hysterectomy

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## ABSTRACT

**Introduction:** Both Abdominal and Vaginal are not competitive procedures but each has its own place in the operative armamentarium of the gynecologist. Guidelines incorporating uterine size, mobility accessibility, and the pathology confined to the uterus (no adnexal pathology or known or suspected adhesions) have been proposed as selection criteria for vaginal hysterectomy. This study was performed to evaluate the appropriate route of hysterectomy (abdominal or vaginal) in our hospital population for women with benign disease by comparing peri-operative and post-operative complications.

**Material and Methods:** As per the Inclusion and Exclusion criteria, 100 cases admitted to the gynecology unit requiring hysterectomy for benign diseases were randomly selected out of which 50 cases underwent NDVH and 50 cases underwent TAH. Operating time, Blood loss, Post-Operative pain and other Postoperative complications were the parameters noted.

**Results:** The results were indicative towards Vaginal Hysterectomies being a better Surgical modality with lesser Operating time, Blood loss, Postoperative pain and other Postoperative complications like Febrile Morbidity, Wound Infection, Burst Abdomen, Wound Gape, Paralytic Ileus.

**Conclusion:** With adequate vaginal access, good uterine mobility and technical skill, vaginal hysterectomy can safely be performed on a Non-Prolapsed uterus, with an additional advantage of shorter duration of surgery, intraoperative complications, post-operative morbidity and shorter hospital stay. Hence, allowing us to conclude it to be a better surgical option amongst Hysterectomies.

**Keywords:** Gynaecology, Total Abdominal Hysterectomy, NDVH, Burst Abdomen, Operating Time.

## INTRODUCTION

Hysterectomy are easily the most common elective surgeries in Gynecology; with both Abdominal and Vaginal hysterectomies holding their own positions in the Gynecological universe and certainly not at loggerheads with each other.<sup>1</sup> Charles Clay in Manchester performed the first abdominal hysterectomy in 1843. Vaginal hysterectomy was performed first by Soranus of Ephesus in 120 AD.<sup>2</sup>

Criteria such as the uterine size, mobility, accessibility and the pathology confined to the uterus (no adnexal pathology or known or suspected adhesions) are mostly the incorporating factors for vaginal hysterectomy.<sup>3</sup>

Extra uterine disease such as adnexal pathology, severe endometriosis or adhesions may preclude vaginal hysterectomy.

Severe operative and postoperative complications are experienced much more by younger women undergoing hysterectomy for symptomatic fibroids (especially LAVH).<sup>4</sup> Following hysterectomy women might be at higher risk of depression, anxiety and psychosexual problems.<sup>5</sup> This study

was performed to evaluate the appropriate route of hysterectomy (abdominal or vaginal) in our hospital population for women with benign disease by comparing peri-operative and post-operative complications.

## MATERIAL AND METHODS

After clearance from ethics committee the study was undertaken over a period of 2 year in a Tertiary Care Hospital and Teaching Centre. Total number of 100 cases admitted to the gynecology unit requiring hysterectomy for benign diseases were randomly selected out of which 50 cases underwent NDVH and 50 cases underwent TAH. Patients were selected as per the following inclusion and exclusion criteria:-

### Inclusion criteria

- 1) Uterine size not exceeding 12 weeks of gravid uterus.
- 2) Adequate uterine mobility.
- 3) Fibroid Uterus.
- 4) Abnormal uterine bleeding(AUB)
- 5) Chronic cervicitis.
- 6) Adenomyosis.
- 7) Postmenopausal Bleeding.

### Exclusion criteria

- 1) Uterine size more than 12 weeks of gravid uterus.
- 2) Restricted uterine mobility.
- 3) Prolapsed uterus.
- 4) Patients with complex adnexal mass.
- 5) Patients with previous 2 or more LSCS.

After taking a thorough history and clinical examination, patients were subjected to routine investigations which included USG abdomen and pelvis, complete haemogram, urine analysis, blood grouping and Rh typing, random blood sugar, blood urea, serum creatinine, Liver Function Tests, Chest XRay, ECG, HIV, HBsAg and pap smear. Patients were selected according to exclusion and inclusion criteria.

Operating time for Non-descent vaginal hysterectomy was calculated from incision at cervicovaginal junction to the completion of closure of vault. Operating time for Total abdominal hysterectomy was calculated from incision on the abdomen to closure of skin incision.

Blood loss was estimated by preoperative and postoperative

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(day 2) haemoglobin and haematocrit measurement and Intra operative complications such as injury to bowel/bladder or ureter and haemorrhage was noted.

Post-operatively all patients were given same antibiotic prophylaxis with adequate analgesia and fluid replacement. Complications like wound infection, vault hematoma, febrile morbidity, haemorrhage and death were kept into consideration, while hospital stay was calculated as number of days in hospital after the surgery including the day of surgery.

Post-Operative pain was documented as per the Visual Analogue Scale.

**STATISTICAL ANALYSIS**

Data analysis was done using the SPSS (Statistical Package for the Social Science) Version 17 for window. The detail of previous surgery, indication, type of haemorrhage, ambulation, oral fluid and complication at follow up were calculated with no. The chi-square test, Z test, proportion test was used to find significance difference of age, parity, comorbidity, duration blood loss, intra op complication, anesthesia, post of complication, hospital stay between TAH and NDVH. MW test was used to find the significant difference of post of pain score between TAH and NDVH. A probability value of 0.05 was accepted as the level of statistical significance.

**RESULTS**

The Mean age of women in our study was 48.74 in NDVH, which was higher when compared to TAH with a Mean age of 46.12. As it was expected with a higher age mean in NDVH patients, all comorbidity DM, HTN, Bronchial asthma, IHD were more than TAH.

The maximum number of patients who underwent the surgeries the underlying pathologies were very consistent with first being Fibroids followed closely by AUB the comparison of which have been demonstrated in Figure 1.

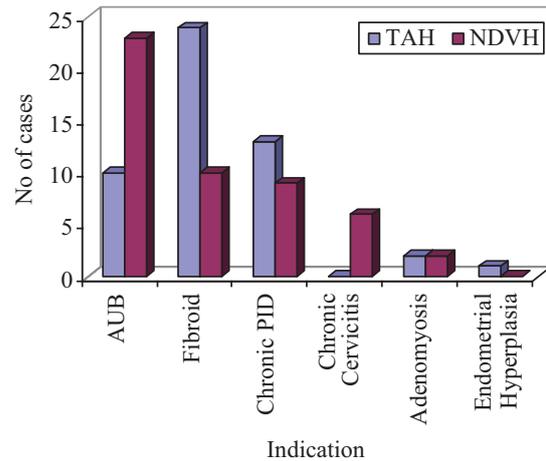
The Mean duration of surgery in both the procedures was kept and TAH was much lengthier a task than NVDH where it took 75.90 minutes in TAH which as compared to just 39.76minutes in NDVH. This was a statistically significant finding in our study.

TAH also measured higher when it came to intraoperative blood loss where it amounted to 138.80ml of blood loss than that of NDVD with on an average just 41.96ml. This also was statistically significant. It could majorly be amounted to the fact that all the patients with primary haemorrhage (16) were from the TAH group while Reactionary and Secondary haemorrhage didn't assert any significance in our observations as is seen in the Figure 2.

In the 100 surgeries performed the complications were as follows: 4 cases had Ureteric injury were in TAH, one cases with bladder injury was in NDVH and one cases with bowel injury was in TAH and this was not statistically significant. Post operatively pain was measured using the Visual Analogue Scale on Day 1,2 and 3 in which the scores for the patients who underwent TAH were always higher than that of NDVH as depicted in Figure 3, and were statistically significant too.

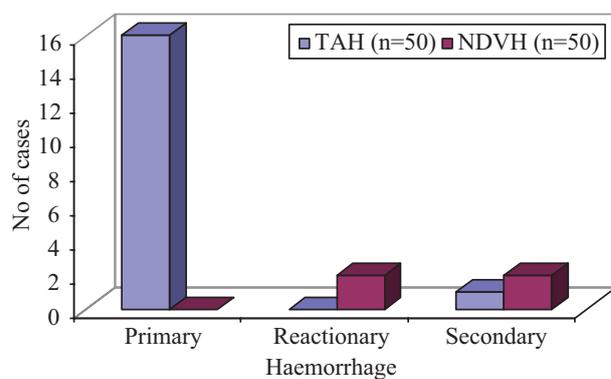
Post operative complications like febrile morbidity, wound infection, Burst abdomen, wound gape, Paralytic Ileus were

Bar diagram showing indication wise distribution of cases in TAH and NDVH group



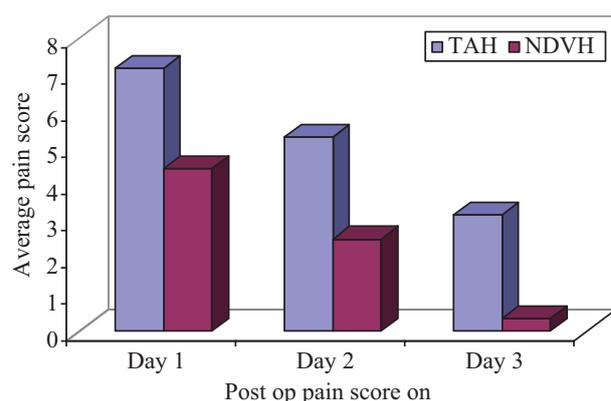
**Figure-1:** Comparison of Various Indications for both TAH and NDVH

Bar diagram showing comparison of type of haemorrhage in TAH and NDVH group



**Figure-2:** Comparison of type of Haemorrhage in TAH and NDVH

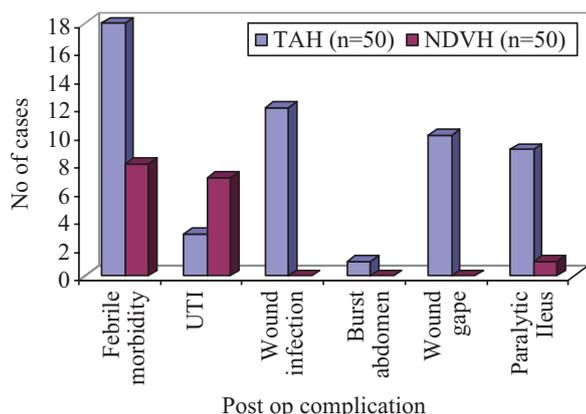
Bar diagram showing comparison of post of pain score in TAH and NDVH group



**Figure-3:** Comparison of Postoperative pain score in TAH and NDVH till Post-operative Day3.

also more in TAH but held no statistical significance have been demonstrated with the help of Figure 4. Even a comparative analysis of hospital stay showed TAH patients stayed for 7.14 days on an average in the hospital and NDVH patients stayed for just 3.18 days on an average. This indeed was highly significant statistically.

Bar diagram showing post op complication wise distribution of cases in TAH and NDVH group



**Figure-4:** Comparison of Postoperative complications in TAH and NDVH

## DISCUSSION

The non-randomized prospective cohort study was carried out to study the indication for abdominal and vaginal hysterectomy for non-descent uterus and to compare postoperative complications in vaginal and abdominal routes of hysterectomy. Advantage and disadvantage for abdominal and vaginal hysterectomy for non-descent uterus were also studied. Following were the important observations, which have been enumerated upon.

Mean age was more among the cases underwent Non-descent vaginal hysterectomy compared to Total abdominal hysterectomy in the study group. Mean age in Non-descent vaginal hysterectomy was 48.74 and in Total abdominal hysterectomy was 46.12 yrs. Similar finding was also observed in a study conducted by L. Benassi *et al* who did a prospective, randomized study. 60 vaginal hysterectomies (study group) were compared with 59 abdominal hysterectomies (control group). There were no major differences in patient age, weight, parity, and uterine weight between the two groups.<sup>6</sup>

Another study by Asnafi N, *et al* comparing the complications of vaginal versus abdominal hysterectomy also concurred with similar results with the mean age of the patients who had undergone vaginal hysterectomy was  $58.5 \pm 12$  years for vaginal hysterectomy and  $44.69 \pm 7.9$  years for abdominal hysterectomy.<sup>7</sup>

Comorbid condition like anemia, Diabetes mellitus, Hypertension, bronchial asthma and ischemic heart disease were not significantly associated with Total abdominal or Non-descent vaginal hysterectomy in study group and similar finding were also seen in a study conducted by Hoffman MS, DeCesare S, Kalter C in 1994.<sup>8</sup>

In our study AUB, fibroid and chronic cervicitis were common indications for hysterectomy. For fibroid, chronic PID and endometrial hyperplasia, Total abdominal hysterectomy was preferred and for chronic cervicitis and AUB Non-descent vaginal hysterectomy was preferred. Similar finding was observed in a study conducted by S Bharatnur (2010) where they studied the comparative risks of complications of abdominal and vaginal hysterectomies and concluded that DUB, Fibroid and chronic cervicitis were common indica-

tions for hysterectomy. Other indications were cervical dysplasia, adenomyosis and cervical polyp.<sup>9</sup>

The mean duration of surgery was significantly less among Non-descent vaginal hysterectomy as compared to Total abdominal hysterectomy cases in the study group. Mean duration was 39.76 min in Non-descent vaginal and 75.90 min in Total abdominal hysterectomy. Similar finding observed in a study conducted by Bing Chen, Dong-Ping Ren, Jing-Xuan Li, Chun-Dong Li where the operation time in Vaginal hysterectomy (Mean time 65.2 min) group was significantly shorter than in the abdominal hysterectomy (Mean time 95.6 min) group.<sup>10</sup> S Bharatnur also noted that mean operating time was more in abdominal hysterectomy than in vaginal hysterectomy (AH  $101 \pm 27.1$  min, VH  $65 \pm 26.2$ ).<sup>9</sup>

Mean blood loss was significantly less amongst Non-descent vaginal hysterectomy cases as compared to Total abdominal hysterectomy. Mean blood loss was 41.96 in Non-descent vaginal and 138.80 in Total abdominal hysterectomy. Bing Chen, Dong-Ping Ren, Jing-Xuan Li, Chun-Dong Li who compared outcomes of vaginal and abdominal hysterectomy procedures in women also concurred with their results showing intraoperative blood loss was significantly less in the Vaginal Hysterectomy (Mean 30.4 ml) group compared with the abdominal hysterectomy (Mean 70.3 ml) group.<sup>10</sup> Intraoperative complication showed ureteric injury was significantly high among Total abdominal hysterectomy cases as compared to Non-descent vaginal hysterectomy cases, while bladder injury was seen in one case in Non-descent vaginal hysterectomy and one case had bowel injury in Total abdominal hysterectomy. N. Fatima Shanthini, G. K. Poomalar, M. Jayasree, A. Bupathy found that Bladder injury occurred in 1 case in VH (1.9%) and in 4 cases in TAH (2.3%). Ureter injury occurred in 1(0.6%) case in TAH group. Authors concluded that vaginal hysterectomy is associated with quicker recovery, early mobilization, and shorter hospitalization, less operative and postoperative morbidity when compared to abdominal hysterectomy.<sup>11</sup>

Mean hospital stay in days was significantly less among Non-descent vaginal hysterectomy as compared to Total abdominal hysterectomy. Mean hospital stay was 3.18 days in Non-descent vaginal hysterectomy and 7.14 days in Total abdominal hysterectomy. Similar finding observed in a study conducted by Bing Chen, Dong-Ping Ren, Jing-Xuan Li, Chun-Dong Li with hospital stay length in the vaginal hysterectomy (Mean hospital stay 4.5 days) group being significantly shorter than in the Abdominal hysterectomy (Mean hospital stay 6.3 days) group.<sup>10</sup>

## CONCLUSION

The present study was undertaken to provide objective evidence to assist Gynaecological surgeons in their selection of the most appropriate method of hysterectomy and to provide data to permit patients to make an informed decision about their preferred type of hysterectomy. With adequate vaginal access, good uterine mobility and technical skill, vaginal hysterectomy can safely be performed on a Non-Prolapsed uterus, with an additional advantage of shorter duration of surgery, intraoperative complications, post-operative morbidity and shorter hospital stay. Hence, it can be elementarily

concluded that Non Descent Vaginal Hysterectomy triumphs over Abdominal Hysterectomy with patient favourable outcome and must be the choice of operative procedure amongst the two surgeries.

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# A Comparative Study of Psychiatric Aspects, Eating Attitude and Quality of Life of Overweight and Obese Females

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## ABSTRACT

**Introduction:** Obesity is the emerging public health problem in the world. The present study was planned to gain insight in to psychiatric, eating and quality of life aspects of clinically overweight and obese female subjects. It is hypothesized that obese and overweight subjects differ in their psychiatric, aspect. To test the above hypothesis the present study was planned.

**Material and methods:** Thirty obese and thirty overweight and thirty normal weight subjects were included for the study as per there B.M.I. (body mass index) when they met the inclusion criteria along with their consent and those meeting exclusion were excluded from the study. All three groups underwent general Performa and M.H.Q. (Middlesex Hospital Questionnaire), EAT-26, short form of health survey (SF-36).

**Results:** Intra-group statistical analysis of ANOVA shown significant difference in Free floating anxiety ( $P>0.001$ ) and highly significantly ( $P>0.0001$ ) difference in Phobic anxiety, obsessional traits and somatic symptoms. Depressive symptoms were mildly significant in between groups ( $p>0.014$ ) and insignificant for hysterical traits. Eating attitude was also highly significant ( $P>0.0001$ ).overweight and obese females shown significant difference values for general, mental health and role impairment due to physical functioning.

**Conclusion:** obese and overweight females found vulnerable to ill mental health, prone to abnormal eating attitude and poor quality of life.

**Keywords:** overweight, obese, body mass index, Middlesex hospital questionnaire, eating attitude test-26, short form of health survey (SF-36)

## INTRODUCTION

Columbia Encyclopedia defines obesity "condition resulting from excessive storage of fat in the body".<sup>1</sup> Encyclopedia Britannica defines obesity as "excessive accumulation of body fat, usually caused by the consumption of more calories than the body can use".<sup>2</sup>

Obesity varies anatomically by the size, number, and distribution of fat cells and fat tissue. Obesity is key manifestation of hypothalamic injury, Cushing's disease and the polycystic ovary syndrome. Stopping smoking, over consumption of high-fat foods, aging having overweight parents, multiple births, and a sedentary lifestyle are obesity inducing factors. Obesity tends to put lot of burden on physical mental and eating aspect of the sufferer.

### Psychological aspects of obesity

McFarland and Baker-Baumann<sup>3</sup>, noted that body image perception influences eating patterns and self-esteem, distorted body image and low self-esteem can lead to eating disorders and overweight. Strict diets can cause depression in predisposed women.<sup>4</sup> Continuous dieting failures give rise to more

cycles of depression and binge eating.<sup>6</sup> Keeping in view the impact of obesity on mental health the current study was planned.

### Eating bhaviour

Emotional eating is a common eating addiction found in obese and overweight subjects under stress or negative mood.<sup>7</sup> many times specific type of food relieves the emotional turmoil and prepare ground for cyclic food abuse/eating disorder<sup>7</sup> Likewise the quality of life is also being compromised due to physical and mental impact of obesity and overweigh subjects. Keeping all these aspects in consideration the current study is planned to evaluate and analyze the role of mental health, eating attitude and its impact on obesity in Indian population which can be helpful in formulating management and prevention strategies for obesity with following aims and objectives.

Aims and objectives of the research were to find out socio-demographic profile of clinical obese and overweight subjects, to compare psychiatric profile of the participants, to obtain the eating attitude of study subjects and to know the quality of life of clinical obese and overweight.

## MATERIAL AND METHODS

### General Design of Study

The present observational study was conducted at obesity clinic in SMS Medical College; Jaipur on every Friday from 10-12 a.m. The data from the study sample was collected over the period of 8 months starting from April 2002 to November, 2002. We confined to the female gender specifically, for the study as majority of the subjects coming to the clinic were females. This was planned to make the study comparable and specific.

### Sample Collection

At the first visit of the patient, the treating physician as a regular health check up examined them. This was followed by weight (in k.g.) and height (in meters) measurement to calculate their B.M. I. (B.M.I. i.e. body mass index) body mass index is defined as follows: -

$$\text{B.M.I.} = \frac{\text{Weight (In Kilogram)}}{\text{Height (In Metre)}^2}$$

Patients were included for the study when they met the inclusion criteria along with their consent and those meeting exclusion were excluded from the study.

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**Inclusion criteria** for the study were:

1. Female subjects of age group 20 - 40 years.
2. Subjects of BMI > 25. (Except for control group)
3. Subjects having working knowledge of both Hindi and English language.

**Exclusion Criteria** for the study were:

1. Pregnant and lactating females.
2. Subjects suffered from obvious psychosis in past history.
3. Subject receiving current treatment from psychiatrist or psychologist.

Patients were grouped into obese when their B.M.I. exceeded 30 k.g. /m<sup>2</sup>. Patients were further included in the study under age group 20-40 years. Total numbers of obese and overweight (30<B.M.I.>25) subjects were 30 each. For the purpose of preliminary analysis 30 consecutive female patients with normal weight (18k.g. /m<sup>2</sup><B.M.I. <25k.g. /m<sup>2</sup>) of 20-40 years age group were also included as a control group. These subjects were those who accompanied obese and overweight during first visit. This was planned to make control group comparable to both the groups.

Thereafter, patients were subjected to socio-demographic sheet to collect the data, followed by series of three psychological scales (M.H.Q., E.A.T.-26 and S.F.-36) to know their psychiatric profile, eating attitude and quality of life. These were self-rating scales to assess the subjects. Each patient took around 30-45 min. to fill the questionnaire. Some of the patients were reluctant enough to fill the questionnaire while others required motivation to do so.

**Tools of the study**

Scoring method of each test along with each individual test is described below:

**Socio-demographic Data Sheet:** This includes name, age, and father, husband name, address, education, occupation, marital status, and economic status, type of family, past psychiatric history.

**Middlesex Hospital Questionnaire (MHQ)<sup>8</sup> HINDI VERSION<sup>9</sup>**

The Middlesex Hospital questionnaire is a 48 item short clinical diagnostic self rating scale for psychoneurotic patients constructed by Crown and Crisp.<sup>8</sup> MHQ consist of six sub scales including Free Floating Anxiety (FFA), Obsessional trait symptoms (OBS), Phobic Anxiety (PHO), Somatic Concomitant of Anxiety (SOM), Neurotic Depression (DEP), Hysterical personality traits (HYS)

It also provides total quantitative score on neurosis. It is widely used both in Britain and India. It is reported to be reliable and valid. Shrivastava and Bhatt<sup>9</sup> used the Hindi version of MHQ to groups of normal population (homog-

enous and heterogeneous) and a neurotic population. They also concluded from their study that the Hindi version of the MHQ is a very sensitive, reliable and valid instrument for differentiating the neurotics from normal.

**Eating Attitude Test – (EAT-26)**

David M.et.al.<sup>10</sup> Hindi Version Ritu Nehra et.al.<sup>11</sup> EAT-26 was developed by David M. Garner (1982) and has been established as highly efficient as the sole means for identifying eating disorders. This is a self-reporting questionnaire consisting of 26 questions. Each question is to be answered yes or no. A cut-off score of 20 was given by Garner. Hindi version of the EAT-26 was developed by Ritu nehra et. al.<sup>11</sup> They suggested the Hindi version of EAT-26, a reliable test for measuring eating attitudes. Although the cut off score for the Indian population has not been found, but it can be used for comparative study of eating behavior.

**Short form of health survey (SF-36):<sup>12</sup>** It is reasonable indicators of quality of life in eight dimensions which are measured by SF - 36. This test consists of 36 questions, collecting eight dimension of quality of life. It includes physical functioning, role impairment due to physical factors, bodily pain, general health, vitality, social functioning, role impairment due to emotional factors and mental health.

The cut-off scores for Indian population are not calculated. But in our study we have used this test for comparison in between two groups. It served the purpose and the error remained the same in both the groups.

**STATISTICAL ANALYSIS**

To evaluate results appropriate statistics were used. Mean and standard deviation used to measure how widely values are dispersed from the average value (the mean). Quantitative data were tested to prove/disprove hypothesis by applying chi square test ( $\chi^2$ ) which provides the probability for a  $\chi^2$  statistics and degree of freedom (df). In cases where statistical analysis includes three or more groups and one ordinal and another numerical variable, we used analysis of variance ANOVA (F).

**RESULTS**

Table no. 1 shows mental health finding as per M.H.Q. Free floating anxiety is highlighting significant difference (P>0.001) among groups. Phobic anxiety, obsessional traits and somatic symptoms were highly significantly (P>0.0001) among groups as per ANOVA. Depressive symptoms were mildly significant in between groups (p>0.014). ANOVA was not significant among groups (P=0.246) for hysterical traits.

All three groups were insignificantly different (F value was 1.206) age wise, that's why comparable as per study plan.

Serial no.	M.H.Q. Sub scale score	Mean square	F	P-Value
1	Free floating anxiety	72.411	7.375	0.001
2	Phobic anxiety	79.544	8.922	0.0001
3	Obsessional traits	79.011	8.428	0.0001
4	Somatic symptoms	161.244	17.445	0.0001
5	Depressive symptoms	43.744	4.516	0.14
6	Hysterical traits	10.033	1.426	0.246

**Table-1:** Analysis of variance of scores obtained on MHQ between obese, overweight and normal weight subjects

Most of the obese and overweight subjects were married (93.33%) along with normal weight (86.66%). Difference among groups on chi square was in-significant. Majority of obese were post-graduate (43.33%), 16.67% were educated up to primary or middle school each, rest were either graduate or educated up to secondary school. Most of the overweight females were graduate (43.33%), followed by post-graduate (36.67), middle-schooling (13.33%) and primary schooling (6.67%). While most of the normal weight were graduate (50%) followed by post graduate (16.66%), rest were educated up to Secondary school. Chi square shows significant difference among groups Occupation wise Housewife dominates all the groups (obese=60%, overweight=46.67%, normal weight=56.67%), this is followed by government job or highly qualified professional (obese=40%, overweight=46.67%, normal weight=26.66%), rest were students. Difference among groups was not significant. Family income profile shows Majority of females in obese group were in-between rs. 10001-15000 per month (43.33%) and 1000-5000 (20%) per month while most of the overweight were >20000(40%) and 10001-15000(30%). Most of the normal weight subjects were in 10001-15000 (36.67%) followed by 15001-20000(26.67%). Difference among groups was significant (P=0.002)

Table no. 2 shows highly significant (p>0.0001) as per ANOVA which shows significant difference for eating behavior in overweight and obese females.

Social functioning as per SF-36 scale provided highly significantly different (p>0.0001) value for general health and role impairment due to physical functioning for obese and overweight. Mental health was also significantly different (p>0.001) among obese and overweight. Physical functioning and bodily pain were also mildly significant (p>0.01). While vitality, social functioning, and role impairment due to emotional factors were insignificant among groups.

## DISCUSSION

### Sociodemographic profile

Since most of the people in our study were married, we found significant difference between the groups on this variable. Lipowicz et.al.<sup>13</sup> reported that married women were more likely to be overweight and obese than never married individuals. The results indicated a significant association (P < 0.001) between marital status and the BMI. While Sobal et.al.<sup>14</sup> concluded that marital status was not significantly associated with fatness or obesity among women, when other variables were controlled. Our finding confirms with those of lipowicz et.al.<sup>13</sup> but differ from sobal et.al.<sup>14</sup> Ehrenreich<sup>15</sup> explained the causative factor behind it. He found that in the western world where individuality is considered a great value and where strong relations are becoming harder to build and maintained, food might be used as an answer to feelings of isolation. However due to the different design of our study we were not able to appreciate these findings.

Regarding the education status we found a significant difference between the three groups. Aranceta et. al.<sup>16</sup> found that Educational level showed an inverse relationship with obesity, thus obesity was higher in less educated groups, particularly among women. Galobardes B et.al.<sup>17</sup> Found that

EAT-26 Score	Mean square	F	P-Value
	193.733	11.852	0.0001*

**Table-2:** Anova of eating behaviour scores obtained on EAT-26 between obese overweight and normal weight subjects

SF-36 subscale Variable	Mean square	F	P-Value
Physical functioning	3091.878	5.922	0.004*
Role impairment due to physical functioning	7000.000	9.369	0.0001*
Bodily pain	3547.778	6.204	0.003*
General health	3418.611	17.872	0.0001*
Vitality	1451.944	3.338	0.040*
Social functioning	1018.186	2.457	0.092
Role impairment due to emotional factors	1334.005	1.798	0.172
Mental health	2329.211	7.833	0.001*

**Table-3:** Anova of quality of life scores obtained on SF-36 between obese, overweight and normal weight subjects

Education and occupation were inversely related to BMI in women and had a synergistic effect (p-value for the interaction = 0.03). Woo J et. al.<sup>18</sup> examined influence of education on Body mass index and found inverse relationship between B.M.I. and education. Wardle J, et. al.<sup>19</sup> found that Higher educational attainment was associated with a lower risk of obesity in women. Our sample shows higher education among overweight and obese subjects. This was so, because we had chosen the sample attending the obesity clinic which was not representative of the community. Moreover highly educated subjects seem to be more aware of their weight related problems and seek help, that's why our result contradicts all these findings.

We did not find any significant difference in the occupational status between the three groups. While Lahti-Koski M et. al.<sup>20</sup> reported that in women changes in BMI were similar in all occupational groups. Wardle J, et. al.<sup>19</sup> found that higher occupational status was associated with a lower risk only for women. Our finding matches with that of lahti-koski et. al.<sup>20</sup> but this should be interpreted with caution since it does not give any idea of the physical work involved in these occupations. If we would have classified the groups, according to the physical work involved, the findings would have been different.

In our study, monthly family income between the groups was significantly different. Monteiro CA et.al.<sup>21</sup> found that obesity in women was strongly and directly associated with income. Sarlio-Lahteenkorva S et. al.<sup>22</sup> found that both overweight and obesity were associated with low individual earnings. Gortmaker SL et.al.<sup>23</sup> concluded that obesity was associated with lower household incomes and higher rates of household poverty. Our findings match with these studies it may be due to the fact that High earning group of the society are more cosmetically aware as well as their nutritional habits differ from that of lower earning group. These factors may contribute to the findings in our study.

### Psychological aspects

In our groups we found that there was a significant difference between the groups on all, except one (hysterical) subscale

of M.H.Q. Free floating anxiety, phobic anxiety, obsessional trait, somatic symptoms and depressive symptoms were significantly different. Strunkardet.al.<sup>24</sup> found that traits Such as immaturity, suspiciousness, rigidity, frustration-depression, withdrawal, tension anxiety and neurasthenia prevailed significantly in the obese population. As our study has shown significant difference among groups on free floating anxiety and phobic anxiety scores likewise becker et.al.<sup>25</sup> also found an association between psychological disorder and weight they concluded that obese women suffered from anxiety disorder significantly more as compare to normal weight counterparts. Nichole H.Falkner et.al.<sup>26</sup> found that when obese girls were compared with their average weight counterparts they were more likely to report serious emotional problems, more likely to report hopelessness, and more likely to report a suicide attempt. R Rosmond et.al.<sup>27</sup> studied 1464 women, aged 40 years, in bivariate analyses, they found that BMI was associated with use of anxiolytics, ant depressive drugs, various sleeping disturbances, and a low degree of life satisfaction and suggested that elevated BMI (obesity) were associated in different ways with symptoms of psychiatric ill-health in women. In contrast Stewart et.al.<sup>28</sup> reported that obese persons were significantly less anxious and depressed than normal weight persons. The differences among the groups were not strong.

Our results were similar to the earlier three studies. Wolman et. al.<sup>5</sup> described the psychopathology behind obesity, according to this obese individuals are depressed due to lack of self-confidence, self-blame and a feels of isolation. Due to poor mental and physical health, overweight or obese people have a pessimistic outlook on life, which cause more depression and overeating.

Martins et.al.<sup>29</sup> reported the association of cerebral asymmetry and HPA axis reactivity to the obesity. They found that subjects with hyper reactive HPA axis scored higher on stress related psychological measures, and cerebral asymmetry was causal in the obesity acquisition. Thus different psychoendocrinal characteristics may be the possible cause of increased neurotic traits in obese subjects.

### Eating behavior

We found that eating behavior of three groups was significantly different, the obese and overweight scored higher on the E.A.T. scale showing more abnormal eating behavior. However due to the lack of cut off score for Indian population, we were unable to diagnose specific disorders. Adami GF et.al.<sup>30</sup> found aberrant eating patterns in obese patients as compared to normal weight subjects. While Chugh R, Puri S<sup>31</sup> reported significant difference of eating behavior between obese and normal weight females, and found that 43.3 % were at a significantly ( $P=0.00109$ ) greater risk of developing anorexia in the future. Diehl JM<sup>32</sup> found significantly different eating behavior between obese and normal weight subjects.

Our findings matches with that of above three studies, although the obese were shown significantly higher scores on EAT-26 but the specific eating disorder can not be diagnosed on the scale. Thus different eating behavior in obese may be a part of partial eating disorder.

### Quality of life

We found that in our sample there was a significant difference between the groups on measure of physical health which was measured with the help of S.F.-36. Obese subjects scored lower on the physical functioning, role impairment due to physical functioning, bodily pain and general health. Regarding the mental health, obese people scored significantly lesser than other groups on vitality and mental health. Larsson U et.al.<sup>33</sup> found that obese women rated their health worse than normal-weight women on three of the physical health scales and analysis indicated a clearer negative association between obesity and physical health than between obesity and mental health.

Barofsky I et. al.<sup>34</sup> concluded that obese patients reporting pain scored significantly lower on all SF-36 domains than those not reporting pain. Findings indicate that the pain itself is independently associated with impaired HRQL in nearly half of obese persons, seeking treatment.

Our finding matches with the above mentioned findings. Poor quality of life (both physical and mental) may be due to social bias against obese people and increased likelihood of medical disorders affecting physical and mental functioning.

### CONCLUSION

To sum up, it can be concluded that clinically obese and overweight individuals are vulnerable to psychological ill health or vice versa. They also show different socio-demographic characteristics, impaired quality of life and eating attitude. An attempt should be made to deal with psychological, eating and quality of life related problems so that obesity can be managed in a better way.

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# Clinical and Radiological Study of Antrochoanal Polyps

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## ABSTRACT

**Introduction:** A polypoidal mass in the nasal cavity is a commonly encountered but its treatment often presents a clinical dilemma, as a diverse group of lesions may present themselves as polypoidal masses. Computerized Tomography (CT) provides essential preoperative information for the assessment of patients undergoing functional endoscopic sinus surgery (FESS). Aim of the research was to study the Clinical (endoscopic) and radiological correlation of antrochoanal polyps and to aid for management of these cases depending on their radiological features.

**Material and methods:** Study group 50 patients with nasal polypoid masses, who were treated for a period of 2 years. Patients were subjected to a comprehensive history and clinical evaluation, radiological evaluation and histological examinations as per the proforma designed for study.

**Results:** In study of 50 cases of antrochoanal polyps, the maximum incidence is in 11 to 20 years age range (40%) followed by 21-30 years age (36%) and predominantly in females (60%). Unilateral presentation of antrochoanal polyps (100%) was most commonly with predominance of right side (76%) and 60% of antrochoanal polyps had posterior. Nasal obstruction was the prominent symptom (100%). More number of patients were seen with complaints of headache (36%) which is one of the main symptom of sino nasal pathologies. Sinus tenderness is to be the most predominant sign seen in most of the patients, (86%). In 33 (66%) of 50 patients we found mucosal thickness as associated findings, evidenced by CT; only 30 (60%) of 50 patients had the same problem in nasal endoscopy.

**Conclusion:** CT scans form an important and reliable objective assessment tool for patients undergoing surgery for sino nasal pathologies.

**Keywords:** Antrochoanal polyps, Functional endoscopic sinus surgery, Computerized Tomography.

## INTRODUCTION

A polypoidal mass in the nasal cavity is a commonly encountered by most of the Otorhinolaryngologists all over the world. Despite the high prevalence, its treatment often presents a clinical dilemma, as a diverse group of lesions may present themselves as polypoidal masses. They may be simple mucosal polyp or a variety of other pathological entities like infective granulomatous diseases, papillomas, vascular masses or neoplasms. A number of deceptively benign looking polyps often turn out to be intracranial lesions, such as meningocele or encephalocele and these exemplify the difficulty faced by the clinicians. However, only by histopathological examination of excised polypoidal tissues one can arrive at the final diagnosis. This study is intended to assess, differentiate and manage the various conditions presenting as antrochoanal polyps. Also to understand their exact nature by histopathological examination and to understand their site of involvement by radiological investigations

(CT scan), for placing them under established classification and thereby learn the relative incidence of Antrochoanal polyps, in our geographical area.

CT has become the standard diagnostic tool in evaluation of paranasal air. CT scan evaluation of the patients, who have to undergo eventually FESS, is extremely useful in confirming the clinical diagnosis, for knowing the extension of the disease and any abnormalities in the anatomy of paranasal air sinuses. Computerized Tomography (CT) scan play a vital role in the present day to day assessment of all the sinonasal pathologies and their management.<sup>1</sup> Though the investigation is expensive and having merits and demerits of its own, this study will help in having an insight into the necessity of this investigation.<sup>2</sup> Variations in intranasal and sinus anatomy have been implicated in the aetiology of sinonasal disease, and CT imaging has become an important diagnostic tool. Despite this, some patients present with symptoms and signs suggests sinonasal disease, yet demonstrate little abnormality on CT scan.<sup>3</sup> The pre-operative diagnosis for these patients is based upon the combination

of endoscopy of the lateral nasal wall along with CT scan of the paranasal sinuses, but however, the prevalence of the mucosal changes in an asymptomatic population is quite significant.<sup>4</sup> The present study was done to correlate and evaluate between the clinical and radiological findings (CT Scan) of antrochoanal polyps.

Computerized Tomography (CT) provides essential preoperative information for the assessment of patients undergoing functional endoscopic sinus surgery (FESS). One of the aim of CT of the sinuses is to delineate the extent of the disease, define any anatomical variants and relationship of the sinuses with the surrounding important structures. At present, CT scanning is the most commonly used imaging technique for assessing Sino nasal pathologies and defining the anatomical abnormalities.

The primary role of the coronal CT scan is to determine the extent and if possible the underlying cause. As a rule, surgeons individualize their surgical approach according to the extent and location of disease, they see on CT scan. Endoscopic techniques for paranasal sinus surgery have allowed detailed and complete visualization of sinus disease while promising minimum distress to the patient. The endoscopic view of the operative field shows details of the sinus anatomy and its disease. It is possible to see areas of the cribriform

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and orbital wall that are at risk to produce cerebrospinal fluid rhinorrhoea and orbital complications during the surgery respectively. At the same time, landmarks for avoiding these complications can be defined to guide the surgeon during the surgery as seen through the endoscope.

Anterior rhinoscopy reveals little information with regard to the middle meatal cleft and provides no information regarding the infundibulum and maxillary sinus orifice. Nasal endoscopy provides the ability to accurately access these areas for evidence of localized disease, or for the anatomical defects that compromise ventilation and mucociliary clearance.

Hence computerized tomography(CT) and endoscopy have revolutionised the understanding and management of sino nasal pathology in recent times. Recently combination of systematic understanding of the lateral nasal wall with CT in the coronal plane and endoscopy has become the corner stone in the evaluation of the PNS disease. This is the basis for the concept of FESS.

**MATERIAL AND METHODS**

Study group 50 patients with nasal polypoid masses, who

	Antrochoanal polyps ( n=50)	Percentage
Age Group		
0 – 10	4	8%
11 – 20	20	40%
21 – 30	18	36%
31 – 40	2	4%
41 – 50	3	6%
51 – 60	3	6%
Gender		
Male	20	40%
Female	30	60%
Symptoms of antrochoanal polyps		
Nasal Obstruction	50	46%
Nasal Mass	23	70%
Rhinorrhoea	35	26%
Post nasal Discharge	13	28%
Smell Disturbance	14	10%
Epistaxis	5	36%
Headache	18	10%
Sneezing	5	100%
Duration of symptoms of Antrochoanal polyps		
0– 6	17	34%
7 – 12	17	34%
13– 24	10	20%
> 24	6	12%
Incidence		
Recurrence absent	45	90%
Recurrence present	5	10%

**Table-1:** Details of Antrochoanal polyps

were treated at Guntur Govt. general Hospital, Guntur attached to Guntur Medical College, Guntur between nov 2012 and october 2014. Sample size was based on inclusion and exclusion criteria.

**Inclusion criteria:** The patients of all age groups of both sexes presenting with nasal symptoms and who on anterior rhinoscopy revealed polypoidal mass in either or both nasal cavities.

**Exclusion criteria:** Patients presenting with congenital nasal mass or nasal mass, of intra cranial origin such as basal meningocoele, basal meningo-encephalocele and nasal glioma Patients were subjected to a comprehensive history and clinical evaluation, radiological evaluation and histological examinations as per the proforma designed for this study.

The histopathological slides and blocks were taken from the department of pathology and were reviewed by the pathologist. The radiological data and reports were taken from the department of radiology and were reviewed by the radiologist.

Heamatological investigations like Hb%, total leukocyte count, Differential count, Absolute eosinophil count, bleeding time, clotting time, blood grouping and typing and urine examination were done. Radiological investigations included plain paranasal sinus x-rays (Water’s view/ Caldwell’s view/Lateral view), Computerised tomographic scan of nose and paranasal sinuses (coronal and axial with or without contrast enhancement) was done in all cases.

**RESULTS**

A total number of 50 cases were studied during two years period. The following observations were made and analyzed. Antrochoanal polyps had an incidence of 8% in the age group of 0 to 10 years and incidence of 40% in the 11 to 20 years, followed by 36% in the age group of 21 to 30 years, 41 to 50 years and 51 to 60 years has got 6%. Overall, females dominated with the ratio of 0.66:1. In our present series females dominating in antrochoanal polyps.

Nasal obstruction was found in all cases with majority (100%). Other symptoms included rhinorrhoea 70% and post nasal discharge 26%. Anterior rhinoscopy showed mass in nasal cavity in most of cases and showed posterior extension in post nasal examination in 30 cases. Antrochoanal polyps had a maximum duration of symptoms with 0 -6 and 7-12 months (34%). Incidence of recurrence of Antrochoanal polyps is 10%.

According to the clinical findings, antrochoanal polyps had 100% unilateral presentation with predominance of right side (76%). while antrochoanal polyps presented as solitary polypoidal mass in all cases (100%). 60% of antrochoanal polyps had posterior extension.

Type	Laterality		No of cases visualized in posterior rhinoscopic Examination	
	Right	Left	Visualized	Not Visualized
Antro Choanal polyps	38	12	30	20
Percentage	76%	24%	60%	40%

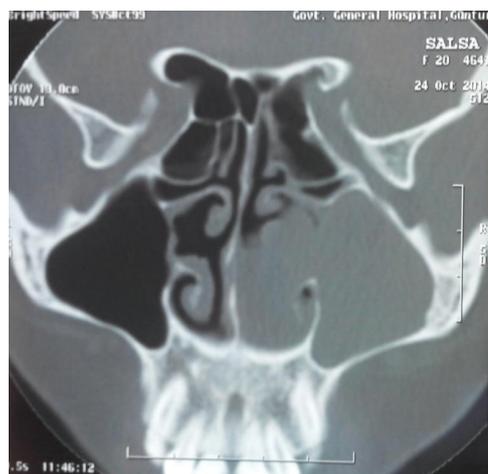
**Table-2:** Clinical findings in cases of Antrochoanal polyps

Findings	Total CT scan	Endoscopy Positive CT scan
Mucosal thickness	28	2
Left OMC patency	32	2
Right OMC patency	31	3
Hypertrophy of Inferioturbinate	32	1
Hypertrophy of middle turbinate	7	1
Septal deviation	31	0
Polyp	50	0
Cyst	6	0
Concha bullosa	4	0

**Table-3:** Correlation between CT- Scan and endoscopic features in patients with sino nasal pathologies

Types	Antrochoanal polyps	Percentage
Inflammatory (Neutrophils + Plasma cell predominance )	38	76%
Allergic (Eosinophilic predominance)	12	24%

**Table-4:** Histopathological pattern of Antro Choanal polyps



**Figure-1:** CT-PNS right antrochoanal polyp; Endoscopic view of Antrochoanal polyp

Hypertrophied middle turbinate is found in 34 %whereas non purulent middle meatal discharge is seen in 30% of the patients. Other signs like inferior turbinate hypertrophy are seen in 42%, oedematous nasal mucosa in18%, congested

mucosa in 34% and pale mucosa in 26%. Normal mucosa is seen in 22% of the patients. In antrochoanal polyps recurrence incidence was less (10%).

### DISCUSSION

The present study was conducted on 50 patients enumerated the clinico-radiological features of antrochoanal polyps in the nasal cavity. The patients are in the age group of 6 to 78 years with the mean age being 20 years. Of the patients, 20 were males and 30 were females.

In our study the age incidence of 37 out of 50 patients with antro choanal polyps, ranged between 16 to 45 years. Out of them the majority belonged to 11 to 20 years of age (40%). This has a difference of 26.5% higher incidence in adolescent group. Antrochoanal polyps are said to be more common in children and adolescents. Study done by Ramesh C.Deka et al<sup>5</sup> out of 120 patients majority of patients belong to adolescent age which well correlates with our study.

In our study of 50 cases, males dominated with 20 cases (40%). The male to female ratio was 1:1.5. Study also correlates with previous studies. Our study is nearly on par with the study conducted by Anuj kaushal et al<sup>7</sup> with respect to male: female ratio it is.<sup>6</sup>

Antrochoanal polyp had symptoms of unilateral nasal obstruction (100%) and unilateral presentation (100%), post nasal discharge (26%), which closely resembles Anuj kaushal et al<sup>7</sup>

In the study conducted by Fikret Kasapoglu et al<sup>8</sup> the most common findings are deviated nasal septum noted in 18 (41.9%) cases on CT scan. In the study conducted by Jareoncharsri P et al<sup>9</sup> septal deviation is obvious in 60(72.3%) of the patients out of 83 cases on nasal endoscopy. No conclusive literature is present to compare CT scan and endoscopy of deviated nasal septum on the same patients.

Osteomeatal complex block is seen in 17(34%) cases on diseased side on nasal endoscopy. The block is assessed with an angled endoscope and in many of the cases with the help of a curved suction tube which can be passed into the ostium, thereby confirming block. On CT scan the present study shows 19(38%) cases on diseased side has block.

In the study conducted by Zojaji et al<sup>10</sup> OMC block is seen in 18(36%) on right and 17(34%) on left when seen by CT scan and 15(30%) on both right and left when seen by nasal endoscopy. On comparison the present study shows similar results.

Pneumatized uncinata process is seen in 2 cases (4%) on the right and one case on the left on CT scan, while on FESS only 1case (2%) is seen on the left. In the study conducted by G.L Fadda et al<sup>11</sup> pneumatized uncinata process is noted in 1(0.7%) case on the right and 4(2.8%) on left. On comparison both the studies shows almost equal percentage of patients with pneumatized uncinata.

Agger nasi: 8(16%) cases on the right and 14((28%) cases were demonstrated with FESS whereas on CT scan shows 15 (30%) on right and 18(36%) cases on the left. In the study conducted by Sheetal D et al<sup>1</sup> on CT scan the Agger nasi cells are present in 37% and 33% of the cases on the right and left sides respectively. cells. On comparing both studies showed similar number of cases with Agger nasi

Onodi cells is only seen on CT scan in 2(4%) cases on the right side. Importance of Onodi cells is its close relation to the optic nerve and it can be only appreciated completely in axial cuts of the CT scan hence making axial cuts to be a must in CT study of paranasal sinus.

Middle turbinate concha bullosa is the most common variation present, seen both in nasal endoscopy and CT scan. 4(8%) cases show concha bullosa on nasal endoscopy whereas CT scan shows 6(12%). The advantage of CT scan is that it detects both lamellar as well as concha pneumatization with more accuracy. The presence of concha is more important, because pneumatization of middle turbinate causes compression of the middle meatus and hence causes narrowing of the hiatus semilunaris.

Paradoxical middle turbinate is seen only on left side in 3 (6%) on endoscopy whereas on CT scan 1 (2%) case is seen on the right and 5 (10%) is seen on the left side.

In the study by Sheetal D et al<sup>1</sup> on CT scan Concha bullosa is seen in 35% and 42% of the patients on the right and left sides respectively. On endoscopy concha bullosa is seen in 33% and 40% of the patients on the right and left sides respectively. On CT scan Paradoxical middle turbinate is seen in 17% and 8% of the patients on the right and left sides respectively. On comparison, present study has less number of paradoxical middle turbinate as well as concha bullosa.

Hypertrophy of Middle turbinate is seen in 8(16%) cases on Nasal Endoscopy and CT scan. The hypertrophy of the middle turbinate is mostly seen in cases with allergy. In the similar study conducted by Zojaji et al<sup>10</sup> out of 51 patients, middle turbinate hypertrophy is seen in 8(15.6%) cases endoscopically and 7 (13.7%) cases in CT scan. On comparison both the studies have almost similar number of cases seen with middle turbinate hypertrophy.

Inferior turbinate hypertrophy: It is seen in 33 (66%) patients on both right and left on Nasal Endoscopy, whereas on CT scan shows 35 (70%) on both the left and right side. The striking finding seen both in CT and Endoscopy is the inferior turbinate hypertrophy is always bilateral and in no case can a unilateral hypertrophy be seen and in most of the cases it is associated with pale mucosa indicating allergic condition. Pale inferior turbinate is evident in 31 cases on the right (62%) and 31 cases on the left (62%). Whereas this finding is not appreciated on CT scan, hence indicating that the condition of the mucosa whether pale, congested and edematous can only be clearly appreciated on endoscopy, whereas CT scan holds no diagnostic value about the condition of the mucosa.

In the study conducted by S. Naghibi et al<sup>12</sup> Hypertrophy of the inferior turbinate is the most obvious finding in the CT scan (70.6%) as well as in endoscopic evaluation (68.6%).

On comparison with the present study both the studies shows nasal endoscopy as well as CT scan can detect hypertrophied inferior turbinate in almost equal percentage of cases.

Polyp is seen in 50 cases detected on nasal endoscopy whereas CT scan also showed 50(100%) findings, thereby showing that CT para nasal sinuses has more sensitivity in evaluating polyps. Mild polyposis could not be seen in Nasal Endoscopy.

Masses and Cysts in CT Scan and nasal endoscopy showed

almost similar results. Maxillary mucosal thickening noted in 23(46%) cases on CT scans and 20(40%) in nasal endoscopy. Anterior ethmoidal and sphenoid sinus haziness is seen in 12 cases (24%) in CT scans and 8(16%) in nasal endoscopy. Maxillary mucosal thickening is mostly seen associated with other sinus involvement.

In the study of Sheetal D et al<sup>1</sup> on CT scan maxillary sinus is found to be the most common sinus to get affected (57% on the right and, 46% on the left side), followed by the anterior ethmoid cells (40% on the right and, 37% on the left side), the posterior ethmoid cells (33% on the right and, 28% on the left side), the frontal sinus (28% on the right and, 26% on the left side) and, sphenoid (20% on the right and, 13% on the left side) respectively.

CT has become the standard diagnostic tool in the evaluation of paranasal sinuses. When coupled with nasal endoscopy, it provides most of the objective data needed for diagnosing sino nasal pathologies. The aim of this study was to determine the correlation between preoperative CT and clinical features, in patients with sino nasal pathologies. The results of our study indicated that although for most of the findings, there was a good to excellent level of agreement between the results of the two methods. According to the present results, the finding of hypertrophic inferior turbinate was more evidenced in CT scan compared to sinus endoscopy (88% vs 84%).

In 33 (66%) of 50 patients we found mucosal thickness as associated findings, evidenced by CT; only 30 (60%) of 50 patients had the same problem in nasal endoscopy. This discrepancy may be due to the fact that up to 40% of asymptomatic individuals have incidental opacification of the paranasal sinuses on CT. In children, the prevalence of mucosal change is even larger. CT scans form an important and reliable objective assessment tool for patients undergoing surgery for sino nasal pathologies.

No single intervention, questionnaire, or radiologic study is sufficient to make the diagnosis alone. When combined with a directed and thoughtful history, CT Scan can yield valuable information regarding anatomic location and severity of the disease which will act as "road map" for the surgeon who plans FESS.

The polyps are divided into two types depending on the eosinophils and inflammatory cells. The eosinophilic polyp, which have abundant eosinophils are said to be associated with allergy while inflammatory polyps with scanty eosinophils and moderate number of lymphocytes, plasma cells and neutrophils are said to be associated with chronic inflammation.

Dandapath A<sup>13</sup> found an incidence of only 48.7% of eosinophilic variety among nasal polyps. However in our study 76.19% of antrochoanal polyp showed inflammatory cell type, mainly lymphocytic.

## CONCLUSION

CT scan has got a better advantage compared to nasal endoscopy in detecting the anatomical variations, number of sinuses involved as well as to know the extent of disease in sinuses.

Pneumatized uncinat process is better seen in CT scan than

Nasal endoscopy as that condition is present in few cases only. It is an anatomical variation that causes narrowing of the infundibulum there by leading to sino nasal pathologies. Most of the important findings like OMC block, Hypertrophy of turbinates, septal deviation, polypoidal mass, were detected both in CT and nasal endoscopy and showed good correlation. Mucosal thickness, Concha bullosa are better seen in CT rather than Endoscopy. Nasal endoscopy can prove to be a better diagnostic modality compared to CT scan when conditions like middle meatal secretions, condition of mucosa, polyps are looked for. The study stresses that in all patients with sino nasal disease CT scan has to be done, to know the exact pathology, any anatomical abnormalities and to plan for FESS. From this study it is evident that CT can complement for diagnosis there by facilitating surgery (FESS) to a great extent. CT scan provides findings almost similar to the preoperative findings of Nasal endoscopy and helps in management and provides “road map” to the surgeons if FESS is indicated.

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# Comparative Study of Ropivacaine and Bupivacaine in Bilateral Ilioinguinal and Iliohypogastric Nerve Block for Post Caesarean Section Analgesia

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## ABSTRACT

**Introduction:** Optimum analgesia in post caesarean section patient is necessary to provide better care for mother and enhance bonding between mother and neonate. Ilioinguinal and iliohypogastric nerve block is an effective method to provide analgesia in them. Bupivacaine and ropivacaine have been used in various concentrations in many peripheral nerve blocks. Hence We conducted the study in post caesarean section patients to compare bupivacaine and ropivacaine in ilioinguinal and iliohypogastric nerve block with regards to Adequacy of pain relief (visual analogue scale), Duration of analgesia, Comfort at breast feeding (comfort scaling), Hemodynamic parameters ( pulse rate and blood pressure) and Any adverse effect.

**Material and Methods:** The present study was carried out in 60 ASA grade I patients with age above 18 years and weight between 40kg to 80kg, undergoing Caesarean Section. These patients were randomly divided into two groups of 30 each. Group I and Group II was administered 0.25% bupivacaine and 0.25% ropivacaine respectively. SPSS version 17 was used for analysis.

**Results:** Both the drugs provided effective post-operative pain relief. There was no statistically significant difference in VAS score at each time interval postoperatively, except after 7 hrs and 8 hrs between both the groups. Duration of analgesia was significantly longer in bupivacaine group. Both the drugs provided adequate levels of comfort during Breast feeding.

**Conclusion:** Bupivacaine and Ropivacaine were successfully used for post operative analgesia through bilateral ilioinguinal and iliohypogastric nerve block. Duration of analgesia was longer in bupivacaine. Both the drugs provided adequate levels of comfort during breast feeding.

**Keywords:** Ilioinguinal/iliohypogastric nerve block, post-caesarean analgesia, bupivacaine, ropivacaine

## INTRODUCTION

Lower segment caesarean section (LSCS) is one of the most commonly performed surgeries under spinal anaesthesia. The provision of effective postoperative analgesia to lower segment caesarean section (LSCS) patients is of key importance to facilitate early ambulation, infant care (including breast feeding, maternal-infant bonding) and prevention of postoperative morbidity. The analgesic regimen needs to meet the goals of providing safe, effective analgesia, with minimal side effects for the mother and her child.

Caesarean section causes moderate to severe postoperative pain, usually lasting for 48 hrs. Current techniques for post operative analgesia includes administration of non-steroidal anti-inflammatory or opioid drugs.<sup>1,2</sup> However, opioids (Intravenous or Neuraxial route) causes sedation, respiratory

depression and can be secreted in breast milk, sedating the newborn.<sup>3</sup>

Bilateral ilioinguinal block and iliohypogastric block is the preferred technique for pain relief after caesarean section.<sup>4</sup> Bupivacaine and ropivacaine are synthetic amide local anaesthetic drug commonly used drug for anaesthesia, analgesia, infiltration and nerve blocks. Normal safe dose for bupivacaine is 2 mg/kg and for ropivacaine is 3-4 mg/kg. Ropivacaine is a newer drug with slow nerve penetrating power, produces differential blockade and has a cardiostable profile.<sup>5,6</sup> It provides effective anaesthesia at concentration of 0.5% and adequate analgesia at 0.25% as mentioned Su et al in their recent study.<sup>7</sup>

The aim of the study was to compare 0.25% ropivacaine and 0.25% bupivacaine for bilateral ilioinguinal and iliohypogastric nerve block for post caesarean section analgesia. We compared them with respect to adequacy of pain relief (Visual analogue scale), duration of analgesia, comfort level at breast feeding, haemodynamic parameters, any other adverse effect.

## MATERIAL AND METHODS

It was a prospective Randomized Controlled, Double Blinded study, conducted after approval from institutional ethics committee and valid, written, informed consent from patients. Study was carried out in the Obstetrics and Gynaecology operation theatre of a tertiary care teaching public hospital over a period of 1 year from January 2012 to January 2013 and included total 60 patients. The number 30 per group was selected on the presumption that most variables will have normal distribution at a sample size of 30. This is based on the central limit theorem. We included females undergoing caesarean section via Pfannenstiel incision, American Society of anaesthesiologists (ASA) Grade I, II and weighting 40-60 kgs. We excluded patients with known sensitivity to drugs used in the study, infection on the nerve block area and incision other than Pfannenstiel incision

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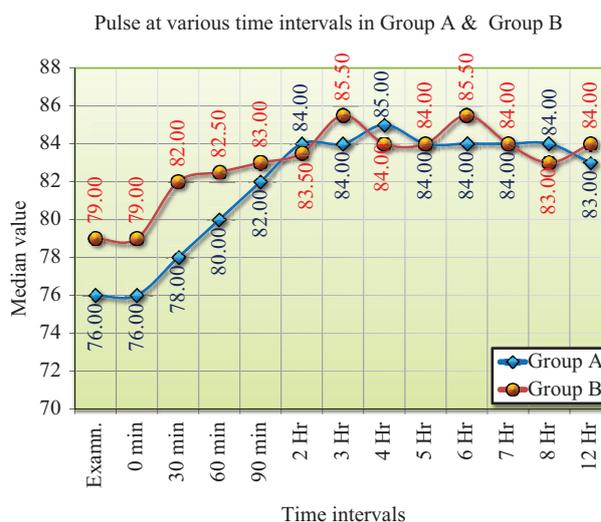
We studied 60 patients, with 30 in each group A (0.25% bupivacaine) and B (0.25% ropivacaine). Patients were randomized using a computer generated randomization. Blinding was done by using pre-filled syringes of the study drug as both bupivacaine as well as ropivacaine are clear colourless drugs. To make 0.25% bupivacaine, or ropivacaine dilution with 0.9% normal saline was done and labelled as "DRUG-X and Y" the contents of which were known only to a third party anaesthesiologists not participating in the study. The observer or patients were not aware of the drug contents in the syringes. The patients were educated about the Visual Analogue Score (VAS). After detailed history, clinical examination, investigations and written informed valid consent was confirmed and LSCS was done under standard spinal anaesthesia technique using 10 mg of 0.5% bupivacaine [Heavy]. At the end of the surgery after regression of two segment level of subarachnoid block, bilateral ilioinguinal and iliohypogastric nerve block was given by landmark technique (Figure 1). Under all aseptic precautions at a point 2cm medial and superior to anterosuperior iliac spine using 22 gauge needle a total of 15ml of the study drug was injected in a fan-like distribution between external and internal oblique and transversus abdominis muscles on each side. After computerised randomisation patients received either drug X1 or Y in the block. To prevent entering the abdomen after piercing the external oblique muscle, the depth was limited to 1.5 cm, continuous aspiration was done while injecting drug. Haemodynamic parameters such as pulse rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure (MAP) and severity of pain was assessed systematically by an investigator blinded to group allocation. These assessments were performed every 30 mins for 2 hrs, hourly for next 6 hrs and 2 hourly for next 4 hrs. Study ended at the time of rescue analgesia. Pain severity was measured using VAS (10 cm unmarked line in which 0 cm = no pain and 10 cm = worst pain imaginable) and time of first dose of rescue analgesia was noted. Time to complete regression of spinal anaesthesia was noted by using pinprick method and Bromage scale. We also noted first breastfeeding time and also the comfort level during breastfeed using will four point scale (Excellent, Good, Fair and Poor).

## STATISTICAL ANALYSIS

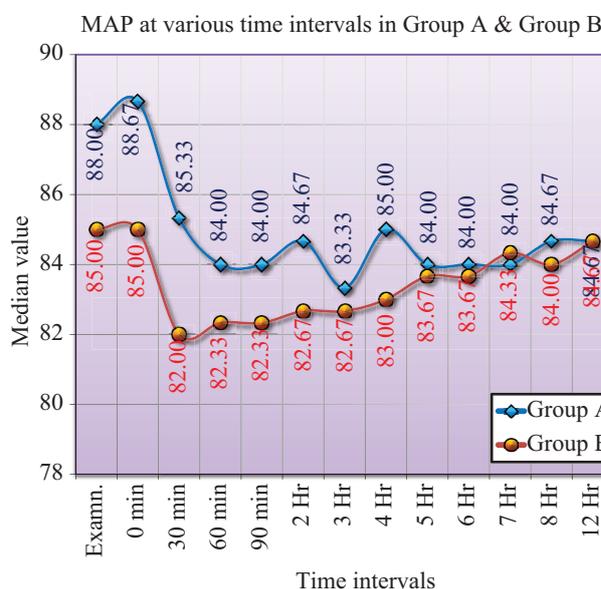
The number 30 per group was selected on the presumption that most variables will have normal distribution at a sample size of 30 based on the central limit theorem. Qualitative data was represented in form of frequency and percentage. Association between qualitative variables was assessed by Chi-Square test and Fisher's exact test where p-value of Chi-Square test was not valid due to small counts. Quantitative data was represented using mean±sd and Median and Interquartile range (IQR). Analysis of Quantitative data between the two groups was done using unpaired t-test or by Mann-Whitney Test. Results were graphically represented where deemed necessary. SPSS Version 17 was used for most analysis.

## RESULTS

Both the group were comparable with respect to demo-



**Figure-1:** Comparison of pulse rate at various time intervals between bupivacaine (Group A) and ropivacaine (Group B) groups



**Figure-2:** Comparison of MAP at various time intervals between bupivacaine (Group A) and ropivacaine (Group B) groups

graphic and vital parameters. Age, weight and ASA status and baseline pulse rate and mean arterial pressure in both the groups were comparable. There was no statistically and clinically significant variation in pulse rate and mean arterial pressure in both the groups during the study period. (Figure 1 and 2)

The VAS scores between the two groups showed statistically significant difference after 7 hrs {Group A (mean= 3.00±0.87) vs. Group B (mean= 3.50±0.86)} (p=0.024) and after 8 hrs {Group A (mean= 3.80±0.81) vs. Group B (mean= 4.23±0.50)} (p=0.00927). However before that VAS scores were comparable in both the groups (Table 1). There was statistically significant difference of duration of analgesia between bupivacaine and ropivacaine groups (p=0.000604). (Table 2). There was no statistically significant difference among duration of spinal anaesthesia between both the groups and observed time was between 90-120 minutes in both the groups.

Out of 30 patients in group A; comfort during first breast

VAS at- ^	Group A				Group B				Mann-Whitney test applied		
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z-value	p-value	Difference
At 0 min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.000	Not significant
After 30 min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.000	Not significant
After 60 min	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00	-1.000	0.317	Not significant
After 90 min	0.13	0.35	0.00	0.00	0.10	0.31	0.00	0.00	-0.399	0.690	Not significant
After 2 Hr	0.13	0.35	0.00	0.00	0.13	0.35	0.00	0.00	0.000	1.000	Not significant
After 3 Hr	0.57	0.57	1.00	1.00	0.73	0.69	1.00	1.00	-0.873	0.383	Not significant
After 4 Hr	1.10	0.71	1.00	0.25	1.37	0.62	1.00	1.00	-1.702	0.089	Not significant
After 5 Hr	1.63	0.89	2.00	1.00	1.90	0.89	2.00	1.25	-1.027	0.305	Not significant
After 6 Hr	2.57	0.68	3.00	1.00	2.63	1.00	3.00	1.25	-0.237	0.813	Not significant
After 7 Hr	3.00	0.87	3.00	2.00	3.50	0.86	4.00	1.00	-2.261	0.024	Significant
After 8 Hr	3.80	0.81	4.00	0.00	4.23	0.50	4.00	1.00	-2.602	0.00927	Significant
After 12 Hr	4.73	0.87	5.00	1.25	5.07	0.74	5.00	1.25	-1.569	0.117	Not significant

**Table-1:** Comparison of Visual analogue Score (VAS) at various time intervals between bupivacaine (Group A) and ropivacaine (Group B) groups.

Variable	Group A				Group B				Mann-Whitney test applied		
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z-value	p-value	Difference is-
Duration of Analgesia (min) ^	460.83	67.34	480.00	60.00	404.83	56.48	420.00	97.50	-3.430	0.000604	Significant

^ Data failed 'Normality' test. Hence Mann-Whitney test applied. T-value replaced by Z-value.

**Table-2:** Comparison of Duration of Analgesia between bupivacaine (Group A) and ropivacaine (Group B).



**Figure-3:** Puncture site showing ilioinguinal/iliohypogastric nerve block in post caesarean patient

feeding was “excellent” in all 30 (100%). Similarly, out of 30 patients in group B; comfort during first breast feeding was “excellent” in all 30 (100%). None of the patients in both the groups experienced “poor” comfort level during first breast feeding.

There was no incidence of any postoperative adverse event between both the groups.

## DISCUSSION

The relief of pain has been the basic aspect of the practice of anaesthesiology. High quality analgesia is important after caesarean delivery to promote early recovery and optimise the mother's ability to care for her newborn. An ideal post-caesarean analgesic regimen should provide consistent and high quality pain relief, simple, cost-effective, but have a low incidence of side-effects and without any adverse effects

on the newborn.

McDonnell et al observed that opioids, with patient-controlled techniques and appropriate local anaesthetic blocks forms basis for multimodal approach for post LSCS analgesia.<sup>1</sup> Bunting P. et al and other studies mentioned bilateral Ilioinguinal nerve blockade for analgesia after caesarean.<sup>8</sup> Ganta R. et al studied the comparison of the effectiveness of ilioinguinal nerve block and wound infiltration for postoperative analgesia significantly the pain scores and analgesic requirements in the immediate postoperative period.<sup>9</sup> Bupivacaine and ropivacaine are synthetic amide local anaesthetic drugs and are used successfully to achieve adequate analgesia in postoperative period. Kocum A et al<sup>10</sup>, de lima E Souza R<sup>11</sup> et al and Hickey et al<sup>12</sup> showed that the ropivacaine 0.25% is as effective as bupivacaine 0.25% in various lower limb and upper limb surgeries. The duration of sensory and motor block also was not significantly different between the two groups and the mean duration of analgesia ranged from 9.2 to 13.0 hrs.<sup>11</sup> There was no statistically significant difference between the two groups in terms of the post-operative heart rate and post-operative mean arterial pressure mm Hg with p value >0.05.<sup>10</sup> In the present study there was no statistically and clinically significant variation in pulse rate and mean arterial pressure in both the groups during the study period.

One of the advantages of giving nerve block at the end of the surgery after regression of two segment level of subarachnoid block is that patient did not feel the pain of puncture and remains comfortable. Also being LSCS standard low dose spinal anaesthesia (10mg, 0.5% bupivacaine) was used without any additive and complete spinal level (sensory and motor) regression was observed by pinprick and Bromage scale of lower limb.

In our study, in post-operative period, when the patients

complained of VAS score of  $>3$ , were treated with rescue analgesics and observed for at least 12hrs and more. The VAS scores in all other patients from both the groups were comparable during the entire postoperative observation period. This is attributable to the analgesic actions of both the drugs. VAS showed no significant difference throughout post operative period, except after 7 hrs and 8 hrs. There was statistical difference in the VAS scores between the groups after, 7hrs:- Group A (Mean=  $3.00 \pm 0.87$ ) vs. Group B (Mean=  $3.50 \pm 0.86$ ) ( $p \leq 0.05$ ), 8hrs:- Group A (Mean=  $3.80 \pm 0.81$ ) vs. Group B (Mean=  $4.23 \pm 0.50$ ) ( $p \leq 0.05$ ). Both the drugs provided effective post-operative analgesia. Our findings are supported by similar results of various studies. Ganta R. et al studied, both ilioinguinal block and wound infiltration reduced significantly the pain scores and analgesic requirements in the immediate postoperative period. The differences in pain scores and analgesic requirements between the study groups were not statistically significant ( $P > 0.05$ ).<sup>9</sup> Bunting P. et al observed that pain scores were less in the block patients at all times during the first day after elective Caesarean section with the exception of 12 hrs. There was an increased time from the patient's recovery from anaesthesia to the first injection of opioid in the block group.<sup>8</sup> Sakalli M et al compared ilioinguinal/ iliohypogastric block with Sham block in post casearean groups and concluded that tramadol usage in ilioinguinal/ iliohypogastric block group was significantly less than in sham block group at all estimated time intervals ( $p < 0.05$ ). Total tramadol consumption was  $331 \pm 82$  mg in II-IH block group and  $622 \pm 107$  mg in sham block group ( $p < 0.05$ ).<sup>13</sup>

Tsuchiya N et al confirmed that bupivacaine and ropivacaine were more effective than lidocaine in the prevention of post-operative pain after children's inguinal hernia repair.<sup>14</sup>

In the present study, there was statistically significant difference of duration of rescue analgesia between bupivacaine (mean duration =  $480 \pm 67.34$  min) and ropivacaine (mean duration =  $420 \pm 56.48$  min) groups ( $P \leq 0.05$ ). Similar results observed in various studies, Greengrass RA et al concluded that, 0.5% bupivacaine and 0.5% ropivacaine had a similar onset of motor and sensory blockade when used for lumbar plexus and sciatic nerve block. Analgesic duration after using 0.5% bupivacaine was prolonged by four hours compared with an equal volume of 0.5% ropivacaine.<sup>15</sup>

Locatelli et al mentions that caudal levobupivacaine, ropivacaine and bupivacaine have comparable analgesia however bupivacaine has high motor block and longer analgesia.<sup>16</sup> The optimum time to begin nursing should be as early as possible after delivery. Persistent pain negatively affects mother and child bonding and success of breast feeding.<sup>17,18</sup> In our study, from non tabulated data, out of 30 patients in group A; comfort during first breast feeding was "excellent" in all 30 (100%). Similarly, out of 30 patients in group B; comfort during first breast feeding was "excellent" in all 30 (100%).

None of the patients in both the groups experienced "poor" comfort level during first breast feeding. Various studies have emphasized that, better quality of analgesia improves success of breast feeding.<sup>17,18</sup>

There was no incidence of postoperative adverse effects be-

tween the two groups. As the block is limited to the lower abdominal wall and inguinal region, no hemodynamic changes were noted also any other complication like intravascular injection, local anaesthetic toxicity, hematoma, intra-peritoneal injection and bowel injury did not occur as it mentioned in literature although rare.<sup>19</sup> To prevent above complications, the depth of 22 gauge hypodermic needle was limited to 1.5 cm and continuous aspiration was done while injecting the drug.

This study was not without limitation as we did not use ultrasound to confirm needle position because it was not available in our institution during the study period. Ultrasound-guided block has the advantage of less dose requirement and increase in safety margin.<sup>19,20</sup>

## CONCLUSION

Adequate postoperative analgesia after LSCS should be provided with the intention of providing comfort to new mother, enhancing bonding between mother and neonate. A multimodal approach is recommended including regional technique whenever possible thus reducing the amount of opioids and non-steroidal anti inflammatory agents in post-operative period. From the present study we conclude that both bupivacaine and ropivacaine were successfully used for post operative analgesia through bilateral ilioinguinal and iliohypogastric nerve block. However bupivacaine found to have longer action of analgesia but both the drugs provided adequate levels of comfort during breast feeding. Thus bilateral ilioinguinal and iliohypogastric nerve block using bupivacaine and ropivacaine has definite and promising role in multimodal approach for postoperative analgesia after caesarean section. Consequently, the number of post-caesarean analgesic options continues to expand whilst existing methods are refined.

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# Comparison of Finger Print Patterns in Patients with and without Oral Submucosis Fibrosis - A Dermatoglyphics Study

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## ABSTRACT

**Introduction:** The introduction of chewing tobacco containing areca nut into the market has led to a sharp increase in the frequency of OSMF. Henceforth, present study was undertaken to find out any correlation of dermatoglyphic parameters with Oral Submucosis fibrosis which could act as a useful tool in assessing the risk of OSMF in gutka chewers.

**Material and methods:** The present cross-sectional study comprised of 30 subjects, 15 patients with and 15 patients without oral submucous fibrosis with history of gutka chewing since past 10 years. Fingerprints were taken using Camel ink on an A4 white paper by using ink and paper method which were studied for the pattern. atd angles were measured in both hands and mean±standard deviation calculated. Chi square test was applied with p-value<0.05 considered as significant value.

**Results:** The present study found decrease in arches pattern, radial loop pattern, whorl pattern and atd angle in patients with OSMF.

**Conclusion:** Palmar Dermatoglyphics can foretell the probability of occurrence of OSMF which can help in screening of gutka chewers to identify susceptible persons and can recognize a person in the prefibrosis stage.

**Keywords:** Dermatoglyphics; Fingerprints; OSMF

## INTRODUCTION

From the time of early civilization, the features of the hands have been an area of interest to predict the future. Over the years of scientific research, the hand has come to be acknowledged as a useful tool in the diagnosis of psychological, genetic and other medical conditions. The term dermatoglyphics refers to the study of the naturally occurring patterns of the surface of the hands and feet. It was first introduced by Cummins in 1926 and since then, this approach has been a topic of interest of various scientific researchers to determine a relationship between fingerprints and various medical conditions.<sup>1</sup>

In humans, the mammary buds begin to develop during the 6<sup>th</sup> week, as solid down growths of the epidermis, into the underlying mesenchyme. The dermal ridges develop in relation to the volar pads are formed by the 6<sup>th</sup> week of gestation and they reach their maximum sizes between the 12<sup>th</sup> and 13<sup>th</sup> weeks. This means that the genetic message is deciphered during this period and it is also reflected by dermatoglyphics.<sup>2</sup> Various studies show agreement of dermatoglyphic features in assessing various medical conditions.<sup>2-5</sup>

Oral submucous fibrosis (OSMF) is a disease that is prevalent mainly in South Asian populations due to chewing of areca nut which is an ingredient of betel quid. Disease contributes in significant morbidity as it leads to loss of mouth function as oral tissues become rigid and mouth opening

reduces and mortality due to malignant transformation into squamous cell carcinoma occurs.<sup>6</sup>

Henceforth, present study was undertaken to find out correlation dermatoglyphic parameters in OSMF patients in the and to determine whether any correlation exists between OSMF and palmar dermatoglyphics which could act as a useful tool in assessing the risk of OSMF in gutka chewers.

## MATERIAL AND METHODS

The present cross-sectional study comprised of 30 subjects of age 30 to 50years, 15 patients with and 15 patients without oral submucous fibrosis with history of gutka chewing since past 10 years. Patients were selected from the out patient departments of vanachal dental college and Hospital Garhwa. The finger prints of individuals of similar age group and gender with history of Gutkha chewing with and without oral submucous fibrosis were taken for the study. Ethical clearance was obtained from institutional ethical committee. Informed consent was taken from the individuals after explaining them about the study. Patients of OSMF diagnosed and confirmed after histopathological examination were enrolled for the study. Patients were asked to fill proforma that included data regarding age, sex, address, history of gutkha chewing and other relevant medical history. Patients were asked to wash their hands with soap water and then the fingerprints were taken using Camel ink on an A4 white paper by using ink and paper method which were studied for the pattern. The finger tip pattern configurations were categorized as arches, loops and whorls. In order to find out the frequency of finger tip print patterns both hands i.e. all ten fingers of an individual were considered together.

## STATISTICAL ANALYSIS

Statistical analysis was done with the help of SPSS version 21. atd angles were measured in both hands and mean±standard deviation calculated. Chi square test was applied with p-value<0.05 considered as significant value.

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Group	No. of patients	Arch	Loop		Whorls
			Radial	Ulnar	
Patients with OSMF	15	2.4%	1.6%	67%	29%
Patients without OSMF	15	4.2 %	3.2%	59.6%	33%
p-value	-	0.152	1.321	0.002	0.051

**Table-1:** Percentage frequency in patients with history of gutka chewing with and without OSMF

Group	No. of patients	atd angle (mean±standard deviation)	
		Right	Left
Patients with OSMF	15	41 <sup>o</sup> ±7.9	40 <sup>o</sup> ±9.4
Patients without OSMF	15	45 <sup>o</sup> ±2.2	45 <sup>o</sup> ±4.2

**Table-2:** Mean±standard deviation of atd angle in patients with history of gutka chewing with and without OSMF

## RESULTS

In the present study all patients were male with mean age of 43.6±2.4 years and with a history of 14.3 with a history of 14.3±1.2 years. The table 1 shows percentage frequency of finger print pattern in patients with OSMF group and in patients without OSMF. Analysis of finger prints showed 2.4% arch pattern, 1.6% radial loops, 67% ulnar loops pattern and 29% whorls pattern in patients with OSMF and 4.2% arch pattern, 3.2% radial loops, 59.6% ulnar loops pattern and 33% whorls pattern in patients without OSMF. Significant p-value was found in ulnar pattern with p<0.05.

Table 2 shows mean atd angle in right and left hand and there was significant decrease in mean atd angle of both hands in patients with OSMF in comparison to patients without OSMF.

## DISCUSSION

Dermatoglyphics is a scientific study of epidermal ridges and their configuration on the volar aspect of hands, fingers, feet and toes.<sup>5</sup> The study of dermatoglyphics was pioneered in 1892 by Galton and it is a simple yet complicated tool in the study of genetic disorders. The palmar pattern is evaluated to get a better insight into the study of the disease under consideration.<sup>4</sup>

Millions of the people around world chew gutkha but not all of them develop oral submucous fibrosis. Genetic predisposition explains such individual variability.<sup>7</sup> Thus, the present study was conducted to evaluate any association between oral submucous fibrosis palmar dermatoglyphics and found decrease in arches pattern, radial loop pattern, whorl pattern and atd angle in patients with OSMF. atd angle is the angle found by the axial triradius which is situated near the base of 5th metacarpal and the digital triradi.<sup>4</sup>

Tamgire DW et al<sup>7</sup> conducted a study to find the dermatoglyphic markers for the patients of Oral submucous Fibrosis by assessing the quantitative dermatoglyphic parameters and reported that there was a significant decrease atd angle for the patients of Oral sub Mucous Fibrosis. Gupta A et al<sup>1</sup> studied role of dermatoglyphics as an indicator of precancerous and cancerous lesions of the oral cavity and reported that right hand showed decrease in atd angle and decrease in frequency of palmar accessory triradii in OSMF patients. Vijayaraghavan A et al<sup>8</sup> analyzed the palmar dermatoglyph-

ics in patients suffering from OSMF and oral squamous cell carcinoma and found highly significant difference among the finger ridge, hypothenar pattern and mean ATD angle in OSMF and OSCC patients. Madura MG reviewed literature and concluded that analysis of dermatoglyphic pattern can prove to be a significantly useful tool for preliminary investigations in those conditions with a suspected genetic base.

## CONCLUSION

Palmar Dermatoglyphics can foretell the probability of occurrence of OSMF which can help in screening of gutka chewers to identify vulnerable persons and can recognize a person in the pre-fibrosis stage. This can lead to prevention of OSMF in the population.

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# Metabolic Syndrome and Hypertension in Diabetic Nephropathy Patients in Rural Goa, India

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## ABSTRACT

**Introduction:** In India, longer duration of Diabetes increases the probability of patients developing hypertension, atherosclerotic plaques and nephropathy. So this study aims to analyze the association of Metabolic Syndrome BMI and Hypertension with Diabetic Nephropathy.

**Material and Methods:** All diabetic patients treated at a primary care level center in Goa, India in the first quarter of 2013 were assessed for Nephropathy based on microalbuminuria and retinopathy positivity. Obesity (BMI), Hypertension, and Metabolic syndrome was assessed in the study subjects and their association with Nephropathy was studied. Statistical analysis by SPSS version 22 using Fisher's Exact test and t test.

**Results:** Nephropathy was seen in 42 Diabetes patients (17.4%). Nephropathy was diagnosed in 21.22% patients with metabolic syndrome and 6.45 % patients without metabolic syndrome (p=0.006). In diabetics with hypertension 21.1% had nephropathy while nephropathy was present only in 2.1% of non-hypertensive patients (p=0.001). The mean systolic blood pressure in nephropathy patients was 148.95mm Hg (SD ± 16.26), p=0.0001. Nephropathy patients had a mean diastolic blood pressure of 85.66 mm Hg (SD ±9.72), p=0.0001.

**Conclusions:** Metabolic syndrome, higher levels of systolic and diastolic blood pressure and established hypertension were significantly associated with diabetic nephropathy. Diagnosing metabolic syndrome and hypertension early among diabetics in rural areas is imperative to initiate appropriate therapy to avert and retard the progression of nephropathy.

**Keywords:** Diabetic Nephropathy, Metabolic syndrome, Obesity, Hypertension

## INTRODUCTION

Nephropathy in India is envisioned to impact approximately 6.6 million.<sup>1</sup> Numerous studies worldwide and in India have revealed that prevalence of Nephropathy among Diabetes patients varies from 13% to 70.8%.<sup>2-4</sup> In the Fearless forecast of the Eighth Joint National Committee, attention has been drawn to the triad of hypertension, diabetes and chronic kidney disease. Hypertension is one of the pertinent factors raising the probability of cardiovascular morbidity and mortality in diabetic patients.<sup>5</sup>

In diabetics, blood pressure steadily and progressively begins to escalate. As gross proteinuria is detected, a majority of patients with type II diabetes have established hypertension.<sup>5</sup> Chronic Kidney Disease is attributed to Diabetes if there is macroalbuminuria or a combination of retinopathy with microalbuminuria according to the guidelines of National Kidney foundation. Uncontrolled blood pressure levels in diabetic patients further exacerbates this risk.<sup>6</sup>

When Diabetes and Hypertension coexist, arterial intimal calcification appears in atherosclerotic plaques.<sup>7</sup> Metabolic

Syndrome is an early indicator of this occurring, gradually progressing to diabetes, hypertension and consequent cardiovascular morbidity. In India, with a precipitous escalation in metabolic syndrome and dramatically pronounced diabetes, the risk of complications like nephropathy is likely to increase.

This study aims to analyze the association of Metabolic Syndrome BMI and Hypertension with Diabetic Nephropathy.

## MATERIAL AND METHODS

A study of all the rural diabetes cases treated at a primary care level center of the Department of Preventive and Social Medicine, Goa Medical College Goa, India was conducted in the first quarter of 2013. The study subjects were two hundred and forty one. The Institutional Ethics Committee of Goa Medical College approved the study in October 2012. Patients after informed consent were examined and investigated for diabetic nephropathy based on criteria that comprised of microalbuminuria with presence of retinopathy or just clinical albuminuria. Urine albumin creatinine ratio between 30µg/mg to 300µg/mg creatinine was considered positive for microalbuminuria and above 300µg/mg creatinine was considered clinical albuminuria (National Kidney Foundation- Kidney Disease Outcome Quality Initiative Guidelines) and retinopathy was detected by ophthalmoscopy as per Early diagnosis and treatment of Retinopathy study classification.

The data obtained was waist circumference in cm, weight in Kg and height in meters and BMI calculated. Blood pressure was measured with a mercury Sphygmomanometer. All patients were subjected to testing of blood sugar and lipid levels and assessed for the presence of Metabolic syndrome by National Cholesterol Education Program Adult Treatment Panel ATP III guidelines.

BMI was classified based on the Joint report by ICMR and Ministry of Health and Family welfare department of India 2008. "Consensus statement for the diagnosis of Obesity, Abdominal Obesity, and Metabolic syndrome for Asian Indians and Recommendations for Physical Activity, Medical and Surgical Management".

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Hypertension was diagnosed in subjects whose systolic blood pressure is 140 mm Hg and /or diastolic blood pressure is 90 mm Hg.

**STATISTICAL ANALYSIS**

SPSS Version 22 was used for statistical analysis. Means and proportion were used to express data and comparison assessed by t test and Fisher’s exact test.

**RESULTS**

The participants in this study included two hundred and forty one diabetic patients availing treatment at a primary care level center of the Department of Preventive and Social Medicine, Goa Medical College, Goa India.

Diabetic Nephropathy was present in 42 study subjects (i.e. 17.4%). Metabolic syndrome was present among 129 diabetic patients (74. 27%). Of the patients with metabolic syndrome, 21.22% had Diabetic nephropathy while nephropathy was present in 6.45% of those without metabolic syndrome (p = 0.006).

Mean waist circumference of patients with Diabetic Nephropathy was 91.4 cm (SD ±10.8) while it was 91.32 (SD ±10.34) in those without nephropathy. p=0.573. Nephropathy was found in 26.9% of those with normal weight compared to 14.2% patients with a BMI of more than 23kg/m<sup>2</sup>.

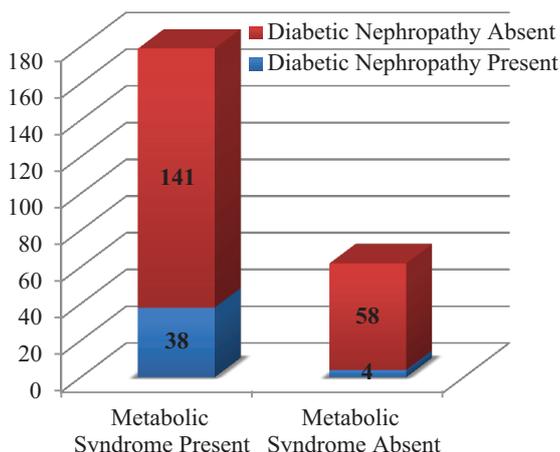
(p = 0.0707)

In Diabetics with hypertension 21.1% had nephropathy compared to 2.1% of non-hypertensive patients (p=0.001). The mean systolic blood pressure among diabetic nephropathy patients was 148.95mm Hg (SD±16.26) the mean diastolic blood pressure was 85.66 mm Hg (SD±9.72). While in patients without nephropathy mean systolic BP was 128.19 (SD±12.54) mm Hg and mean diastolic BP was 80.04 mm Hg (SD±7.22).

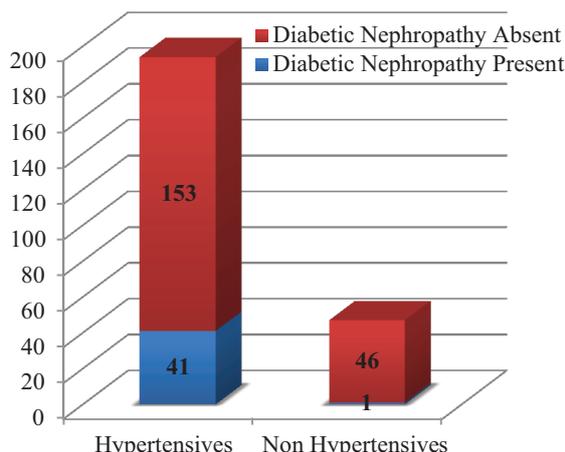
**DISCUSSION**

Metabolic syndrome was present among 74.27% diabetic patients. This study revealed that in patients with Metabolic syndrome 21.22% had Diabetic nephropathy while nephropathy was present in 6.45% of those without metabolic syndrome (p = 0.006). This strengthened the claim made in a study by Palaniappan et al in which Metabolic syndrome and hypertension verified the convincing association with microalbuminuria in both females OR =3.34; 95% (CI 2.45-4.55) and males OR= 2.51; 95% (CI 1.63- 3.86).<sup>8</sup>

Mean waist circumference of patients with Diabetic Nephropathy was 91.4 cm (SD ±10.8) while it was 91.32 (SD ±10.34) in those without nephropathy. p=0.573. Waist circumference was not independently significantly associated with Diabetic Nephropathy but when combined with other criteria and



**Figure-1:** Diabetic Nephropathy and Metabolic Syndrome



**Figure-2:** Diabetic Nephropathy and Hypertension

Characteristic	Diabetic Nephropathy present	Diabetic Nephropathy absent	Test	P value
Mean systolic BP blood pressure mm Hg	148.95 (SD 16.26)	128.19 (SD 12.54)	t test	0.001
Mean diastolic blood pressure mm Hg	85.66 (SD 9.72)	80.04 (SD 7.22)	t test	0.001
Mean waist circumference Cm	91.64 (SD 10.8)	91.32 (SD 10.34)	t test	0.573
Metabolic syndrome present	38 (21.22 %)	141 (78.78%)	Fisher’s test	0.006
Metabolic syndrome absent	4 (6.45 %)	58 (93.55 %)		
Total	42 (17.4 %)	199 (82.6 %)		
Hypertension present	41 (21.1 %)	153 (78.9%)	Fisher’s test	0.001
Hypertension absent	1 (2.1%)	46 (97.9%)		
Total	42 (17.4%)	199 (82.6%)		
BMI <18.5 kg/ m <sup>2</sup>	1 (10%)	9 (90%)	Fisher’s test	0.0707
BMI 18.5 – 22.9kg/m <sup>2</sup>	18 (26.9%)	51 (73.1%)		
BMI 23 Kg/m <sup>2</sup> and above	23 (14.2%)	139 (85.8%)		
Total	42 (17.4 %)	199 (82.6%)		

**Table-1:** Characteristics associated with Diabetic Nephropathy

patient categorized as metabolic syndrome there was significant association with nephropathy observed. Chang Sheng Sheng et al in Shanghai also found that microalbuminuria was not significantly associated with independent waist circumference element of metabolic syndrome.<sup>9</sup>

Our study finding thus implies that the presence of metabolic syndrome among diabetics is an important predictor of nephropathy.

The presence of nephropathy in 26.9% of those with normal weight compared to 14.2% patients with a BMI of more than 23kg/m<sup>2</sup>. (p = 0.0707) in this study was similar to the evidence from patients from 26 countries by Martin Theones Jan- Christian Reil et al (2009), it was found that BMI was not associated with microalbuminuria. Another study confirms this finding.<sup>10</sup>

In Diabetics with hypertension 21.1% had nephropathy compared to 2.1% of non-hypertensive patients (p=0.001). The mean systolic blood pressure among diabetic nephropathy patients was 148.95mm Hg (SD± 16.26) the mean diastolic blood pressure was 85.66 mm Hg (SD± 9.72). While among patients without nephropathy mean systolic BP was 128.19 (SD±12.54) mm Hg and mean diastolic BP was 80.04 mm Hg (SD±7.22).

The International Society of Nephrology Kidney disease improving global outcome revealed that the presence of uncontrolled blood pressure in diabetic patients strengthens the risk of association with nephropathy.<sup>11</sup> Analysis by Ranjit Unnikrishnan et al in 2006 (CURES 45) revealed that in diabetics, systolic blood pressure (p=0.001) and diastolic blood pressure (p=0.022) were significantly associated with microalbuminuria.<sup>2</sup>

## CONCLUSIONS

This study revealed that metabolic syndrome and hypertension were significantly associated with diabetic nephropathy. Higher levels of systolic blood pressure and diastolic blood pressure were significantly associated with nephropathy.

However, BMI did not reveal such an association with nephropathy.

Screening for metabolic syndrome, early diagnosis of hypertension and regular monitoring of blood pressure among diabetics is imperative to initiate appropriate therapy to retard its progression to nephropathy particularly in rural India where dialysis availability is limited thus averting a renal catastrophe of far reaching dimensions.

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# Comparative Evaluation of Ilioinguinal/ Iliohypogastric Nerve Block with Spinal Anaesthesia for Unilateral Open Inguinal Hernia Repair

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## ABSTRACT

**Introduction:** Inguinal hernia repair is usually performed under spinal anaesthesia. However, local anaesthesia technique provides stable hemodynamics with early ambulation and less postoperative pain. We compared efficacy, feasibility and safety of ilioinguinal/iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia.

**Material and methods:** Sixty adult male patients scheduled for elective inguinal hernia repair were randomized into two groups to receive either ilioinguinal/iliohypogastric nerve block or spinal anaesthesia. The total time to perform anaesthetic procedures, time of onset, hemodynamic variations, supplemental sedation, intraoperative fluid requirement, duration of postoperative analgesia and ambulation were compared in both groups. Continuous data are presented as mean±S.D. Unpaired *t*-test and paired *t*-test were applied for intergroup and intragroup comparisons respectively. *P* <0.05 was taken as significant.

**Results:** Duration to perform ilioinguinal/iliohypogastric nerve block was significantly longer (7.95±0.461 minutes) than that of spinal block (3.73±0.679 minutes). Systolic and mean blood pressure showed statistically significant reduction in first 40 minutes with higher intraoperative fluid requirement in Group II patients (1280±190.1 ml vs 348.33±77.106 ml). Group I patients required higher dose of midazolam (3.00±0.347 vs 2.23±0.254 mg) (*p*<0.05). Supplemental anaesthetic infiltration was required in 36.7% patients in Group I and 45.45% of them required propofol for sedation (55.56±5.11 mg). The duration of postoperative analgesia was longer in Group I (5.163±0.4542 vs 3.871±0.4801 hours) (*p*<0.05). Duration of ambulation was significantly shorter in Group I (3.95±2.56 vs 9.58±0.87 hours) (*p*<0.05).

**Conclusion:** Ilioinguinal/iliohypogastric nerve block can be a safe alternative to spinal anaesthesia for elective unilateral inguinal hernia repair.

**Keywords:** Ilioinguinal/iliohypogastric nerve block, spinal anaesthesia, inguinal hernia repair

## INTRODUCTION

Open Inguinal hernia repair is one of the commonest procedures performed worldwide. Still, there is no consensus regarding the optimum anaesthesia technique for this surgery. General, spinal, epidural and local anaesthesia techniques have all been used, each having its own advantages and disadvantages.<sup>1</sup> General anaesthesia carries risks of possible airway complications, postoperative deterioration of cognitive function, sore throat, nausea, vomiting and prolonged period of immobilization with associated risk of deep vein thrombosis and longer hospital stay.<sup>1</sup> Spinal anaesthesia, although effective, is not without risk in patients with decompensated heart disease, recent head injury, convulsions and coagulopathies. Also spinal and epidural anaesthesia have

been associated with hemodynamic instability, vomiting, urinary retention, post dural puncture headache, and backache.<sup>2</sup> Local inguinal field block which includes the blockade of ilioinguinal and iliohypogastric nerves may be an ideal technique as it blocks the surgical stress, provides better hemodynamic stability, extended analgesia, early ambulation and is associated with low risk of complications.<sup>3</sup> Harvey Cushing and William Halsted first described the inguinal field block in 1900.<sup>4</sup> Since then, its efficacy and advantages have been compared by many surgeons and anaesthesiologists in a number of studies. Refinements and modifications in the technique still continue. In 1963, Joseph L Ponka described in great detail a seven step procedure of performing it in 837 patients successfully.<sup>5</sup> In children, Dalen's technique is a preferred method of analgesia for surgical repair of inguinal hernia. He used a single puncture technique in contrast to the previously used multiple puncture technique.<sup>6</sup> In our institute, inguinal hernia repair is usually performed under spinal anaesthesia. The aim of this study was to evaluate success, efficacy, feasibility and safety of inguinal field block with single puncture technique and also to compare intraoperative and postoperative complications of inguinal field block with spinal anaesthesia.

## MATERIAL AND METHODS

A randomized, prospective, comparative trial "To evaluate the efficacy, feasibility and safety of ilioinguinal and iliohypogastric nerve block by single puncture technique with wound infiltration in comparison to spinal anaesthesia" was conducted in the anaesthesia department of a tertiary medical center after obtaining Institutional Ethics Committee approval and patient's written and informed consent. The exclusion criteria were negative consent, complicated hernias, epilepsy, morbid obesity, anticipated difficult intubation and contraindication of spinal anaesthesia. Sixty male subjects, aged 18 to 65 years, weighing between 40 and 80 kg, belonging to American Society of Anaesthesiologist (ASA) grade I and II, scheduled to undergo elective uncomplicated unilateral inguinal hernia repair were randomly assigned

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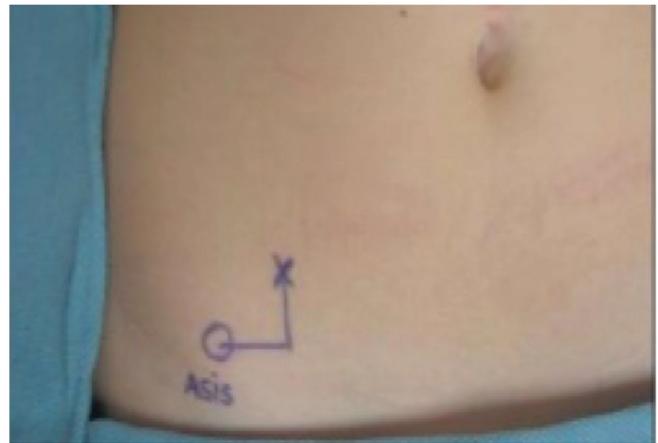
to one of the two study groups each containing 30 patients. Group I was administered ilioinguinal and iliohypogastric nerve block by single puncture technique with wound infiltration and Group II was administered spinal anaesthesia. All patients were familiarized with the Visual Analogue Score (VAS) preoperatively.

On the day of surgery after confirming starvation and consent, intravenous access was secured. In the operating room, patient's heart rate, arterial blood pressure, oxygen saturation and electrocardiogram were monitored. Ringer lactate was started at 2 ml/kg/hr in Group I. Injection midazolam 0.03mg kg<sup>-1</sup> was given intravenously (IV) 10 minutes prior to performing inguinal block, in Group I.

Technique of ilioinguinal and iliohypogastric nerve block by single puncture technique with wound infiltration was adapted from modification of the Dalens' technique used in children, described by P Carre' et al.<sup>6</sup> The skin was prepared with chlorhexidine gluconate and isopropyl alcohol using strict aseptic technique. We used 22 gauge Quincke spinal needle for administering ilioinguinal and iliohypogastric nerve block. Dose of local anaesthetic was calculated according to patient's body weight, i.e bupivacaine 1.5 mgKg<sup>-1</sup> and lignocaine with adrenaline 6 mgKg<sup>-1</sup>. Local anaesthetic solution was prepared by combining 2% lignocaine hydrochloride with adrenaline 1:2,00,000 and 0.5% bupivacaine hydrochloride in a 50:50 mixture, along with normal saline as a diluent, so as to achieve a total volume of 40-60 ml in a concentration of 0.25% bupivacaine and 1% lignocaine. A skin wheal was raised 2cm medial and 2cm superior to the anterior superior iliac spine (Figure-1). Spinal needle was inserted through the skin puncture site perpendicular to the skin. Increased resistance was appreciated as needle encountered the external oblique aponeurosis and first loss of resistance was felt as the needle passes through the muscle to lie between it and the internal oblique. After the initial loss of resistance and negative aspiration for blood, 7-8 ml of local anaesthetic was injected. The needle was then further moved down to appreciate second loss of resistance as it crosses the internal oblique and lie between it and transversus abdominis muscle. Another 7-8 ml of local anaesthetic was injected. Needle was then withdrawn till the skin and redirected at an angle of 45 degrees towards the midpoint of inguinal ligament to pierce the external oblique and the internal oblique muscles. After each loss of resistance, 7-8 ml of local anaesthetic was injected. The remaining 5-6 ml of local anaesthetic was preserved for further supplementation during sac dissection if required.

Patients in Group II received ringer lactate 10 ml/kg as preloading. Spinal anaesthesia was administered in sitting position, with 25 gauge Quincke spinal needle in L3-L4 intervertebral space, under all aseptic precautions and local infiltration, with 3.0 ml of 0.5% bupivacaine (heavy) after ensuring free, clear and adequate flow of cerebrospinal fluid. After giving spinal anesthesia, patient was made to lie supine.

Intraoperatively Group 1 patients received local anaesthetic infiltration and injection midazolam and/or propofol supplementation in graded doses if required especially at the time of sac dissection. However, total dose of midazolam was not



**Figure-1:** Landmark of ilioinguinal/iliohypogastric nerve block showing puncture site

exceeded above 0.1mgkg<sup>-1</sup>. Patients in Group II were given Injection midazolam 0.03mg kg<sup>-1</sup> IV, for sedation if required during the surgery. All patients received supplemental oxygen (2-3 L/min) via nasal prongs. Hypotension defined as systolic blood pressure (SBP) < 90mmHG or >20% reduction in preoperative SBP was managed with fluids and vasopressor aliquots. Injection atropine was administered in cases of bradycardia defined as pulse rate (PR) < 50/min. Standard general anaesthesia (GA) was administered in cases of failure of block or spinal anaesthesia.

The following parameters were studied intraoperatively:

Total time taken for performing the procedure of anaesthesia, either local inguinal field block or spinal anaesthesia (in minutes) i.e. the time taken from the aspiration of drugs till the completion of the procedure, time of onset of action of block or spinal anaesthesia in minutes, intraoperative monitoring – PR, SBP, diastolic blood pressure (DBP), mean arterial pressure (MAP) and oxygen saturation (SPO<sub>2</sub>) every 10 minutes till the end of surgery, intraoperative requirement of intravenous fluid and vasopressors, supplementation required in the form of local anaesthetic infiltration, IV midazolam and Propofol, intraoperative complications like hypotension, bradycardia, nausea and vomiting and the duration of surgery. Postoperatively, patient was shifted to post anaesthesia care unit and was monitored for pulse, blood pressure, oxygen saturation, VAS score, any postoperative complications like nausea, vomiting, urinary retention, postdural puncture headache and duration of ambulation. Rescue analgesia was given in the form of IV tramadol 1mgkg<sup>-1</sup> when VAS score was ≥ 4. Total duration of analgesia was defined as the time interval from the end of surgery till the VAS score was ≥ 4. Duration of ambulation was the time interval from the end of surgery till the patient could start walking without support.

## STATISTICAL ANALYSIS

Continuous variables were presented as mean±standard deviation. Unpaired t-test and paired t-test were applied for intergroup and intragroup comparison of parameters respectively. P value<0.05 was considered as statistically significant.

## RESULTS

Demographic data and duration of surgery were comparable in both the groups (Table 1 and 2). Total time taken for

performing the procedure of ilioinguinal and iliohypogastric nerve block was significantly longer than that of spinal block ( $7.95 \pm 0.461$  Group I vs  $3.73 \pm 0.679$  minutes Group II  $p < 0.05$ ) but onset of action was comparable in both the groups ( $6.567 \pm 0.4037$  in Group I vs  $6.224 \pm 1.0487$  min in Group II  $p = 0.101$ ). Systolic and mean blood pressure showed statistically significant reduction in first 40 minutes ( $p < 0.05$ ) and intraoperative fluid requirement was statistically higher in Group II ( $1280 \pm 190.1$  ml vs  $348.33 \pm 77.106$  ml) ( $p < 0.05$ ). None of the patients in either group developed bradycardia and required vasopressors. However, Group I patients required statistically higher dose of midazolam ( $3.00 \pm 0.347$  vs  $2.23 \pm 0.254$  mg) ( $p = 0.000$ ). Supplemental local anaesthetic infiltration was required during handling of sac in 36.7% and out of those 36.7%, 45.45% of patients required additional sedative dose of propofol ( $55.56 \pm 5.11$  mg) in Group I. The duration of postoperative analgesia was longer in Group I ( $5.163 \pm 0.4542$  vs  $3.871 \pm 0.4801$  hours) ( $p < 0.05$ ). 10 % patients had failure of inguinal field block where as spinal anaesthesia failed in 3.3% patients. Duration of ambulation was significantly shorter in Group I as compared to Group II ( $3.95 \pm 2.56$  vs  $9.58 \pm 0.87$  hours) ( $p < 0.05$ ) (Table 2).

## DISCUSSION

Inguinal hernia repair which is the commonest surgery has been performed under general, spinal, epidural and local anaesthesia techniques with varying success. According to recent guidelines of European Hernia Society, in the case of an open repair, local anaesthetic should be considered for all adult patients with a primary reducible unilateral inguinal hernia.<sup>7</sup> This is a grade A recommendation. In spite of this, there is great level of inertia in adopting this technique among anaesthesiologists. Inguinal field block is one of the oldest techniques, in practice since decades.<sup>8</sup> Initially, local

anaesthesia was given by the surgeon at the site of operation but that did not provide complete anaesthesia. Ilioinguinal and iliohypogastric nerve block provide somatic block over the lower abdomen and visceral pain is often relieved by giving supplemental local anaesthetic at the time of sac dissection. In this study we evaluated the efficacy, feasibility, safety, advantages and complications of ilioinguinal and iliohypogastric nerve block by single puncture technique combined with wound infiltration through same puncture, as compared to spinal anaesthesia.

We chose the modification of Dalens' technique used in children, as described by P Carre et al.<sup>6</sup> The advantage of using single puncture technique is less discomfort to the patient by avoiding multiple pricks as described in classical technique. Multiple puncture techniques of inguinal field block were associated with transient femoral nerve palsy causing weakness of knee extensors<sup>2,9</sup>, cord haematoma<sup>9</sup>, thrombosis of the dorsal vein of penis<sup>10</sup>, wound haematoma and wound infection.<sup>11-13</sup> In our study we did not observe any of such complications with single puncture technique as our injection site was close to anterior superior iliac spine and far from operative field, femoral nerve and pubic tubercle. N Sasaoka et al in their study concluded that there is little clinical benefit of additional genitofemoral nerve block in terms of intra and postoperative analgesia.<sup>14</sup> Shandling et al found increased incidence of haematoma formation within the cord in patients who received genitofemoral nerve block.<sup>15</sup> Hence, we decided not to perform separate genitofemoral nerve block.

Quincke spinal needle (22 gauge, 90mm) allows the wound infiltration throughout the incision line through the same puncture. Its short bevel provides correct identification of tissue planes with better appreciation of loss of resistance, allows effective spread of local anaesthetic solution to both the nerves and causes less trauma to blood vessels, muscle

Parameter	Group I (30) mean $\pm$ SD	Group II (30) mean $\pm$ SD	p-value
Average age (years)	42.33 $\pm$ 13.353	41.83 $\pm$ 12.371	0.881
Average Weight (Kilograms)	55.83 $\pm$ 5.584	58.23 $\pm$ 5.151	0.089
Average height (centimeters)	157.9 $\pm$ 5.068	158.9 $\pm$ 4.413	0.418

Table-1: Demographic Data

	Group I	Group II	p-value
ASA Grade (%)			
I	21(70%)	20(66.7%)	0.781
II	9(30%)	10(33.3%)	0.690
Mean duration for procedure (Min)	7.95 $\pm$ 0.461	3.73 $\pm$ 0.679	0.000
Onset of action (Min)	6.567 $\pm$ 0.4037	6.224 $\pm$ 1.0487	0.101
Intravenous fluid requirement (ml)	348.33 $\pm$ 77.106	1280 $\pm$ 190.1	0.000
Mean dose of midazolam (mg)	3.00 $\pm$ 0.347	2.23 $\pm$ 0.254	0.000
Mean dose of propofol (mg)	55.55	-	-
Duration of surgery (min)	84.00 $\pm$ 10.120	85.17 $\pm$ 7.822	0.619
Block failure (%)	3 (10%)	1 (3.3%)	
Intraoperative Hypotension (%)	0	5 (16.67%)	0.014
Urinary retention	0	05(16.67%)	0.014
Nausea and Vomiting	0	01(3.3%)	0.309
PDPH	0	01(3.3%)	0.309
Duration of ambulation (hour)	3.95 $\pm$ 2.557	9.58 $\pm$ 0.872	0.000
Duration of analgesia (hour)	5.163 $\pm$ 0.4542	3.871 $\pm$ 0.4801	0.00

Table-2: Intraoperative and postoperative comparison of various parameters

and bowel.<sup>6</sup>

Adequate premedication allows the patient to remain calm and quiet during local anaesthetic infiltration. In our study, premedication was sufficient in the form of short acting benzodiazepine (midazolam) in the dose of 0.02-0.03mgkg<sup>-1</sup> which was given to all patients in Group I.

The mean time taken for performing ilioinguinal and iliohypogastric nerve block was higher than spinal anaesthesia and was statistically significant (7.95±0.461vs 3.73±0.679 minutes). It was probably due to time spent in identification of correct planes for injecting local anaesthetic solution and wound infiltration.

The onset time of surgical anaesthesia was almost similar in both the groups. (6.567±0.4037 in Group I vs 6.224±1.0487 min. p>0.05). We did not experience any significant changes in heart rate and none of the patients in either group, especially Group II where spinal anaesthesia was given, developed bradycardia. The Group II had a statistically significant decrease in SBP in the first 40 minutes of spinal anaesthesia as compared to preoperative values and there was significant difference in systolic blood pressure between both the groups in first 40 minutes. This effect is due to the sympathetic blockade caused by spinal anaesthesia, leading to vasodilatation, peripheral venous pooling of blood and decreased cardiac output. Five patients in Group II had hypotension, which responded to head low position and fluid therapy. Fall in DBP was not significant as spinal level was maintained till T8 dermatome and the compensatory vasoconstriction of upper part of body maintained the total peripheral resistance. In Group II, the mean arterial pressure showed a significant fall for first 30 minutes after spinal anaesthesia, but values were well above the range at which compensatory autoregulation sets in. (Figure 2). Aysun Yilmazlar et al found a significant decrease in mean arterial pressure in spinal anaesthesia group (pre 70.3±10.3mmHg and post 52.3±9.3 mmHg) and no such fall in ilioinguinal and iliohypogastric nerve block group.<sup>16</sup> Our findings are also in confirmation with the study conducted by Nehme et al who found that the incidence of hypotension was highest in cases of spinal anaesthesia (19%),<sup>17</sup> while it was negligible in cases of inguinal block. Similar results were also reported by Tingwald and Cooperman.<sup>18</sup>

The mean intraoperative intravenous fluid requirement was considerably higher in Group II (1280±190.1 ml vs 348.33±77.106ml). The higher fluid requirement in spinal anaesthesia group is because of sympathetic blockade, which expands the intravascular compartment necessitating rapid intravascular infusion to maintain the good intravascular volume and blood pressure. Therefore ilioinguinal and iliohypogastric nerve block can be a technique of choice in patients with low ejection fraction.

However ilioinguinal and iliohypogastric nerve block does not ameliorate visceral pain, which occurs at the time of sac handling which can be taken care of by additional local anaesthetic infiltration and/or sedative agents. In our study, 36.7% (11) patients in Group I required additional dose of local anaesthetic infiltration at the time of sac handling out of which 45.45% (5) patients required Propofol sedation (55.56±5.11mg). Also, the sedative dose of midazolam was provided in all the patients of Group I as part of premedi-

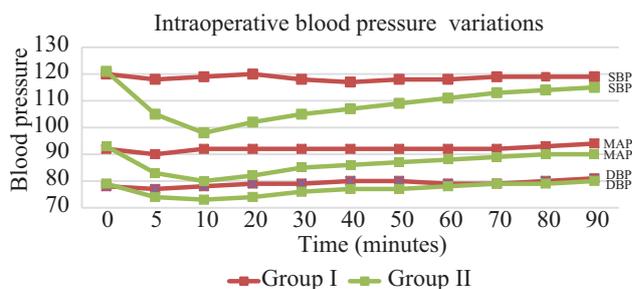


Figure-2: Intraoperative blood pressure variations

ation while 50% of patients required midazolam to relieve anxiety during the surgery in Group II. A variety of drugs like diazepam, pethidine and Propofol have been used for conscious sedation, by various authors during inguinal field block. Pethidine and diazepam have sedative effects, which can persist postoperatively for 6-8 hours, thus delaying recovery and ambulation. Propofol has now become the drug of choice for conscious sedation because it has rapid onset of action, titrable drug levels and a short half life that leads to rapid clear headed recovery without nausea and vomiting and patients can meet discharge criteria sooner. We have used midazolam which provides effective sedation and amnesia with short duration of action.<sup>13,16</sup> Since midazolam gives good amnesia, we found that inguinal nerve block was fairly acceptable even in patients who had experienced mild discomfort intraoperatively. None of the patients in Group I was excessively drowsy, requiring prolonged stay in PACU or delaying ambulation as the sedative dose was well within the therapeutic range. The intraoperative and postoperative oxygen saturation (SPO<sub>2</sub>) were comparable and maintained around 99% in both the groups. None of our patients developed nausea and vomiting intraoperatively.

There was one spinal anaesthesia failure (3.3%) in Group II who was given general anaesthesia. In Group I three patients (10%) had to be given general anaesthesia because of inadequate block. Eleven patients experienced discomfort during dissection of hernia sac and the pain subsided after 4-5 ml of local anaesthetic infiltration at the neck of sac. In similar studies done by Sultana A et al<sup>19</sup> and Ruben N Van Veen et al<sup>13</sup> using standard inguinal field block, intraoperative discomfort of moderate grade during the dissection of hernia sac was reported in 34% and 35% patients respectively. Failure rate for local inguinal field block was 3.33% as reported by C J Sparks et al<sup>9</sup> and for local infiltration anaesthesia, it was 3.17% as reported by Aysun Yilmazlar et al<sup>16</sup> as compared to 10% in our study. The failure rate can be minimized with further experience and skill in this technique.

The postoperative VAS score was significantly higher in Group II as compared to Group I. Duration of Postoperative analgesia was significantly longer (5.163±0.4542 vs 3.871±0.4801 hours) in Group I as compared to Group II. Similar findings were also observed by Sultana A et al<sup>19</sup> and Tverskoy et al.<sup>20</sup>

Postoperative complications - 3.33% of patients had nausea, and vomiting which responded to IV ondansetron, 16.67% of patients developed urinary retention and 3.33% of patients had PDPH in Group II. None of patients in Group I had any of these complications. Similar results were also observed by Young et al<sup>11</sup> (urinary retention 14%) and Sultana A et al<sup>19</sup>

(urinary retention 7% and PDPH 8%). None of our patients developed wound haematoma or local infection.

Duration of ambulation was longer in Group II as compared to Group I (9.58± 0.87 vs 3.95±2.56 hours)(p<0.05). Song D et al found that the time-to-home readiness in ilioinguinal iliohypogastric block was shortest (133±68 min) as compared to SA (280±83 min).<sup>21</sup> Ding Y and White PF also found that the ambulation time in block group was (86 ±18 min) and fit to discharge time was (112±49 min).<sup>22</sup> Goutorbe P et al found that the mean time until discharge was 6.85 h in block group and concluded that it should be a preferred method in countries with a low Gross National Product (GNP) like in Africa.<sup>23</sup>

Although USG guided technique for nerve block is preferred over blind technique,<sup>24</sup> Trainor D et al in their study comparing both the techniques for the treatment of chronic postherniorrhaphy groin pain did not find statistically significant difference in postoperative VAS pain scores between both groups.<sup>25</sup>

## CONCLUSION

The ilioinguinal and iliohypogastric nerve block is associated with better hemodynamic stability, less postoperative complications, longer duration of analgesia and early ambulation as compared to spinal anaesthesia and hence can be an alternative anaesthetic technique for patients with complex medical conditions which make them unsuitable for SA and GA. Short hospital stay and cost effectiveness with extended duration of postoperative analgesia makes it more acceptable.

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# Contralateral Breast Exposure to Radiation; Does Linear Accelerator Gives any Advantage Over Cobalt Unit?

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## ABSTRACT

**Introduction:** With better understanding of tumor behavior, availability of better chemotherapeutic agents, radiotherapy equipment, techniques and development of oncosurgery, the survival in carcinoma breast has significantly improved. Longer survival has lead to increased incidence of late side effects of treatment. As breast cancer is the commonest malignancy among women, the late effects in this disease are a matter of concern. One of late effect of treatment is malignancy of contralateral breast (CLB).

**Material and Methods:** In this study, we compare dose to CLB during irradiation of diseased breast on cobalt and linear accelerator (LA). Measurement of CLB was done in 50 patients undergoing radiotherapy for carcinoma breast following surgery; 25 on cobalt teletherapy machine and 25 on LA unit. Standardized and precalibrated CaSO<sub>4</sub>: Dy Thermoluminescent discs (TLD) were used for the dose measurement.

**Results:** For all patients, the total dose to the CLB was more with Cobalt unit- 168.29cGy (3.36%) than with LA 120.77cGy (2.41%)(p<0.001). At gantry angle more than 50 degree, the dose received was more for both cobalt and LA units (p=0.199 for cobalt and p=0.682 for LA).

**Conclusion:** With the advancement of techniques like three dimensional conformal radiotherapy and Intensity Modulated Radiotherapy with linear accelerator, we can reduce the CLB dose as compared to conventional cobalt teletherapy.

**Keywords:** Cobalt, Linear Accelerator, Contralateral Breast, Thermoluminescent Disc

## INTRODUCTION

Breast cancer is the most common malignancy among the women worldwide. Radiotherapy plays an important role in the management of carcinoma breast. Radiotherapy is a double edged sword in the treatment of cancer because its use in treatment of cancer is well known; however, it may also cause second malignancy. The minimum dose of ionizing radiation causing second malignancy cannot be defined because it is a stochastic effect, a minimal dose may cause cancer; however, intensity of second malignancy increases with increase in radiation dose. During the course of irradiation to the chest wall, some dose, which may range from few cGy to Gy, is also delivered to the contralateral breast (CLB) due to scattered radiation. Breast is highly radiosensitive tissue so, radiation induced malignancy is a major concern, especially in women of younger age.<sup>1,2</sup> Dose received by CLB during the course of treatment depends upon various factors; energy of incident photons, gantry angle at which dose was delivered, half beam block, radiotherapy technique and type of beam used (photon/electron). Several studies had proved the role of ionizing radiation in causing the second malignancy to CLB after the radiation given to affected breast after a

long follow up. Half beam is routinely used in the treatment of breast cancer to reduce the dose to lungs. Studies have shown that the dose to CLB was maximum with half beam with custom block or breast cone and least with half beam with symmetrical jaws.<sup>3</sup> Dose received by CLB also depends upon the angle of the gantry at which radiation dose was delivered. If gantry angle is more than 50 degree, the scattered dose to CLB was increased.<sup>4</sup> In this study, we compare the dose received by CLB with cobalt and linear accelerator (LA) machine during the course of treatment of diseased breast.

## MATERIAL AND METHODS

This study was done at Acharya Tulsi Regional Cancer Treatment and Research Centre, Bikaner, Rajasthan, India. Patients selection was based on inclusion and exclusion criteria. Before including the patients in the study a written informed consent was taken from them and ethical approval was taken from the institutional ethical board. Measurement of CLB was done in 50 patients (sample size calculation was done by t-test method) undergoing radiotherapy for cancer breast; 25 on cobalt teletherapy machine (Theratron 780 C and E, Canada) and 25 with LA (Varian, Palo Alto, USA) following modified radical mastectomy (MRM). Standardized and precalibrated CaSO<sub>4</sub>: Dy TLDs (9mm×13mm) were used for the dose measurement. The chips were placed on the surface of CLB; one at the level of the nipple and other two on either side of nipple along midline 3 cm away from nipple. Skin tattooing was done to demarcate the exact position at the first sitting and this was used subsequently to replicate the position. After exposure, the chips were removed and new set of three chips was placed to measure next exposure. The TLDs were stored in a radiation free room and the readings were taken after 24 hours and within seven days of exposure. The readings were taken with the help of NUCLEONIX TL10091 TLD reader. After one set of readings the chips were annealed by heating (400°C) and then were used for next set of exposure. Dose measurement was

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performed three times in a patient; first week, third week and fifth week. Total 50 Gy was delivered in 25 fractions, 2 Gy per fraction, 5 fractions in a week for five weeks on both the units. On cobalt teletherapy, supraclavicular field (SCL) field was treated daily while medial tangential (MT) and lateral tangential (LT) fields were treated on alternate day. On LA, all the three fields were treated daily. On cobalt unit, SSD technique was used while on LA isocentric technique (SAD) was used. Randomization was done based on computer generated program.

**STATISTICAL ANALYSIS**

The mean dose received by CLB on both the units was compared (Table 1). Also, the total dose received by CLB, was calculated by multiplication of mean dose to number of fractions (mean dose× no. of fractions). The percentage of radiation dose received by CLB with respect to the prescribed

dose to diseased breast (Total dose× 100 / prescribed dose to diseased breast) was calculated and compared. The data was also stratified based on gantry angle at which EBRT was delivered (≤50 degree and > 50 degree).The statistical software SPSS version 20.0 was used for the data analysis.

**RESULTS**

In our study, 70% (35/50) of patients were < 50 years old. Out of 50 patients, 54% had right sided breast cancer. The mean dose of radiation received by the CLB was stratified according to age (table 2). In the age group 31-40 years, the total dose received with cobalt unit was 196.437 cGy (3.93%) while with LA, the total dose received in this age group was 112.687cGy (2.42%)(p<0.007). In the age group 41-60 years, the total dose received by CLB was less with LA but statistically not significant. Dose to the CLB was more with LA 118.0cGy (2.36%) than cobalt unit 97.875cGy

Patient Wise Dose Measurement On Cobalt Unit							Patient Wise Dose Measurement On Linac							
S. no.	Age	Gantry	Dose(cGy)			Total dose	%	Age	Gantry	Dose(cGy)			Total dose	%
		Angle	MT	LT	SCL				Angle	MT	LT	SCL		
1	31	52	6.88	1.22	1.46	239	4.78	31	55	3.01	0.73	0.85	114.75	2.29
2	31	45	5.66	0.47	0.94	176.75	3.54	38	50	3.81	0.84	1.07	143	2.86
3	35	50	3.44	1.15	1.02	140.25	2.81	40	49	2.87	0.95	0.91	118.25	2.36
4	35	52	4.78	0.54	1.56	167	3.34	40	47	1.99	0.49	0.51	74.75	1.49
5	35	59	7.01	2.48	1.72	280.25	5.61	41	61	3.15	0.86	1.12	128.25	2.57
6	38	48	3.36	1.83	1.87	176.5	3.53	42	53	2.46	1.12	1.14	118	2.36
7	40	56	5.17	1.35	1.19	192.75	3.86	44	52	2.97	1.25	0.58	120	2.4
8	40	47	5.36	1.28	1.32	199	3.98	44	50	3.14	0.73	0.81	117	2.34
9	45	60	6.93	1.01	1.59	238.5	4.76	45	52	1.83	0.43	0.64	72.5	1.45
10	45	58	7.25	1.35	3.05	291.25	5.82	46	42	2.61	1.14	1.67	135.5	2.71
11	45	45	3.23	0.45	1.55	130.75	2.62	46	59	3.3	0.66	0.69	116.25	2.32
12	45	48	2.01	0.51	0.65	79.25	1.59	46	56	3.01	0.88	1.01	122.5	2.45
13	48	46	2.56	0.78	1.14	112	2.24	48	52	2.63	1.12	0.73	112	2.24
14	50	57	3.81	1.22	1.08	152.75	3.06	48	48	3.11	0.91	0.82	121	2.42
15	50	59	1.55	0.42	0.46	60.75	1.22	50	60	2.84	0.98	0.91	118.25	2.36
16	50	49	6.61	0.24	2.14	224.75	4.49	50	53	4.43	1.35	1.01	169.75	3.39
17	50	60	4.14	2.63	1.21	199.5	3.99	53	45	2.52	1.13	0.93	114.5	2.29
18	50	56	3.76	0.62	1.48	146.5	2.93	54	46	2.99	1.13	1.05	129.5	2.58
19	50	45	2.72	0.59	0.77	102	2.04	54	62	3.15	0.8	0.79	118.5	2.37
20	55	45	3.64	0.99	1.08	142.75	2.85	56	51	2.89	0.93	0.92	118.5	2.37
21	55	55	6.86	1.57	1.44	246.75	4.93	58	50	2.56	0.99	1.22	119.25	2.38
22	60	56	2.17	1.9	2.99	176.5	3.53	58	53	3.15	1.25	1.27	141.75	2.83
23	60	65	2.89	1.48	1.07	136	2.72	60	51	3.69	0.87	1.02	139.5	2.79
24	64	56	2.24	2.04	0.81	127.25	2.55	65	45	2.35	1.34	1.13	120.5	2.41
25	70	50	1.52	0.85	0.37	68.5	1.37	67	48	2.92	0.86	0.84	115.5	2.31

MT: Medial tangential, LT: Lateral Tangential, SCF: Supraclavicular Field, %: Percentage

**Table-1:** Dose Received By Contralateral Breast in Each Patient on Cobalt and LA Units.

Characteristics	Radiation dose ( cGy)							T Value	P Value
	Cobalt			Linear Accelerator					
	Total	Mean	S.D.	Total	Mean	S.D.			
Age in years	31-40	63.06	7.882	±1.74	18.03	4.507	±1.12	3.468	<0.006
	41-50	69.51	6.319	±2.88	58.04	4.836	±0.86	1.636	0.129
	51-60	28.08	7.02	±2.02	35.25	5.035	±0.44	1.931	0.144
	>60	7.83	3.915	±1.66	9.44	4.72	±0.14	-0.683	0.565
All Patients		168.48	6.739	±2.48	120.76	4.830	±0.76	3.666	<0.001

**Table-2:** Mean Dose of Radiation Received by the Contralateral Breast According to Age.

Characteristics		Mean Percentage %				T Value	P value
		Cobalt	S.D.	Linear Accelerator	S.D.		
Age in years	31-40	4.09	0.945	2.22	0.606	3.566	0.005
	41-50	3.25	1.481	2.67	0.538	1.224	0.244
	51-60	3.49	1.341	2.47	0.128	1.516	0.226
	>60	1.73	0.876	2.37	0.049	-1.039	0.408
All Patients		3.44	1.354	2.52	0.459	3.205	0.003

**Table-3:** Percentage of dose received by contralateral nipple

Beam	Percentage of Dose Received by Contralateral breast		
	≤2.37	>2.38≤2.86	>2.86≤5.86
Cobalt Unit	05	05	15
Linear Accelerator Unit	13	12	00

**Table-4:** Results Stratification; Percentage of Dose Received by Contralateral breast

(1.96%) in patients with age more than 60 years ( $p=0.569$ ). This was an unusual finding and may be due to small size of sample ( $n=4$ ). For all the patients, the total dose to the CLB was more with Cobalt unit 168.29cGy (3.36%) than with LA 120.77cGy (2.41%) ( $p<0.001$ ). The dose to CLB also compared in relation to gantry angle at which EBRT was delivered. At gantry angle more than 50 degree, the dose received was more for both cobalt and LA units ( $p=0.199$  for cobalt and  $p=0.682$  for LA).

In present study, the measured average contralateral nipple dose on cobalt unit was 171.88cGy (55.5-303.80cGy) which accounts 3.47% (1.11%-6.07%) of the prescribed dose (Table 3). The measured average contralateral nipple dose on LA unit was 125.74cGy (78.75-180.00cGy) which accounts 2.51% (1.57%-3.60%) of prescribed dose.

To better understand the implication of this result, the resultant CLB dose is divided into three different ranges: i) less than or equal to 2.37%, ii) 2.37-2.86% and iii) above 2.86% (Table 4). As per the results in our study, the LA is safer in terms of CLB dose, all the 25 patients receiving CLB dose values below 2.86%. Higher dose was delivered from telecobalt machine having 15 patients received doses more than 2.86%.

## DISCUSSION

Breast cancer is the second most common cancer in the world and by far, the commonest cancer among women with an estimated 1.67 million new cases diagnosed in 2012 (25% of all cancer).<sup>5</sup> Multimodality treatment of breast carcinoma has resulted in longer survival. Radiotherapy for breast carcinoma inevitably results in radiation dose to the CLB. Several past studies have quantified this risk. Boice et al showed that CLB cancer risk does increase with radiation especially in young women.<sup>6</sup> In our study also 70% of the patients were below 50 years. Thus the need for measuring CLB dose becomes an important issue.

Most of previous studies were phantom based studies but the present study is a clinical study conducted directly on breast cancer patients undergoing radiotherapy. Muller et al showed that the skin dose measured at 5cm away from the medial border of the treatment field will be equivalent to the overall total scattered dose received by the contralateral

breast.<sup>4</sup> In our study, three TLD were placed, one on nipple and other on either side of nipple at a distance of 3cm along the midline.

Tercilla et al compared isocentric (SAD) and SSD techniques with respect to CLB dose; he found that SSD technique gave lesser contribution compared to SAD technique.<sup>7</sup> In our study, the dose contribution to CLB was found to be high in SSD technique compared to SAD technique (3.36% versus 2.41%) because in the present study SSD technique was used only for Cobalt teletherapy unit while all patients on LA were treated with SAD technique. The wedges were not used as use of wedge is reported to increase CLB dose.<sup>8</sup> The MT field gantry angle that is used to deliver the photon beam is found to be around 50 degrees. So, a comparison was made between less than or equal to 50° and more than 50° gantry angle. Muller et al demonstrated that higher the gantry angle closer will be the beam to surface and hence higher will be the dose.<sup>4</sup> In our study, it was found that gantry angle >50° has contributed more doses to the CLB on both the units (table 3).

Chougule showed that the mean contralateral nipple dose was 152.5-254.75 cGy which accounts 3.05-6.05% for a dose of 50 Gy in 25 fractions for post mastectomy breast cancer treated on cobalt unit.<sup>9</sup> In the present study, the contralateral nipple dose was 171.88cGy (55.5-303.80cGy) which accounts 3.47% (1.11%-6.07%) of the prescribed dose on cobalt unit.

In a study conducted at All India Institute of Medical Science, New Delhi, India, intensity modulated radiotherapy (IMRT) and Enhanced Dynamic Wedge (EDW) were utilized for comparison of CLB dose.<sup>10</sup> EDW reduces CLB dose compared to physical wedge. The IMRT technique provides good dose uniformity and reduces the dose to the CLB significantly. The dose to CLB can be reduced by reducing the medial gantry angle. In our study dose to CLB was more when gantry angle was greater than 50°, thus we can reduce the dose to CLB by reducing the gantry angle.

At University of Pittsburg in 2006, an on-patient study was conducted to determine the dose received by the CLB during breast irradiation using IMRT compared with conventional tangential field techniques.<sup>11</sup> Paired TLDs were placed on patient's contralateral breast, 4 and 8 cm from the center of the medial border of the tangential field. After single exposure, the TLDs were changed. Primary breast radiation with tangential IMRT technique significantly reduces the dose to the CLB compare to tangential field techniques.

## CONCLUSION

It is evident that radiation induced carcinogenesis is a significant issue in the current context of longer survival of treated

patients of breast cancer. Further, with the advanced techniques, we can reduce the CLB dose as compared to conventional cobalt teletherapy.

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# Role of MDCT in Evaluation of Mandibular Lesions

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## ABSTRACT

**Introduction:** Confirmatory diagnosis of Various Mandibular pathologies as early as possible is critical to decide the management. CT Scan in most cases is the final imaging modality to conclude imaging diagnosis of mandibular pathology and its extent. The aim of the study is to correlate clinical findings, MDCT Scan findings and biopsy findings, as well to establish the importance of CT Scan as a strong imaging modality for Mandible lesions.

**Material and methods:** MDCT Scan were done in 70 patients with suspected Mandibular Pathologies. Findings of CT were noted and probable diagnosis was given. Follow up and confirmation of the diagnosis was done in all cases which was followed up by peroperative findings and biopsy report.

**Results:** In present study, in 61 patients MDCT scan was accurate for diagnosis as per peroperative findings and biopsy report. In 9 patients probable diagnosis given on CT scan was not matched with postoperative biopsy diagnosis. In 25 patients OPG or conventional radiographs were inconclusive for lesion characteristics but CT Scan reveals characteristics and extent of lesion. In 9 patients OPG revealed single lesion while CT showed multiple lesions.

**Conclusion:** MDCT Mandible is recommended in patients with mandibular pathologies as a final imaging tool.

**Keywords:** MDCT Mandible, Lesions of Mandible, Arteriovenous Malformation Mandible, Ameloblastoma, Keratocystic Odontogenic Tumour.

## INTRODUCTION

"The face is the mirror of the mind". But any pathology on the face will definitely disturb the mind. So early diagnosis and characterization of the pathology and timely treatment will give glow on the face and ultimately calm the mind. Mandible and teeth are very common and timely management and diagnosis is of prime importance

Lesions of Mandible falls into vast spectrum of odontogenic and nonodontogenic lesions. Many lesions have similar radiology appearance. CT scan is very helpful in those cases to reveal secondary findings to get some clue. However many lesions require biopsy to get the final diagnosis. Imaging especially CT Scan even if don't give final diagnosis will narrow the differential.

With the way back of discovery of X ray in 1895, there has been continuous development in studying and depicting pathologies of different systems of body.

Earlier OPG was the only modality to throw some light on the mysterious mandible pathologies. Only small boat to sail in the mysterious sea of mandible pathology until departure of the big ship - CT Scan.

Correlating the CT Scan findings with Biopsy are essential for predicting the importance and usefulness of different findings.

## MATERIAL AND METHODS

The study was conducted during June 2015 to January 2016. The study was done on 70 patients referred for CT Scan Mandible in B.J. Medical college Ahmadabad. Inclusion criteria for selection of the patients was patients having nontraumatic clinically suspected mandibular pathologies, patients referred for CT Scan due to inconclusive clinical diagnosis in toothache, patients with OPG or X rays done and were referred for further evaluation. Exclusion criteria were traumatic injuries to mandible as well patients with metal prosthesis. Thus Patient referred for MDCT mandible after road traffic accidents or other trauma were excluded from this study. Final diagnosis was suggested by CT Scan and clinical correlation. Final diagnosis was confirmed by biopsy in all cases. All patients were evaluated clinically and then underwent CT Mandible. 54 patients also underwent OPG or Radiograph of Mandible. Contrast Enhanced CT Scan done in 52 patients and Plain CT Mandible done in 18 patients. CT Scan for follow up of lesion done in 2 patients. No selection bias were exercised in terms of patients age and sex.

In all patients CT Scan was done by SIEMENS SOMATOM DEFINITION 128 slice MDCT. Following CT Technique was used in all patients: - Plain CT scan of Mandible ( without IV contrast ) was done with. 16X0.625 mm Collimation, 5 mm Slice thickness, 1.75 Pitch with Table speed/gantry rotation -55mm/17.5 mm were used.

Whenever indicated Plain CT is followed by intravenous bolus of non-ionic iodinated contrast material via power injector. 100 cc of contrast was administered at rate of 3.5 ml/sec. CECT Mandible was done under the supervision of the anesthetist.

Detail Findings were noted and probable diagnosis or differential diagnosis were given. In all cases follow up was taken by peroperative findings and by biopsy report. Result of the study was analyzed and was compared with other available studies.

## STATISTICAL ANALYSIS

SPSS version 21 was used to infer results. Results are based on descriptive statistics.

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Diagnosis and Frequency (Total 70 Cases)	CT Appearance	No of cases	Percentage of CT Appearance
Ameloblastoma (17 cases = 24.28%)	Multiloculated lytic lesion with cortical erosion	14	82%
	Multiloculated lytic lesion with cortical erosion	3	18%
Keratocysticodontogenic tumor (KCOT) (14 cases = 20%)	Cyst with mild cortical expansion without destruction	12	86%
	Cyst with cortical expansion and erosions	2	14%
Periapical cyst (12 cases=17.14%)	Cyst with sclerotic margins	10	80%
	Lytic-Sclerotic lesion with soft tissue swelling	2	20%
Odontoma (10 cases=14.28%)	Opaque lesion with lucent rim	10	100%
Dentigerous cyst (6 cases =8.57%)	Expansile cyst with unerupted crown of teeth	6	100%
Osteomyelitis (5 cases=7.14%)	Lytic lesion with sequestrum	4	80%
	Lytic-Sclerotic lesion with soft tissue swelling	1	20%
Cementoblastoma (2 cases =2.85%)	Well circumscribed radioopaque mass associated with root of tooth	2	100%
Fibrous Dysplasia (2 cases =2.85%)	Lesion with ground glass density and expansion	2	100%
Arteriovenous Malformation (1 case =1.42%)	Multiloculated cystic lesion with intense postcontrast enhancement	1	100%
Osteogenic Sarcoma (1 case =1.42%)	Aggressive destruction of bone with periosteal reaction and soft tissue mass	1	100%
Osteochondroma (1 case =1.42%)	Bony outgrowth with area of sclerosis	1	100%

Table-1: Frequency and MDCT appearance of mandibular pathologies

MDCT Diagnosis and Frequency	Diagnosis on Biopsy		Total no of case
	Same Diagnosis	Different Diagnosis	
Ameloblastoma	13	4	17
Keratocysticodontogenic tumor (KCOT)	12	2	14
Periapical Cyst	11	1	12
Odontoma	9	1	10
Dentigerous cyst	6	0	6
Osteomyelitis	4	1	5
	55	9	64

Table-2: Correlation of MDCT Diagnosis and Biopsy Diagnosis

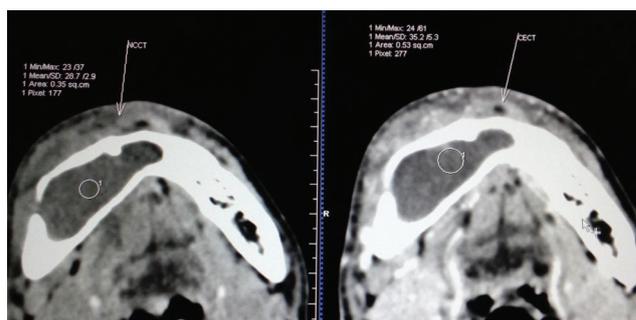


Figure-1: Plain and contrast axial CT Scan showing Ameloblastoma - buccolingually expanding enhancing lytic lesion with cortical destruction in body of mandible on right side

**RESULTS**

In this study most common pathology was Ameloblastoma (24.28%), followed by Keratocysticodontogenic tumor (KTOC) (20%).

In present study, in 61 patients MDCT scan was accurate for diagnosis as per peroperative findings and biopsy report. In 9 patients probable diagnosis given on CT scan was not matched with postoperative biopsy diagnosis. In 25 patients OPG or conventional radiographs were inconclusive for lesion characteristics but CT Scan revealed characteristics and extent of lesion. In 9 patients OPG revealed single lesion while CT showed multiple lesions.

Calculated from Table 2 the calculations are;  $\chi^2 = 2.851$ ,  $df = 5$ , So  $\chi^2/df = 0.57$ ,  $P(\chi^2 > 2.851) = 0.7229$

Thus P value is 0.72, So it can be stated that MDCT diagnosis correlates well with Biopsy diagnosis.

In 4 cases, On CT Scan probable diagnosis was given Amelo-



Figure-2: Coronal scan bone window setting showing Osteochondroma - bony outgrowth with sclerosis arising from mandible body on left side

blastoma turned out to be KTOC on biopsy, while in 2 case CT diagnosis of KTOC turned out to be Ameloblastoma on Biopsy.

## DISCUSSION

As cost effective and easily accessible as well low radiation dose, conventional radiographs such as panoramic radiographs (orthopantomographies [OPTs] or panoramic X-rays) or dental intraoral radiographs are commonly used for the diagnosis of pathology of the mandible.<sup>9</sup> However conventional radiographs having two-dimensional projections of three-dimensional structures, have a limited role for the assessment of lesion size, lesion margins, as well as extension into important anatomic structures or soft tissues. New imaging modalities complement conventional radiographs overcoming the above-mentioned limitations and providing more specific information in terms of diagnosis and therapeutic options.<sup>9</sup> With the introduction of multi-detector computed tomography (MDCT), the imaging evaluation of patients with mandibular lesions has changed.

Although Cone Beamed Computed Tomography (CBCT) has gained increasing popularity over the past years, it does not allow evaluation of extraosseous structures; use of CBCT may therefore lead to underestimation of disease extent.

Dentists and oral surgeons were experiencing difficulty with the use of conventional radiographs to determine whether there was sufficient bone in the jaw to accommodate dental implants.<sup>3</sup> But now with MDCT Mandible it has been easier for them to decide.

CT has many advantages over Conventional X ray used for diagnosis in mandibular pathologies as it gives access for imaging of both bones and soft tissues. Excellent differentiation between different types of tissues, both normal and diseased is also possible as well as the images can be manipulated.<sup>2</sup>

In all patients the exact extension of the lesion, the involvement of nearer anatomical structures and planning for biopsy and surgical planning could be decided in our study.

Whenever a benign lesion is suspected, the surgeon need to know the integrity of the inferior cortex of mandible as it helps to decide the approach if curettage or resection is needed. Also relationship of the lesion to the root of teeth is essential to determine as to plan if any of the vital or nonvital teeth need to be resected.<sup>3</sup>

Multicystic Ameloblastoma is the most common type accounted in our study. On CT most common appearance was of multiloculated lytic lesion with cortical erosions. Solid or multicystic ameloblastoma is the most common variant, accounting for 85% of all ameloblastomas. This variant is also the most aggressive and has a high recurrence rate compared with the other variants. Radiographically the multicystic (solid) Ameloblastoma variant typically appears multiloculated with internal septations manifested by a honeycomb or soap-bubble appearance.<sup>5</sup>

In our study CT was also helpful in evaluation of teeth root resorption or erosion. The hallmark of ameloblastoma is extensive tooth root absorption.<sup>5</sup>

Keratocysticodontogenic tumor (KCOT) formally known as "odontogenic keratocyst" but recently was categorized as an odontogenic tumor rather than a cyst.<sup>5</sup> Most cases In our

study were having nonaggressive radiological appearance with minimal if any cortical expansion. 2 out of 14 Keratocysticodontogenic tumors in our study showed aggressive growth pattern and cortical destruction. Keratocysticodontogenic tumor scan show a more aggressive growth pattern including multilocularity, cortical expansion, perforation of the cortical bone, tooth and mandibular canal displacement, root resorption, and extrusion of erupted teeth.<sup>5</sup>

In our study there were 2 cases of recurrence of Biopsy proven KCOT. Most KCOTs possess destructive potential, with a high recurrence rate after resection.<sup>6</sup> It is sometimes very difficult to differentiate between ameloblastomas and KCOT by characteristic radiographic findings. However, KCOT have relatively less resorption or erosion of teeth root. Also in our study all ameloblastoma showed predominant buccolingual expansion while KCOT showed anteroposterior expansion. Ameloblastomas and not KCOT tend to expand the marked buccolingual cortical bone.<sup>1</sup>

The periapical (radicular) cyst is the most common odontogenic cyst.<sup>6</sup> However In our study only 11 cases were undergone CT Scan probably because the clinicians were confident enough for the diagnosis in case of Periapical cyst and with help of only conventional radiographs they managed those cases. In many cases, such as in radicular cysts, the diagnosis is straightforward and no additional imaging is required for diagnosis and treatment.<sup>8</sup> However in one the cases in our study biopsy findings were of keratocystic odontogenic tumour.

Radiographically, a dentigerous cyst appears as a well circumscribed unilocular radiolucent lesion adjacent to the crown of an unerupted tooth most commonly the third molar tooth.<sup>5,9</sup> In our study all cases showed similar radiological picture with four out of six cysts were in association with third molar tooth.

In our study 4 cases diagnosed of osteomyelitis were of chronic Osteomyelitis and were showing lytic lesion and sequestration. One lesion showed Sclerotic lesion with soft tissue swelling, all cases were noted in body of mandible. Osteomyelitis of jaw most commonly involves body of mandible.<sup>7</sup>

Odontoma is the most common odontogenic tumor of mandible. Forming between the roots of teeth, the tumor is initially radiolucent but later forms a radioopaque mass with a lucent rim.<sup>6</sup> It is easy to diagnose on conventional x rays of OPGs so in our study less patients were referred for such probable diagnosis. Radiologically, odontomas usually are not difficult to differentially diagnose.<sup>1</sup>

Both cases of Cementoblastoma showed typical well circumscribed radioopaque mass associated with root of tooth. However expected peripheral lucent rim was not seen in either of cases.<sup>1</sup>

There were 2 case of fibrous dysplasia both of which showed characteristic ground glass bone density. In a study by Subodh Arun Sontakke et al, 100% lesions of fibrous dysplasia showed ground glass bone density.<sup>9</sup>

We came across a single case of osteosarcoma of mandible in this study. CT features are of Aggressive destruction of bone with periosteal reaction and soft tissue mass with mild contrast enhancement. In malignancy of mandible CT imag-

es commonly include soft tissue density masses with mild contrast enhancement associated with bone destruction.<sup>1</sup> There was a rare case of Osteochondroma in body of mandible in our study. It is extremely rare and only one case reported of OC at angle of mandible. Majority of cases are reported in condyle followed by coronoid process.<sup>10</sup>

By better characterization of vascular supply or vascularised nature of the lesion in many cases CECT Mandible is of extremely useful. In one of the case in our study clinical suspicion of Ameloblastoma turned out to be Arteriovenous malformation on CECT Mandible. Before performing a biopsy or surgery in a radiographically suspected case of ameloblastoma or aneurysmal bone cyst, CT or MRI should be done to rule out the possibility of an AVM to avoid sudden massive hemorrhage from the lesion. Contrast-enhanced CT can be useful in assessing the AVMs.<sup>4</sup>

## CONCLUSION

MDCT plays a pivotal role in making a precise diagnosis, grading it and then guiding treatment decisions being far superior to conventional radiography of mandible in all terms except the cost and when metal prosthesis induced artifacts. Availability of different planes in MDCT aids accuracy in diagnosis of mandible lesions. Soft tissue extension is also accurately detected by CT Scan. CT Mandible may be useful for knowing occult lesions in the rest of mandible which cannot be detected by OPG or other radiographs of mandible. Diagnosis of mandibular pathologies by MDCT correlates well with Biopsy diagnosis. CT often allows differentiation of benign lesions and cysts from malignant lesions; thus avoiding biopsy which usually is necessary to establish the final diagnosis.

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# Coronally Advanced Flap Along with Autologous Platelet Rich Fibrin: Boon for Recession Coverage- A Case Report

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## ABSTRACT

**Introduction:** Gingival recession results due to the apical migration of gingival margin. Correction of such gingival recession is necessary to enhance aesthetic as well as functional demand. Variety of periodontal plastic surgical procedures including coronally advanced flap (CAF) are described, each having advantages and disadvantages. To improve the clinical outcome of such surgical procedures, several regenerative materials have been combined with it. Though platelet rich fibrin (PRF) is one of the best regenerative material, it is not frequently used along with the periodontal plastic surgical procedures. In the present case report, PRF is combined with CAF for the treatment of multiple gingival recessions.

**Case report:** 29 years female reported to our department with complain of gingival recession. CAF surgery along with the incorporation of PRF was carried out to treat the gingival recession.

**Conclusion:** The addition of PRF to CAF procedure provided complete root coverage. This case report helped to focus treatment outcomes and predictability of autologous PRF when used along with CAF for the treatment of recession defects on multiple adjacent teeth.

**Keywords:** Recession, Platelet rich fibrin (PRF), Coronally advanced flap (CAF), Regeneration, Root coverage.

## INTRODUCTION

Gingival recession is the displacement of the soft tissue margin apical to cemento-enamel junction with exposure of root in the oral cavity.<sup>1</sup> It is one of the major aesthetic concern seen in the field of periodontology. Root hypersensitivity is a common complaint associated with gingival recession, resulting because of root exposure and subsequent exposure of dentinal tubules in the oral cavity. It also results in attachment loss and root caries.<sup>2</sup> One or more etiologic factors are responsible for gingival recession includes inflammatory periodontal disease; mechanical trauma from tooth brushing; occlusal trauma; high frenal attachment; tooth malposition or root prominence leading to the thinning of bony plate; orthodontic tooth movement in unusual direction; underlying alveolar dehiscence; thin gingival biotype; and other periodontal treatment-related factors.<sup>3</sup>

Various periodontal plastic surgical procedures are offered to treat gingival recession. Most commonly used techniques are free graft which includes free gingival graft and subepithelial connective tissue graft; and pedicle flap which includes lateral pedicle flap and coronally advanced flap (CAF). With the use of free gingival grafts, gingival tissue color matching is always a problem which results in an unsatisfactory aesthetic. Though subepithelial connective tissue graft is satisfactory in terms of aesthetic and recession coverage, it requires a second surgical site. CAF technique have also

shown more predictable recession coverage with apparently acceptable aesthetic results.<sup>2</sup> CAF when used alone is unstable on long-term, in spite of having many advantages.<sup>4</sup> Such procedure does not always result in the regeneration of lost attachment apparatus such as cementum, periodontal ligament, and alveolar bone, which may act as a future risk factor in the recurrence of gingival recession. To avoid such further risk of recurrence, CAF is often combined with various regenerative materials like guided tissue regeneration membranes, enamel matrix proteins derivatives, alloderm, living tissue-engineered human fibroblast derived dermal substitute which helps to regenerate functional attachment apparatus as well as enhances root coverage.<sup>2</sup>

Various new regenerative materials have been tried with CAF. One of such material is autologous platelet concentrates.<sup>2</sup> Platelet rich fibrin (PRF) is an autologous platelet concentrate system which require simplified process of preparation, and also does not need addition of any anticoagulant during its preparation.<sup>5</sup> The prepared PRF has a three dimensional fibrin network incorporated with platelets, leukocytes, different growth factors, and circulating stem cells. Use of PRF is increasing in the periodontal and implant surgical procedures because of it's enhanced capacity for bone regeneration and soft tissue wound healing.<sup>2</sup>

Thus by considering various advantages of PRF, the multiple gingival recession shown in the present case report, was treated using autologous PRF membrane combined with CAF.

## CASE REPORT

A 29 year old female patient reported to the department of periodontology in CSMSS Dental College, Aurangabad with the chief complaint of unaesthetic appearance and teeth sensitivity in maxillary anterior region. Patient noticed the presence of such unaesthetic appearance 1 year back.

During clinical examination, Miller's class-I gingival recession noticed with maxillary right central incisor, left central incisor and lateral incisor i.e. with 11, 21 and 22. Gingival recession of 2 mm, 3mm and 1.5mm were recorded with teeth 22, 11 and 21 respectively (Fig 1). The teeth presented shall

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low probing depth with slide bleeding on probing. Gingival biotype was thin, width of attached gingiva was adequate and labial frenum was terminated into the attached gingiva. To correct such recession defects, CAF + PRF procedure was decided to carry out. Aims behind the use of PRF in this surgical procedure were to correct the thin gingival biotype in recession area and to improve wound healing.

Whole surgical procedure was explained to the patient and written consent was obtained. Complete hemogram check-up was done before surgical procedure. Scaling and root planing was carried out. Coronoplasty was done as indicated. Oral hygiene instructions were given mainly in terms of proper brushing technique. Three weeks following this initial therapy, the periodontal re-evaluation was done for oral hygiene maintenance and to record gingival tissue response to the initial therapy. After re-evaluation surgical procedure was carried out.

### Surgical procedure

Before proceeding to surgical procedure, The PRF was prepared following the protocol developed by *Choukrounet al.*<sup>6</sup> 10 ml of intravenous blood (by a venipuncture of the antecubital vein) was collected into two test tubes (each containing 5 ml of blood) without anticoagulant and immediately centrifuged at 3000 revolutions/min for 10 minutes. At the end of centrifugation, three layers were seen, the top layer containing supernatant serum, the fibrin clot at the middle layer, and the bottom layer containing the red blood corpuscles (RBC). The fibrin clot was easily separated from the RBC base (preserving a small RBC layers) using sterile tweezers and scissors.<sup>2</sup> It was placed in a sterile dappen dish and was left aside. Before use, it was slightly squeezed with the gauze piece to remove its serum content.

After giving local anaesthesia (1: 200000 adrenaline), a full thickness trapezoidal flap was elevated on the buccal aspect of the teeth being treated. Initially, an intrasulcular incision extending horizontally from distal side of 11 to the distal side of 22 was given and two vertical incisions starting from its distal extremities i.e. from distal line angle of 11 and 22 were given extending beyond the mucogingival junction. All incisions were given using blade number 15. Full thickness flap was followed apically with a partial thickness dissection beyond mucogingival junction (Fig 2). Freely movable flap was advanced coronally with its margin located on enamel and the vertical sutures were given to create an envelope, which was interposed with the previously prepared two PRF membranes (Fig 3). Suturing was done using 4-0 non resorbable silk sutures. Gentle pressure was applied at the surgical site with moistened gauze to achieve hemostasis and followed by periodontal dressing. At the same time frenotomy was performed with maxillary labial frenum to avoid muscle pull on the flap tissue (Fig 4).

Patients were prescribed with antibiotics and analgesics (Cap. Amoxicillin 500mg, TDS and Tab. Paracetamol + Ibuprofen, TDS for 3 days). Post-operative instructions were given and patient was informed to report after 10 days for suture removal. Complete root coverage was noticed at that time.

Professional scaling and oral hygiene reinforcement were provided at each follow-up visit whenever indicated. Follow

up recorded 3 months post operatively shown 100% root coverage (Fig 5).

### DISCUSSION

Treatment of gingival recession is becoming an important issue in clinical periodontology due to the increasing demand for cosmetic treatment. Problems relate particularly to the fact that very often, the patient exposes only the most cor-



**Figure-1:** Gingival recession of 2 mm, 3 mm and 1.5 mm with 11, 21 and 22 respectively recorded at baseline (shown by black lines)



**Figure-2:** Flap reflected beyond mucogingival junction by giving intrasulcular and vertical incisions



**Figure-3:** PRF placed in the recession defects



**Figure-4:** Interrupted sling sutures given to CAF and frenotomy was performed



**Figure-5:** 3 months follow up showing 100% root coverage

onal millimeters of the recession when smiling. Thus, only surgical procedures that provide the clinician with a very high percent of complete root coverage should be included in the mucogingival plastic surgical techniques. The present case report aimed at treating Miller's Class-I gingival recessions, with an initial recession height of 2 mm, 3 mm and 1.5 mm with teeth 11, 21 and 22 respectively. Such type of recession defect could be treated with pedicle soft tissue grafts, free soft tissue grafts or combinations of the two. Among the pedicle grafts, the CAF is one of the valid surgical options to cover exposed root surfaces. It has many advantages over other surgical procedures used to treat gingival recessions: it does not require a separate surgical site to obtain a graft; the tissue of the pedicle provides a perfect color and contour match with the surrounding tissue; the procedure is simple to perform; and does not require an extended surgical or recovery time.<sup>7</sup>

Most of the studies support the hypothesis that therapy with CAF alone can be successfully applied when the residual gingiva is thick and wide.<sup>8</sup> Accordingly the adjunctive use of a graft could be restricted to sites with thin residual gingiva. Therefore in the presented case report, PRF was used along with CAF. PRF also promotes more rapid attachment to the tooth with stable result. In addition, PRF slows down the blood activation process, which could induce an increased

leukocyte degranulation and cytokine release from proinflammatory mediators, such as interleukin (IL)-1 $\beta$ , IL-6, and tumor necrosis factor- $\alpha$ , to anti-inflammatory cytokines, such as IL-4, different growth factors like transforming growth factor-1 $\beta$ , platelet derived growth factor- $\alpha$   $\beta$ , and vascular endothelial growth factor, and glycoproteins (thrombospondin-1) over more than 7 days. Leukocytes seem to have a strong influence on growth factor release, immunoregulation, anti-infectious activities and matrix remodelling during healing. As a healing material, it stimulates the gingival connective tissue on its entire surface with growth factors and impregnates the root surface with key matrix proteins for cell migration (fibronectin, vitronectin, and thrombospondin-1). Moreover, the fibrin matrix itself shows mechanical adhesive properties and biologic functions like fibrin glues: it maintains the flap in a high and stable position; enhances neoangiogenesis; reduces necrosis and shrinkage of the flap; and guarantees maximal root coverage.<sup>9</sup>

Thamaraiselvan M *et al* compared CAF with and without PRF in the treatment of isolated Miller's class-I and class-II gingival recession. The CAF group showed a non significant gingival thickness (GTH) increase of  $0.03 \pm 0.04$  mm which is similar to other studies. Interestingly, the addition of PRF to CAF resulted in a  $0.30 \pm 0.10$  mm GTH increase, which was statistically significant when compared both within and between the groups and concurs well with Arocaet *al* study. This gain in GTH should be considered clinically significant since abundant empirical evidence suggests that thick tissue, resists occlusal trauma and subsequent recession, enables tissue manipulation, promotes creeping attachment and exhibits less clinical inflammation.<sup>2</sup> Biju RM *et al* used PRF along with CAF to treat gingival recession of around 2-3 mm with 22 and 23. Superior results were obtained after the treatment with residual recession of only 1mm remained with 23 after 6 months.<sup>9</sup>

The result from the present case report are in accordance with the studies by Wiltfanget *al.* and Corsoet *al.* who have confirmed the successful use of PRF membranes in the management of both single and multiple gingival recession defects. In a similar study Erenand Atilla accepted that the PRF method is practical and simple to perform. Additionally, they found PRF to be superior to subepithelial connective tissue graft since it eliminates the requirement of a donor site.

Some of the studies found inferior result of PRF for root coverage. Arocaet *al* combined PRF to a modified coronally advanced flap and compared with modified coronally advanced flap alone (control group) for the treatment of multiple gingival recession. Similarly, Rajaram V *et al* evaluated the effect of PRF, when used along with double lateral sliding bridge flap for the coverage of multiple gingival recessions. No added benefits of PRF was seen in both studies.<sup>10</sup>

Baseline recession depth is important in determining the treatment outcome. Greater baseline gingival recession depth is always associated with decreased results in terms of root coverage.<sup>7</sup> Gingival recession depth is not only factor which determines the clinical outcome. Other factors like root prominence, tooth position, vestibular depth, high frenal pull, gingival thickness as well as tooth brushing technique of the patient have to be considered and should be corrected

before carrying out root coverage procedure. This enhances the treatment outcome and helps to maintain long term results. Therefore in the present case report, frenotomy was performed simultaneously to avoid frenal pull on the healing tissue after coronal advancement of flap.

Thus, in the presented case report, addition of PRF to CAF helped to obtain favorable clinical outcome in terms of root coverage. No histologic evaluation was performed to assess the type of healing. Therefore, the effect of PRF on the establishment of a connective tissue attachment remains to be determined. Further evaluation of PRF to CAF is necessary to find out the type of healing, histologically as well as long term follow up of the clinical case.

## CONCLUSION

PRF is used frequently in periodontics as it has several beneficial effects including periodontal regeneration and rapid healing. It gave promising clinical outcome when combined with CAF in the present case report. Though the mechanism involved in improving the treatment outcome is poorly understood, still PRF has a bright scope in different periodontal plastic surgical procedures.

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# Prevalence and Possible Risk Factors of Anaemia in Different Trimesters of Pregnancy

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## ABSTRACT

**Introduction:** Anaemia in pregnancy is a major health issue with adverse maternal and foetal outcome worldwide, specially in developing countries like India. Nutritional anaemia in pregnant women continues to be a cause of concern despite the fact that this problem is largely preventable and easily treatable. Objective of this cross-sectional descriptive study was to determine the presence of anaemia in pregnant women in different trimesters, and to assess the possible risk factors of anaemia.

**Material and Methods:** 300 pregnant women in different trimesters of pregnancy were enrolled coming for the 1<sup>st</sup> time in outpatient dept of Obstetrics and Gynaecology, in Punjab Institute of Medical Sciences, Jalandhar from July 2015 to December 2015. Information regarding age, age at marriage, age at 1<sup>st</sup> pregnancy, parity, Interval between previous and index pregnancy, no of abortions, educational status, dietary habits, Type of family, Socioeconomic status was collected in pre-designed structured schedule after taking written consent from pregnant women attending out-patient department. Haemoglobin estimation was done by Sahli's method and anaemia was graded according to WHO criterion. Statistical analysis was done by percentages and proportions.

**Results:** A high prevalence of anaemia, 65.6% was observed in pregnant women. The current study shows (60 %) cases of mild anaemia, (30.4 %) of moderate anaemia, and (9.6%) of severe anaemia. The study also observed higher prevalence of anaemia in last trimester of pregnancy (81.4%) as compared to 1<sup>st</sup> and 2<sup>nd</sup> trimester which is statistically significant. 90.8% anaemic women had parity >3 as compared to anaemic women with parity 2(56.2%) and parity 1(29.4%) and 87.5% women with spacing between previous and next pregnancy <1 year suffered more from anaemia as compared to women with parity <2 and >3 years space between pregnancies which is statistically significant. In the current study, it was also observed that socio-demographic factors significantly influencing anaemia are educational status, type of family, infrequent consumption of Iron-folic acid tablets.

**Conclusion:** Anaemia continues to be a serious health problem in India where the life of pregnant women and her child are endangered. It is directly proportional to parity, less spacing between pregnancies and related to lower educational status. It is highly recommended that more effective guidelines regarding educating girl child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron-folic acid tab, should start at grass-root levels to get safe motherhood.

**Keywords:** anaemia, pregnant women, prevalence

## INTRODUCTION

The prevalence of anaemia during pregnancy is widely recognized as a major health problem throughout the world, particularly in the developing countries. WHO estimates that

prevalence of anaemia is 14% in developed countries, 51% in developing countries, and 65-75% in India.<sup>1</sup> India contributes to about 80% maternal deaths in South Asia, as estimated by WHO.<sup>2</sup>

The National Family Health Survey (NFHS) 2(4) and 3(5), Indian council of Medical Research(ICMR) estimates reveal the prevalence of anaemia to be over 70% in preschool children, over 70% in pregnant women and adolescent girls.<sup>3</sup>

Anaemia in pregnancy is not only associated with adverse maternal outcomes like Puerperal Sepsis, Ante partum hemorrhage, post partum hemorrhage, maternal deaths<sup>4</sup> but also adverse fetal outcomes like increased incidents of premature births, low birth weight babies and high perinatal mortality.<sup>4,5</sup> Despite the fact that most of the anaemia seen in pregnancy is largely preventable and easily treatable, but still it continues to be a common cause of mortality and morbidity in India.

During pregnancy, foetal and placental growth and larger amount of circulating blood, leads to an increased demand for nutrients, especially iron and folic acid. In developing countries, majority of women start pregnancy with low reserves of iron and folic acid due to either younger age at marriage, early pregnancy, less spacing between previous and index pregnancy, more no of children, or due to less resources in joint families, low socio-economic strata, lack of education, lesser and infrequent intake of Iron-folic acid tab in pregnancy, While mild and moderate anaemia may not be direct cause of maternal mortality but contribute to morbidity by low resistance to common infections, poor wound healing, foetal morbidity but can also contribute to maternal mortality from post-partum haemorrhage. Anaemic mothers do not tolerate blood loss to the same degree as healthy non- anaemic woman. Anaemia in 3<sup>rd</sup> trimester can be very fatal as small amount of blood loss will be detrimental for the woman.

Anaemia is classified according to WHO criteria. According to W.H.O, Haemoglobin concentration of <11 gm/dl, is considered as an indication of anaemia.

### Types of Anemia (WHO Classification)<sup>6</sup>

- Mild Anemia: Hb between 10 -10.9 gm/dl
- Moderate Anemia: Hb between 7.0 -10.0 gm/dl
- Severe Anemia: Hb <7.0 gm/dl

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The present cross-sectional descriptive study was done with the aim to determine the prevalence of anaemia in different trimesters of pregnancy and to explore possible risk factors e.g. age at marriage, age at 1<sup>st</sup> pregnancy, interval between subsequent pregnancies, No. of abortions, Parity, socio-demographic features e.g. education, socioeconomic status, dietary habits, type of family and occupation.

**MATERIAL AND METHODS**

The present study was conducted, comprising of 300 pregnant women of ASA 1 and 2 coming into Ante natal clinic, in the department of Obs and Gynae, in Punjab Institute of Medical Sciences Jalandhar, who came in different trimesters of pregnancy, for 1<sup>st</sup> time. There was continuous enrolments of the patients into the study for twelve months, as many as consented were enrolled in the study. The blood sample was collected from pregnant women and haematological investigation was carried out to determine blood group genotype and pack cell volume. The subjects were examined monthly for PCV until delivery. High risk pregnancy like ladies with cardiac, renal or hepatic diseases, diabetes, hypertension were excluded. Written informed consent was obtained from each ante-natal women for their participation, after explaining the nature of study in their own language. A questionnaire was prepared on the basis of present age, age at first pregnancy, no. of abortions, present gestational age, diet, socioeconomic status, education and whether she is taking iron folic acid supplements or not. Socioeconomic status was calculated by modified B G Parsad Scale (2013).

Socio Economic Status: Class	BG Prasad’s Classification of 1961	Modified BG Prasad’s Classification for 2013
Class – I	Rs 100 and above	Rs 5156 and above
Class – II	Rs 50-99	Rs 2578-5155
Class – III	Rs 30-49	Rs 1547-2577
Class – IV	Rs 15-29	Rs 773-1546
Class – V	Below Rs 15	Below Rs 773

**Sample size**

After clinical examination, venous blood samples were col-

Age	Examined		Anaemic	
	N	%	N	%
<20 years	80	26.6%	52	65%
20-30 years	170	56.6%	100	58.8%
35-49 years	50	16.8%	45	90%
Total	300	100%	197	65.6

**Table-1:** Prevalence of Anaemia among Antenatal mothers according to Age

Age	Examined		Mild		Moderate		Severe	
	N	%	N	%	N	%	N	%
<20 years	80	26.6%	90	76.2%	28	46.6%	7	37%
20-30 years	170	56.6%	15	12.7%	8	13.3%	6	31.5%
35-40 years	50	16.8%	13	11.1%	24	40%	6	31.5%
Total	300	100%	118	60%	60	30.4%	19	9.6%

**Table-2:** Shows that (60%) mothers suffered from mild anaemia, 30.4% suffered from moderate anaemia and only 9.6% suffered from severe anaemia

lected in Ethylene DiamineTriacetic Acid (EDTA) tubes in haematology lab. Haemoglobin estimation was done by Sahli’s Haemoglobinometer method. Anemia was graded as Mild, Moderate and Severe as per WHO guidelines.

All those pregnant women with clinical infection, bleeding disorders, multiple pregnancies, haemoglobinopathies and chronic diseases were excluded from the study.

**STATISTICAL ANALYSIS**

The data was compiled, tabulated, analyzed with percentages and proportions. Data analysis will be done by SPSS version 21 (Statistical package for social sciences). P < 0.05 was considered statistically significant.

**RESULTS**

A total of 300 pregnant women were studied. Most of the pregnant women were between age group 0f 35-49 years (90%) followed by <20years (65%) and between 20-30 years (56.6%). Out of 300 participants who were examined 197 (65.6%) were anaemic (table-1).

The above table shows that mild (60%), moderate (30.4%) and severe anaemia (9.6%) was more prevalent between age group of 35-40 years (table-2).

Table-3 shows that maternal anaemia was significantly (p<0.001) associated with vegetarian dietary pattern as majority of the anaemic women (83.3%) were vegetarian.

The table-4 depicts that education significantly influences maternal anaemia. As the level of education increases, prevalence of maternal anaemia significantly decreases (p<0.001).

Figure-1 depicts that as parity is increasing, maternal anaemia significantly (p<0.001) increases.

Figure-2 shows that maternal anaemia is significantly (p<0.001) higher in last trimester. Sociodemographic distribution of the anemia patients is shown in table 5.

**DISCUSSION**

Anaemia is the most common nutritional deficiency disorder in the world. Inadequate intake or absorption of iron in conjunction with blood loss may contribute to anemia. Anaemia during pregnancy is a major problem especially in India due to many contributing factors like increased iron demand of body, increased appetite and other social factors like high parity, frequent pregnancies, education and type of family. The current study was conducted to estimate prevalence of anaemia and associated risk factors in different trimesters of pregnancy. The study will be discussed in accordance with objectives outlined earlier.

The study revealed that prevalence of anemia among pregnant women is 65.6 %. These findings are similar to the findings documented by National Family Health Survey – 3(NF-

Diet	Examined		Anaemic	
	N	%	N	%
Veg	180	60%	150	83.3%
Non veg	60	20%	30	50%
Mixed	60	20%	17	28.3%
Total	300	100%	197	65.6%

$\chi^2=16.1, \text{dof}=2, p < 0.001$

**Table-3:** Prevalence of Anaemia among Antenatal mothers as per dietary pattern

Education	Examined		Anaemic	
	N	%	N	%
Illiterate	80	26.6%	71	88.7%
Primary	60	20%	55	91.6%
Secondary	40	13.3%	31	77.5%
Higher Secondary	35	11.6%	24	68.5%
Graduate	50	16.6%	9	18%
Post graduate	35	11.6%	7	20%
Total	300	100%	197	65.6%

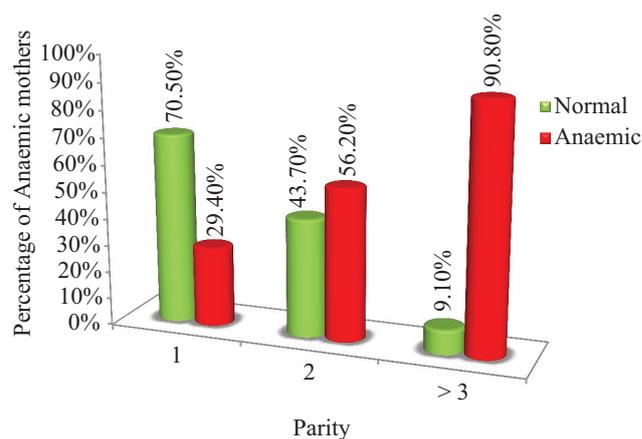
$\chi^2=31.1, \text{dof}=5, p < 0.001$

**Table-4:** Prevalence of Anaemia among Antenatal mothers as per Literacy status

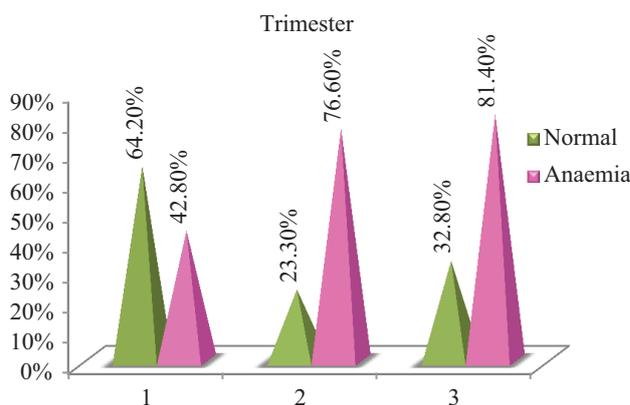
SES (BG Prasad)	Examined		Anaemic		P value
	N	%	N	%	
Class 1	35		20		
Class 2	30		19		
Class 3	40		28		
Class 4	150		115		
Class 5	45		34		
Type of family					<0.001
Nuclear	120		42	35%	
Joint	180		155	86.1%	0.004
IFA consumption					
Nil	60		54	90%	
Full	200		133	66.5%	
Partial	40		10	25%	
Spacing					0.000
< 1yr	128		112	87.5%	
1-2 years	60		50	83.3%	
2-3 years	34		19	55.8%	
3-4 years	30		9	30%	
>4 years	48		7	14.5%	

**Table-5:** Socio-Demographic Distribution of anaemia

HS-III).<sup>7</sup> Singh AB et al (2009) in a study on anemia among pregnant women in Dehradun also reported that prevalence of anemia among pregnant women was 65.5%.<sup>8</sup> In the current study women aged between 35-49 years were more anaemic compared to women <20 years and 20 to 30 years. However this difference was not statistically significant ( $p > 0.05$ ). Dietary pattern significantly influences anemia status. The current study revealed that 83.3% anaemic women were following vegetarian pattern of diet where as 50% and 28.3% anaemic pregnant women were following non vegetarian (diet based on daily or several times weekly consumption of meat/eggs/fish/chicken) and mixed pattern dietary pattern respectively. Women following non vegetarian(50%) or mixed pattern (28.3%) of diet were less anaemic as compared to wom-



**Figure-1:** Status of Anaemia as per parity



**Figure-2:** Percentage of Anaemia in Different trimesters

en who were exclusively on vegetarian diet (83.3%) and this difference was statistically significant ( $p < 0.001$ ). These findings are supported by studies conducted by Rammohan A et al (2011)<sup>9</sup> and Singh R et al(2015)<sup>10</sup> in which it was found that diet contributed to anemia and vegetarians were more anaemic as compared to non vegetarians showing a statistically significant difference ( $p < 0.05$ ).

The current study witnessed socio-demographic parameters significantly influenced anaemia status. Education, type of family, parity, spacing and different trimesters significantly determined maternal anaemia.

In the current study it was observed that pregnant women who were graduates (9%) and post graduates (7%) were significantly ( $p < 0.001$ ) less anaemic compared to those who were illiterate (88.7%) or had received primary (91.6%), secondary (77.5%) and higher secondary (68.5%). Lokare PO et al (2012) conducted a study among 352 antenatal mothers and found that anaemia increased steadily with decrease in the level of education.<sup>11</sup> This is further supported by study conducted by Dutta et al (1992) in which an inverse relation was found between literacy status and maternal anaemia.<sup>12</sup> Unequal distribution of food in joint family and eating last or after serving the husband contributes significantly to maternal anaemia. This trend was reflected in current study where more number of antenatal mothers (86.1%) who belonged to joint family suffered more from anaemia as compared to those living in nuclear families showing a statistically significant difference ( $p < 0.001$ ). Similar trend was documented by Bisoi S et al (2011) in a study among pregnant women in

West Bengal.<sup>13</sup>

Demand of micronutrients is increased in last trimester which aggravates anaemic status. The current study observed a higher prevalence of anaemia in 3<sup>rd</sup> trimester (81.4%) as compared to 1<sup>st</sup> and 2<sup>nd</sup> trimester and this difference was statistically significant. This was because maximum number of pregnant women booked themselves for antenatal check up in last trimester. This finding corroborate with study conducted among antenatal mothers in Uttar Pradesh by Singh R et al (2015).<sup>10</sup>

Other socio-demographic factors impacting maternal anaemia are parity, spacing between two pregnancies and consumption of iron folic acid tablets. 90.8% anaemic women had parity >3 and 87.5 % women with spacing between current pregnancy and outcome of last delivery <1 year suffered more from maternal anaemia as compared to women with birth interval more than 3 years and parity <2 and this difference was statistically significant (p<0.001) These findings are in consonance with study conducted by Bios S et al (2011) in a study among pregnant women in West Bengal in which anaemia was significantly (p<0.05) higher among participants having a gap of less than two years between two pregnancies. Singh R et al (2015) in a study among 352 antenatal mothers observed significant association between anaemia and parity.

Anaemia in pregnancy needs mandatory Iron Folic Acid supplementation from 4<sup>th</sup> month onwards. In the current study it was observed that participants having nil(90%) or partial (25%) IFA supplementation were significantly (p<0.05) more anaemic as compared to those with full (66.5%) IFA supplementation. These findings are in accordance with observations of Viveki R.G et al (2012) in a study among antenatal mothers in Karnataka which revealed anaemia prevalence to be significantly (p<0.05) higher among those having partial consumption of IFA tablets.<sup>14</sup>

## CONCLUSION

Anaemia continues to be a serious health problem in India where the life of pregnant women and her child are endangered. It is directly proportional to parity, less spacing between pregnancies and related to lower educational status. It is highly recommended that more effective guidelines regarding educating girl child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron-folic acid tab, should start at grass-root levels to get safe motherhood.

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# Management of Sub-Gingival Fractured Teeth by Multi-Disciplinary Approach: Endodontics – Forced Orthodontic Extrusion and Prosthetic Rehabilitation: A Case Report

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## ABSTRACT

**Introduction:** At times, traditional periodontal surgery (crown lengthening) cannot be performed on the tooth as it may compromise the functional root length and esthetics. Controlled orthodontic extrusion can be considered as the most desirable method for lengthening of the clinical crown which can provide desirable results with good prognosis and low risk of relapse.

**Case Report:** This case report describes in detail the chosen treatment for management of subgingival fracture and the final result was successful and showed good esthetics and secured periodontal health.

**Conclusion:** From the case represented here a multidisciplinary approach is necessary for the restoration of tooth fractured at subgingival level and forced orthodontic extrusion as an alternative to periodontal surgery resulted in good esthetics and function post-operatively.

**Keywords:** Sub-gingival fracture, Orthodontic Extrusion, Implant, Cast-Gold Post, Zirconium crown.

## INTRODUCTION

Traumatic injuries to the teeth most probably in esthetic region constitute a great challenge to a dentist to be able to restore the tooth to proper health and function.<sup>1</sup> The majority of dental injuries involve the anterior teeth, especially the maxillary central incisors. Such dental trauma often lead to tooth fracture, at times when the fracture is below the level of gingiva, the prognosis of such fractured tooth is considered questionable or hopeless.

Nowadays, with the recent trend the common treatment modality remains dental implants with extraction of the tooth. Also, it has been said that replacing the maxillary central incisor remains the most challenging procedure in implant dentistry. As it depends on several factors for its success which include the amount of available bone, the type of soft tissue, correct positioning of the implant, the provisional restoration, the design and material of the implant abutment, and the final restoration.<sup>2</sup> Thus, orthodontic extrusion can be considered as a feasible treatment approach which can result in significant gains in both alveolar bone and soft tissue. Thus, every attempt should be made to preserve and restore the natural tooth structure. Such treatment modalities involve a multi-disciplinary approach including endodontics, periodontal crown lengthening and orthodontic extrusion followed by prosthetic rehabilitation. This case report discusses multi-disciplinary treatment approach of traumatized incisors with sub-gingival fracture.

## CASE REPORT

A 48 year old male patient was reported to the Department

of Conservative dentistry and Endodontics, with a chief complaint of fractured anterior teeth. Clinical examination showed horizontal coronal fracture with #11, #21 and #22. It was seen that teeth presented an extensive sub-gingival fracture making the prosthetic rehabilitation difficult. Around 0.5mm of the buccal tooth structure was visible without any mobility [Fig.1A]. Radiographic examination revealed fully formed apices without any periapical lesion or any sign of additional root fracture [Fig. 1B]. Patient had been advised forextraction or a multi-disciplinary treatment, and thankfully patient opted for multi-disciplinary approach.

With patients consent, periodontal crown lengthening was carried out on the same appointment to expose sufficient amount of crown structure [Fig 1C]. After periodontal crown lengthening insufficient amount of coronal structure was seen to support the restoration [Fig. 2A]. The root canal therapy was carried out immediately after 1 week with #11,#21,#22 and the root canal treatment was completed subsequently. After the tooth was asymptomatic for a week, post-space preparation was made with #11, #21, #22 upto peeso-reamer #3 and orthodontic root extrusion was carried out [Fig.2B].

Orthodontic extrusion was carried out by using modified removable appliance having posterior bite plane and labial bow with 3 'J' hooks [Fig.3A]. A 19 guage 'J' hook was prepared and partially inserted in the canals and bonded with light cure composite in the prepared post-space with #11, #21 and # 22 [Fig.3B]. The appliance was worn daily and the patient was called for activation of the appliance after every 15 days. The activation was made between 'J' hook labial bow and 'J' hook individual tooth by using elastic modules. The extrusive force was optimum for individual tooth and it was light and intermittent force. The elastic module was changed after every 15 days. After 5 months of follow up, 3-4 mm of extrusion was seen in every tooth [Fig. 3C]. The orthodontic extrusion was completed and removable appli-

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**Figure-1:** (A) Extensive sub-gingival fracture with #11, #21 and #22; (B) Radiographic Examination with #11, #21 and #22. (C) Periodontal crown lengthening was carried out to expose crown structure



**Figure-2:** (A) Insufficient amount of coronal structure seen to support restoration; (B) Root canal treatment was completed and post-space preparation was done with #11, #21 and #22

ance was removed and post-treatment records were taken. On the same appointment, fixed retainer was bonded with #12, #11, #21, #22 and #23 for another two months and patient was referred back to the department of endodontics for further treatment.

As there was insufficient dentin to support a restoration, a post-core was prepared to provide retention and support. The cast gold post and core was made with #11, #21 and #22 [Fig4.A, B]. Temporary crown cementation was done with #11, #21 and #22. Periodontal probing was done 1 month after orthodontic root extrusion and observed the maintenance of the periodontal health of the tissues and their adjacent sites with regard to plaque accumulation, bleeding on probing and probing depth. After 1 month, a full coverage Zirconium crown was given with #11, #21 and #22 [Fig:4C]. Patient was reviewed after 1 month, and the treatment outcome was stable and symptomless.

**DISCUSSION**

In general practice, dentist often encounter teeth that have lost part or all of their clinical crown due to extensive caries or crown fracture that make restoration difficult. One of such etiologic factor is sub-gingival fractures due to traumatic injuries. The major problem with subgingival fracture is absence of adequate coronal ferrule and a compromised biological width.<sup>1</sup>



**Figure-3:** (A) Modified Removable appliance having posterior bite plane and labial bow with 3 'J' hooks; (B) 19 gauge 'J' hook was prepared and partially inserted in canals and bonded with light cure composite in the prepared post-space with #11, #21 and #22; (C) After 5 months of follow up, 3-4 mm of extrusion was seen in every tooth.



**Figure-4:** (A) Cast Gold Post cementation done with #11, #21 and #22; (B) Radiographic image of post cementation with #11, #21 and #22; (C) After 1 month, temporary crown was removed and Zirconium crown was cemented with Resin cement

Ingber suggested that a minimum distance of 3mm is required from the restorative margin to the alveolar crest to permit adequate healing and restoration of the tooth.<sup>6</sup> Since, maintaining the biologic width is of paramount importance for preservation of periodontal health as placing restorative margins within the biologic width often leads to gingival inflammation, clinical attachment loss and bone loss. Hence, it is very important to preserve health of periodontium during restoration in subgingival areas.<sup>6</sup> Usually periodontal surgery (crown lengthening) cannot be performed on the tooth in question because of potential compromise to adjacent teeth and long term prognosis to justify treatment. In such cases, orthodontic extrusion can be one of the minimally invasive treatment options.

Heithersay and Ingber were the 1<sup>st</sup> to suggest the use of forced eruption to treat non-restorable or previously hopeless teeth. Orthodontic extrusion has also been referred as "slow eruption of teeth" which stipulate that by utilizing light eruptive forces, the entire attachment apparatus can be shifted coronally in unison with the tooth.<sup>7</sup> The main advantage of orthodontic extrusion is that the root can be kept within the alveolus, thus the bone height is maintained without compromising the periodontal support, also it re-establishes bi-

ologic width without affecting the esthetics. Besides several advantages, rapid orthodontic extrusion is accompanied with several problems as higher forces exerted frequently precede to pulpal necrosis, root resorption, ankylosis, mobility and failure of treatment. Various extrusion techniques are available, depending on the clinical conditions encountered. Fixed and removable orthodontic appliances are usually used for extrusion. As in the present case, dental tissue was inadequate for bonding bracket; traction was applied from attachment inserted in to the prepared canal of the tooth after endodontic therapy. The removable appliance was used in this case which was made up of Hawley's retainer with posterior bite plane, Modified labial bow with soldered 'J'hook where extrusion is required and Adam's clasp for molars for better retention. The force was generated by 2 main passive components 'J'hook placed in the canal and labial bow while elastic modules acted as an active component. While the force generated by the appliance was light, intermittent force and it was slightly tipping at the labial aspect. The removable appliance was used in the present case as it is easy to fabricate, it has patient compliance, bite opening can be done easily and simultaneously extrusion can also be carried out. Also, prior to final restoration, it is essential to retain the root in its new position to prevent relapse.<sup>9</sup> Studies have suggested circumferential supracrestal fibrotomy after orthodontic extrusion.<sup>10,11</sup> In the present case, different technique was used for slow orthodontic extrusion and follow up of patient showed good periodontal health and stable result.

After orthodontic extrusion, there was insufficient dentin to support the restoration so post and core was prepared to provide retention and support. The cast gold post and core was done in the present case because of its superior adaptation to the root canal, long-term prognosis and high strength in comparison to the prefabricated post.

Although orthodontic extrusion requires a prolonged treatment time, this treatment is preferred over crown lengthening as orthodontic extrusive forces allow the biological way of erupting the tooth, with no removal of alveolar bone and better final esthetics.<sup>11</sup> While crown lengthening removes alveolar bone and may become the reason for pocket formation and also compromises the esthetics.<sup>12</sup>

## CONCLUSION

This clinical case report outlines the method of implementation of forced orthodontic eruption as an alternative to periodontal surgery and a multidisciplinary approach is mandatory for the restoration of tooth fractured at subgingival level. In the present case, placement of the final restoration after orthodontic extrusion resulted in good esthetics and function post-operatively.

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# Idiopathic Gingival Fibromatosis

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## ABSTRACT

**Introduction:** Gingival hyperplasia is a heterogenous division of disorder characterized by increasing enlargement of the gingiva caused by an raise in submucosal connective tissue elements. Idiopathic gingival fibromatosis is a circumstance of undecided origin which can expand as an lonely disorder but frequently it is associated with a number of syndrome. It usually begins at the time of eruption of everlasting teeth but can build up with the upsurge of deciduous dentition and hardly ever present at birth.

**Case report:** This case report describes an extraordinary case of non-syndromic idiopathic gingival fibromatosis in a 25-years old female. Surgical treatment in the form of gingivectomy was performed.

**Conclusion:** Oral hygiene and the prevention of plaque accumulation have a crucial effect on the prognosis of the disease. Long term follow-up is required for predictability. Further research and genetics studies in this area is required for the group of patients with a permanent cure.

**Keywords:** Gingival enlargement, gingival fibromatosis, gingival hyperplasia, gingivectomy

## INTRODUCTION

Idiopathic gingival hyperplasia is a scarce compassionate situation without any origin.<sup>1</sup> The etiology and pathogenesis of gingival hyperplasia are still not well recognized but be directly linked to these factors that are individual susceptibility which depends on host response of the individual, local factors and the action of various chemical substances and their metabolites in day to day life.<sup>2</sup> The stipulation is painless until the gingival tissue enlarges to covers the occlusal surface of the teeth. Due to this condition the subject develops an irregular swallowing prototype and experiences intricacy with verbal communication and mastication. It also causes interference with maintenance of oral hygiene and mastication. The hyperplastic tissue occurs due to accumulation of materia alba and plaque which may further complicates the periodontium.<sup>3,4</sup> We reported a case of gingival hyperplasia of idiopathic origin without any syndrome and its management.

## CASE REPORT

A twenty five years muslim female patient came with bleeding gums in lower front region of the jaw since 7 days (fig 1). She was apparently alright 2-3 years back then she noticed bleeding during brushing for which she had consulted the dentist and scaling was done. But from 7 days she experienced bleeding in same region with difficulty in mastication. On extraoral examination all finding were normal which includes facial symmetry, lips competency, TMJ movements, lymph nodes. On Intraoral examination overgrowth of gingival was extending from distal surface of 33 till mesial surface of 43. It was pale, soft involving only marginal,

interdental and attached gingiva of 31, 32, 41, 42 (Fig 2). The overgrowth is extending till the middle one third of 31, 41, 32, 42. There was crowding with 31, 32, 41, 42. Pseudo-pockets was noted with bleeding on probing was also present. There was melanin pigmentation in 43, 44 region. Rotated 11, 12 and Anterior open bite was present (fig 3).

## Histopathology Report

The excisional biopsy was taken from lower front region of jaw (Fig 4). It showing keratinised stratified epithelium with proliferation of fibro collagenous tissue. Lymphocytes and polymorphs were present in the subepithelium.

**Histopathological diagnosis:** Benign squamous hyperplasia of gingiva.

**Final Diagnosis:** Idiopathic gingival hyperplasia of lower front region of jaw.

## Treatment

1. Surgical excision or gingivectomy
2. Orthodontic therapy

## DISCUSSION

Idiopathic gingival enlargement is a benign unusual condition.<sup>5</sup> It is usually caused by local conditions like improper brushing, food lodgment and mouth breathing habit. Systemic circumstances such as hormonal imbalance, medication and tumor infiltrates may possibly cause difficulties in maintaining oral hygiene. When edema occurs with vascular engorgement, and inflammatory cell infiltration then it is considered as inflammatory gingival hyperplasia. If the inflamed gingivae consist of intense fibrous tissue due to chronic inflammation or any other cause the condition is referred as fibrotic gingival hyperplasia or chronic hyperplastic gingivitis.<sup>6,7</sup>

The concerned tissues will be glossy in appearance, smooth, soft and edematous which will show bleeding on probing that is consider as the primary sign of gingivitis. A foul aroma may

occur due to disintegration of food stuff and from the accretion of microorganism in the difficult or proximal areas where cleaning is not possible. If the oral hygiene is not maintained then it may lead to bone

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**Figure-1:** Profile picture; **Figure-2:** Intra oral Overgrowth



**Figure-3:** Intraoral overgrowth with occlusion; **Figure-4:** After gingivectomy

loss and teeth mobility These changes will convert from gingivitis to periodontal disease.<sup>4,7</sup> In this case the plaque and calculus accumulates on tooth surface due to crowding which causes chronic irritation of gingival tissues resulting in its proliferation. Histologically showing keratinised stratified epithelium with proliferation of fibro collagenous tissue. Lymphocytes and polymorphs were present in the subepithelium.

It may keep going as an remote deformity or any syndrome.<sup>6,7</sup> It is frequently episodic but can be autosomal dominant. All the patients must be examined with awareness and blood picture should be checked to rule out any blood disease.<sup>3</sup> The syndrome associated with gingival fibromatosis are Rutherford, Cross, Ramon and Laband syndrome. Rutherford syndrome includes gingival fibromatosis, hypertrichosis, mental retardation, epilepsy and corneal dystrophy.<sup>8</sup> Cross syndrome consists of gingival fibromatosis with microphthalmia. There is mental retardation and pigmentary defects are noted.<sup>9</sup> Ramon syndrome contains the following features like gingival fibromatosis, hypertrichosis. It also shows mental retardation, delayed development, cerebral defect like epilepsy and cherubism.<sup>10</sup>

Laband syndrome shows the features of gingival fibromatosis and syndactily. It also shows extraorally finding like nose and ear abnormalities, hypoplasia of the nails and terminal phalanges. After exclusive of all these supplementary reason these condition it called as idiopathic gingival hyperplasia. Treatment is surgical excision or gingivectomy.<sup>11</sup>

## CONCLUSION

The etiopathogenesis of Idiopathic gingival enlargement is up till now to be unwavering. Even though there is not comprehensible accepted data about the treatment. In these cases only indicative treatment continues to be the solitary preference. The method of gingival enlargement and the causative factors which elicit the reappearance are up till now found. Even supposing reappearance cannot be predicted. As doc-

tors we should always realise that panic of nameless is the most horrible and we should hub our study towards these areas.

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# Assessment of Knowledge, Attitude and Practice of Hand Hygiene among Nursing and Medical Students in a Tertiary Care Hospital in Puducherry, India

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## ABSTRACT

**Introduction:** Health Care Associated Infections (HCAI) are a major problem for patient safety and its prevention must be a first priority for institutions. Hand hygiene is the most effective means to reduce the hospital acquired infection. This study was undertaken to assess the knowledge, attitude and practice of hand hygiene among medical and nursing students in our institution.

**Material and Methods:** A self-administered questionnaire based cross sectional study was done among the nursing staff and medical students at our institution. Based on their responses, a scoring system was devised and their knowledge, attitude and practice were graded as good (>75%), moderate (50-74%) and poor (<50%).

**Results:** Of the 140 participants were involved in the study, we found that majority (medical-85%, nursing-76%) had moderate knowledge on hand hygiene. But the overall attitude of the respondents towards hand hygiene was not satisfactory (good attitude - medical- 9%, nursing-14%) and only few (medical-3%, nursing-5%) showed good hand hygiene practices.

**Conclusion:** This study reveals the wide gaps in the knowledge, attitude and practice of hand hygiene among the nursing staff and medical students and hence the need for conducting regular training.

**Keywords:** Hand hygiene, Knowledge, Attitude, Practice

## INTRODUCTION

Health care associated infections (HAI) are the major cause of mortality and morbidity among the hospitalised patients contributing 7-10% of the hospital admissions.<sup>1</sup> Health care workers contribute to the transmission of these infections through contaminated hands. The concept of hand hygiene and antiseptics was introduced by Ignel Semmelweis who demonstrated that cleansing heavily contaminated hands with an antiseptic agent between patient contacts may reduce health-care-associated transmission of contagious diseases more effectively than handwashing with plain soap and water.<sup>2</sup>

Various studies have shown that effective hand hygiene can lower the prevalence of hospital acquired infections. But the compliance to it among health care providers, despite the relative simplicity of this procedure, is as low as 40%.<sup>3-5</sup> Various factors contribute to this lack of compliance like lack of knowledge among the personnel regarding the importance of hand hygiene in preventing disease transmission, incorrect technique or understaffing. In order to overcome these factors, Centers for Disease Control and Prevention's (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) published comprehensive Guideline for Hand Hygiene in Health-Care Settings in 2002. This study was

undertaken with the objective of assessing the knowledge, attitude and practice of hand hygiene among health care workers in our hospital and to determine the various factors involved in poor hand hygiene practices.

## MATERIAL AND METHODS

The present study was conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, South India. This is a 150 bedded teaching hospital and multispeciality centre. The present questionnaire based cross sectional study was undertaken during January 2014 after getting ethical clearance from the Institutional Ethical Review Committee. About 140 participants, which included 74 nurses and 66 medical students were enrolled in the study. The participants were briefed about the study and their verbal consent obtained.

A self administered questionnaire based on CDC Hand hygiene guidelines was used. It consisted of 5 parts; demographic information, assessment of knowledge, attitudes and practices. Knowledge was assessed using 8 questions which included multiple choice and "yes" or "no" questions. Attitudes were measured using 10 statements, where the respondents were asked if they agree or disagree to it. Practice was assessed in a similar way using 8 questions. A scoring system was used where 1 point was given for each correct response to knowledge, positive attitudes and good practices. 0 was given for incorrect knowledge, negative attitudes and poor practices. A score of more than 75% was considered good, 50-74% moderate and less than 50% poor.

## STATISTICAL ANALYSIS

The results obtained were statistically analysed using Chi square test with the help SPSS 16 software, to assess the various parameters of hand hygiene.

## RESULTS

A total of 140 (74 nurses and 66 medical students) participants were enrolled in the study. The nursing group included

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a mixed population of trainees and trained nurses posted at various departments and the medical group mainly included interns. Nearly 54 participants had received a formal training in hand washing technique, 40(of 74, 54.1% ) nurses and 14(of 66, 21.2%) medical students (Table 1).

### Knowledge on hand hygiene

The overall knowledge on hand hygiene among the participants was moderate (medical 64%,nursing 63.1%). On analysing the results based on the scoring system, only few participants (13.6%) scored good, while most (80%) scored moderate, few (6.4%) scored poor. Comparing the two groups, nurses had better knowledge on hand hygiene than medical students ( P value 0.001, significant). The respons-

es of the participants to the individual questions in given in table 2

### Attitude to hand hygiene

The response of the participants to attitude based questions revealed that their attitude towards hand hygiene was not satisfactory. But nurses showed positive attitude towards hand hygiene when compared to the medical students (table 3). The response of the participants to attitude based questions is given in table 3.

### Practice of hand hygiene

On analysis of the hand hygiene practice among the participants, most of them exhibited poor hand hygiene practice (medical -73%, nursing - 57%) and only few showed good hand hygiene practice (medical -3%, nursing -5%). On comparing, nurses showed better hand hygiene practice than medical students

## DISCUSSION

Hand hygiene is the most important tool in preventing the transmission of nosocomial infections as the hands of HCWs are the most common mode of transmission of pathogens to patients. Factors that contribute to poor adherence to hand hygiene include poor access to hand-washing facilities (sinks), the time required to perform standard hand wash-

Study population (n= 140)	Number	Percentage
Occupation		
Nurses	74	52.9%
Doctors	66	47.1%
Gender		
Male	34	24.3%
Female	106	75.7%
Formal training on hand hygiene		
Nurses	40	54.1%
Doctors	14	21.2%

**Table-1:** Distribution of the study population

S. No	Knowledge based questions	Medical		Nursing		P value
		No.	%	No.	%	
	Route of cross transmission of pathogens among patients in hospital	66	100	74	100	-
	Source of organisms for nosocomial infections	62	93.9	70	94.6	0.9
	Hand hygiene actions which prevent transmission of organisms to patients					
	Before touching a patient	57	86.4	20	33.8	0.00
	Immediately after body fluid exposure	47	71.2	65	83.8	0.14
	After exposure to immediate surroundings of the patient	20	30.3	16	21.6	0.21
4.	Hand hygiene actions which prevent transmission of organisms to health care workers					
	After touching a patient	60	90.9	70	94.6	0.4
	Immediately after body fluid exposure	57	86.4	65	87.8	0.0
	Before a clean / aseptic procedure	27	40.9	43	58.1	0.04
	After exposure to immediate surroundings of the patient	47	71.2	59	79.7	0.24
5.	True statement on alcohol based hand rub and hand washing with soap and water					
	a. Hand rubbing is more rapid for hand cleansing than handwashing	53	80.3	39	41.9	0.001*
	b. Hand rubbing causes skin dryness more than hand washing	15	22.7	28	37.8	0.053
	c. Hand rubbing is more effective against germs than hand washing	49	74.2	40	54.1	0.013
	d. Hand washing and hand rubbing are to be performed in sequence	15	22.7	24	32.4	0.201
6.	Minimal time needed for alcohol based handrubs	10	15.2	17	23	0.242
7.	Type of hand hygiene method in various situations					
	a. before palpation of abdomen	54	81.8	58	78.4	0.612
	b. before giving injections	50	75.8	61	82.4	0.331
	c. after emptying bed pan	17	25.8	58	78.4	0.000
	d. after removing examination gloves	42	63.6	55	74.3	0.171
	e. after making patients bed	25	37.9	34	45.9	0.335
	f. after visibe exposure to blood	53	80.3	50	67.6	0.088
8.	Actions to be avoided during hand hygiene					
	a. wearing jewellery	42	83.6	60	81.1	0.021
	b. artificial finger nails	58	63.6	52	70.3	0.011
	c. regular use of hand creams	57	87.9	36	48.6	0.000*
	d. presence of damaged skin	17	87.4	57	77	0.000*
	Average		64%		63.1%	

\*significant P value <0.001

**Table-2:** Assessment of Knowledge among Medical and Nursing students

ing, irritant contact dermatitis associated with frequent exposure to soap and water, high workloads, knowledge deficits among HCWs, and the failure of administrative leaders to make hand hygiene an institutional priority.<sup>6</sup>

In our study analysis of the responses showed that health care workers had moderate knowledge on hand hygiene, similar to findings in other studies.<sup>7</sup> Though this was a positive finding, major gaps in the knowledge were identified which should be addressed during the future training sessions. For instance the participants were not aware that hand hygiene is to be practiced before patient contact and after contact with patient surroundings. Nursing group exhibited more of such gaps in knowledge than the medical students. Another finding in our study was that most of the participants didn't know the minimal time required for alcohol based hand rubs to kill the germs (medical-89.7%, nursing- 77%, table 2.2). But overall analysis showed that medical students had better knowledge on hand hygiene than nursing students.

The attitude of the participants towards hand hygiene was overall poor. Nearly 85% of the medical students agreed that they don't adhere to correct hand hygiene practice all the time, in spite of the knowledge of this group on hand hygiene being good. The participants also agreed to various reasons for not adhering to hand hygiene like forgetfulness, emergency cases. Such poor attitude was seen more among the medical students than nurses. This is similar to the finding in a study done by Sasidharan et al where nursing stu-

dents showed better attitudes (52.1%) than medical students (12.9%).<sup>8</sup> Both the groups agreed that they missed out hand hygiene sometimes because they had more important works to attend to, which showed that hand hygiene was not in their priority. Nearly 36.4% of medical students and 63.5% of the nurses had the misconception that wearing gloves obviates the need for practicing hand hygiene. Most (79%) of the nurses and few medical students (43.9%) in our study felt that following hand hygiene was difficult in the current set up. This could be due to the lack of facilities in our institution and could be overcome by setting up bedside handrubs, maintaining the patient to sink ratio etc.

In our study only few medical students (51.5%) felt that they had sufficient knowledge on hand hygiene compared to nurses (93%) similar to other studies.<sup>7,8</sup> This could be due to the fact that unlike medical students, the nursing students are taught on hand hygiene during the early part of their curriculum. This explains the need to conduct training sessions to medical students and emphasize the importance of hand hygiene atleast during their internship. The participants also felt that presence of infection control notice boards in the workplace will have a positive influence on adherence to hand hygiene. Nearly 18.1% of the medical students and 54% of the nurses were not satisfied with facilities for hand hygiene. Such practical problems like inadequate supply of hand rub solutions, difficult access to wash basins, are to be considered as this could be one of the reasons for poor

S. No	Statement	Medical Students n=66	Nursing students n=74	P value
1	I adhere to correct hand hygiene practices at all times	10(15%)	64(86.4%)	0.000*
2	Sometimes I have more things to do than hand hygiene	59(89.4%)	69(93.2%)	0.417
3	Sometimes I miss out hand hygiene simply because I forget it	45(68.1%)	38(52%)	0.043
4	Emergencies and other priorities make hygiene more difficult at times	64(97%)	59(95%)	0.002
5	Wearing gloves reduce the need for hand hygiene	24(36.4%)	47(63.5%)	0.001*
6	I feel frustrated when others omit hand hygiene	19(28.8%)	43(58.1%)	0.000*
7	I am reluctant to ask others to engage in hand hygiene	14(21.2%)	24(32.4%)	0.136
8	Newly qualified staff has not been properly instructed in hand hygiene in their training	26(39.4%)	54(73%)	0.000*
9	I feel guilty I omit hand hygiene	21(31.8%)	55(74.3%)	0.000*
10	Adhering to hand hygiene practices is easy in the current setup	29(43.9%)	58(79%)	0.000*
	Average	47.1%	70.7%	

\* significant, p value <0.001

**Table-3:** Comparison of responses to Attitude based questions among medical and nursing students

S.No	Statement	Medical students n=66	Nursing students n=74	P value
1	I have sufficient knowledge about hand hygiene	34(51.5%)	68(93%)	0.000*
2	Hand hygiene is no negotiable part of my role	39(59.1%)	32(44%)	0.061
3	There are adverts or newsletters about hand hygiene in my workplace	42(63.6%)	59(79.7%)	0.034
4	The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	61(92%)	56(77%)	0.008
5	Facilities are adequate for hand hygiene in my area of work	12(18.2%)	40(54.1%)	0.000*
6	Infection prevention team will have a positive influence on my hand hygiene	61(92%)	65(89%)	0.367
7	Infection prevention notice boards will remind me to do hand hygiene	61(92%)	31(42%)	0.000*
8	It is difficult for me to attend hand hygiene courses due to time pressure	62(94%)	60(82%)	0.023
	Average	56.5%	70.1%	

\*significant P value <0.001

**Table-4:** Comparison of hand hygiene practices among medical and nursing students

compliance of health care workers to hand hygiene practices. Hence the institutional support is necessary for overcoming these practical difficulties to combat the substandard hand hygiene practices. A majority of the participants (table 3) felt that presence of infection control team would have a positive influence on their hand hygiene practice. Infection control team in a hospital focuses on many areas while controlling nosocomial infection one such key arena being hand hygiene practice in the hospital setup.

In our study we identified various gaps in the knowledge of the health care workers. Though the overall knowledge of the participants was satisfactory, there was a wide gap between the it and practice of hand hygiene. Hence it is essential to conduct training sessions for medical students and nurses addressing these gaps in knowledge and on the correct hand hygiene procedures. On the other hand, it is also important to improve the current training programmes targeting hand hygiene practices in medical and nursing students. Previous studies have shown that self reported compliance of hand hygiene is higher than the actual compliance during the working shift. However, having regular hand hygiene campaigns, displaying posters and encouraging peers to remind colleagues of hand hygiene has been shown to improve the compliance of HCWs significantly.<sup>9</sup> Our findings are in agreement with previous observational studies which found that nurses had better hand hygiene practices than doctors.<sup>10,11</sup>

## CONCLUSION

Our study shows wide gaps in the knowledge and practice of hand hygiene among the medical students and nurses. Hence it is important to conduct regular training programs on hand hygiene for medical students and nurses with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practice.

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# Cervical Lymphadenopathy in Children-A Clinical Approach

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## ABSTRACT

Lymphadenopathy is a disorder of lymph nodes which are abnormal in consistency and size. Cervical lymphadenopathy is a common problem encountered in pediatric clinic and is mostly due to infectious etiology. Since the diagnosis varies from a simple infection to malignancy, this can be a matter of anxiety for both the family as well as the treating doctor. A systemic clinical approach is required to avoid unnecessary investigations. The current article addresses a stepwise approach to diagnosis and management of cervical lymphadenopathy.

**Keyword:** Cervical Lymphadenopathy, pediatric clinic

## INTRODUCTION

Lymph nodes are organs found in the neck, chest, underarm, abdomen, and groin. They play the role of filters for the lymph fluid as it circulates throughout the body. The lymph nodes contain T and B cells along with antigen presenting macrophages which are also called dendritic cells. They form part of the immune system and function to fight disease and infections. Lymphadenopathy is a disease process which involves lymph nodes that are abnormal in consistency and size. Lymphadenitis refers specifically to lymphadenopathies which are caused due to inflammatory processes.<sup>1</sup> Cervical lymphadenopathy is a common problem encountered in pediatric patients and is mostly attributable to infectious etiologies.

In India, a large number of patients with enlarged cervical, axillary or inguinal lymph nodes are seen in the outpatient clinic.<sup>2</sup> Cervical lymphadenopathy is a very common but challenging medical condition for the family as well as the treating physician.<sup>3</sup> Around 90% of children aged 4-8 years old have cervical lymphadenopathy.<sup>4</sup>

### Epidemiology

The exact incidence of lymphadenopathy is unknown, but the number varies from 38-45%.<sup>5</sup> These are usually found by parents and caregivers. Tuberculosis still remains one of the challenging and leading health problems in developing countries, with vast social and massive economic implications.<sup>6</sup> Additionally, high incidence of HIV has led to the resurgence of cervical lymphadenopathy in developed countries.

In India about 1.5% of the population is affected with tuberculosis.<sup>7</sup>

Tuberculous lymphadenitis is a common form of extrapulmonary tuberculosis, approximately 30-40% in reported series.<sup>8</sup>

### Definition<sup>3</sup>

Pathologic Lymph Node	> 2 cm in pediatric patients is considered abnormal <sup>9</sup>
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Acute Lymphadenopathy	< 2 weeks' in duration
Sub -acute Lymphadenopathy	2-6 weeks' in duration
Chronic Lymphadenopathy	> 6 weeks' in duration

### Pathophysiology of Cervical Lymphadenopathy

The pathophysiology differs according to the etiology which maybe infectious or noninfectious.

After an initial insult with infections of upper respiratory tract, teeth or soft tissue of the face or scalp, microorganisms are carried to the draining lymph nodes via afferent lymphatics.<sup>3</sup> The cervical lymphatic system plays a role of defence against the infections that occur in the head and neck region. Once the organisms enter into the lymph nodes, the macrophages and dendritic cells trap, phagocytose, and present the organisms as antigens to T cells. B cells with the help of T cells are activated and release immunoglobulins which help in the immune response. The signs and symptoms are a result of this immune response. Nodal enlargement occurs due to cellular hyperplasia and lymphocyte infiltration. Swelling and erythema occur as a result of dilation of blood vessels. When lymphadenopathy occurs as part of malignant process, the lymph node enlargement is due to malignant or metastatic cells.

### Classification of Cervical Lymphadenopathy Based on Clinical Presentation<sup>10</sup>

1. Acute Unilateral: This is the most common type of cervical lymphadenopathy. This is usually reactive and secondary to upper respiratory tract infection (URTI), skin infection, or dental infection. Other rare causes are Kawasaki, cat scratch disease (Bartonella) and Kikuchi-Fujimoto disease (histolytic necrotising lymphadenitis).
2. Acute Bilateral: This type of lymphadenitis occurs secondary to viral URTI, Epstein-Barr virus (EBV), and cytomegalovirus (CMV).
3. Sub-acute: The common cause for this is *Mycobacterium tuberculosis*.
4. Chronic: This can be reactive in process secondary to neoplasia, lymphoma, leukemia, or soft tissue tumours.

### Infectious Etiologies

#### Acute Viral Lymphadenitis

This is the most common form of reactive lymphadenopathy and typically develops following URTI. The common viruses involved are adenovirus, rhinovirus, Coxsackie virus A

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and B, Epstein-Barr virus, parainfluenza, influenza and cytomegalovirus. Less frequent etiologies are mumps, measles, rubella, varicella, and herpes simplex viruses.<sup>11</sup>

This type of lymphadenopathy is often bilateral, diffuse, and nontender, without warmth or erythema of the overlying skin and often has other signs and symptoms that are consistent with URTI. Viral lymphadenitis resolves spontaneously within a short period of time or may require symptomatic treatment. Specific antiviral therapy is rarely recommended except in immunocompromised patients.

Mononucleosis is commonly caused by Epstein-Barr virus. The clinical features comprise of generalized fever along with lymphadenopathy, pharyngitis and splenomegaly. The blood test is suggestive of lymphocytosis, however, monospot test and serum heterophile antibody are more definitive tests for the diagnosis.<sup>3</sup> The treatment encompasses symptoms' management.

In cases of CMV infection, rashes and hepatosplenomegaly are often seen along with other symptoms.

#### Acute Bacterial Lymphadenitis

*Streptococcus pyogenes* or *Staphylococcus aureus* are the main reasons of acute cervical lymphadenitis in age group of 1-4 years in around 40% to 80% of cases.<sup>11</sup> Cervical adenitis may also occur due to Group B streptococcal infection. Anaerobic bacteria may be the causative agent in older children with dental disease.<sup>12</sup>

The presentation includes fever, sore throat, cough, cold, or earache. Physical examination elucidates pharyngitis, tonsillitis, or otitis media while in case of anaerobic infection, there may be evidence of periodontal disease. Treatment involves initial management with oral or intravenous antibiotics depending on severity of infection. If this does not get resolved then an ultrasound and further fine needle aspiration cytology (FNAC) is advised. Surgical incision and drainage may be required in case an abscess is identified.

#### Subacute Lymphadenitis

This is the type of lymphadenitis which is mostly attributable to infectious etiology and persists for 2-6 weeks' duration. The most common causative agents are *Mycobacterium tuberculosis*, *Atypical mycobacterium*, cat scratch disease, and toxoplasmosis. Sometimes EBV and CMV are also responsible for this type of lymphadenitis. These are explained in detail in subsequent sections.

#### Mycobacterium Tuberculosis

Chronic cervical lymphadenitis may be caused by *Mycobacterium tuberculosis* (scrofula). The patients present with cervical lymph node enlargement mostly the paratracheal or the supraclavicular lymph nodes. Tuberculin test may help in the diagnosis. Tuberculin test may turn out to be positive even in nontuberculous causes but generally are less reactive (<15 mm induration). A history of contact can also be found. Chest radiograph reveals abnormal findings in most cases. The treatment of choice would be multi-agent antituberculous therapy for 12 -18 months. Regression of the enlarged nodes occurs within 2-3 months of starting the therapy.

#### Atypical Mycobacterium

In *Atypical mycobacterium* the species involved are *Mycobacterium avium-intracellulare* and *Mycobacterium scrofulaceum*.

This lymphadenitis may develop over weeks to months. The lymph nodes are tender and rubbery with discoloured skin over the node. The diagnostic test is acid fast stain and culture of material from lymph node. This condition if left untreated may lead to sinus tract and cutaneous drainage for up to 12 months.<sup>3</sup> The treatment of choice is surgical excision of involved lymph nodes and not incision and drainage to avoid sinus formation. This lymphadenitis is different from tuberculous variety where it is more of a disseminated disease.<sup>3</sup> This does not respond to the treatment with antituberculous drugs. Appropriate antibiotic treatment should be started after sensitivity testing.

#### Cat Scratch Disease

This is a lymphocutaneous syndrome caused by bacterial infection with species *Bartonella henselae*, a gram negative rickettsial organism. A small papule may develop at the site of inoculation which may or may not be evident on examination. In 90% of cases who have had exposure to cat bite or scratch, lymphadenitis can take up to 2 weeks to develop. The papule may resolve till the lymphadenitis develops. It presents commonly in younger age group patients with tender lymph nodes associated with fever and malaise. It is diagnosed by serology for antibodies or polymerase chain reaction (PCR). This is usually a self-limiting disease with symptomatic treatment. Antibiotics may be recommended in some cases.<sup>13,14</sup>

#### Toxoplasmosis

Lymphadenitis is the most common clinical form of toxoplasmosis where the causative organism is *Toxoplasma gondii*. The mechanism of illness is usually after consumption of undercooked meat, leading to ingestion of oocytes from cat faeces. The symptoms are malaise, fever, sore throat, and myalgias. Lymphadenitis usually occurs in the head and the neck region and 90% have cervical lymphadenitis. The diagnosis is done by serologic testing. The complications include myocarditis and pneumonitis. The treatment is with pyrimethamine or sulphonamides.

#### Noninfectious Etiologies

##### Kikuchi-Fujimoto Disease

This seemingly benign and rare condition which is also called necrotizing lymphadenitis, is seen to be associated with signs and symptoms of fever, nausea, weight loss, night sweats, arthralgia, and hepatosplenomegaly. The cause is thought to be likely viral or autoimmune etiology. It does spontaneously regress within 6 months and is unresponsive to antibiotics. Some patients are known to have recurrences.

##### Kawasaki Disease

This is a mucocutaneous lymph node syndrome which usually affects children less than 5 years of age. The disease is manifested by vasculitis throughout the body. There are 5 characteristic features associated with this disease:

1. Fever for  $\geq 5$  days
2. Cervical lymphadenopathy
3. Edema, erythema and desquamation of the skin of the palms/soles
4. Bilateral conjunctivitis
5. Inflammation of the lips, mouth and/or tongue

The diagnosis is established if 4/5 features are present. One

of the earliest symptoms is lymphadenopathy which is unilateral, within anterior triangle of the neck, and nonfluctuant. Resolution of cervical lymphadenitis occurs on its own.

### Sarcoidosis

Sarcoidosis is a chronic granulomatous disease of unknown etiology which involves multiple organs. Cervical lymphadenitis is most common manifestation of head and neck involvement. The confirmatory test for diagnosis would be biopsy for histologic examination. Supportive therapy with corticosteroids is currently the treatment of choice.

### Langerhans Cell Histiocytosis

This condition is also called eosinophilic granuloma. It presents as solitary bone, skin, lung, or stomach lesion. The severe form of this condition is associated with life threatening multisystem disorder. The histopathology shows normal lymph node but increased sinusoidal Langerhans cells, macrophages, and eosinophils.<sup>3</sup> The treatment involves systemic steroids. Chemoradiation therapy is also sometimes administered.

### Malignancies

Lymphadenopathy which is persistent for more than 6 six weeks' increases the risk factor of malignancy. Out of the total incidence, around 25% of malignant tumors occur in the head and neck. In these cases, cervical lymphadenopathy is a common finding.<sup>15</sup> Neuroblastoma and leukemia associated with cervical lymphadenopathy are the commonest tumors until 6 years of age, followed by rhabdomyosarcoma and non-Hodgkin's lymphoma.<sup>15</sup> Hodgkin's lymphoma associated with cervical lymphadenopathy is one of the common tumor after 6 years of age, followed by non-Hodgkin's lymphoma and then rhabdomyosarcoma.<sup>15</sup>

A biopsy is done to establish the diagnosis. Depending on the diagnosis, the patient may be referred to oncologist for further management.

### Clinical Approach to Case of Cervical Lymphadenopathy

Currently there is no defined pathway for investigating pediatric patients with lymphadenopathy.<sup>16</sup>

### Proforma for Clinical Examination<sup>3</sup>

#### History

- Fever, anorexia, myalgias, night sweats
- Node is tender or nontender
- Toothache, earache, bone pain
- Bruising, pallor
- Sore throat, URTI symptoms
- Preceding tonsillitis
- Contact with tuberculosis patients
- Medications/Immunizations
- Exposure to animals/cats
- Use of medications like phenytoin or isoniazid
- Recent immunization history with diphtheria-pertussis-tetanus (DPT), poliomyelitis, or typhoid vaccination

#### Examination Findings

- General Appearance: Malnutrition, poor health, febrile, toxic
- Rash, pallor, erythema, edema
- Poor dental hygiene, otitis, pharyngitis
- Lymph node examination for size, mobility, consistency, tenderness

cy, tenderness

- Location of lymphadenitis: Unilateral versus bilateral
- Associated findings of lungs consolidations/hilar lymphadenopathy/TB/hepatosplenomegaly
- Associated inguinal and axillary adenopathy

### Investigations

#### Laboratory

- Complete blood count (CBC)/Urea and Electrolytes/C-reactive protein
- Throat swab/antistreptolysin O titre (ASOT)
- Serology EBV/CMV/Toxoplasmosis/Bartonella based on clinical findings. It is important to rule out immunocompromised state of the patient by doing serology for HIV
- The polymerase chain reaction (PCR) is useful for pathogen identification in pediatric cervical lymphadenitis, although it is less sensitive in identification of mycobacteria.<sup>17</sup>

#### Imaging

- Chest x-ray
- Ultrasonography is an extremely helpful diagnostic tool which helps in differentiation and following the treatment of childhood lymphadenopathy. Failure of regression after 4-6 weeks might be an indication for a diagnostic biopsy
- CT Scan imaging study for retropharyngeal or deep neck abscess, or suspected malignancy
- ECG/ECHO based on clinical findings if Kawasaki is suspected to rule out any complications

#### Invasive

- FNAC should be performed if the enlarged node has not responded to antibiotics and has been present for 2-6 weeks' duration
- Excisional biopsy to be performed if the FNAC results are negative however the clinical findings are strongly suggestive of malignancy

Guidelines for early referral for biopsy especially to rule out malignancy

- a. Lymph nodes are non-tender, firm or hard
- b. Lymph nodes are greater than 2 cm in size
- c. Lymph nodes are progressively enlarging
- d. Other associated features of general ill-health, fever or weight loss
- e. Axillary nodes are involved (in the absence of local infection or dermatitis)
- f. Supraclavicular nodes are involved.
- g. Generalised lymphadenitis
- h. Hepatosplenomegaly

### CONCLUSION

Cervical lymphadenopathy is a common but challenging clinical problem especially in pediatric age group. A thorough history and physical exam are very helpful in determining the cause of lymphadenitis. Cervical lymphadenopathy occurs mostly as part of reactive process from viral and bacterial pathogens. In India, tuberculosis is a prevalent cause of cervical lymphadenopathy which needs antitubercular therapy. Most cases of acute lymphadenopathy are treated

with antibiotics for 1-2 weeks' duration. Further laboratory and radiologic investigations can help identify other important risk factors and conditions associated with cervical lymphadenopathy. In some cases of cervical lymphadenopathy when one suspects abscess formation or if the patient is toxic, the investigation of choice is ultrasound scan. Ultrasound scan is a good option to differentiate reactive from malignant nodes. The lymph nodes can be subjected to FNAC however it has false negative rate of around 45%. Excisional biopsy is gold standard for diagnosis. A stepwise approach along with close followup can lead to right and timely management of this condition.

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# Parotid Sialolith- A Case Report and Review of Literature

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## ABSTRACT

**Introduction:** Sialolithiasis is caused by the obstruction of a salivary gland or its excretory duct by the formation of calcareous concretions or sialoliths. It is the most common disease of the salivary glands and accounts for 30% of salivary diseases. Sialolithiasis commonly involves the submandibular glands (83-94%) less frequently the parotid (4-10%) and the sublingual glands (1-7%). Salivary calculi affecting the parotid gland are usually small unilateral and are located in the duct.

**Case report:** A 56 year male patient with a sialolith of right parotid duct came to our institute. Examination and plain radiographs confirmed the diagnosis. Patient was treated with intra-oral sialolithotomy and oral antibiotics and analgesics.

**Conclusion:** Parotid gland calculi generally are unilateral, affecting duct more commonly than the gland and are less common than submandibular calculi. Depending upon size, site of sialolith the treatment options vary.

**Keywords:** Parotid gland, Sialolith, Stensen's duct, Sialoendoscopy.

## INTRODUCTION

Salivary duct lithiasis refers to the formation of calcareous concretions or sialoliths in the salivary duct causing obstruction of salivary flow resulting in salivary ectasia, sometimes even dilatation of the salivary gland. This also may be complicated by infection of the salivary gland which may result in chronic sialadenitis.<sup>1</sup>

Parotid gland stone incidence in males to females is 2:1. It generally occurs at 3<sup>rd</sup> to 6<sup>th</sup> decades of life. In children, submandibular stones are commonly seen than parotid stones. Intraductal sialolith have more incidence of occurrence than intraglandular sialoliths.<sup>2</sup> Parotid calculi are unilateral, generally seen in duct and size is less than 1cm. Sialolith which are not detected by radiograph may require sialoendoscopy as 40% of parotid and 20% of submandibular stones are not radioopaque. The exact etiology and pathogenesis of salivary calculi is not known.

## CASE REPORT

A 56 year old male reported at our Maxillofacial unit, for an opinion on a firm mass in the right cheek region. The patient gave history of the swelling from last two years.

The pain was localized, pricking in nature continuous and aggravated at mealtimes. There was no history of trauma. Past-medical history revealed that the patient was having joint pains and is on medication. On extraoral examination, the patient had facial asymmetry due to a slight swelling on the right side of the face. The swelling was diffuse, extending 2 cm laterally from ala of the nose anteriorly till 2 cm in front of the ear posteriorly. The swelling was about approximately 3 x 3cm in size. The skin over the swelling was smooth, stretched. There were no secondary changes. Palpa-

tion revealed hard, non tender swelling.

Intra-orally, the mouth opening was normal with and no involvement of the teeth. A swelling was present in the right buccal mucosa extending from first molar tooth to the opening of the right Stensen's duct posteriorly, superiorly 2 cm below upper buccal sulcus to upto the level of occlusal plane inferiorly. The opening of the Stensen's duct was slightly inflamed and red. Bi-digital palpation revealed no pus discharge from the duct with reduced salivary flow.

Plain radiographs showed radiopaque mass of 2 × 1 cm<sup>2</sup> size confirmed the provisional diagnosis of sialolith in the right parotid duct, As the calculus was located near the duct orifice and planned surgical removal by an intra-oral approach under local anesthesia. The dilated duct was left open without suturing. Patient was kept on antibiotics and analgesics and was discharged with the advice to take lemon slices frequently. No recurrence of pain and swelling when patient was reviewed in subsequent appointments.

## DISCUSSION

Sialolithiasis is a relatively common disease, reported to account for up to 30% of salivary gland disorders.<sup>1</sup> Patient age in our case report was adult of 56 years old as in commonly occurring age range (50-60 years).

The exact etiology and pathogenesis of salivary calculi is not known. Several hypotheses put forward to explain the etiology of these calculi include: mechanical, inflammatory, chemical, neurogenic, infections, strange bodies etc. Traditional theories suggest that the formation of sialoliths occur in two phases: (1) Formation of a central core and (2) A layered periphery. The central core is formed by the precipitation of salts, which are bound by certain organic substances. The second phase consists of the layered deposition of organic and inorganic material. Submandibular sialoliths are thought to be formed around a nidus of mucus, whereas parotid sialoliths are thought to be formed around a nidus of inflammatory cells or a foreign body. A retrograde theory for sialolithiasis has also been proposed. Aliments, substances or bacteria within the oral cavity migrate into the salivary ducts and become a nidus for further calcification. Some authors have suggested hypercalcemia as one of the causative factors of formation of sialolith in animal model. This, however, has to be proved in humans. Thus a preventive diet, regarding

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**Figure-1:** Parotid stone near the right Stensen's duct opening



**Figure-2:** OPG



**Figure-3:** PA projection of the mandible showing the sialolith on right parotid duct



**Figure-4:** Removed stone

the calcium concentration does not exist in the current literature.<sup>3</sup>

Symptom of salivary gland or duct obstruction by a sialolith is salivary duct swelling at meal time without any reason and lasts for less than 2hrs, later it disappears and may reappear throughout the day.

On some occasions, the swelling is accompanied by an episode of salivary colic, an acute, lacerating pain which does not last for long and disappears after 15 or 20 minutes. Patient also complained of similar type of pain during meal times.

The clinical symptoms are characteristic and aid in early diagnosis, however, pain is only one of the symptoms and it does not occur in 17% of cases.<sup>4</sup> Sialoliths are usually unilateral and do not cause xerostomia. They consist of mainly calcium phosphate and smaller amounts of carbonates in the form of hydroxyapatite as also magnesium, potassium and traces of ammonium. The ratio of organic to inorganic material in a submandibular stone is 18:82, whereas that in a parotid stone is 51:49.<sup>5</sup> Sialoliths are usually small and measure from 1 mm to less than 1 cm in size. They rarely measure more than 1.5 cm. The mean size varies from 6 to 9 mm. Grossly, the sialolith has a round or ovoid shape, a porous texture and a pale yellow color. Parotid stones are smaller in size and more radiolucent than submandibular stones but our case of 2 X 1 cm<sup>2</sup> size, pale yellow colour stone with porous texture, larger than conventional parotid stones and of radiopaque in nature. Sialoliths are usually more or less organized hard concretions, of a pale yellow colour and porous aspect. They usually have an oval or long shape, although we may also find some in the form of a cast.<sup>5</sup> Messerly removed a 51 mm long calculus that occupied the entire length of Stenson's duct in a 66-year-old man.<sup>6</sup> Brusati and Fiamminghi removed a sialolith from the left submandibular duct of a 55 year-old man measuring 27 x 31 mm.<sup>7</sup> More recently Leung et al. removed a sialolith 14 x 9 mm from the right submandibular duct.<sup>8</sup>

The diagnostic aids other than sialography are CT scan and MRI with the benefits of minimal invasiveness and accuracy. Sialoendoscopy is better option to visualize intraductal stenosis and inflammatory changes.<sup>6</sup> Treatment options vary according to size and site of calculi. Differential diagnosis include diffuse unilateral swelling in parotid region, sialadenitis is considered when mass is absent and lymphadenitis, pre-auricular cyst, sebaceous cyst, benign lymphoid hyperplasia or extra-parotid tumor are considered when mass is superficial in the salivary gland.

In case of a diffuse swelling in the parotid region, unrelated to the parotid glands, masseteric hypertrophy, lesions of the temporomandibular joint have to be considered. It is also important to differentiate sialoliths from other soft tissue calcifications. Parotid sialoliths are characterized by pain and swelling of the salivary gland, whereas, other calcifications such as calcified lymph nodes are symptom-free. There are various methods available for the management of salivary stones, depending on the gland affected and stone location. Regarding the general management of sialoliths, for small calculi, the treatment of choice should be medical rather than surgical. The patient with small liths can be administered natural sialogogues such as small slices of lemon or sialogogue medication.

Drugs like pilocarpine and short-wave infrared heating will stimulate contraction of ducts, but medium or large salivary colic may occur and calculus may not be cleared.

The treatment of choice, for parotid stones not responding

to conservative treatment, is extracorporeal shock-wave lithotripsy under sonographic control. Moreover, it does not require anaesthesia, sedation or analgesia. This method is reported to be effective, with patients stone-free in 50-60% and symptom-free in 80-90%. Although lithotripsy is a useful technique, there is the potential risk of parenchymal damage and fibrosis of the gland.<sup>3</sup> Some authors advocate treatment of sialolithiasis by means of intraductal instillation of penicillin or saline. According to these authors, this method is more effective than systemically administered drugs due to low recurrence rate and many other advantages.<sup>1</sup>

When medical therapy is ineffective the next alternative is surgical removal of the calculus or even of the whole gland. One of the disadvantage is facial nerve damage. Intraoral surgery is more effective than extraoral technique because of no visible scar.<sup>1</sup>

Parotidectomy should be considered as the last treatment option, in patients with multiple stones (> 3mm stones) in the same gland, recurrent episodes of sialadenitis and after failure of minimal invasive techniques and shock-wave lithotripsy.<sup>9,10</sup>

The most conservative technique is the anastomosis of Stensen's duct by means of microsurgery. Factors affecting treatment are size, site and composition of sialolith. Salivary stone removal through the oral cavity, creation of a salivary fistula interventional sialoendoscopy, and resection of the gland are treatment options.

## CONCLUSION

Parotid sialolithiasis is less frequent than that of submandibular sialolithiasis, generally unilateral and predominantly affects the salivary duct than gland. Sialendoscopy can be used as newer diagnostic and therapeutic aid. Treatment depends on size and location of sialolith.

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# Evaluation of Orthodontic Patient Satisfaction in Buraidah City, Al-Qassim, Saudi Arabia

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## ABSTRACT

**Introduction:** The goal of orthodontic treatment is to produce a normal or ideal occlusion that is morphologically stable, aesthetically and functionally well-adjusted. However, there is a large variation in treatment outcome because of the severity and type of malocclusion, treatment approach, patient cooperation, and growth and adaptability of the hard and soft tissues. Given this, there are a number of factors that may influence patient satisfaction; this includes physical comfort, emotional support, patient expectations and respect for their preference. The aim of the study was to assess the level of satisfaction of orthodontic patients after the treatment.

**Material and methods:** This study design involved a cross-sectional study of 85 male and female participants from Buraidah City, Saudi Arabia.

**Results:** Study show that a higher percentage of the participants reported that self-motivation was the main reason to go and see the orthodontist. Out of the total 85 participants, a significantly high percentage of female patients reported that aesthetics was the main reason for seeking orthodontic treatment with more than half of the participants saying that they were very satisfied. Furthermore, 58% of the participants reported that orthodontic treatment improved their confidence and communication skills with no complications during the treatment.

**Conclusion:** The overall response to the questionnaire revealed that, in general, patients who undergone orthodontic treatment remained satisfied with their facial aesthetics in a long-term period after the treatment was done.

**Keywords:** Orthodontics, Aesthetics, Patient satisfaction

fect on self-esteem.<sup>5</sup> Another research indicated that a high self-esteem could be related to orthodontic concern.<sup>1</sup>

The major reason behind opting for orthodontic treatment is to improve the facial form and aesthetics.<sup>1,2</sup> The major challenge in the field of Orthodontics is that the clinician is expected to correct the facial form as a result of improper dental occlusion as well as the skeletal pattern.

The maintenance of dental alignment after orthodontic treatment has been and continues to be a challenge to the orthodontic profession. Usually, the goal of orthodontic treatment is to produce a normal or so-called ideal occlusion that is morphologically stable and aesthetically and functionally well-adjusted. There is, however, a large variation in treatment outcome because of the severity and type of malocclusion, treatment approach, patient cooperation, and growth and adaptability of the hard and soft tissues.<sup>6</sup>

The responsibility of assessing the quality of health care is in the hands of the patient, clinician or the parents. Parental feedback regarding the treatment may be clouded by past experience. So, The Clinician should take in to account the Parent as well as the child's feedback and judiciously use it.<sup>7</sup> The satisfaction of patients relies on the physical basis, emotional basis and in satisfying their own expectations regarding their appearance.<sup>8-10</sup> Relying only on Clinician's judgement may not be reliable and valid in all cases.<sup>11</sup> It is now evident that patient satisfactory measures should include criterias that are important to the patient to have a positive feeling about their appearance.<sup>12</sup>

Therefore, the aim of the study is to assess the level of satisfaction of orthodontic patients after the completion of the treatment.

## MATERIAL AND METHODS

The research design was a cross-sectional study involving 85 male and female participants from Buraidah City, Saudi Arabia. An anonymous pilot self-administered questionnaire was distributed amongst different private and governmental orthodontic clinics. The questionnaires were in Arabic language and were filled out by orthodontic patients. The forms were gathered by an assigned person in each clinic then it

## INTRODUCTION

Research suggests that an important motivational factor for orthodontic treatment is improved dental facial appearance.<sup>1</sup> The relationship between physical appearance and perception of an aesthetic deviation, and the impact of such a deviation on self-esteem and body image are important issues in determining the benefits gained from orthodontic treatment. Attention should be given to the specific occlusal and aesthetic deviations that are a major concern to the patients, and assumptions based purely on the general occlusal condition should be avoided.<sup>2</sup>

Furthermore, a variety of social, cultural, psychological factors, and personal norms influence perception of physical attractiveness.<sup>3</sup> Studies in social psychology indicate that physical attractiveness plays a major role in social interaction and influences the impression of an individual's social skill.<sup>4</sup>

As orthodontic treatment improves facial appearance, it is assumed to increase self-worth. However, this hypothesis is difficult to verify. A certain study on self-concept perception during orthodontic treatment showed no long-lasting ef-

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was collected by the researchers.

The criteria needed to answer the questionnaire are based on the patient's duration of the treatment. Patients are eligible to answer only if they are already in the final months of the treatment. The duration of the study was during the months of January to February 2013.

**STATISTICAL ANALYSIS**

Statistical analysis was done in SPSS program version 16 in which frequency measurement and Chi-Square Test were used. The results of these tests enabled the researchers to make comparisons between male and female participants and come up with conclusions that will be relevant to the study.

**RESULTS**

Out of the 200 questionnaires that were distributed in Buraidah City, Qassim district, 85 forms were returned back which gives an overall response of 42.5%. This includes 37 males and 48 females as seen on Table 1. There are five categories that were used to create an age interval in which a majority of the respondents are between 15-20 years old.

		Gender		Total
		Male	Female	
Age	15-20	12	24	36
	20-25	15	17	32
	25-30	9	6	15
	More than 30	0	1	1
	Missing	1	0	1
Total		37	48	85

**Table-1:** Age Interval

		Gender		Total
		Male	Female	
Who Encouraged you to start the orthodontic treatment?	Dentist	2	4	6
	Parents	3	2	5
	Friends	6	8	14
	Myself	26	33	59
	Others	0	1	1
	Total	37	48	85

**Table-2:** Motivation for seeking orthodontic treatment.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.586(a)	4	.811

		Gender		Total
		Male	Female	
Mainly reported reason to do orthodontic treatment	To improve aesthetics	33	48	81
	To improve function	2	0	2
	To improve speech	0	0	0
	For fashion	2	0	2
	Total	37	48	85

**Table-3:** Reason for orthodontic treatment

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.445(a)	2	.066

When the researchers asked about their motivation and encouragement to start with an orthodontic treatment, 69% of the participants stated that self-motivation was their primary reason. Table 2 shows the summary of the results and it can be concluded that there is no statistical difference between the responses of male and female participants.

The next question asks for the participant's main reason in starting with an orthodontic treatment. 95% of them answered that they want to be aesthetically appealing while the remaining percentage chose functionality and improved speech.

The next seven questions ask about the level of satisfaction gained by orthodontic patients after the treatment. The results are summarized in Table 4.

In response to their level of satisfaction for the overall treatment, 91% of the participants showed that they were either very satisfied or simply satisfied. The remaining percentage felt dissatisfied because the occlusion of their teeth were unlike what they had initially expected while the other reason shows their disappointment in feeling that their teeth were much better before than after the treatment.

When it comes to their overall appearance after the treatment, 86% showed their approval while 7% disapproved of the result because they felt that the outlook of their face was not compatible with their teeth.

Moving on to the next question, 88% of the participants felt that they experienced a significant difference with the way they smile while 5% felt no significant change.

The two questions below seek to determine the impact of orthodontic treatment when it comes to the level of their

		Gender		Total
		Male	Female	
Level of satisfaction in regard to overall treatment	Very Satisfied	22	28	50
	Satisfied	12	15	27
	Unsatisfied	1	4	5
	Very much Unsatisfied	1	1	2
	Missing	1	0	1
	Total	37	48	85
Level of satisfaction in regard to overall facial appearance after treatment	Very Satisfied	16	23	39
	Satisfied	15	19	34
	Unsatisfied	2	4	6
	Very Unsatisfied	0	0	0
	Missing	4	2	6
Total	37	48	85	
Level of satisfaction in regard to smile after the treatment.	Very Satisfied	17	24	41
	Satisfied	16	18	34
	Unsatisfied	2	2	4
	Very Unsatisfied	0	0	0
	Missing	2	4	6
Total	37	48	85	

**Table-4:** Satisfaction of orthodontic patients after treatment.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.471(a)	4	.650
	1.665(a)	3	.645
	.565(a)	3	.904

self-confidence and communication skills improvement. A majority of the participants (58%) reported a positive answer stating that orthodontic treatment improved their confidence level while more than half of the participants (51%) agreed that orthodontic treatment improved their ability to communicate effectively.

The next question asks the respondents if they are willing to undergo orthodontic treatment should they ever go back in time. This question serves as the key in evaluating the general satisfaction status of the patients. 60% of the respondents confirmed that they are willing to do it again and this is a good indicator that they are generally satisfied with the treatment they received. 30% remain undecided while 8% would rather not undergo the same treatment

The question in table 7 aims to determine how a person's orthodontic treatment is accepted by their peers. Out of the total participants, 26 of them felt that their orthodontic treatment negatively affected the relationship that they have with their friends while 35 of them did not see it as an annoyance. When it comes to the noise that they encountered, 54% claimed that the duration of the treatment was the most difficult to endure and this is followed by TMJ and teeth pain with over 14%. Not far from it is the regular appointment (13%) while the last few reasons are shape of the orthodontic, difficulty of speech and the expenses paid for the treatment, respectively.

The next six questions focuses on the complications of orthodontic treatment as perceived by the patients and these are used to evaluate the satisfaction that they received. Using statistical tests, none of the answers in Table 9 revealed a significant result to the complication of orthodontic treatment while minorities of the respondents think that caries and periodontal diseases exist after the treatment aside from some discolorations in their teeth.

**DISCUSSION**

In general, high levels of satisfaction with their teeth fol-

lowing an orthodontic treatment have been reported in many other studies.<sup>13,14</sup> The present study found out that 58% of the participants were very satisfied and 40% were satisfied with the overall result after the treatment. Al-Omiri and Alhajja reported that 34% of subjects were totally satisfied<sup>13</sup> whereas Larsson and Bergsröm reported that the satisfaction rate was 74%.<sup>15</sup> Birkeland et al. reported a high degree of satisfaction with orthodontic treatment results (95.4%).<sup>16</sup> Al-Omiri and Alhajja's study found that only 4% of patients treated with orthodontic were dissatisfied with their teeth after treatment<sup>13</sup>, and the present study found that only 5 of the patients were dissatisfied with their overall treatment results. Hence, it should be noted that the rates of dissatisfaction are fairly similar, despite differences in treatment location. Looking at gender differences, some studies reported that gender is not a major factor in dental satisfaction.<sup>13,15,17</sup> Others show that females tend to be more concerned about their appearance and thus find a greater need for this treatment as compared to males.<sup>18,19</sup> Moreover, Phillips et al found that the expect-

		Gender		Total
		Male	Female	
Did orthodontic correction improve your self-confidence level?	Yes, Of Course	23	26	49
	I think that	10	14	24
	I don't think	1	2	3
	Never	1	4	5
	No	2	2	4
Total		37	48	85
Did orthodontic correction improve your communication skills?	Yes, Of Course	19	24	43
	I think that	12	12	24
	I don't think	1	5	6
	Never	2	3	5
	Missing	3	4	7
Total		37	48	85

**Table-5:** Impact of Orthodontic treatment

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.204(a)	4	.698
	1.587(a)	4	.811

		Gender		Total
		Male	Female	
If you were in a situation before doing the orthodontic treatment, Would you like to do it again?	Yes, of Course	23	28	51
	I think so	11	14	25
	I don't think so	2	5	7
	Never	0	0	0
	Missing	1	1	2
Total		37	48	85

**Table-6:** General satisfaction

		Gender		Total
		Male	Female	
Did orthodontic treatment affect your relation with friends negatively?	Yes, Of course	14	12	26
	Sometimes	3	7	10
	Never	16	19	35
	Missing	4	10	14
Total		37	48	85

**Table-7:** Complication of orthodontic treatment perceived by patients

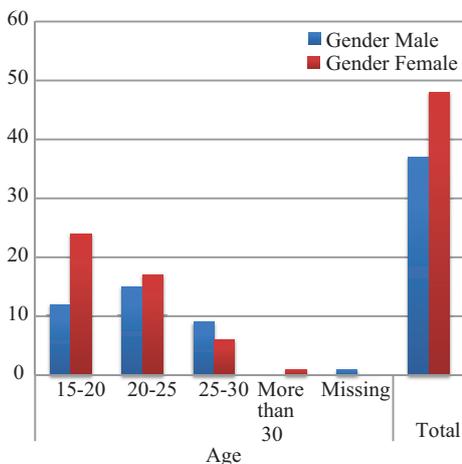
		Gender		Total
		Male	Female	
What is the most difficult thing during your orthodontic treatment?	Duration of the treatment	17	29	46
	Orthodontic braces	3	5	8
	Difficulty attending appointment	6	5	11
	Teeth and TMJ pain	7	5	12
	Difficulty in speech	1	2	3
	Expensive	1	2	3
	Others	1	0	1
	Missing	1	0	1
	Total		37	48

**Table-8:** Noises in Orthodontic treatment

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.388(a)	7	.613

		Gender		Total
		Male	Female	
Did you feel pain or sounds in TMJ?	Yes, Of Course	1	2	3
	I think that	2	3	5
	I don't think	12	13	25
	Never	22	27	49
	Missing	0	3	3
Total		37	48	85
Did you have a caries or periodontal problem after treatment?	Yes, Of Course	11	6	17
	I think that	10	16	26
	I don't think	10	9	19
	Never	6	16	22
	Missing	0	1	1
Total		37	48	85
Did you feel any difficulty in mouth opening after treatment?	Yes, Of Course	1	1	2
	I think that	5	4	9
	I don't think	15	24	39
	Never	15	18	33
	Missing	1	1	2
Total		37	48	85
Did you feel any color changes in your teeth?	Yes, Of Course	6	10	16
	I think that	19	19	38
	I don't think	9	10	19
	Never	2	7	9
	Missing	1	2	3
Total		37	48	85
Did you feel any change in voice intonation?	Yes, Of Course	3	8	11
	I think that	7	9	16
	I don't think	8	11	19
	Never	17	16	33
	Missing	2	4	6
Total		37	48	85
Did you feel that orthodontic treatment improve your food eating?	Yes, Of Course	13	15	28
	I think that	16	15	31
	I don't think	4	10	14
	Never	2	6	8
	Missing	2	2	4
Total		37	48	85

**Table-9:** Complications of orthodontic treatment



**Figure-1:** Age Range of Respondents

tations of orthodontic treatment among males differed from those among females.<sup>20</sup> The present study found that the “gender factor” to be different only in the level of satisfaction

in regard to smile appearance after treatment while the other factor has shown almost the same result as it has no significant effect. One study in British and American community found that from a patient’s perspective, the most important reason in deciding to have an orthodontic treatment was to improve their appearance.<sup>21</sup> Similarly, 95% of the subjects in the present study stated that their main concern was improving their aesthetic appearance. The literature shows that most individuals who have undergone orthodontic treatment feel that they have benefited from the treatment; even if dramatic changes in facial appearance are not always evident.<sup>22</sup> The present study found that a high proportion of patients were satisfied with their final overall profiles. Moreover, improved patient self-confidence together with a more aesthetic facial appearance accounted for the highest level of patient satisfaction. Other studies investigated the issue of TMD in 32 patients during their follow-up after an orthodontic treatment and they found out that 75% of them were asymptomatic.<sup>23</sup> As a result of these findings, they concluded that orthodontic treatment is neither a risk factor for TMD nor does it prevent TMD. In the present study, only 9% of the patients said that they experienced definite pain or clicking in their TMJ region after orthodontic treatment while a majority of them did not state any problem.

Another noticeable finding of the present study was that 70% of patients experienced an improvement in their eating ability after treatment. This rate is almost similar to the 73% improvement in eating ability reported by Zhou et al. in patients who had undergone orthodontic treatment.<sup>24</sup> Bos et al. found that patients who had undergone orthodontic treatment had a more positive view of the treatment than those who did not.<sup>18</sup> Birkeland et al. reported that 80% of children would undergo orthodontic treatment again.<sup>16</sup> Similarly, 89% of patients in the present study stated that they are willing to do the treatment again should they be given a chance.

In recent years, there has been growing acceptance among dental professionals that aesthetics and their psycho-social impacts are an important benefit from the treatment.<sup>25,26</sup> Some patients reported significant improvement in their self-confidence related to their appearance after orthodontic treatment.<sup>14,27</sup> In the present study, a high percentage (86%) of the subjects stated that orthodontic treatment had a positive influence on their self-confidence levels. Al-Omiri and Alhajja pointed out the importance of psychological assessments of patients undergoing orthodontic treatment and suggested that satisfaction levels could be correlated with personality traits.<sup>13,28</sup>

**Limitations of the study**

The researchers experienced a low response rate. Satisfaction measurement was based on subjective evaluation only.

**CONCLUSION**

Responses to the questionnaire revealed that, in general, patients who undergo orthodontic treatment remained satisfied with their facial aesthetics in the long-term following orthodontic treatment. In addition, there was no evidence of differences in satisfaction ratings between the two gen-

ders, male and female. Therefore, orthodontic treatment has a clear impact in helping improve the psycho-social status of the patient as majority of them reported high improvement in their self-confidence and communication skills. Furthermore, there were no reports from a majority of the respondents related to complications occurring from the treatment.

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# Evaluation of Hicrome Candida Differential Agar for Species Identification of *Candida* Isolates from Various Clinical Samples

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## ABSTRACT

**Introduction:** *Candida albicans* remains the most common species causing human infections but recent epidemiological data reveal shift from *C. albicans* to non *albicans* *Candida* species. The conventional methods of identification are time consuming and difficult to perform. The present study was done to evaluate the performance of conventional identification method (phenotypic and biochemical) and commercially available chromogenic *Candida* speciation media (Hicrome Candida differential agar) for the identification of medically important *Candida* species in a routine clinical microbiology laboratory.

**Material and Methods:** A total of 115 *Candida* isolates from various clinical specimens received in the Department of Microbiology were taken up for the study over a period of one year i.e. from January 2014 to December 2014. The *Candida* isolates were speciated by using conventional methods and were compared against chromogenic agar medium (Hicrome Candida differential agar). The conventional methods used for speciation of yeast isolates were germ tube test, colony morphology on corn meal agar, sugar fermentation and sugar assimilation test

**Results:** The isolation of non *albicans* *Candida* (59.1%) predominated over *Candida albicans* (40.9%). Non *albicans* *Candida* species isolated were *C. tropicalis* (40%) followed by *C. guilliermondii* (10.43%), *C. krusei* (4.34%), *C. glabrata* (2.60%), *C. kefyr* and *C. parapsilosis* (0.87%) each.

**Conclusion:** The accurate species identification of *Candida* is important for the treatment, as not all species respond to the same treatment and also because of the problem of anti-fungal resistance. Hicrome Candida differential agar is a convenient and rapid method of identification of *Candida* species even in resource limited poor settings.

**Keyword:** *Candida albicans*, Non *albicans* *Candida* species, Hicrome Candida differential agar and Conventional method.

## INTRODUCTION

*Candida* is an asexual, dimorphic fungus which is present in the human body and his surroundings. Candidiasis has emerged itself as an alarming opportunistic disease due to increase in the number of immunocompromised, aged, receiving prolonged antibacterial and aggressive cancer chemotherapy or undergoing invasive surgical procedures and organ transplantation patients.<sup>1</sup> Among *Candida* species, *Candida albicans* is generally considered as the major pathogen. An increase in the prevalence of non-*albicans* *Candida* species has been noted during the last decades.<sup>2,3</sup>

It has become important to identify yeast isolated from various clinical specimens to the species level.<sup>4</sup> Species identification of *Candida* isolates is conventionally done by germ tube test, inoculation on corn-meal agar, sugar assimilation and fermentation tests. Newer methods which have been de-

veloped for yeast identification include CHROM agar, API systems, Vitek 2 ID system and molecular methods.<sup>5-7</sup> Study of colony morphology on cornmeal agar, sugar fermentation and assimilation tests are time consuming and labour intensive.<sup>8,9</sup> Several brands of chromogenic media have been developed to produce rapid yeast identification. These media contain chromogenic substrates that react with enzymes secreted by microorganisms producing colonies with various pigmentation. These enzymes are species specific, allowing organisms to be identified to the species level by their colour and colony characteristics.<sup>10</sup> Hicrome Candida differential agar (Himedia, Mumbai, India) is one such chromogenic medium which is introduced by Himedia laboratory to differentiate *Candida* species namely *C. albicans*, *C. krusei*, *C. tropicalis*, and *C. glabrata* based on colony color.<sup>11</sup> Non *albicans* *Candida* like *C. tropicalis*, *C. krusei*, *C. glabrata* and *C. parapsilosis* are less susceptible to azoles, particularly fluconazole.<sup>12</sup> Therefore, correct identification of *Candida* species is of great importance, as it presents prognostic and therapeutic significance, allowing an early and appropriate antifungal therapy. Thus, the present study was undertaken for species identification of *Candida* isolates in various clinical specimens and to evaluate utility of Hicrome Candida Differential Agar to differentiate *Candida* species isolated from various clinical samples on the basis of coloration and colony morphology.

## MATERIAL AND METHODS

The present study was laboratory based carried on clinical isolates of *Candida* species. The study was carried out in the Department of Microbiology, MGM's Medical College and Research Centre, Aurangabad, Maharashtra after approval by institutional Ethical Committee. A total of 115 *Candida* species were isolated from various clinical specimens received in the Department of Microbiology, Tertiary Care Centre were taken up for the study over a period of one year i.e. from January 2014 to December 2014.

### Isolation and identification of *Candida* species

All the clinical samples were screened for budding yeast like cells by direct microscopy of wet mount, gram stain, 10% KOH preparation and Gram stain of a colony on routine

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culture media. All the *Candida* isolates were subcultured on Sabouraud's Dextrose Agar with Chloramphenicol and incubated at 25°C and 37°C. The *Candida* isolates were further speciated by standard protocol that include germ tube test, chlamydospore formation on corn meal agar, sugar fermentation and sugar assimilation test.<sup>13-16</sup> Simultaneously the *Candida* species were inoculated on HiCrome Candida differential agar and incubated at 37°C for 24 to 48 hours and the species were identified by type and colour of the colonies on Hicrome Candida differential agar media as per manufacturer's instruction.<sup>11,13</sup>

**Colony morphology of *Candida* species on HiCrome Candida differential agar**

- i. *Candida albicans*: light green coloured smooth colonies
- ii. *Candida tropicalis*: blue to metallic blue coloured raised colonies
- iii. *Candida glabrata*: cream to white smooth colonies
- iv. *Candida krusei*: purple fuzzy colonies

We used ATCC strains of *Candida albicans* ATCC 10231, *Candida glabrata* ATCC 15126, *Candida krusei* ATCC 14243 and *Candida tropicalis* ATCC 750 as control.

**RESULT**

A total of 115 *Candida* species were isolated from various clinical specimens processed during the study period. *Candida albicans* was the commonest species isolated 47 (40.9%) followed by *C. tropicalis* 46 (40%), *C. guilliermondii* 12 (10.43%), *C. krusei* 5 (4.34%), *C. glabrata* 3 (2.60%), *C. kefyri* 1 (0.87%) and *C. parapsilosis* 1 (0.87%). Isolation rate of non *albicans* *Candida* species was higher 68 (59.1%) as compared to *Candida albicans* 47 (40.9%) [Table No. 1]. Among the non *albicans* *Candida*, *Candida tropicalis* 46 (40%) was the commonest followed by *C. guilliermondii* 12 (10.43%), *C. krusei* 5 (4.34%), *C. glabrata* 3 (2.60%), *C. kefyri* 1 (0.87%) and *C. parapsilosis* 1 (0.87%). These 115 *Candida* isolates were also subjected to identification using Hicrome Candida differential agar. The results of conventional method and Hicrome Candida differential agar for various species are given in [Table No. 3]. There was an agreement in identification by Hicrome Candida differential agar and conventional method for four species. (i.e. *Candida albicans*, *Candida tropicalis*, *Candida krusei* and *Candida glabrata*). Three *Candida* isolates (*Candida guilliermondii*, *Candida parapsilosis* and *Candida kefyri*) were not identified by Hicrome candida differential agar. These three *Candida* species were identified by conventional methods like sugar fermentation and sugar assimilation tests. The colony morphology of *Candida albicans*, *Candida tropicalis*, *Candida krusei*, *Candida glabrata* and *Candida guilliermondii* on Hicrome Candida differential agar are shown in photograph number 1, 2, 3,4 and 5 respectively.

**DISCUSSION**

Rapid identification of yeast species are very difficult in resource-limited poor laboratories due to lack of trainings, proper reagents and equipments. The conventional methods like inoculation on corn-meal agar, biochemical assimilation and fermentation tests are not used in these laboratories due to lack of resources, expertise and time required for these

<i>Candida</i> isolates	Number of isolates	Percentage
<i>Candida albicans</i>	47	40.87%
Non <i>albicans</i> <i>Candida</i>	68	59.13%
Total	115	100%

**Table-1:** Distribution of *Candida albicans* and Non *albicans* *Candida* isolates

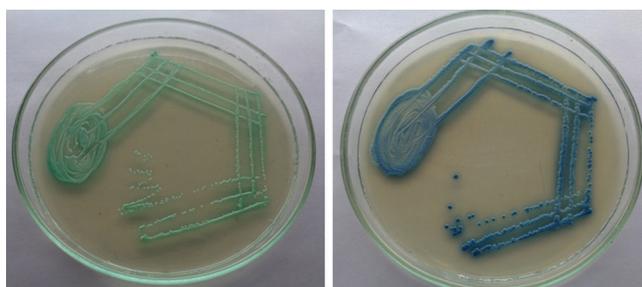
<i>Candida</i> species	Conventional method	Hicrome Candida differential agar
<i>Candida albicans</i>	47	47
<i>Candida tropicalis</i>	46	46
<i>Candida guilliermondii</i>	12	-
<i>Candida krusei</i>	5	5
<i>Candida glabrata</i>	3	3
<i>Candida kefyri</i>	1	-
<i>Candida parapsilosis</i>	1	-

'p' value – 0.864, Result – No significant difference

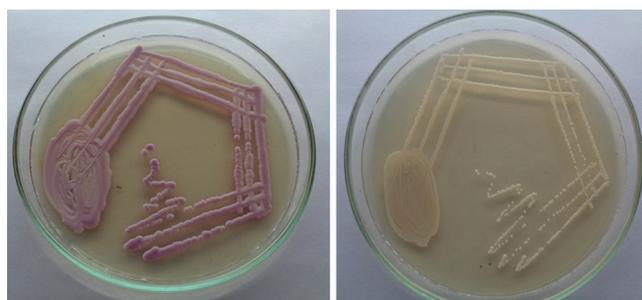
**Table-2:** Identification of *Candida* species by Conventional method and Hicrome Candida differential agar

	<i>Candida</i> species	Colony colour on HicromeCandida differential agar	No. of <i>Candida</i> -isolates. (n=115)
1	<i>Candida albicans</i>	Light green	47
2	<i>Candida tropicalis</i>	Blue	46
3	<i>Candida guilliermondii</i>	Light pink to pink	12
4	<i>Candida krusei</i>	Purple fuzzy	5
5	<i>Candida glabrata</i>	White to cream	3
6	<i>Candida kefyri</i>	Light pink	1
7	<i>Candida parapsilosis</i>	Light pink	1

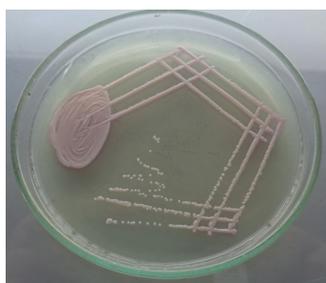
**Table-3:** Colony colour of *Candida* isolates on Hicrome Candida differential agar



**Figure-1:** Light green coloured colonies of *Candida albicans* on Hicrome Candida differential agar, **Figure-2:** Blue coloured colonies of *Candida tropicalis* on Hicrome Candida differential agar



**Figure-3:** Purple fuzzy colonies of *Candida krusei* on Hicrome Candida differential agar, **Figure-4:** Cream coloured colonies of *Candida glabrata* on Hicrome Candida differential agar



**Figure-5:** Light pink coloured colonies of *Candida guilliermondii* on Hicrome Candida differential agar

tests which increase the cost of mycology cultures. Therefore, these laboratories do not go beyond the germ tube test and limit their diagnosis to *C. albicans* or non *albicans Candida*.<sup>17</sup> As a result of which, selection of appropriate agent for antifungal therapy becomes almost impossible. Without standard diagnostic tools, a safe and effective drug treatment, prevention of resistance to antimicrobial therapy and monitoring of resistance are not possible. So, in these settings there is always a need of a medium which helps in the isolation and identification of the agent at the species level.<sup>4</sup> It is necessary to evaluate simple, cost effective and rapid method like chromogenic medium to identify *Candida* to species level. Chromogenic agar is a newer and more rapid method to speciate *Candida* species. It contains enzymatic substrates that are linked to chromogenic compounds. When a specific enzyme cleaves the substrate, the chromogenic substances produce colour. The action of different enzymes produced by yeast species results in colour variation which is useful for presumptive identification of some yeast.<sup>18</sup>

In the present study, conventional method and Hicrome Candida differential agar were used for identification of *Candida* isolates from various clinical samples and utility of Hicrome Candida differential agar was noted. *Candida albicans* produces light green colonies on Hicrome Candida differential agar. In our study, all the isolates of *Candida albicans* produced light green colonies on Hicrome Candida differential agar. This is in agreement with Sivakumar *et al* (2009),<sup>19</sup> Kumar *et al* (2013),<sup>20</sup> Sukumaran *et al* (2012),<sup>21</sup> who reported that all the isolates of *Candida albicans* produced light green colonies on Hicrome agar (HiMedia, Mumbai, India). Nadeem *et al* (2010),<sup>4</sup> also reported that *Candida albicans* produced green coloured colonies however media used was CHROMagar Candida, (France).

*Candida tropicalis* produces blue to metallic blue colonies on Hicrome Candida differential agar. In our study, all the isolates of *Candida tropicalis* produced blue colonies on Hicrome Candida differential agar. This is in agreement with Sukumaran *et al* (2012),<sup>21</sup> Manikandan *et al* (2013),<sup>22</sup> who reported that all the isolates of *C. tropicalis* produced blue colonies on Hicrome agar (HiMedia). This is also in agreement with Devi *et al* (2014),<sup>23</sup> who found that all the isolates of *Candida tropicalis* produced metallic blue coloured colonies.

*Candida krusei* produces purple fuzzy colonies on Hicrome Candida differential agar. In our study, all the isolates of *Candida krusei* produced purple fuzzy colony on Hicrome Candida differential agar. Our study is in accordance with

Deaf *et al* (2014),<sup>17</sup> who reported that all the isolates of *Candida krusei* produced purple fuzzy colonies on Hicrome Candida agar. Dharwad *et al* (2011),<sup>24</sup> also reported that *Candida krusei* produced pale pink to purple rough colonies. This is also in agreement with Omar *et al* (2010),<sup>25</sup> who reported that all the isolates of *Candida krusei* were correctly identified however the media used was CHROMagar Candida (CHROMagar Microbiology, Paris, France).

*Candida glabrata* produces white to cream coloured colonies on Hicrome Candida differential agar. In our study, all the isolates of *Candida glabrata* produced white to cream coloured colonies on Hicrome Candida differential agar. This is in agreement with Deaf *et al* (2014),<sup>17</sup> who found that *Candida glabrata* produced white to cream colonies on Hicrome Candida agar (HiMedia) This is also in agreement with Devi *et al* (2014),<sup>23</sup> Yashavanth *et al* (2013),<sup>26</sup> who found that *Candida glabrata* produced white colonies however the media used was CHROM agar.

In our study, three other species (*C. guilliermondii*, *C. kefyr* and *C. parapsilosis*) produced light pink to pink coloured colonies on Hicrome Candida differential agar leading to difficulties in identification. These species were identified by conventional method like sugar fermentation and sugar assimilation tests. This is in accordance with Sivakumar *et al* (2009)<sup>19</sup> who reported that *Candida guilliermondii*, *Candida parapsilosis*, *Candida kefyr* produced varying shades of pinkish purple-coloured colonies however the chromogenic media used was CHROMagar Candida (CHROMagar Company, Paris, France).

In our study, all the isolates *Candida* species namely *Candida albicans*, *Candida tropicalis*, *Candida krusei* and *Candida glabrata* were identified by conventional method. *Candida* isolates were inoculated on Hicrome Candida differential agar. We observed that performance of Hicrome Candida differential agar for identification of these four species was exactly paralleled that of conventional method. Similar findings were observed in various studies however they used Chrome agar for identification of *Candida* species. Devi *et al* (2014),<sup>23</sup> Vijaya *et al* (2011),<sup>27</sup> Amar *et al* (2012),<sup>28</sup> Sajjan *et al* (2014),<sup>29</sup> also reported that results of CHROM agar for identification of *Candida* species were consistent with the results of the conventional methods.

The colony colour produced by *Candida albicans*, *Candida tropicalis*, *Candida krusei*, and *Candida glabrata* were typical, this medium can be recommended for identification of these species in resource limited settings as it will not require any expertise. Use of Hicrome Candida differential agar may replace conventional methods like germ tube test, colony morphology on cornmeal agar, sugar fermentation and sugar assimilation tests there by reducing the time and expenses required for identification of common isolates of *Candida* species.

## CONCLUSION

Conventional methods like germ tube test, morphology on corn meal agar, sugar fermentation and sugar assimilation tests used for the identification of *Candida* species up to species level were very time consuming and cumbersome. The present study highlights the fact that Hicrome Candida dif-

ferential agar is useful in identification of four major isolates of *Candida* species like *Candida albicans*, *Candida tropicalis*, *Candida krusei* and *Candida glabrata* and this will also help clinician to make early decision regarding appropriate antifungal therapy thereby decreasing patient morbidity and mortality. Routine use of this media carries the potential for cost saving in the clinical microbiology laboratory and can save the time and expense of performing fermentation and assimilation tests required for identification of *Candida* species. However conventional techniques need to be performed for correct identification of *Candida* species like *Candida guilliermondii*, *Candida parapsilosis* and *Candida kefyr*.

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# Pancreatic Metastases after Renal Cell Carcinoma: A Rare Case Report

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## ABSTRACT

**Introduction:** Pancreatic metastases are not found so often following renal cell carcinoma. They are not detected usually. Only few cases have been reported till now.

**Case report:** A 58 year old gentleman having generalised symptoms was accidentally diagnosed to have tumour in the pancreas during regular follow up after being operated for nephrectomy for left renal cell carcinoma. The case discusses how the patient was successfully managed and the importance of regular follow up after malignancy.

**Conclusion:** Early diagnosis is very important in such cases for better results as most of the time tumour is detected incidentally as in these case. Surgery offers very good chances of cure.

**Keywords:** Renal cell carcinoma (RCC), pancreatic metastases, Endoscopic ultrasound.

## INTRODUCTION

Renal cell carcinoma (RCC) tend to metastasize to the pancreas representing 0.25% -3% of all resected specimens. Pancreatic metastases are usually detected during the follow up of patients having undergone a previous nephrectomy for RCC. The biology of Metastatic RCC is heterogeneous. Recurrence may present within 1year or even after more than 20 years with a slow growth pattern for metastases. RCC spreads haematogenously and 30% of patients have distant metastases or locally advanced disease at presentation.<sup>1</sup> 10% of patients have metastases to colon and pancreas.<sup>2</sup>

## CASE REPORT

We report a case of 58 years male patient incidentally discovered pancreatic mass at Sir Ganga Ram Hospital, New Delhi, when he was on regular follow up post left nephrectomy for RCC. The patient was apparently well till April 2010, when patient had generalised weakness and decreased appetite on evaluation, found to have large heterogeneously, enhancing mass with exophytic component in mid and lower pole of left kidney abutting lower pole of spleen and posterior abdominal wall and was subsequently operated for same with pre-operative embolisation, open left radical nephrectomy. Biopsy showed clear cell type cancer. Patient was on regular follow up and was relatively asymptomatic till October 2015, when on regular follow up, CECT Abdomen found to have 3 well defined arterially enhancing lesion in the head, proximal and distal body of pancreas. EUS guided FNAC suggestive of metastatic RCC or Neuroendocrine tumour. PET-CT was done which reveal non FDG avid lesion in the head and body of pancreas, appearing suspicious of malignancy, now admitted for further management. Examination: P/a: soft non-tender, no organomegaly. Blood investigations were all normal.

Number of complication: 1, Clavien grade 2, Type of complications: Fever, Charlson's co-morbidity index score.<sup>8</sup>

## Special Investigations

CECT abdomen: reveals evidence of left nephrectomy, at least<sup>3</sup> well defined arterially enhancing lesion in the head, proximal and distal body of the pancreas. They may represent neuro-endocrine lesion or metastatic disease in a known case of RCC (figure-1,2).

EUS-FNAC: 12 X 14 mm well defined hypoechoic lesion seen at the junction of body and head of pancreas. Using a 22 G FNA needle tissue was obtained from the pancreas SOL and sample sent for cytology. Pancreatic SOL – malignant FNAC: Positive diagnostic for malignancy.

PET- CECT Whole body: Non FDG avid enhancing lesion in the head and body of pancreas appears suspicious for being malignant: ? NET ? Metastases.

Operation was performed at Sir Ganga Ram Hospital New Delhi. Subtotal Pancreatectomy with splenectomy

## Operative details

1) 3x2 cm nodule in tail of pancreas was found and 3x3 cm nodule in midbody of pancreas was also present. Intra – op US: 1x0.5 cm lesion in the head of pancreas. Liver along with rest of viscera were found normal. Left nephrectomy was performed (figure-3,4).

Hospital course: Postoperatively patient was shifted to ward on Pod 1. Ryle's Tube was removed on POD 2 and patient was gradually started on diet. Patient developed fever for which patient was started on IV antibiotics according to culture and sensitivity report. Patient developed colicky pain in abdomen for which patient was kept on liquid diet for one day and was restarted on diet gradually again. Drain was removed on POD.<sup>4</sup> Now patient is being discharged in stable condition for further follow up in OPD.

**Histopathology:** Metastatic Renal (clear) cell carcinoma of pancreas.

Section examined from pancreatic nodules show a metastatic tumor. Tumor is composed of nests and acini of tumor. Cells separated by thin fibrous septae. Cells are polygonal with abundant clear cytoplasm. Nuclei are small. Retropancreatic and pancreatic neck resection margins are free of tumor.

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Section from spleen show expansion of red pulp, which is congested. Multiple splenunculi ae seen. Two lymph nodes resected are free of tumor.

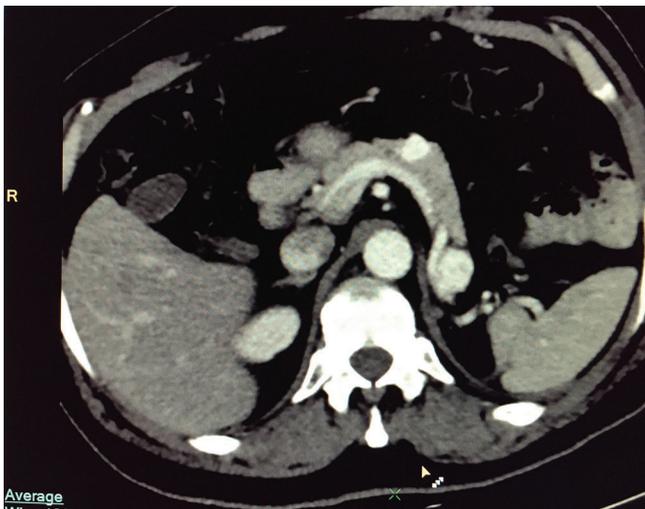
**DISCUSSION**

Lung cancer was the most common source of metastasis to the pancreas followed by Lymphoma and Carcinoma of the gastrointestinal tract, kidney and breast. Pancreatic metastases from Renal cell carcinoma may be solitary or may form polypoid lesions in the pancreatic ducts in the ampulla. They may manifest after years or decade after the original diagnosis was established. Resection of these secondary tumours, particularly after RCC is associated with relatively good survival rates.<sup>3</sup> MDCT can reliably detect pancreatic involvement of RCC,. The arterial phase is necessary to detect pancreatic involvement of RCC. The pattern of presentation is nearly constant helping to differentiate pancreatic metastases from pancreatic adenocarcinoma.<sup>4</sup> EUS is widely accepted and helpful as the test of choice for imaging and sampling of pancreatic masses.<sup>5</sup> EUS can also

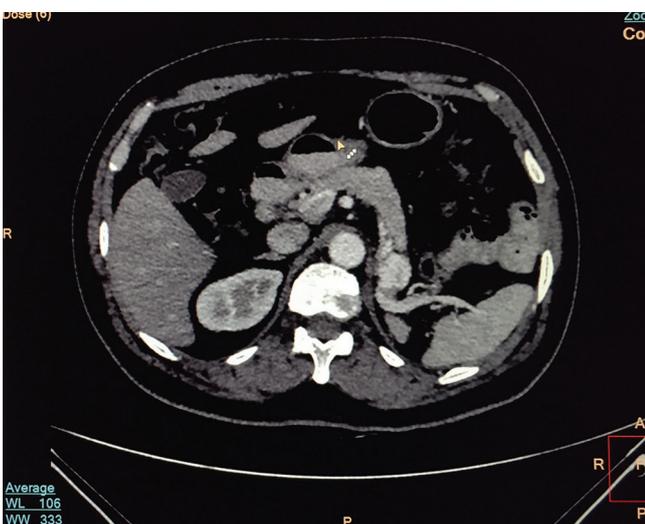
assess vascular invasion and lymphnode invasion, which is helpful in patient management and to decrease complications and mortality.<sup>5,6</sup>

Surgical treatment of metastatic pancreatic lesion after RCC may involve a standard whipple’s or distal pancreatectomy depending on the location of the secondary deposit. Many authors have adviced for atypical resection of pancreatic metastases from RCC such as duodenum preserving pancreatic head resection, Middle pancreatectomy and enucleation of the tumour.<sup>7,8</sup>

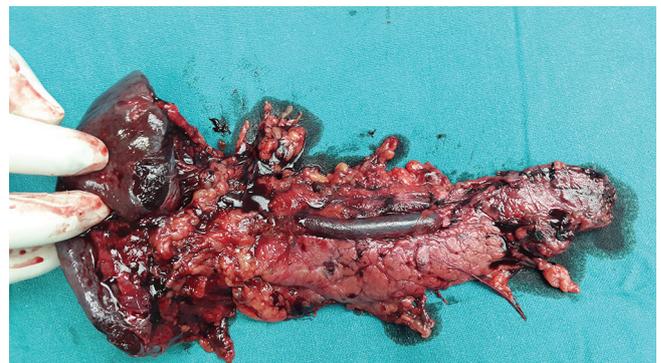
Pancreatic resection has been associated with high morbidity and mortality. However many recent reports, confirm the mortality associated with pancreatic resection has decline over the past three decades..Mortality rate is 1-2% and morbidity rate is 38.3%.<sup>9</sup> For that matter, complications were further analysed by stratification on the basis of severity using the classification system proposed by Dindo and colleagues... With this analysis, most complications were deemed to be grade 1 requiring only pharmacological intervention. Grade 4 complications were seen in only 6% of patients and consisted of sepsis related to post-operative pancreatic fistulae.<sup>9</sup> The effectiveness of pancreatic metastasectomy is dependant on the tumour biology of the primary cancer. Renal cell carcinoma is associated with the best outcome with around 66% 5 year survival.<sup>9</sup> Factors associated with good prognosis include, long disease free interval after resection of primary tumour, a single metastatic deposit with central necrosis and



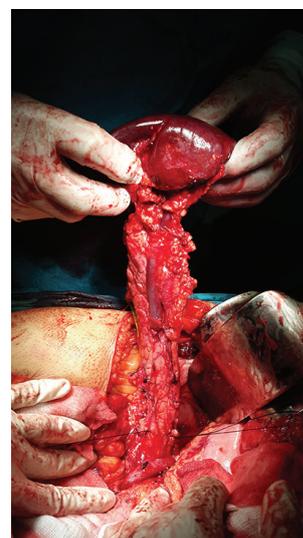
**Figure-1:** Arterial enhancement showing intensively the lesion in the pancreas



**Figure-2:** Nonenhancing phase showing bulge anteriorly in the pancreas



**Figure-3:** Specimen: pancreas with spleen



**Figure-4:** Intraop: pancreas with spleen

complete excision of the secondary deposit with histologically negative margins.<sup>10</sup>

## CONCLUSION

Pancreatic metastasis from RCC are rare and may be the only site of metastasis. They may present many years after radical nephrectomy of primary RCC. Sometimes the lesions are detected accidentally during routine follow up. The best outcome for pancreatic metastasectomy is for renal cell cancer compared to pancreatic metastases from neoplasms other than RCC..Complete resection of the tumour gives the best chances of cure. Local recurrence or a new site of tumour development in the pancreas may be actively treated with a total pancreatectomy. Patients with a history of RCC should undergo long-term follow up to detect and evaluate metastases to pancreas and other organs.Surgical resection must be discussed as it offers long term survival..

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# A Histopathological Audit of Hysterectomy: Experience at A Tertiary Care Teaching Hospital

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## ABSTRACT

**Introduction:** Rates of hysterectomy vary according to geographic distribution, patient expectations and training and practice patterns of the local gynaecologic surgeons. We present a retrospective study where one year data of all hysterectomy cases sent for histopathology were analysed to find out the causes for which these surgeries were performed and also the spectrum of histopathological changes encountered in these specimen.

**Material and methods:** A descriptive study was conducted for the period of one year in the Pathology Department of Assam Medical College and hospital. All cases of hysterectomy sent to the pathology department were included in the study. The clinical history of all cases were collected from records and slides stained with hematoxylin and eosin were re examined. Pathological findings in the uterus, cervix, ovaries and tubes were noted.

**Results:** Of the 150 cases studied, the most common age group undergoing hysterectomy appeared to be 40-49 yrs (74cases) followed by 30-39 years (39 cases). Mean age was found to be 40.26 years. Most common findings in the uterus included leiomyoma (39 cases), and adenomyosis (39 cases). Chronic cervicitis was the most common finding in cervix. In the ovaries, benign cystic lesions included follicular cyst (42 cases), luteal cyst (27 cases), hemorrhagic cyst (where the lining could not be delineated) in 5 cases, benign cystic teratoma (5 cases). There were 6 patients with serous cystadenoma, 1 borderline serous tumor and 5 cases of papillary serous cystadenocarcinoma, 1 case of mucinous cystadenoma, 3 cases of mucinous cystadenocarcinoma and a single case of Krukenberg tumor.

**Conclusion:** The most common indication for hysterectomy in our setting is excessive uterine bleeding. Fibroid uterus was the most common pathology for which hysterectomy was performed. Chronic cervicitis was the most common incidental finding. Adenomyosis remained the most common problem which was missed preoperatively.

**Keywords:** hysterectomy, histopathology

## INTRODUCTION

Hysterectomy, which means surgical removal of the uterus is the second most frequently performed major surgical procedure in females worldwide next to cesarean section.<sup>1</sup> Indications of hysterectomy vary from benign condition to malignancies of genital tract. Since early twentieth century it is considered definite treatment of various pelvic pathologies like leiomyoma, dysfunctional uterine bleeding (DUB), chronic pelvic pain, endometriosis, adenomyosis, prolapse, and malignancies.<sup>2</sup> Rates of hysterectomy vary with geographic area, patient expectations and training and practice patterns of the local gynaecologic surgeons. However, like any other surgery, hysterectomy is also associated with intra-

operative and postoperative complications. It has led to a lot of debate owing to physical, emotional, economic, sexual, and medical significance to women.<sup>3</sup> We present a retrospective study where one year data of all hysterectomy cases sent for histopathology were analysed to find out the causes for which these surgeries were performed and also the spectrum of histopathological changes encountered in these specimen.

## MATERIAL AND METHODS

A descriptive study was conducted for the period of one year in the Pathology Department of Assam Medical College and hospital. All cases of hysterectomy sent to the pathology department of Assam Medical College and hospital were included in the study. Study period was 1 year and sample size was 150. All elective as well as emergency hysterectomies (including obstetric hysterectomies) were analysed and included in the study sample excluding oncological hysterectomies. The clinical history of all cases during this period were collected from records and slides stained with hematoxylin and eosin were re examined. Pathological findings in the uterus, cervix, ovaries and tubes were noted. At the end main postoperative histopathology diagnosis was recorded. Preoperative indication was compared with pathologist's report after surgery.

## STATISTICAL ANALYSIS

SPSS version 21 was used to generate tables. Only descriptive statistics were used to infer results.

## RESULTS

Of the 150 cases studied, the most common age group undergoing hysterectomy appeared to be 40-49 yrs (74 cases) followed by 30-39 years (39cases). Mean age was found to be 40.26 years. Hysterectomy below 20 years and above 70 years was rare (1 case each). The most common complaint was uterine bleeding, followed by abdominal distension and mass.

Histopathological findings in the uterus included leiomyoma (39 cases) [Fig 1], adenomyosis (39 cases) [Fig 2], atrophic endometrium was seen in 34 cases of which 4 cases showed

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cystic atrophy of endometrial glands, endometrial hyperplasia (29 cases), endometrial polyp (6 cases) and endometritis (1 case). Of the cases showing endometrial hyperplasia, 3 cases of complex hyperplasia and 26 cases showing simple hyperplasia were noted. 2 of these showed atypia, 2 showed cystic hyperplasia.

Among cervical lesions, 120 cases showed features of chronic cervicitis. Cervical adenosis was seen in 9 cases, polyp in 5 cases, squamous metaplasia of endocervical glands was seen in 7 cases, cervical dysplasia in 5 cases, squamous cell carcinoma and cervical fibroid in 1 case each.

On examination of the ovaries, benign cystic lesions included follicular cyst (42 cases), luteal cyst (27 cases), hemorrhagic cyst (where the lining could not be delineated) in 5 cases, benign cystic teratoma (5 cases) [Fig 3]. There were 6 patients with serous cystadenoma, 1 borderline serous tumor and 5 cases of papillary serous cystadenocarcinoma (of which 4 cases were in right ovary and 1 case was bilateral) [Fig 4]. We observed 1 case of mucinous cystadenoma, 3 cases of mucinous cystadenocarcinoma (2 in right ovary, 1 in left) and a single case of Krukenberg tumor.

Fallopian tube pathology included chronic salpingitis (14 cases), hydrosalpinx (3 cases), dysplasia (1 case), tubercular granuloma (1 case) and ectopic pregnancy (1 case).

Ratio of benign to malignant lesions in total hysterectomy specimen were 14:1. Most of the malignancies were in the ovary. Right ovary was more commonly involved by malignant disease as compared to the left. Although endometrial carcinoma is quite common in endometrial biopsies, no case of endometrial carcinoma was recorded in the hysterectomy specimen.

**DISCUSSION**

It is observed that more than 90% of gynaecological surgeries are performed for benign conditions with the major objective of improving the patient’s quality of life.<sup>4</sup> In our study, a total of 150 hysterectomies were performed over a period of 1 year. Most of these were for benign causes (93.3%) and 6.6% only were for malignant cause. Uterine fibroid was the most

common indication in our cases, which correlates with the findings in several other studies. Most common incidental finding was chronic cervicitis. Cervical dysplasia was seen in 5 cases and a single case of squamous cell carcinoma was reported in our study.

Uterine leiomyoma and adenomyosis were the two most common pathological findings after chronic cervicitis. A similar pattern has been reported in various other studies.<sup>5-7</sup>

Age group(in years)	Total no. of cases	Percentage
10-19	1	0.66%
20-29	9	6%
30-39	39	26%
40-49	74	49.33%
50-59	14	9.33%
60-69	12	8%
70-79	1	0.66%

**Table 1:** Age wise distribution of cases

Histopathological Finding	Total cases	Percentage
Leiomyoma	39	26%
Adenomyosis	39	26%
Atrophic endometrium	34 (4 cases – cystic atrophy)	22.7%
Endometrial hyperplasia	29	19.3%
Endometrial polyp	6	4%
Endometritis	1	0.7%

**Table-2:** Histopathological findings in uterus

Histopathological Finding	Total cases	Percentage
Cervical adenosis	9	6%
Squamous metaplasia of endocervical glands	7	4.7%
Cervical polyp	5	3.3%
Cervical dysplasia	5	3.3%
Squamous cell carcinoma	1	0.7%
Cervical fibroid	1	0.7%

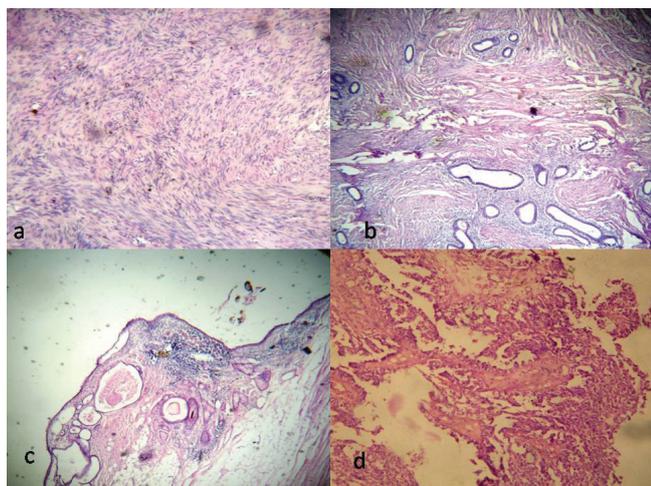
**Table-3:** Histopathological findings in cervix

Histopathological Finding	Total cases	Percentage
Follicular cyst	42	28%
Luteal cyst	27	18%
Serous cystadenoma	6	4%
Serous cystadenocarcinoma	5	3.3%
Benign cystic teratoma	5	3.3%
Mucinous cystadenocarcinoma	3	2%
Mucinous cystadenoma	1	0.7%
Borderline serous	1	0.7%
Krukenberg tumor	1	0.7%

**Table-4:** Histopathological findings in ovaries

Histopathological Finding	Total cases	Percentage
Chronic salpingitis	14	9.3%
Hydrosalpinx	3	2%
Dysplasia	1	0.7%
Ectopic pregnancy	1	0.7%
TB granuloma	1	0.7%

**Table-5:** Histopathological findings in fallopian tubes



**Figure-1:** (a) showing histopathological structure of uterine leiomyoma (40X); (b) showing endometrial glands deep inside the myometrium- adenomyosis (10X); (c) showing microscopic picture of benign cystic teratoma (10X); (d) showing picture of serous cystadenocarcinoma (10X)

More than 50% of women presenting with menorrhagia are seen to have fibroid during their reproductive life. Several studies have reported uterine fibroid as the most frequent pathological lesion with the frequencies ranging from 25-48% in local studies.<sup>5,8-10</sup>

Excessive menstrual bleeding was the main indication for hysterectomy. Adenomyosis was the most common finding missed preoperatively. This agrees with the findings of Tiwani et al.<sup>11</sup> and Siwath et al.<sup>12</sup> Higher degree of suspicion and better technique may help in diagnosing the missed indications. The mention of all findings on histopathology request forms is important to correlate the pre and postoperative findings and justify the decision for hysterectomy.

Ovarian tumors were observed in 11.3% of the hysterectomy cases. Most common were serous cystadenomas followed by serous cystadenocarcinoma. Mucinous tumors were less common in our study. In the study by Siwath et al. serous and mucinous cystadenomas were seen in equal frequency. Benign ovarian tumors in our study were slightly more common (12 cases) than malignant tumors (9 cases) with one case in borderline category.

Fallopian tube pathology in our study included chronic salpingitis, hydrosalpinx, dysplasia, tubercular granuloma and ectopic pregnancy.

Mean age of patients undergoing hysterectomy was 42.6 years. Sirpurkar et al reported a mean age of 46 years<sup>13</sup> Peak age group in our study was 40-49 years, followed by 30-39 years. Several other studies also have shown that majority of hysterectomies occur in the fifth decade.<sup>5,6,14</sup>

Majority of pre operative diagnosis were confirmed on hysterectomy. Those missed were mainly patients with dysfunctional uterine bleeding where histopathology revealed adenomyosis, small leiomyomas and endometrial hyperplasia.

## CONCLUSION

The most common indication for hysterectomy in our setting is excessive uterine bleeding. Fibroid uterus was the most common pathology for which hysterectomy was performed. Chronic cervicitis was the most common incidental finding. Adenomyosis remained the most common problem which was missed preoperatively and diagnosed on histopathological examination. Analyzing the indications for hysterectomy with the pathologic/surgical findings can help recognize malpractice and lacunae in the knowledge or training of health care service providers or non availability of newer alternatives for hysterectomy. We want to stress on fact that uterus should not be considered for child bearing purposes only, as after hysterectomy females suffer from various psychosexual dysfunctions and the operation should be performed only in presence of proper indications and in the non availability of other treatment options.

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# Clinical Analysis and Voice Handicap Index -10 (VHI-10) of Patients with Vocal Cord Polyps and Nodules

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## ABSTRACT

**Introduction:** Vocal polyps and nodules are benign lesions of vocal cords. These lesions have significant influence on quality of life of patients. Mainly these lesions present as hoarseness of voice with vocal demand and abuse as significant precipitating factor. Objective of the study was to analyze clinical and demographic profile and VHI-10 of patients with vocal cord polyps and nodules.

**Material and Methods:** A total of 50 patients with clinical diagnosis of vocal polyp or nodule were studied. All cases were analyzed clinically. History, laryngeal examination (Indirect laryngoscope and fibro-optic laryngoscopy) and patient self reporting questionnaire (VHI-10) was taken from every patient.

**Results:** Total 50 cases with Male: Female ratio of 1.5:1 were analyzed. Age of patients ranged from 14 to 65 years and majority of patients with vocal polyps and nodules presented in 4<sup>th</sup> decade. Voice demanding profession was presented in 46% of cases. Apart from voice demanding profession, other form of voice abuse, smoking and laryngopharyngeal reflux disease were other predisposing factors in 54%, 30% and 34% of patients respectively. Vocal polyps and nodules were roughly in equal ratio 26:24. Over all mean ( $\pm$  SD) of VHI-10 was 11.16 $\pm$ 6.68. In male, it was 10.2 $\pm$ 5.91 and in female, it was 12.60 $\pm$ 7.63.

**Conclusion:** Vocal polyps and nodules are benign lesions of vocal cords with male predominance and voice demand/abuse acts as significant precipitating factor and have a significant impact on patients quality of life.

**Keywords:** Vocal cord polyp, vocal nodule, vocal handicap index-10.

## INTRODUCTION

Vocal cord polyps and nodules are the most common benign lesions of true vocal cords. Vocal polyps are usually solitary and vocal nodules are usually bilateral. Both arise from the edge of the vocal folds.<sup>1</sup> Phono trauma is an important etiological factor in both. Phonotrauma include vocal overuse (voice demanding profession) or vocal abuse. Voice abuse is characterized by forced voice production due to strain in the head, neck and shoulder region producing a hoarse quality of voice.<sup>2</sup> Since both lesions usually cause hoarseness of voice and thus interfere in day to day activities. Vocal handicap index-10 is easily self administered and scored, quickly at the time of evaluation while preserving original VHI's utility and validity.<sup>3</sup>

Aim of the research was to analyze clinical and demographic profile and VHI-10 of patients with vocal cord polyps and nodules.

## MATERIAL AND METHODS

This prospective study was carried in Department of ENT,

GMC Srinagar for one year from July 2014 to June 2015 on 50 patients with clinical diagnosis of vocal polyps and nodules. Consecutive sampling method was used in selecting the study group and all the patients were selected based on inclusion and exclusion criteria. Patients with age less than 10 years were excluded. Also patients with super-added secondary muscle tension dysphonia on vocal polyp and vocal nodule were excluded. Patients with malignancy on histopathological examination were also excluded. After taking clinical history, (sex, age, precipitating factors and occupational voice demand) laryngeal examination (indirect laryngoscopy or fibro-optic laryngoscopy or both) was done. The impact of benign lesions on patients quality of life was read using voice handicap index-10. Patients self-reporting tool i.e. voice handicap index-10 was taken from every patient (appendix-1). Before the start of the study ethical clearance was sought from ethical committee of GMC and written informed consent was taken from all the subjects and method of study was explained properly in local language.

## STATISTICAL ANALYSIS

SPSS version 21 was used to generate tables and graphs. The data collected was analyzed by descriptive statistics.

## RESULTS

A total of 50 cases with male: female ratio of 1.5:1 were included in the study. The maximum number of cases were seen in the 4<sup>th</sup> decade i.e. 31-40 years. The ratio of vocal polyps to vocal nodules was roughly equal in both sexes. (Table 1, fig 1). Voice demanding profession was found in 23 (46%) cases. Other form of voice demand (apart from voice demanding profession) was found in 27 cases (52%). Addiction (smoking ) was found in 15 cases (30%). Symptoms of Laryngo-pharyngeal reflux (LPR) were found in 17 cases (34% cases), voice demanding profession and addiction (smoking) was found more in males in comparison to females (Table 2). Voice handicap index-10 was used to assess the impact of voice complaint on patients quality of life. The mean VHI-10 in total was 11.16 $\pm$ 6.68. The VHI-10 was more in female patients as compared to males. Table 3

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**DISCUSSION**

In our study, male preponderance is seen with male:female ratio of 1.5:1 which is in-concurrence with the studies done by Reddy DS et al and Pawan Singhal et al which showed male:female ratio of 2.12:1 and 2.5:1 respectively.<sup>4,5</sup> Maximum cases (50%) presented in the age group of 31 to 40 years. Again it is in-concurrence with the study of Reddy DS et al and Ruma Gupta et al which showed maximum cases 32% and 40% respectively in this age group.<sup>4,6</sup> The reason for the above two findings i.e. male preponderance and 4<sup>th</sup> decade is that this group is the most active and productive portion of society involved in various social, economical and professional works.

In our study, vocal polyp outnumbered vocal nodules. Various studies on benign vocal cord lesions had showed same results.<sup>4,6</sup> But few studies like study done by Hiren D Sone et al and Sambu Baitha et al showed vocal nodules outnumbering vocal polyp.<sup>7,8</sup> Reason may be different populations studied from different states and difference in their life-styles. In the present study, vocal demand (professional and non-professional) and smoking were predisposing factor in about 65% of cases. Study done by Hiren D Soni et al. also showed vocal abuse (40%) and smoking (23.33%) as most common predisposing factors.<sup>7</sup> Non-professional voice demand include the voice-demand of patients in their families and other day today non-professional activities. Laryngopharyngeal reflux was precipitating factor in about 1/3<sup>rd</sup> of cases. Studies have shown that triad of voice abuse, smoking and LPR in causation of vocal fold lesions (nodules and polyps).<sup>1,9</sup>

In our study, Vocal Handicap Index-10 was used to assess the impact of voice complaint on patients quality of life. It is easily self administered and scored quickly at the time of evaluation while preserving original VHI's utility and validity.<sup>3</sup> Scoring of VHI-10 is from 0 upto 40. In total (both males and females), the mean score was 11.16 with standard deviation of 6.68 and females have more VHI-10 score as compared to males. Arffa RE et al studies normative values of VHI-10 and conclude VHI-10 score greater than 11 as abnormal.<sup>11</sup> Xuakeun Huang et al. also performed VHI- analysis of vocal polyps and vocal nodules and total vocal handicap index-30 was 36.83±21.32 in vocal polyps and 38.00±20.78 in vocal nodules.<sup>10</sup> All the patients were managed either conservatively (medical and voice therapy) or surgically (micro-laryngeal surgery MLS) or both according to pathology diagnosis.

**CONCLUSION**

Vocal cord polyps and nodules are benign lesions of vocal cords and found most commonly in fourth decade of life with male predominance. Vocal polyps outnumbering vocal nodules with voice-demand (professional/ non-professional), LPR and smoking as important triggering (precipitating) factors. Both benign lesions have impact on quality of life which can be measured using voice-handicap index-10. Prevention by voice hygiene and treatment by medical and surgical procedures (MLS) can have excellent impact on prognosis.

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Age Group (Years)	Total No. of Cases	Males	Females
11 – 20	4 (8%)	2 (4%)	2 (4%)
21 – 30	11 (22%)	4 (8%)	7 (14%)
31 – 40	25 (50%)	14 (28%)	11 (22%)
41 – 50	6 (12%)	6 (12%)	0 (0%)
51 – 60	3 (6%)	3 (6%)	0 (0%)
61 – 70	1 (2%)	1 (2%)	0 (0%)

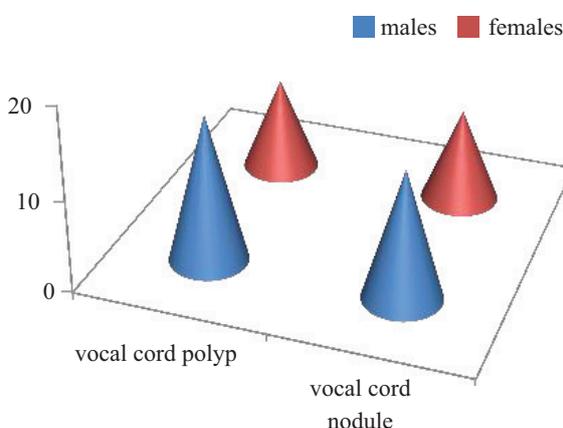
**Table-1:** Demographic Profile Of Study Group Patients

Precipitating Factors (Etiological Factors)	Total No. Of Cases	Males	Females
Professional voice users/ Voice demanding profession	23 (46%)	22 (44%)	1 (2%)
Non-professional voice users (Other form of voice demand)	27 (54%)	10 (20%)	17 (34%)
Addiction (smoking )	15 (30%)	12 (24%)	3 (6%)
Symptoms suggestive of LPR	17 (34%)	12 (24%)	5 (10%)

**Table-2:** Distribution on Basis of Etiological Factor.

Mean VHI-10 scoring ± Standard Deviation Total	Mean VHI-10 scoring ± Standard Deviation Males	Mean VHI-10 scoring ± Standard Deviation Females
11.16 (± 6.68)	10.20 (± 5.91)	10.60 (± 7.63)

**Table-3:** Patient self-reporting questionnaire (Voice handicap index-10)



**Table-2:** Distribution on Basis of Etiological Factor.

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### Appendix I

#### Voice Handicap Index (VHI-10)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Instructions: These are statements that many people have used to describe their voices and effects of their voices on their lives. Circle the response that indicates how frequently you have the same experience.

	<b>0 = never</b>	<b>1 = almost never</b>	<b>2 = sometimes</b>	<b>3 = almost always</b>	<b>4 = always</b>
1. My voice makes it difficult for people to hear me.	0	1	2	3	4
2. I run out of air when I talk.	0	1	2	3	4
3. People have difficulty understanding me in a noisy room.	0	1	2	3	4
4. The sound of my voice varies throughout the day.	0	1	2	3	4
5. My family has difficulty hearing me when I call them	0	1	2	3	4
6. I use the phone less often than I would like to.	0	1	2	3	4
7. I'm tense when talking to others because of my voice.	0	1	2	3	4
8. I tend to avoid groups of people because of my voice.	0	1	2	3	4
9. People seem irritated with my voice.	0	1	2	3	4
10. People ask, "What's wrong with your voice?"	0	1	2	3	4
TOTAL SCORE .....					

# Assessment of Operative Predictors for Difficulty in Laproscopic Cholecystectomy

Ayanat Husain<sup>1</sup>, Saurabh Pathak<sup>2</sup>, Huma Firdaus<sup>1</sup>

## ABSTRACT

**Introduction:** Laparoscopic cholecystectomy from the day of its introduction has aimed at improving the results of traditional surgical treatment and is regarded as gold standard treatment in cholecystitis. The study was aimed to assess various operative predictors for difficult laproscopic cholecystectomy.

**Material and methods:** The present prospective study was conducted over 108 patients with diagnosis of cholelithiasis confirmed by abdominal ultrasonography (USG). Surgical procedure was categorized postoperatively into easy, difficult and very difficult surgical procedure on the basis of time taken in minutes, bile/stone spillage, injury to duct and conversion to open cholecystectomy. Data so obtained was analyzed using SPSS-16 data analysis software. Chi square test was used for statistical analysis with  $p < 0.05$  as significant value.

**Results:** The present study found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures. Conversion to open cholecystectomy was seen in 19 (17%) patients.

**Conclusion:** Patient characteristics indicates a type of laproscopic cholecystectomy procedure i.e. easy, difficult or very difficult. Pre-operative prediction of a difficult laproscopic cholecystectomy can help the surgeon to better prepare for risk factors or intra-operative complications and can help to predict the risk of conversion to open cholecystectomy.

**Keywords:** Cholelithiasis; Laparoscopic cholecystectomy; risk factor

en more than normal are regarded as difficult.<sup>4</sup> The present study was commenced to identify the factors that can predict difficulty in laproscopic cholecystectomy and thus complications can be prevented beforehand.

## MATERIAL AND METHODS

The present prospective study was conducted over 108 patients aged between 35 to 60 years who underwent a laproscopic cholecystectomy for cholecystitis over a period of 3 years in our institute. Ethical approval was taken from the concerned institutional committee for the commencement of study. Informed consent was taken from the patients. Detailed clinical history was obtained that included demographic data consisting of age, sex and obesity, history of previous acute attacks, fever and co morbid diseases (hypertension, any cardiovascular disease, etc). Diagnosis of cholelithiasis was confirmed in patients presenting with abdominal symptoms was done using an abdominal ultrasonography (USG) and the patients who agreed to take part in the study, were randomly selected among them. Leukocyte count, preoperative liver function tests, and other laboratory findings were evaluated. Cholecystectomies were performed by experienced surgeons in the standard four-port technique. All patients were placed on intravenous antibiotics upon admission which was continued after surgery. All the intraoperative events were recorded and timings were noted from the first port site incision until the last port closure. Surgical procedure was categorized postoperatively into easy, difficult and very difficult surgical procedure on the basis of time taken in minutes, bile/stone spillage, injury to duct and conversion to open cholecystectomy (Table 1 as described by Randhawa JS et al<sup>5</sup>). The first port (10-mm cannula) was inserted in the subumbilical region and three 5–10 mm ports were inserted along the subcostal margin under direct vision at midline, midclavicular and anterior axillary line. Dissection of Calot's triangle and the gallbladder from the liver bed was accomplished by using monopolar electrocautery. Conversions to open cholecystectomy were carried out by median or subcostal laparotomy according to the surgeon's decision and each patient's condition. After extraction, specimen was sent for histopathological examination.

## INTRODUCTION

Cholecystectomy was considered as the surgical procedure for cholelithiasis in 1882, when its pioneer Carl Johann August Langenbuch performed the first cholecystectomy in a 43-year-old male patient who suffered from gallstone disease over past 16 years.<sup>1</sup> Laparoscopic cholecystectomy is considered as the gold standard treatment for most gallbladder diseases.<sup>2</sup> The advantages of laparoscopic cholecystectomy are earlier return to bowel function, less postoperative pain, cosmetics, shorter length of hospital stay and earlier return to full activity.<sup>3</sup>

Laparoscopic cholecystectomy (LC) though considered as safe and effective, yet can become difficult at times due to various problems faced during surgical procedure. Various problems encountered includes problem in identifying anatomy, anatomical variation, creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions and extracting the gall bladder. LC with these problems along with time tak-

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## STATISTICAL ANALYSIS

Data so obtained was analyzed using SPSS-16 data analysis software. Chi square test was used for the analysis and a p-value of less than or equal to 0.05 was considered statistically significant.

## RESULTS

LC was performed in 108 patients at our hospital out of which 33 were males and 65 were females. Patients were divided into three groups of surgeries i.e. easy, difficult and very difficult surgery groups according to criteria for laparoscopic cholecystectomy. Difficult and very difficult groups were compared surgery (table 1). The mean age of patients

Easy	Time taken for surgery <60 min, no bile spillage, no injury to duct, artery
Difficult	Time taken for surgery 60–120 min, bile or stone spillage, injury to duct, no conversion to open cholecystectomy
Very difficult	Time taken >120 min, conversion to open cholecystectomy

**Table-1:** Easy/difficult criteria for laparoscopic cholecystectomy as defined by Randhawa JS et al<sup>5</sup>

was 47±1.2 years in case of surgeries completed in time period <60 min (easy cases), 52±2.3 in case of difficult surgeries (Time taken for surgery 60–120 min) and 53±0.7 years in case of very difficult surgeries. Table 2 shows data regarding various assessed factors. 19 cases (17%) categorized into difficult surgery were converted to open cholecystectomy. The factors contributing to open cholecystectomy were inability to correctly identify anatomy, biliary tract injuries, spillage of multiple stones, increased thickness of gallbladder and fibrosis of liver parenchyma. The present study assessed various operative predictors for laparoscopic cholecystectomy and found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, Size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures (table 2 and 3).

## DISCUSSION

Laparoscopic cholecystectomy, which is the treatment of choice for gallbladder disease, is one of the most common laparoscopic surgeries performed in a general surgical unit.<sup>6</sup>

Patient Findings n=108		Easy (n=65)	Difficult (n=24)	Very Difficult (n=19)
Sex	Male (n=33)	12	13	8 (24%)
	Female (n=65)	41	11	13 (20%)
Mean Age		47±1.2	52±2.3	53±0.7
Obesity status	BMI (Non- obese) n=61	44	13	4
	BMI >30Kg/m <sup>2</sup> (Obese) n=47	21	11	15
Co morbid disease (n=53)		16	20	15
Ultrasound findings	Increased thickness of gallbladder	3	18	14
	Fibrosis of liver parenchyma	1	11	9
Previous history of acute cholecystitis or pancreatitis		9	16	15
Surgery after 72 hour of gall bladder inflammation		11	19	17
Size of calculi more than 1 cm (n=45)		14	18	13
Multiple stones (n=72)		32	22	18
Conversion to open surgery		-	-	19

**Table-2:** Comparison of patient findings with easy/difficult/very difficult criteria for laparoscopic cholecystectomy

Predictable Factors	Patients categorized into difficult and very difficult cases	Patients categorized into easy cases	p-value
Gender	Male= 21 Female=22	Male= 12 Female=41	>0.05
Age	52.5 years	47 years	<0.05
Non-obese	17	44	<0.05
Obese (BMI>30 kg/m <sup>2</sup> )	26	21	<0.05
Co-morbid diseases	35	16	<0.05
Previous history of acute cholecystitis or pancreatitis	31	9	<0.05
Surgery after 72 hour of gall bladder inflammation	36	11	<0.05
Inability to correctly identify anatomy	9	-	<0.05
Biliary tract injuries	6	-	<0.05
Spillage of multiple stones	4	-	<0.05
Increased thickness of gallbladder	32	3	<0.05
Fibrosis of liver parenchyma	8	1	<0.05
Size of calculi more than 1 cm	31	14	<0.05
Multiple stones	40	32	>0.05
Conversion to open cholecystectomy	19	-	<0.05

**Table-3:** Predictable factors for difficult and very difficult cases and statistical analysis using Chi-square test

It is regarded as the gold standard for the treatment of symptomatic cholelithiasis. The difficult gallbladder is the most common 'difficult' laparoscopic surgery being performed by general surgeons all over the world and the potential one that places the patient at significant risk. Although the complication rate are low in experienced hands, the surgeon should keep a low threshold for difficult surgeries and conversion to open surgery and it should be taken as a precaution for better care of patient rather than be looked upon as an affront to the surgeon.<sup>7</sup>

The present study was commenced to identify the factors that can predict difficulty in laparoscopic cholecystectomy and thus complications can be prevented beforehand. The present study assessed various operative predictors for laproscopic cholecystectomy and found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, Size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures. Similarly Dhanke PS et al<sup>3</sup> determined the predictive factors for difficult laparoscopic cholecystectomy and reported that high BMI, history of prior hospitalization, palpable gallbladder, impacted stone and pericholecystic collection are significant predictors of difficult laparoscopic cholecystectomy. Nachnani J et al<sup>8</sup> evaluated pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters and reported that body mass index >30 kg/m<sup>2</sup>, male gender, past history of acute cholecystitis or pancreatitis, past history of upper abdominal surgery and thickness of gall bladder wall more than 3 mm are significant predictable factors of difficult cases.

Randhawa JS et al<sup>5</sup> developed a scoring system to predict the degree of difficulty of LC preoperatively, with total 15 score from history, clinical, sonological findings. Score up to 5 predicted easy, 6–10 difficult and >10 are very difficult which was used to preoperatively define cases into easy, difficult and very difficult and results reported that prediction came true in 88.8% for easy and 92% difficult cases with factors like BMI > 27.5, previous hospitalization, palpable and thick-walled gallbladder (GB) were found of statistical significance in predicting difficult LC. Similarly, Dhanke PS et al<sup>3</sup> utilized the same scoring system and concluded that the proposed scoring system had a positive prediction value for easy prediction of 94.05% and for difficult prediction of 100%. The present utilized the same criteria of easy, difficult and very difficult cases to compare the predictable factors.

19 cases (17%) categorized into difficult surgery were converted to open cholecystectomy. The factors contributing to open cholecystectomy were inability to correctly identify anatomy, biliary tract injuries, spillage of multiple stones, increased thickness of gallbladder and fibrosis of liver parenchyma. On the contrary, Singh K et al<sup>1</sup> conducted a retrospective study over 6,380 patients underwent LC over a period of 13 years and reported 22.66% cases were identified as difficult cases. Literature reports a large variation over a rate of conversion of laproscopic method to open cholecystectomy. Oymaci et al<sup>6</sup> reported a rate of conversion of 27.9%, Nachnani J et al<sup>8</sup> reported 11.4% cases whereas Singh K et

al<sup>9</sup> reported a rate of conversion of 0.36%, Ishizaki Y et al<sup>10</sup> of 5.3% and Bakos E et al<sup>11</sup> as 5.7%.

Available data suggests that the experience of the surgeon and meticulous surgical technique are the important factors to achieve a low complication rate. The limitation of the present study was a small sample size. Further cohort studies and meta-analysis of the available literature from various regions or study groups and private or government hospitals are needed to confirm these findings.

## CONCLUSION

Laparoscopic cholecystectomy is the procedure of choice for management of symptomatic gallstone disease which could at times is an easy procedure conducted in a short time whereas occasionally, it can be a difficult procedure extending to a longer duration of time. Pre-operative prediction of a difficult laproscopic cholecystectomy can help the surgeon to better prepare for risk factors or intra-operative complications and can help to predict the risk of conversion to open cholecystectomy.

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