

A Prospective Randomized Study to Compare ProSeal LMA and Laryngeal Tube with Suction in Patients Posted for Short Duration Surgeries Under General Anaesthesia with Controlled Ventilation

Deepa Ravindra Shriyan¹, Bhaskar Murlidhar Patil², Pinakin Gujjar³, Nikhil Kamble⁴

ABSTRACT

Introduction: The Laryngeal Tube with suction and ProSeal LMA are newer airway management devices that are gaining acceptance for airway management in anaesthetized patients because of gastric drainage facility in both. We decided to compare their insertion, ventilation, haemodynamic and complication profiles.

Material and methods: Sixty adult patients were randomly allotted to a Laryngeal Tube or ProSeal LMA group. The number of attempts required for successful placement, time taken to establish effective airway, haemodynamic and ventilatory parameters and incidence of postoperative complications was compared.

Results: The LTS produced higher seal pressures (median value 29.60 cm of H₂O), as compared to PLMA (23.67 cm of H₂O), which was statistically significant ($P < 0.01$). First attempt insertion success rate with PLMA was 24 as compared with 27 with the LTS which was statistically not significant ($P > 0.05$). LTS produced a greater haemodynamic response than PLMA at insertion and at extubation. EtCO₂ showed a statistically significant rise at 20, 25 and 30 minutes after insertion of LTS and at extubation. There was no statistical significance in the difference between the incidence of dysphagia and hoarseness in both groups.

Conclusion: ProSeal LMA is a reliable and better airway management option as compared to Laryngeal Tube with suction, for patients undergoing short surgical procedures under general anaesthesia with controlled ventilation.

Keywords: Supraglottic airway device, cuff pressure, sore throat, hoarseness.

INTRODUCTION

Numerous supraglottic devices have been introduced in the past few years, in the quest to provide better alternatives to intubation of the trachea. The two supraglottic devices compared in this study are the ProSeal laryngeal mask airway (PLMA) and laryngeal tube with suction (LTS). They seem to be gaining wide acceptance among supraglottic airways as both have gastric drainage facility thus reducing the risk of airway contamination by preventing gastric insufflation of gases and diverting regurgitated gastro-oesophageal contents away from the larynx.^{1,2} LMA ProSeal can be used in spontaneously breathing patients and with positive pressure ventilation, with and without muscle relaxants. Comparative trials of the LMA ProSeal with other (supraglottic airway devices) SGAs demonstrated the superior performance of the LMA ProSeal during positive pressure ventilation, under conditions of both normal and elevated (i.e., during laparoscopic surgery) intra-abdominal pressure.³⁻⁵ LTS can also be used in a spontaneously breathing patient or with positive

pressure ventilation.

Overall, research data suggest that the LTS is a safe and effective airway device in adult patients whose lungs are mechanically ventilated.⁶

We decided to study the ProSeal LMA and LTS with the aims and objectives of comparing them with respect to anatomical sealing properties during ventilation, ease of insertion i.e. number of attempts needed and time required for successful placement, haemodynamic changes during device insertion, and the incidence of dysphagia and hoarseness after removal of the SGA.

MATERIAL AND METHODS

This study was conducted at Topiwala National Medical College and Bai Yamunabai Laxman Nair Charitable Hospital, Mumbai over a period of six months. Institutional Ethics Committee approval and the patients' written, informed and valid consent were obtained. Based on the results of previous studies, the PLMA has a seal pressure of 29 cm of water with a standard deviation of 5 cm of water.⁴ Power analysis determined that a study of 30 patients had 80% power to detect a difference in airway seal pressure of 5 cm H₂O. A randomized prospective trial was carried out on 60 adult patients posted for surgeries under general anaesthesia with controlled ventilation lasting less than two hours. Patient inclusion criteria were ASA I and II, age between 18 and 65 years, male and non-pregnant female, posted for elective surgery lasting <2 hours under controlled ventilation and with body mass index < 30 kg/m². Exclusion criteria were mouth opening <2.5 cm, known case of difficult airway, history of hoarseness, history of GERD, hiatus hernia, peptic ulcer disease and history of cervical spine disease. A thorough pre-anaesthetic evaluation was carried out in all the patients, with airway examination and scoring by Mallampati method. Patients were allocated randomly by envelope method into 2 groups: Group L (Laryngeal Tube with suction): n= 30 and Group P (ProSeal

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LMA): n= 30.

Preliminary data collected were age, sex, height, weight, heart rate, respiratory rate, blood pressure and Mallampati score. After confirming consent and NBM status, intravenous access was obtained. Monitoring included pulse oximetry, ECG, capnometry and arterial blood pressure measurement. All patients were premedicated 15 minutes prior to surgery. Patients were pre-oxygenated with 100% O₂ for 3 minutes. Insertion of SGA attempted after 3 minutes² of administration of neuromuscular blocking agent. All the supraglottic airways were inserted by anaesthesiologists with minimum 1 year experience.

The LTS was inserted as per instruction manual. Before insertion, water-soluble jelly was applied to the deflated cuff. The patient's head was extended on the neck ('sniffing position'), jaw thrust was given, the tip of the LTS was placed against the hard palate behind the upper incisors and the device was gently but firmly advanced into the oropharynx till resistance was encountered. If no resistance was felt, the LTS was positioned with the second bold line on the tube between upper and lower incisors. The cuffs were inflated using a cuff inflator to a pressure of 60 cm H₂O. A size 3 LTS was used for patients of height less than 155 cm and a size 4 for those of height between 155 and 180 cm.

The PLMA was inserted as per instruction manual. Placement was assisted with the help of jaw thrust and PLMA introducer in all cases. The back of the cuff was lubricated with hydrophilic jelly. A size 3 PLMA was used for females and a size 4 for males. The cuff was inflated using the same cuff inflator as the LTS until the intracuff pressure reached 60 cm H₂O.

If supraglottic airway device insertion was unsuccessful after two attempts, the patient was withdrawn from the study. An effective airway was defined as normal thoraco-abdominal movement and a square wave capnograph trace. Nasogastric tube of size 16 was introduced for male patients and 14 for female patients, to eliminate risk of aspiration. A leak test as recommended by placing a blob of gel on the gastric drain tube for evidence of leak was carried out in addition to checking for audible air leakage. Only in the absence of leak was the supraglottic airway device insertion considered successful. The device was fixed in place if clinically adequate ventilation was achieved. However, if ventilation was inadequate after these manoeuvres, the device was withdrawn completely and reinserted. The maximum leak pressure attained for each device was noted with the help of a cuff pressure manometer. All haemodynamic and respiratory parameters were recorded at pre-induction, 0, 5, 10, 15, 20, 25 and 30 minutes after insertion, at removal, and 1 and 24 hours in the postoperative period. Volume-controlled ventilation was maintained and at the end of procedure patients were adequately reversed. When the patient was fully awake and responding to verbal commands the device was removed and any blood on the device was noted. Oral cavity was inspected for any oozing or visible trauma. The patient was evaluated after removal of the device, for development of hoarseness of voice and dysphagia.

STATISTICAL ANALYSIS

Qualitative data that included gender, weight, ASA grade

was assessed by Chi square test and by Fisher's Exact test. Quantitative data was represented by using mean \pm SD and analyses between the groups were done by using unpaired t-test and Chi square test (statistical significance: $P < 0.001$; statistical insignificance: $P > 0.05$). A χ^2 -test or a Fischer exact test was used to compare the proportions of patients in whom first-time device insertion was successful, and complications occurring with each device. Appropriate statistical software, including but not restricted to MS Excel, PSPP was used for statistical analyses. Graphical representation was done in MS Excel 2010.

RESULTS

The observation and results of the two groups, Group P (PLMA) and Group L (LTS) are mentioned below. Sixty patients were studied. The demographic data of patients are represented in table 1 and results of the study are summarized in table 2. The insertion success rate was 80.0% and 90.0% for the first attempt for group P and group L respectively, 2 attempts were required for 20.0% in group P and 10.0% in group L. There were no failed attempts in any group. The mean time required for effective airway was 23.97 ± 5.95 seconds for group L and 19.37 ± 6.23 seconds for group P and this difference was statistically significant. Haemodynamic parameters were studied to compare the airway insertion stress response. The heart rate in the pre-operative, post-induction, at 0, 5, 10, 15, 20, 25, 30 minutes after insertion of device, at removal, and 1 and 24 hours after removal showed no statistically significant difference between the groups (figure 1). Between the two groups, the mean arterial blood pressures were compared in the preoperative period, post-induction, and at 0,5, 10, 15, 20, 25, 30 minutes after insertion of device, at removal, and 1 and 24 hours after removal of the device. A statistically significant difference in the mean arterial blood pressures was observed at 5, 10 and 25 minutes after insertion, at removal, and 1 hour after removal (figure 2). In both groups, reduction in the EtCO₂ from the value noted immediately after insertion was observed at 5, 10, 15, 20 minutes after insertion. An increase in the EtCO₂ was observed 25 minutes after insertion in group P from the value observed immediately after insertion (table 2). A statistically significant difference in EtCO₂ was found at 20, 25, 30 minutes after insertion and at removal. Dysphagia was observed postoperatively in 13.3% patients in group P and 6.7% in group L respectively which was statistically not significant. Hoarseness was observed postoperatively in 6.7% patients in group P and 3.3% in group L respectively which was statistically not significant. There was no case of pulmonary aspiration in either of the groups. There were no episodes of desaturation in either of the groups.

Males: Females	10: 20
Age (years)	39.6 (52.6 – 26.6)
Weight (kg)	53.37 (8.24)
ASA I / II	22 / 7
Duration of surgery	80.10 (111.21 - 48.99)
Table-1: Demographic characteristics. The results are given as absolute number of patients, mean or median (SD).	

	PLMA	LTS	P-value
Device insertion			
No. of patients	30	30	
Attempts (one/two/abandoned)	24 / 6 / 0	27 / 3 / 0	>0.05, not significant
Time for effective airway	19.37 (± 6.23)	23.97 (± 5.95)	<0.01, significant
Ventilation			
Airway seal pressures (cm of H2O)	23.67 (± 6.44)	29.60 (± 6)	<0.01, significant
EtCO2 (at 0 minutes)	32.53 (± 2.40)	32.80 (± 2.30)	>0.05, not significant
EtCO2 (at 5 minutes)	30.40 (± 2.59)	29.73 (± 2.98)	>0.05, not significant
EtCO2 (at 10 minutes)	28.53 (± 1.57)	28.40 (± 2.22)	>0.05, not significant
EtCO2 (at 15 minutes)	29.47 (± 1.74)	28.73 (± 2.24)	>0.05, not significant
EtCO2 (at 20 minutes)	28.97 (± 1.46)	29.80 (± 1.79)	<0.01, significant
EtCO2 (at 25 minutes)	33.47 (± 1.74)	31.13 (± 1.11)	<0.01, significant
EtCO2 (at 30 minutes)	29.47 (± 0.90)	28.73 (± 1.20)	<0.01, significant
EtCO2 (at extubation)	31.73 (± 1.95)	32.93 (± 1.68)	<0.01, significant
Patient complications			
Hoarseness	6.7	3.3	>0.05, not significant
Dysphagia	13.3	6.7	>0.05, not significant

Table-2: Results of the study. The results are presented as absolute number of patients or as median (range)

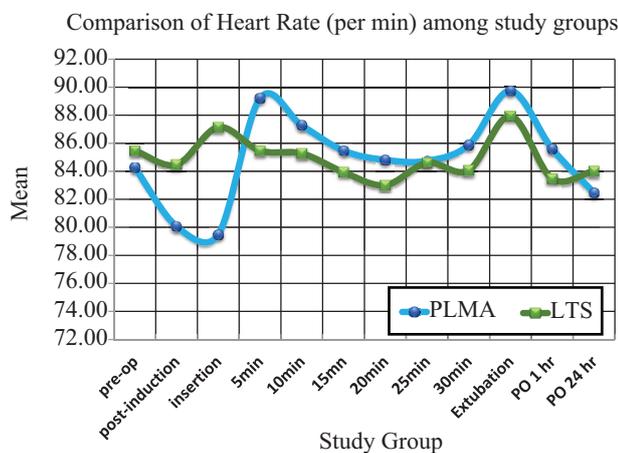


Figure-1: Comparison of heart rates among study groups

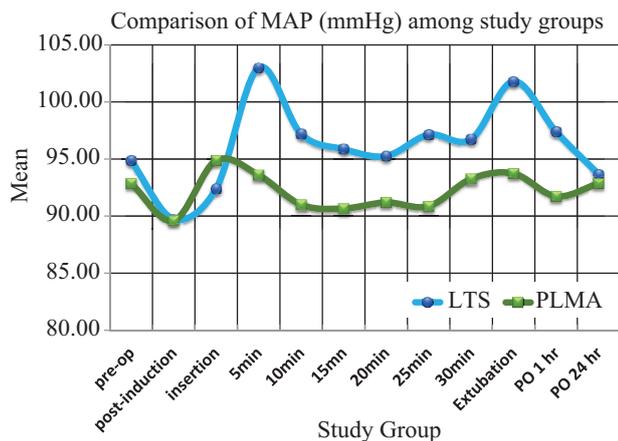


Figure-2: Comparison of mean arterial pressures among study groups

DISCUSSION

The primary outcome of this study was airway leak pressures. PLMA showed airway leak pressures of 23.67 ± 6.44 cm of H2O and LTS group showed airway leak pressures of 29.60 ± 6 cm of H2O which was found to be statistically significant but it is not clinically significant.

Cook et al⁴, in a study of 64 patients also found no clinically significant difference in the airway leak pressures between PLMA and LTS. However, Gaitini et al⁶, in a study of 150 patients that were compared for airway leak between PLMA and LTS, found that airway leak pressures were 28 ± 7 cm of H2O for PLMA and 34 ± 6 cm of H2O for LTS. They attributed performance of PLMA in terms of leak fraction to its wedge shaped ventral double cuff that efficiently adapts to various contours of the pharyngeal surface surrounding the laryngeal inlet and thus achieves an effective airway seal. On the other hand, although LTS cuff achieved a good airway seal they found that high pressures were exerted on the posterior pharynx as the LTS gets firmly wedged against the bone of the anterior cervical vertebrae to compensate for any suboptimal anatomic positioning.

In our study, for both the groups, the first time insertion success rates were comparable (80% in group P, and 90% in group L). In PLMA group, two attempts were required for six patients (20%) and three patients (10%) in the LTS group. There were no failed attempts in both groups and no patient required endotracheal intubation. Cook et al showed LTS insertion was less successful than PLMA, with more complications and greater need for manipulation. These rates for both the LTS and the LMA-ProSeal vary depending on the investigators: for the LTS it is between 80% and 100% first time success rate and between 94% and 100% within three attempts⁶⁻⁸ and for the LMA-ProSeal, it is between 76% and 100% first time and between 81% and 100% overall.^{1,6,9-13}

In our study, the time required for achieving effective airway was longer with LTS than with PLMA (19.37 ± 6.23 seconds for PLMA vs 23.97 ± 5.95 seconds for LTS) which was statistically significant. More acceptance of PLMA among anaesthesiologists might have skewed the results of time taken to insert the device in favour of PLMA as compared to LTS. In a study done by Klaver et al¹⁴ with 160 patients, they found time to establish effective airway was 55 and 53 seconds in LTA and PLMA groups respectively and this difference was not statistically significant. These times were greater than that in our study as devices were inserted by

first-month anaesthesiology residents in the Klaver study.

In our study, the changes in EtCO₂ after PLMA insertion or LTS were statistically significant at 20, 25 and 30 minutes of insertion and at extubation but they were not clinically significant. No desaturation events occurred with use of any device.

Heart rates at insertion were greater in LTS group as compared to PLMA group which was statistically significant. Mean arterial pressures were statistically significant in LTS group at 5, 10 and 25 minutes after insertion and at removal, and 1 hour after removal, as compared to PLMA group. Haemodynamic and catecholamine response was greater in LTS group than in PLMA group reflecting greater pharyngeal stimulation in the former. The other factor that may have contributed to these results was the longer time required to establish effective airway with the LTS.

In our study, we found no statistically significant difference in the incidence of dysphagia and hoarseness in both the groups which was similar to a study done by Brimacombe et al¹³ comparing PLMA with LTS.

Limitations of the study

This study did not compare quality of ventilation by way of parameters like airway pressures, with the two SGA devices.

CONCLUSION

PLMA insertion is easier and quicker than LTS. Airway leak pressure is less for PLMA. The PLMA is associated with lesser haemodynamic response as compared to LTS. Complications like dysphagia and hoarseness were minimal and similar in both groups.

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A Study of Prevalence of Thyroid Disorders in Chronic Obstructive Pulmonary Disease Patients at a Tertiary Care Center in U.P.

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ABSTRACT

Introduction: COPD being a systemic disease, is frequently associated with alteration of systemic functions. This study was designed to determine the prevalence of thyroid disorders in COPD patients.

Material and Methods: A prospective study was designed at SRMS Institute of Medical Sciences, Bareilly, U.P and 201 patients were assessed to evaluate the prevalence of thyroid disorders in COPD patients using Lung function tests, clinical and thyroid function tests data.

Results: A total of 201 cases of COPD were evaluated, of which 130 (64.6%) were observed to be having thyroid disorders. Hypothyroidism was diagnosed in 119 (59.2%) cases and hyperthyroidism in 11 (5.4%) cases. 71 (35.3%) cases were found to be normal on thyroid function tests. P-value of association of COPD and thyroid disorders was 0.213.

Conclusion: The results of this study indicate that thyroid disorders are frequent in patients with chronic obstructive pulmonary disease patients. The thyroid functions were at lower normal range in patients with COPD. Hence COPD patients have higher prevalence of hypothyroidism.

Keywords: COPD- Chronic obstructive pulmonary disease, Hypothyroidism, Hyperthyroidism, Pulmonary function test, Thyroid function test.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. The Global Burden of Disease Study has projected that COPD which ranked sixth as the cause of death in 1990, will become the third leading cause of death worldwide by 2020.¹

There is now increasing evidence available to say that COPD is a systemic inflammatory response to identifiable stimuli, affecting predominantly lungs and numerous other organs like thyroid, pituitary etc.

The thyroid hormone regulates the metabolism of proteins, lipids and carbohydrates, and controls the activity of membrane bound enzymes.^{2,3} The thyroid hormone enhances mitochondrial oxidation, and thus, augments metabolic rate.⁴ This effect on metabolic rate is probably responsible for the association between the thyroid hormone and respiratory drive.⁵ Limited data on the prevalence of thyroid diseases among patients with COPD are available^{6,7} yet, several characteristics of patients with COPD could potentially increase their likelihood of developing hypothyroidism and hyperthyroidism.

Objective of the research was to study the prevalence of thyroid disorders in chronic obstructive pulmonary disease

patients.

MATERIAL AND METHODS

The present Descriptive Cross sectional study was conducted on the patients attending pulmonary medicine OPD and admitted to pulmonary medicine ward in Shri Ram Murti Smarak Institute of Medical Sciences (SRMS IMS) at Bareilly, Uttar Pradesh. with respiratory complaints over a period of one and a half year i.e. from 1st November 2013 to 30th June 2015. All the patients coming to OPD and admitted in the ward of the Department of Pulmonary Medicine, Shri Ram Murti Smarak Institute of Medical Sciences (SRMS IMS) at Bareilly, Uttar Pradesh constituted the study population.

Study Subjects: All the patients diagnosed as a case of COPD were included in the study.

Inclusion Criteria: All patients 30 years or more of COPD attending SRMSIMS (defined as chest symptoms who show a post bronchodilator FEV1/FVC <0.7) and willing to undergo assessment of associated thyroid disorders.

Exclusion Criteria: Patients with other obstructive airway diseases like bronchial asthma and bronchiectasis, inability to undergo the lung function testing and any condition that could unacceptably increase the subject's risk of performing any of the testing.

Sample size estimation: All patients of COPD attending SRMSIMS during study period, meeting the inclusion criteria and not falling in the exclusion criteria were included in the study.

Study Tool: An instrument for the survey was developed after reviewing the available literature which gathered demographic information (Name, age, sex, ID number), anthropometric measurements (Height and weight), history of cigarette smoking, COPD categorisation as per Gold guidelines, test results to rule out Thyroid disorders (CXR – P/A view, Spirometry, complete blood count, renal function test, liver function test, thyroid Profile).

Study Protocol: Eligible subjects were contacted and infor-

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mation about the purpose of study was given, rapport was developed and voluntary consent was taken before filling the pre-designed questionnaire. The methodology comprised of face-to-face interview in the presence of one attendant, preferably care-taker of the patient or closely related. Information was collected on general demographic parameters, COPD, thyroid disorders present and appropriate laboratory investigations. Presence of thyroid disorder was elicited by self-reporting, supplemented by history, clinical examination and scrutiny of relevant medical records and documents.

Defining Chronic Obstructive Pulmonary Disease (COPD):

As per GOLD guidelines (2015), Chronic Obstructive Pulmonary Disease (COPD) is defined as a common preventable and treatable disease which is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.⁸ Spirometry measurements are evaluated by comparison with reference values based on age, height, sex, and race. For greater accuracy spirometry was performed thrice and the largest values of both FVC and FEV1 were noted from three technically satisfactory curves.⁸

COPD severity was classified based on spirometric assessment according to the Gold classification 2015, as follows: In patients with FEV1/FVC < 0.70:

Assessment of Thyroid function

A complete thyroid function test comprising of measuring the levels of TSH, T₃ and T₄ in serum was performed on the blood of all the COPD patients at Central Lab, Department of Biochemistry. The patients were labelled as having hypothyroidism and hyperthyroidism according to the WHO as per the values listed under:

It is clear from table 3 that 15.9% (32) of the patients belonged to the age group up to 50 years and almost 30.3% (61) belonged to the group 51-60 years. Around 33.3% (67) of the patients were in the age group 61-70 years and 20.4% (41) belonged to above 70 years group. The graphical representation of the distribution of patients according to age is given in figure 1.

Table 4 shows the frequency and percentage distribution according to sex. Out of 201 patients studied with spirometry, around 70.1% (141) of the patients were male and 29.9% (60) were female. The graphical representation of the distribution of patients according to sex is given in figure 2.

Table 5 shows the frequency and percentage distribution according to smoking habit. Out of 201 patients studied, majority 94.5% (190) of the patients have the habit of smoking and the rest 5.5% (11) have not. The graphical representation of the distribution of smoker is given in figure 3.

Table 6 shows the frequency and percentage distribution according to COPD severity. It is clear that 24.4% (49) of the patients classified into mild grade and almost 40.8% (82) belonged to moderate grade. Around 31.3% (63) of the patients were severe grade and only 3.5% (7) belonged to very severe grade. The graphical representation of the distribution of COPD severity is given in figure 4.

Table 7 shows the frequency and percentage distribution of thyroid disorders. It is clear that 35.3% (71) of the patients

Gold 1	Mild	FEV1 ≥ 80% predicted
Gold 2	Moderate	50% ≤ FEV1 < 80% predicted
Gold 3	Severe	30% ≤ FEV1 < 50% predicted
Gold 4	Very Severe	FEV1 < 30% predicted

Table-1: Classification of COPD severity on spirometric assessment⁸

	TSH (μIU/ml)	T ₃ (ng/ml)	T ₄ (μg/dl)
Normal	0.4 – 4.5	3.0 – 7.0	0.7 – 1.4
Hyperthyroidism	<0.4	>7.0	>1.4
Hypothyroidism	>4.5	<3.0	<0.7

Table-2: Classification of thyroid disorder⁹

	Frequency	Percent
Up to 50 Years	32	15.9%
51 - 60 Years	61	30.3%
61 - 70 Years	67	33.3%
Above 70 Years	41	20.4%
Total	201	100.0%

Table-3: Distribution of patients according to age

	Frequency	Percent
Male	141	70.1%
Female	60	29.9%
Total	201	100.0%

Table-4: Distribution of patients according to sex

	Frequency	Percent
Yes	190	94.5%
No	11	5.5%
Total	201	100.0%

Table-5: Distribution of patients according to smoking habit

	Frequency	Percent
Mild	49	24.4%
Moderate	82	40.8%
Severe	63	31.3%
Very Severe	7	3.5%
Total	201	100.0%

Table-6: Distribution of patients according to COPD severity

	Frequency	Percent
Normal	71	35.3%
Hypothyroidism	119	59.2%
Hyperthyroidism	11	5.5%
Total	201	100.0%

Table-7: Distribution of patients according to Thyroid disorders

were normal. Around 59.2% (119) of the patients have hypothyroidism and only 5.5% (11) have hyperthyroidism. The graphical representation of the distribution of thyroid disorders is given in figure 5.

DISCUSSION

The study was carried out in the department of Pulmonary Medicine at Sri Ram Murti Smarak Institute of Medical

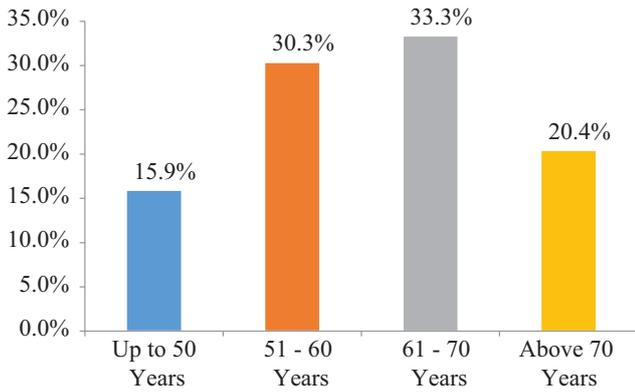


Figure-1: Distribution of patients according to age

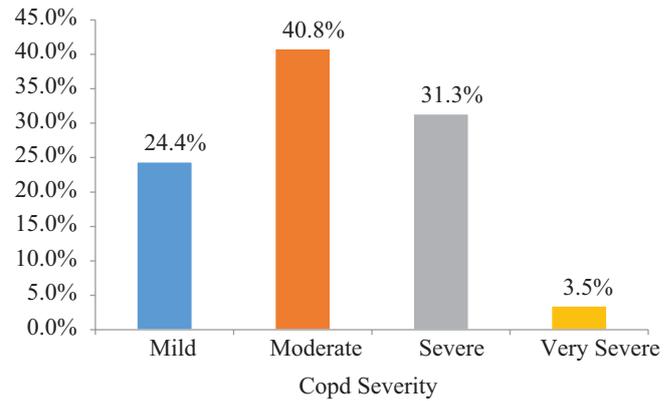


Figure-4: Distribution of patients according to COPD severity

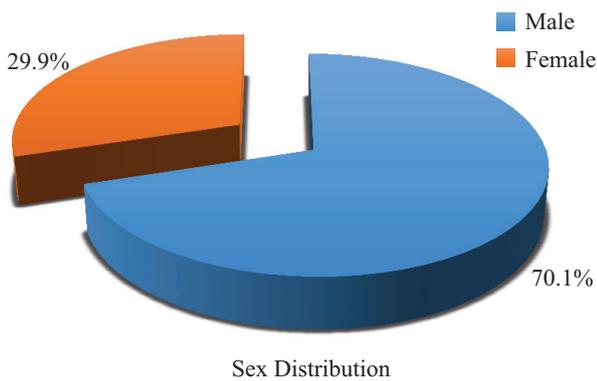


Figure-2: Distribution of patients according to sex

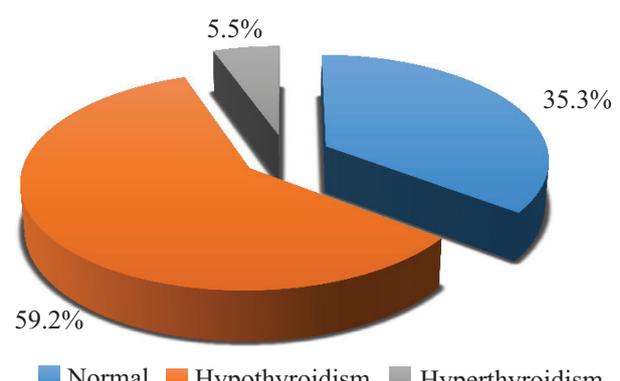


Figure-5: Distribution of patients according to Thyroid disorders

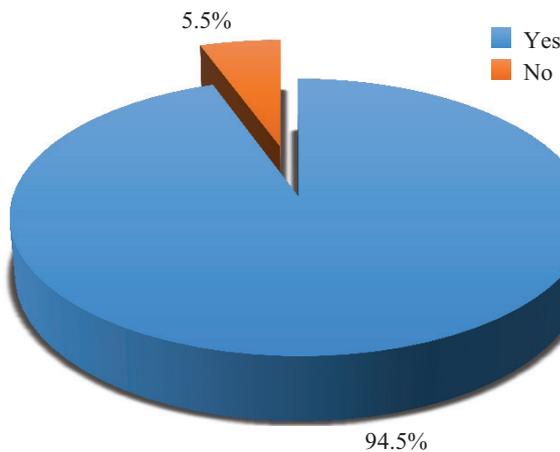


Figure-3: Distribution of patients according to smoking habit

Sciences, Bareilly over a period of 18 months. The study was carried out on 201 subjects who were diagnosed as a case of COPD. Each subject was screened to fulfill the inclusion and exclusion criteria. Various investigations and tests were performed to diagnose comorbidities mentioned as per the GOLD guidelines.

The subjects were selected randomly from the IPD and OPD. No age and sex distribution was made.

The mean age of COPD patients was 62.6 years. Majority of patients were in the age group of 61-70 years. (Table no.3)

Among 201 patients, 60 were females and 141 were males. There was male predominance with the male to female ratio of 2.3:1. (Table no.4)

Majority 190 (94.5%) of the patients had the habit of smoking or had history of long term chullah smoke exposure and

the rest 11 (5.5%) had no such history. (Table no.5)

Out of all the patients studied, about 49 (24.4%) of the patients were classified as having mild COPD and 82 (40.8%) belonged to moderate grade and 63(31.3%) of the patients had severe grade and only 7 (3.5%) belonged to very severe COPD. (Table no. 6)

COPD and thyroid disorders

In our study prevalence of thyroid disorders was 64.7% (n=130) and out of which around 119 (59.2%) of the patients had hypothyroidism and only 11 (5.5%) had hyperthyroidism.

R. Prakash et al¹⁰ in 2014 conducted a study and 96 cases of acute exacerbation of COPD were analysed and he found that 62 (64.58%) patients had lower levels of T3, T4, and TSH and even lower during the exacerbation stage and more significantly in above 60 years of age group.

Gulfidan Aras et al¹¹ in 2014 conducted a study and 21 patients within the exacerbation period of COPD were evaluated and found that 7 (33.33%) patients had free T3 levels below the normal values, and 3 (14.28%) patients had TSH levels below the normal values.

Gupta Madhuri et al¹² in 2013 reported a study and 60 COPD patients and 30 age matched healthy controls were studied and he found that there was a significant difference with respect to BMI, mean serum FT3. Mean serum TSH was within normal limits but had lower values than controls. FT4 was within normal limits. Mean serum FT3 was negatively correlated with bicarbonate levels whereas FT4 was negatively correlated to haemoglobin levels.

Sevinc Sarinc Ulasli et al¹³ in 2013 did a study in which 128

patients were included and showed that TSH values and exacerbation frequency had positive correlation ($p < 0.0001$; $r = 0.82$).

CONCLUSION

The results of this study indicate that thyroid disorders are frequent in patients with chronic obstructive pulmonary disease. In majority of patients with COPD, diagnosed to be suffering from thyroid disorders, were having their TSH values at higher normal range. Hence COPD patients have higher prevalence of hypothyroidism.

The mechanism accounting for the association of thyroid disorders with COPD are not yet fully defined but the systemic effects of inflammation have been suggested as the link.

Data on the prevalence of thyroid disorders among patients with COPD are highly variable. This may partly be due to differences in the methods of data acquisition, which range from self-reported survey data to administrative database analysis.

It can be concluded from this study that there is an increased likelihood of association of COPD with thyroid disorders. A physician dealing with COPD patients should always keep this in mind and use clinical assessment and diagnostic tests, so that the patient can be managed better.

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Study of Anterior Cerebral Artery and its Variations in Adult Cadavers

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ABSTRACT

Introduction: Anterior cerebral arteries supply blood to the midline portion of cerebrum on either sides. Ischaemia of the area normally supplied by anterior cerebral artery can lead to symptoms like constant weakness and sensory loss in the lower limb and behavioural changes, known as Anterior cerebral artery Syndrome. In the present study the variations of anterior cerebral artery have been observed.

Material and methods: One hundred and four brain specimens from the cadavers in the dissection hall of Govt. Medical College Kottayam and P.K. Das Institute of Medical Sciences Ottapalam were studied by grossdissection, mapping of blood vessels, painting and photography, for a time period of 3 years and 6 months (2012 August – 2016 February). Only brain specimens with intact Circle of Willis was included in the study.

Results: Anterior cerebral artery showed variations in 8 cases, like absence, thin and short(Hypoplasia), enlarged and thickened, partial duplication and distal anterior cerebral artery.

Conclusion: Variations of anterior cerebral artery was found to be 7.6%. it is usually associated with anterior cerebral artery syndrome.

Keywords: Anterior, Cerebral, Circle, Specimens, Variations

INTRODUCTION

Anterior cerebral arteries supply blood to the midline portion of cerebrum on either sides. They are inter connected by an anterior communicating artery. Anatomically anterior cerebral artery is divided into five segments A1 to A5. A1 segment is the part from its origin to the level of anterior communicating artery. This ascends on the medial surface of hemisphere and then continues posteriorly on the superior surface of corpus callosum as A2 to A5 segments, demarcated as orbital, frontalpolar, callosal marginal and pericallosal arteries.¹⁻³ They supply the frontal lobe and internal capsule. Ischaemia of the area normally supplied by anterior cerebral artery can lead to symptoms like constant weakness and sensory loss in the lower limb and behavioural changes, known as Anterior cerebral artery Syndrome. In the present study the variations in anterior cerebral artery have been observed.

MATERIAL AND METHODS

One hundred and four brain specimens from the cadavers in the dissection hall of Government Medical College Kottayam and P.K. Das Institute of Medical Sciences Ottapalam were studied by gross dissection, mapping of blood vessels, painting and photography. The study was conducted during the routine dissection classes of these medical colleges. The origin, course and termination of anterior cerebral artery were traced. The length of different parts and the associated variations were noted. Only brain specimens with intact Cir-

cle of Willis were included in the study.

RESULTS

Anterior cerebral artery showed variations in 8 cases.

Variation observed

Artery	Variations observed	No. of cases
Anterior cerebral	Absence	1
	Distal anterior cerebral	1
	Thin and short(Hypoplasia)	3
	Enlarged and thickened	1
	Partial duplication	2

Variations in the Anterior Cerebral Artery

The proximal segment of right anterior cerebral artery was found to be absent in one case where the anterior communicating artery was thickened (Fig-1).

Partial duplication of the initial segment of anterior cerebral artery was observed in two cases (Fig. 2).

The right anterior cerebral was observed to be thin and short in three cases. It was enlarged and thickened in one case on the right side (Fig. 3).

The pericallosal branch of anterior cerebral artery (ACA) supplies the region of precuneus in adults. CMA- Callosomarginal artery, PCA- Pericallosal artery (4).

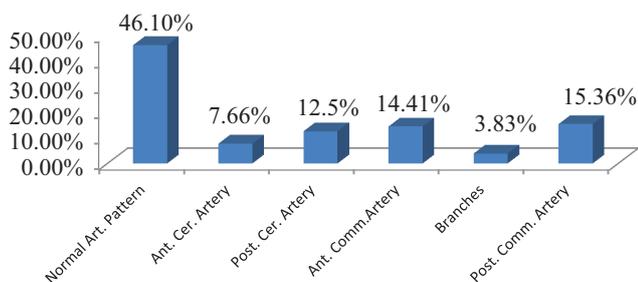
DISCUSSION

In the present study the variations observed in the anterior cerebral artery was only 7.6%. Schaeffer (1924)¹ stated that the right anterior cerebral artery has a chiasmal relation while the left crosses well in advance of the chiasma, which was also observed in the present study. The anterior cerebral artery continues caudally along the dorsal surface of corpus callosum and its terminal branch supplies the precuneus, both in fetuses and adults. This is in agreement with the observation of Salmon and Lazor thes (1971).² According to Dimmick SJ, Faulder KC.³ Hypoplasia of anterior cerebral artery was found in 10% and aplasia in 1-2 %. In the study hyplasia

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Graph-1: Diagram To Show The Variations in Arteries forming Circle of Willis



Figure-1: Proximal segment of right anterior cerebral artery (ACA) absent with a thick anterior communicating artery (ACC); **Figure-2:** Partial duplication of initial segment of right anterior cerebral artery (ACA)

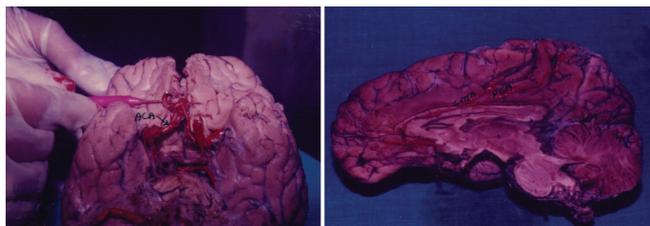


Figure-3: A thickened right anterior cerebral artery (ACA); **Figure-4:** The pericallosal branch of anterior cerebral artery (ACA) supplies the region of precuneus in adults. CMA- Callosomarginal artery, PCA- Pericallosal artery.

was seen in 3% and aplasia in 1%. The anterior cerebral artery was observed to be absent in one case and showed partial duplication in 2 cases. It was hypoplastic in 3 cases. This was in accordance with the study of Fields (1965).⁴ Maurer J., Maurer E., Perneczky A., 1991.⁵ Observed variations in the A1 segment of anterior cerebral artery in 2 cases. In the study there was partial duplication in the A1 segment in 1 case. The greatest length measured for the A1 segment of anterior cerebral artery in the present study was 1.9 cms and a smallest 0.5 cms. According to Sylvia Kamath⁶ (1980) the greatest length measured for anterior cerebral artery was 2.10 cms and 2.56 cms, the smallest was 0.31 cms and 0.34 cms for the right and left respectively. In a study of Variation of Circle of Willis In Adult Human Brains In Nagpur Region Of Maharashtra, India by Saniya H. Lade et al.⁷ show higher percentage of hypoplasia (44%) which is too high to coincide with the previous studies. Abubakhr⁸ and Bertram⁹ revealed only 0.7% and 10% hypoplastic ACA. Stenosis is noted on left side. Circle which has the external diameters of vessels on right side exactly equal to that on left side is the symmetrical circle. (Prof.E.Fawcett 1906).¹⁰

These days there are an increasing number of cerebrovascu-

lar accidents and a grave morbidity associated with it. The awareness of these variations is of importance to the neurosurgeons.

CONCLUSION

Anterior cerebral artery is often said to be associated with Anterior cerebral artery Syndrome. It is found to have 7.6% variations here.

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Comparison Between CD4 Count, Haematological Manifestations and Respiratory Tract Infections in HIV Seropositive Individuals

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ABSTRACT

Introduction: Acquired immunodeficiency syndrome (AIDS) originates due to Human immunodeficiency virus (HIV) infection. If proper precaution is not taken, it can lead to continuous failure of patients immune system further leading to opportunistic infections which may be life-threatening. This study was conceived with the aim to study the comparison between CD4 count, hematological manifestations and respiratory tract infections amongst HIV seropositive individuals.

Material and Methods: Present study was done on 100 patients aged between 20-50 years. On the basis of CD4 count (obtained through hematology analyzer and flow cytometry) as part of the initial evaluation, patients were divided into four groups. Detailed history, symptoms, general and systemic examination was done. HIV status was confirmed by enzyme linked immune sorbent assay (ELISA) test with two different antigens.

Results: There is a strong relation between CD4 count and the hematological features in HIV seropositive individuals. Mean age of patients was 34.56 ± 9.04 years. Out of 100 patients, 62% patients had mean corpuscular volume (MCV) within normal range (80-99 fl). Mean corpuscular hemoglobin (MCH) was 28.4 pg. Leucopenia and Lymphopenia was seen in 20.8% and 65% cases respectively. Thrombocytopenia, severe anemia and pulmonary manifestations were seen in 19%, 76% and 55% cases respectively. Majority of the cases of pneumocystis carinii pneumonia and mycobacterium avium complex (MAC) cases were reported in patients with CD 4 count <200 cells/mm³.

Conclusion: Opportunistic pulmonary infections arise more frequently in HIV patients with lower CD4 counts, indicating a strong relation between CD4 count and respiratory complications in HIV patients. Thus, high level of clinical suspicion is required for diagnosis of respiratory complications in HIV individuals.

Keywords: seropositive, HIV, CD4 count, ELISA, AIDS

INTRODUCTION

AIDS was first recognized in 1981 and HIV in 1983. Globally the phenomenon of HIV/AIDS is best viewed as a pandemic affecting nearly all the countries of the world. In India, an estimated number of people living with HIV were 2.08 million in 2011 with an adult prevalence of 0.29%, home to the world's third-largest population suffering from AIDS.¹ HIV is transmitted primarily via unprotected sexual intercourse (including anal and oral sex), contaminated blood transfusions, hypodermic needles and from mother to child during pregnancy, delivery, or breastfeeding.² Low literacy level among population and wide labor migration are the few factors which have led in deficiency of gender disparity and awareness regarding the disease especially

in rural population.³

Infection with HIV primarily involves a subgroup of T-lymphocytes (CD4+ve), but other cell types are also invaded by the virus, thus the most important biomarkers of disease stage and progression in patients with an HIV infection are the CD4 count and HIV RNA concentration.⁴ CD4 cell count is an excellent indicator of an HIV-infected patient's risk of developing opportunistic pulmonary infections presumably because it reflects stage of HIV disease and degree of immune compromise.⁵ HIV-related illness typically develops at or below a characteristic CD4 cell count range; knowledge of an HIV-infected patient's CD4 cell count can be extremely useful in defining the possible diagnoses and assessing relationship between them.

This study was conceived with the aim to study the correlation between CD4 count and haematological manifestations and respiratory tract infections amongst HIV seropositive individuals.

MATERIAL AND METHODS

An observational cross-sectional study was done on 100 patients attending antiretroviral therapy center and outpatient department from January 2014 to June 2015 in Department of Medicine, BRD Medical College and Nehru Chikitsalya Gorakhpur.

All the patients of age group 20-50 years with ELISA positive HIV were included in the study while patients on highly active anti retroviral therapy (HAART), patients with known hematological disorder, patients with other co-morbid illness and pregnant females were excluded from the study.

A written informed consent from all patients and institutional ethics committee approval was obtained before starting the study and complete confidentiality was observed regarding the identity of the subjects.

CD4 count was done as part of the initial evaluation for patients. Patients were divided into four groups, Group A (CD4 count >500 cells/ μ l), Group B (CD4 count 500-350 cells/ μ l), Group C (CD4 count 350-200 cells/ μ l) and Group D (CD4 count <200 cells/ μ l).

Diagnosis was done on complaints such as weight loss, persistent diarrhea, chronic cough, unexplained fever and prolonged enlargement of glands, generalized body ache, recur-

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rent infections, rashes and sores in mouth, anus and genitals. Patients were studied for detailed history, symptoms, general and systemic examination (especially for hematological and respiratory involvement) and other investigations (for CD4 cell count, Hg, RBC morphology, Leukocyte count, Platelet count, Chest X-ray, sputum and pulmonary diagnosis).

HIV status was confirmed by ELISA test with two different antigens. Absolute CD4 counts were obtained through hematology analyzer and flow cytometry in which reagent BD Multitest CD3/CD4/CD8/CD45 was employed. Peripheral blood cell counts were performed using an ABX Pentra 120 DX automated hematology analyzer for hemoglobin concentration, MCV, mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), total and differential leukocyte count, absolute lymphocyte count and platelet counts.

Three sputum samples (first spot, early morning and second spot) were collected which further smeared and stained by Gram stain and Ziehl Nelson stain, early morning sputum was inoculated into Lowenstein Jensen media and followed by chest X-ray examination.

STATISTICAL ANALYSIS

Data were presented as mean with standard deviation (SD) using IBM SPSS version 20. All hypotheses were constructed two tailed and $p < 0.05$ was considered significant.

RESULTS

In the present study, age of the patients ranged from 20 to 50 years with mean age of 34.56 ± 9.04 years. Out of 100 patients, 64% were males while 36% were females with male to female ratio of 1.7:1. Out of 100 patients, 3% patients belong to group A while group B had 21% patients, whereas in group C and group D, 45% and 31% patients were present respectively.

Out of 100 patients, 29 (40.2%) patients had cough and ex-

pectoration whereas, 12 (16.6%) had cough without expectoration and 8 (11.1%) patients showed symptoms of hemoptysis, 14 (19.4%) patients had symptom of breathlessness and 9 patients (12.5%) had chest pain.

Out of 100 patients; 44% were showing symptoms of normal vesicular breath sound whereas, 32% were having bronchial breath sound. Twelve percent patients showed symptom of coarse crept and 5% had symptom of wheeze While 4% had bronchial breath sounds with crept and 3% showed wheeze with crept.

Chest X-ray of patients showed that, 45% patients were normal. Also, 33%, 9%, 1%, 5%, 3%, 1%, 1%, 1% and 1% had pleural effusion, reticulonodular shadow and millary mottling respectively. Cardiomegaly, pneumothorax and pulmonary fibrosis were found in 1% of patients.

Sputum examination of 14 patients showed that, 10 (71.43%) patients showed positive results while 4 (28.57%) patients showed negative results. Whereas in case of Acid fast bacilli staining, 12 (85.71%) cultures were positive and 3 (21.43%) were negative. In sputum culture, none of the organism was found in group A, while in group B only one (7.14%) patient was infected with *Strep.pneumoniae*, in group C, 2 (14.28%) patients have infection of *Strep.pneumoniae* and 2 (14.28%) had *Staph.aureus* whereas, in group D all patients were infected; 3 (21.43%) patients were infected with *Strep. Pneumonia*, 2 (14.28%) had infection of *Staph. aureus*, 2 (14.28%) were infected with *Pseudomonas aero* and 1 (7.14%) patient got infection of *Haemophilus influenza* and 1 (7.14%) was infected with *Klebsiella*.

DISCUSSION

Recognizing the hematological and respiratory features of HIV infection is very important with the continuing rise in the prevalence of HIV infection particularly in a developing country like India.

The majority of the patients (48%) were in the age group of

Group	Hg	RBC	MCV	MCH	MCHC	TLC	ALC	Platelets
A	11.0±0.7	4.0±0.7	90±3	35±5	34±4	8915±321	2811±132	2.8±0.43
B	10.4±0.6	3.7±0.6	88±4	30±8	32±5	7654±802	2465±168	2.6±0.21
C	8.5±0.9	3.3±0.9	83±6	29±3	30±5	6722±711	1614±156	2.3±0.41
D	6.3±1.0	2.9±0.5	80±4	27±4	29±6	5209±519	1289±213	2.17±0.59

Group A: (CD4 count >500 cells/μl), Group B: (CD4 count 500-350 cells/μl), Group C: (CD4 count 350-200 cells/μl) and Group D (CD4 count <200 cells/μl). Data is expressed as mean±SD. Hg; Hemoglobin (g/dl), RBC; Red blood corpuscles (million/mm³), MCV; Mean corpuscular volume (fl), MCH; Mean corpuscular Hemoglobin (pg), MCHC; Mean corpuscular hemoglobin concentration (g/dl), TLC; Total leukocyte count (cells/dl), ALC; Absolute lymphocyte count (cells/dl), Platelets in lakhs.

Table-1: Showing observations of different parameters in all the groups

Pulmonary diagnosis	N	Group A	Group B	Group C	Group D
Pyogenic pneumonia	14	1 (7.14)	2 (14.2)	4 (28.5)	7 (50)
Tuberculosis	29	1 (3.44)	3 (10.3)	10 (34.4)	14 (48.27)
Fungal pneumonia	4	0	0	0	3 (75)
PCP	5	0	0	1 (20)	4 (80)
Pneumothorax	1	0	0	0	1 (100)
FPP	1	0	0	0	1 (100)
MAC	1	0	0	0	1 (100)

Data is expressed as no of patients (%), PCP; pneumocystis carinii pneumonia, MAC; mycobacterium avium complex, FPP; Fungal and pyogenic pneumonia, N; no of patients

Table 2: Showing findings of Pulmonary Diagnosis of HIV patients

30 to 40 years, with mean of 34.56 ± 9.04 years. This was in accordance with the study done by Patwardhan et al. There was male predominance, with a male to female ratio of 1.7:1 which was comparable with the study done by Chandrakar J et al.^{6,7}

The Hb level ranged from 3.3 to 16.3 g/dl with the mean being 9.9 ± 1.09 g/dl, as also reported by Kaloutsi et al in the range of 3.8 to 17.3 g/dl and a mean of 10.8 g/dl which was in favour of our study.⁸ However Treacy et al reported a higher mean of 11.34 g/dl compared to the present study.⁹

Present study indicates a strong relation between CD4 count and the haematological features in HIV seropositive individuals; also that only Hb and total leucocyte count were significantly affected by the CD4 cell counts. Thus, as the CD4 cell counts decreased, so did the hemoglobin (Hb) levels and the total leukocyte counts.

Mean RBC count was 3.15 ± 0.84 million/mm³. Tripathi et al reported a RBC count of 3.09 ± 0.36 million/mm³ among 55 AIDS patients.¹⁰

MCV in the present study was 87.3 fl. Tripathi et al reported 81.81 fl in majority of the patients.¹⁰ In the present study, 62% had MCV within normal range (80–99 fl) indicating normocytic nature of RBCs.

In present study, MCH was 28.4 pg. Almost similar observation was made by Tripathi et al with aMCV of 27.59 fl.¹⁰ MCHC ranged from 25.9 gm/dl to 36.2 gm/dl with the mean being 32.5 ± 1.74 gm/dl. Sixty seven percent cases had MCHC between 31.5 to 34.5 gm/dl indicating normochromasia in the majority of patients.

TLC in the study population was 5627 ± 657 cells/mm³. A similar observation was made by Patwardhan et al in 378 cases. Leucopenia was seen in 20.8% cases.⁶

Lymphopenia (absolute lymphocyte count less than 1500 cells/mm³) was seen in 65% cases. Treacy et al reported lymphopenia in 14 cases.⁹ However Tripathi et al observed a lower number of lymphopenia cases (25.6%).¹⁰

In the present study thrombocytopenia was seen in 19% cases. This had been reported by Patwardhan et al in 13% cases.⁶ Haematological parameters were compared in four groups. The number of cases with anaemia, leucopenia, and lymphopenia increased with reducing CD4 cell counts. Mean TLC and ALC was lower with reducing CD4 cell counts. These parameters showed significant difference between three groups with differing CD4 cell counts ($p < 0.05$). This indicates a higher occurrence of anaemia, lymphopenia and leucopenia with progression of disease. Though there was a difference in mean platelet count between three groups, it was not statistically significant, indicating occurrence of thrombocytopenia independent of disease progression ($p > 0.05$).

Both opportunistic infections and dyserythropoiesis also led to certain abnormalities in hematological profile of patients.¹¹ Symptoms of severe anaemia was reported in about 76% patients with MAC disease.¹² In HIV-infected patients, studies have also reported chronic pure red cell aplasia with parvovirus B19 infection.¹³

Above finding are sufficient to confirm that hemoglobin concentration might be the authentic biomarker for the diagnosis of HIV infection in a patient and could guide therapeutic op-

tions for patients with anemia.

In this study, the pulmonary manifestations were seen in 55% cases with tuberculosis 52.72% as commonest manifestation.

Tuberculosis included all the cases of recently diagnosed pulmonary TB (18%), military TB (5%) and tubercular pleural effusion (6%). A study done by Sham P Toshniwal included 147 patients of tuberculosis was also consistent with present study observation.¹⁴

Five cases of PCP had been reported, while only one case had been recorded for MAC. Majority of the cases of PCP and all of MAC cases were in group with CD 4 count < 200 cells/mm³, thus indicating significant relationship of these opportunistic infections with the decline in CD4 count ($p < 0.05$). Study done by Kumaraswamy et al reported median CD4 count of patients with PCP of 142 cells / μ l, consistent with present study.^{15,16}

In India, the most common opportunistic infection among people with HIV infection is pulmonary tuberculosis.¹⁷ TB is unique in that it can occur over a wide range of CD4 count, although it is more frequent at CD4 counts < 300 / μ l.¹⁶

CONCLUSION

There was a strong correlation between CD4 count and pattern of respiratory complications in HIV-seropositive patients. From present study it is clear that incidence of all disease expressions was increased with lower CD4 counts. Previous Studies also shown that there is a higher prevalence of diseases such as bacterial pneumonia and tuberculosis as the CD4 count level declines.

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Diagnostic Value of Total Leucocyte Count (TLC), C-reactive Protein (CRP) and Bilirubin in Patients with Suspected Acute Appendicitis

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ABSTRACT

Introduction: Total leukocyte count (TLC), C-reactive protein (CRP) and more recently, bilirubin have been used as adjuncts for diagnosis of appendicitis. This study assessed the diagnostic value of these markers in patients with suspected acute appendicitis.

Material and methods: The levels of TLC, CRP and bilirubin done within 24 hours of surgery were compared among the three groups of patients (1) normal appendix (NA), (2) acute appendicitis (AA) and (3) perforated appendicitis (PA). The diagnostic value of these markers was predicted for the above groups in terms of Sensitivity, specificity, PPVs and NPVs using sensitivity analysis and the diagnostic accuracy assessed by receiver operating characteristic (ROC) curve analysis.

Results: At the cut-off values: TLC 9000/mm³, CRP 6 mg/L, total bilirubin 1.5 mmol/L, TLC had specificity (83.54%) for AA and a sensitivity and specificity of 100.0% and 83.54% respectively for PA. CRP was 94.68% sensitive to detect AA but less specific for both AA and PA (30.38%). Total bilirubin had a high sensitivity of 77.50% for PA. A combination of TLC and CRP had high sensitivity (96.25%) and specificity (83.54%) to detect PA. The specificity for PA increased (89.87%) with combination of all three tests.

Conclusion: TLC, CPR and Bilirubin can be helpful in the diagnosis and decision-making of patients with suspected appendicitis. A combination of TLC ($\geq 9000/\text{mm}^3$) and CRP (≥ 6 mg/L) had high sensitivity (96.25%) and specificity (83.54%) to detect PA. The specificity to detect PA increased (89.87%) when bilirubin (≥ 1.5 mmol/L) was also added to the above combination of markers.

Key words: Appendicitis, Bilirubin, C-reactive protein, Normal Appendix, Perforated appendicitis, Total leucocyte count

INTRODUCTION

The diagnosis of appendicitis remains essentially clinical, requiring a mixture of observation, clinical acumen and surgical science. Despite appendicitis being a common disease, its presentation is not always typical and misdiagnosis is therefore not uncommon.¹ Diagnostic difficulties may lead to negative appendicectomies² or cases of missed appendicitis resulting in complications such as appendiceal perforation (AP) or abscess formation.³

Diagnostic scoring systems have been developed in an attempt to improve the diagnostic accuracy of acute appendicitis (AA).^{4,5} The most prominent of these scores, developed by Alvarado,⁵ gives points for symptoms (migration of pain, anorexia, and nausea), physical signs (right lower quadrant tenderness, rebound tenderness, and pyrexia), and laboratory values (leukocytosis and left shift). Although these scores can help guide clinical thinking, they do not markedly improve diagnostic accuracy.⁶ Other diagnostic aids including ultrasound (USG), computed tomography (CT)⁷ or even magnetic

resonance imaging [MRI],⁸ do exist in order to help confirm the diagnosis or to guide the surgeon's decision on operative management or a period of observation when appendicitis is suspected.⁹ However, these diagnostic adjuncts may be expensive, may involve high radiation exposure, and may not always have accurate and reproducible results.⁹

The diagnostic and discriminatory role of white cell count (WCC) and C-reactive protein (CRP) in AA has been studied expansively but still remains contentious.¹⁰⁻¹⁴ Literature points that a rise in serum bilirubin level in patients with clinically suspected appendicitis may be a predictor for perforation of appendix.¹⁵⁻²⁰ It is well established that when microbes invade the body, leukocytes defend it. This leads to increase in the leukocyte count. Bacterial invasion in the appendix leads to transmigration of bacteria and the release of pro-inflammatory cytokines such as TNF-alpha, IL6 and cytokines. These reach the liver via Superior mesenteric vein (SMV) and may produce inflammation, abscess or dysfunction of liver either directly or indirectly by altering the hepatic blood flow.²¹

In view of the above context, the present study was undertaken to determine the diagnostic accuracy of WCC, CRP and bilirubin, either individually or when combined, in the prediction of appendicitis and, especially, its complications (i.e. perforated appendicitis [PA]).

MATERIAL AND METHODS

The approval was obtained from ethics Committee and signed informed consent were obtained from the patients. Based on the selection criteria, patients admitted with clinical suspicion of acute appendicitis under Department of Surgery, SMHS Hospital, Srinagar during the study period were screened for eligibility.

This prospective observational study was conducted in Shri Maharaja Hari Singh Hospital, a tertiary care hospital in the state of Jammu and Kashmir, catering a population of around 68.9 lakhs. Patients of all ages and either sex scheduled for emergency appendectomy between 1st May 2014 and 30 April 2015 were recruited for the study. Exclusion criteria included:

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1. Patients with past history of jaundice or liver disease.
2. Chronic alcoholism (intake of alcohol of > 40 g/day for men and > 20 g/day for women for 10 years).
3. Hemolytic disease.
4. Acquired or congenital biliary disease.
5. Patients with positive HBsAg.
6. Patients with cholelithiasis.
7. Patients with cancer of hepatobiliary system.
8. Patients known to be on treatment for any collagen vascular disease.
9. The appendectomy was performed as part of another procedure.

All enrolled patients were thoroughly evaluated for a detailed history, thorough general physical examination and systemic examination. The following investigations were done for all patients in the central investigation laboratory of the institutes within 24 hours prior to surgical intervention: (1) complete urine analysis (2) complete blood count (3) liver function tests (4) random blood sugar (5) blood urea and serum creatinine (6) Serum C-reactive protein (CRP) levels (7) serum electrolytes (Na⁺ and K⁺) (8) Hepatitis (B and C) and HIV serology (9) Coagulogram (Prothrombin time and International Normalized Ratio) (10) X-ray chest Postero-anterior view (11) Electrocardiogram and (12) Ultrasound abdomen.

Emergency appendectomy was conducted in all recruited patients through a formal grid iron or right lower paramedian incision. Intra-operative findings (perforation of appendix, presence of fluid and its character, intraluminal contents of appendix, appendicular base) were noted. The specimen was sent to the department of Pathology of the institute for histopathological examination. The results of the histopathological examination were recorded. On the basis of intraoperative findings and histopathological examination patients were classified as having a normal appendix (NA), acute appendicitis (AA) or perforated appendicitis (PA).

STATISTICAL ANALYSIS

Normal levels for the markers were: Total Leucocyte Count (TLC) 4–11 x 10⁹ cells/L, CRP <10mg/L, bilirubin <21μmol/L. The levels of the above markers were summarized as mean and standard deviation. One-way analysis of variance followed by post-hoc comparison (Games-Howell) was used to compare the levels of markers (TLC, CRP, and bilirubin) among the three groups (NA, AA and PA).

The diagnostic value of TLC, CRP and bilirubin was predicted with sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for the above groups either for each individual test or when combined. Sensitivity, specificity, PPVs and NPVs varied when different cut-off values were examined (sensitivity analysis). The cut-off value finally chosen to compare sensitivity, specificity, PPV and NPV for each variable when looked at individually corresponded to the highest combined value for sensitivity and specificity, which resulted in a value either higher than normal or within the upper range of normal for each of the corresponding markers. Finally, the diagnostic accuracy of TLC, CRP and bilirubin was assessed by receiver operating characteristic (ROC) curve analysis. A p-value of <0.05

was considered statistically significant. SPSS version 20.0 was used for analysis of data.

RESULTS

A total of 615 eligible patients were enrolled during the study period. The mean age of patients was 23.94 ± 7.476 years (range, 12–49 years) and the male: female ratio was 1.41. Two hundred seventy four patients (44.6%) had TLC above 11000/mm³, and the differential leucocyte count showed predominance of neutrophils with mean neutrophil% of 80.84±6.94. Histopathological examination was done in all 615 patients. Based on histopathology and intra-operative findings acute AA was diagnosed in 376 (61.1%) patients and PA in 160 (26.0%) patients. Seventy nine (12.9%) patients did not have any evidence of appendicular perforation or inflammation. The clinical and laboratory findings of the patients are presented in Table 1. As compared to those with a normal appendix patients with any appendicitis were older, mostly males and had higher TLC and CRP levels. Patients with PA had higher total bilirubin levels as compared to patients with AA (P<0.001) or a normal appendix (P<0.001).

The next part of the analysis related to choosing cut-off values for calculating sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of TLC, CRP and total bilirubin for diagnosis of appendicitis. This was done by doing sensitivity analysis. The value with highest value of sensitivity and specificity was finally chosen as the cut-off. Table 2 shows the area under ROC curve for TLC, CRP and total bilirubin in AA and PA. The area under curve was highest for TLC and lowest for total bilirubin. Figure 1a and 1b depict the ROC curve for AA and PA respectively. The following cut-off values were taken for analysis: TLC 9000/mm³, CRP 6 mg/L, total bilirubin 1.5 mmol/L.

Table 3 presents the diagnostic performance of TLC, CRP and total bilirubin individually and in combination for AA and PA. TLC had a high specificity (83.54%) to detect AA and a high sensitivity (100.0%) and specificity (83.54%) to detect PA. CRP had a high sensitivity to detect AA (94.68%) but a low specificity for both AA and PA (30.38%). Total bilirubin had a high sensitivity to detect PA (77.50%). A combination of TLC and CRP had high sensitivity (96.25%) and specificity (83.54%) to detect PA. The specificity to detect PA increased (89.87%) when a combination of all three tests was used.

DISCUSSION

Acute Appendicitis (AA), an inflammation of the vestigial vermiform appendix, is one of the most common reasons for acute abdomen and for emergent surgery. A constellation of history, physical signs, radiographic investigation, and laboratory analysis is used to diagnose an acute appendicitis. The most important step in the management of patients with suspected appendicitis is reaching the decision about operative intervention and its timing so that both negative appendectomies and complicated appendicitis rates are kept to a minimum.

In this observational study, 615 patients were prospectively recruited over a period of one year. The negative appendectomy rate in our study was 12.8% whereas that of PA

	Normal Appendix (n=79)	Acute Appendicitis (n=376)	Perforated Appendicitis (n=160)	Total (n=615)	p value
Age (Mean, S.D.)	20.49, 4.359	23.76, 7.355	26.06, 8.271	23.94, 7.476	<0.001 ^A , <0.001 ^B , 0.007 ^C
Sex(Male:Female)	37:42	216:160	107:53	360:255	0.010
TLC (Mean, S.D.)	6.868, 1.8134	10.305, 2.3678	12.801, 2.3588	10.513, 2.8952	<0.001 ^A , <0.001 ^B , <0.001 ^C
CRP (Mean, S.D.)	5.65, 0.578	9.66, 4.104	11.85, 6.085	9.72, 4.820	<0.001 ^A , <0.001 ^B , <0.001 ^C
Bilirubin (Mean, S.D.)	1.384, 0.9364	1.466, 0.3860	2.349, 0.8856	1.685, 0.7494	0.725 ^A , <0.001 ^B , <0.001 ^C

^ANormal Appendix versus Acute Appendicitis, ^BNormal Appendix versus Perforated Appendicitis, ^CAcute Appendicitis versus Perforated Appendicitis

Table-1: The clinical and laboratory findings of 615 patients.

	ROC Area Under Curve (95% CI)	
	Acute appendicitis(AA)	Perforated appendicitis(PA)
TLC	0.866 (0.824, 0.907)	0.995 (0.989, >0.999)
CRP	0.816 (0.775, 0.857)	0.830 (0.780, 0.879)
Bilirubin	0.608 (0.540, 0.676)	0.779 (0.715, 0.843)

Table-2: Shows the area under ROC curve for TLC, CRP and total bilirubin in AA and PA.

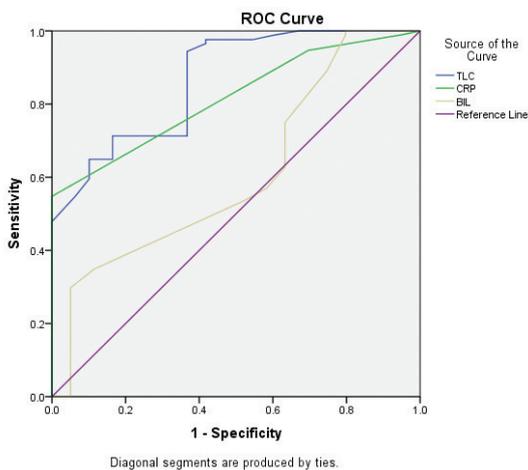


Figure-1: Receiver operating characteristic curves for white cell count (WCC), C-reactive protein (CRP) and bilirubin in predicting acute appendicitis. AUC value provided with 95% confidence interval in parentheses.

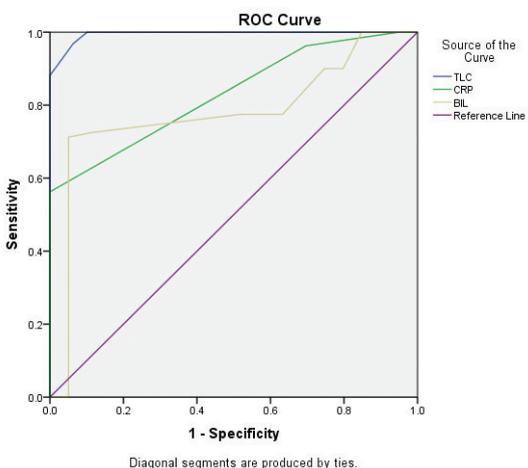


Figure-2: Receiver operating characteristic curves for white cell count (WCC), C-reactive protein (CRP) and bilirubin(bil) in predicting perforated appendicitis. AUC value provided with 95% confidence interval in parentheses.

was 26.0%. Previous studies have reported negative appendectomy rates of up to 20% in male and 30% in female patients.^{22,23} In our case series, the negative appendectomy rate was lower because all patients who had a diagnostic quandary were subjected to diagnostic laparoscopy and were excluded from the study. A great variation exists in the rate of PA in the literature, with PA percentage ranging from 3.5% to 25%.²⁴⁻²⁶

Till now there is no confirmatory laboratory marker for the pre-operative diagnosis of acute appendicitis and appendicular perforation. To supplement the clinical diagnosis and to reduce the frequency of unnecessary appendectomy, the importance of laboratory investigations like White Blood Cell (WBC) counts and C-reactive protein (CRP) values has been stressed.²⁷ Recently, elevation in serum bilirubin was reported, but the importance of the raised total bilirubin has not been stressed in appendicitis.²⁸ In our study, when considered in isolation, TLC was found to be a sensitive and specific tool for diagnosis of AA and PA. Bilirubin, in isolation, was found to have moderate sensitivity for PA.

In a meta-analysis, Andersson concluded that most diagnostic information comes from a history of migratory pain, clinical assessment confirming peritoneal irritation and inflammatory markers.²⁹ He also suggested that inflammatory variables in advanced appendicitis appear to be at least as important discriminators as the clinical descriptors of peritoneal irritation.

In this study we investigated the value of TLC, CRP and total Bilirubin in patients with suspicious signs of appendicitis and correlated the values with the intra-operative findings and histopathological examination of the specimens. TLC was found to have high sensitivity and specificity for PA. A TLC of $<9 \times 10^3$ cells/L was found to rule out PA but not AA. $CRP \geq 6$ mg/L was found to have high sensitivity for diagnosis of both AA and PA, but had a very low specificity (30.38%). Increased levels of both TLC ($\geq 9 \times 10^3$ cells/L) and CRP (≥ 6 mg/L) almost confirm a diagnosis of appendicitis (PPV=94.84% for AA and 92.22% for PA). Normal levels of both TLC and CRP rule out a diagnosis of PA but do not necessarily rule out AA. This is in contrast to the findings of Sengupta A³⁰ et al, who have suggested that normal TLC with normal CRP levels decrease the possibility of AA and that the patient can be discharged without more reviews. Rizazi³¹ et al reports that the possibility of negative appendectomy in patients with both positive tests has been less than 10.0%.

In our study mean bilirubin level was highest among patients

		Sensitivity(95%CI)	Specificity (95%CI)	PPV(95%CI)	NPV(95%CI)	Diagnostic accuracy(95%CI)
TLC. (cut off = 9×10^3 cells/l)	AA	66.76%(61.85,71.33)	83.54%(73.85,90.12)	95.08%(91.76,97.1)	34.55%(28.18,41.54)	69.67%(65.3,73.1)
	PA	100%(97.66,100)	83.54%(73.85,90.12)	92.49%(87.57,95.56)	100%(94.50,100)	94.56%(90.92,96.79)
CRP (cut off= 6 mg/l)	AA	94.68(91.93,96.53)	30.38%(21.34,41.23)	86.62%(82.99,89.57)	54.55%(40.07,68.29)	83.52%(79.83,86.64)
	PA	96.25%(92.06,98.27)	30.38%(21.34,41.23)	73.68%(67.33,79.19)	80.00%(62.69,90.50)	74.48%(68.59,79.59)
Bilirubin (cut off = 1.5 mmol/l)	AA	53.46%(48.41,58.44)	48.10%(37.43,58.95)	83.06%(77.82,87.26)	17.84%(13.28,23.54)	52.53%(47.94,57.08)
	PA	77.50%(70.43,83.28)	48.10%(37.43,58.95)	75.15%(68.04,81.12)	51.35%(40.18,62.39)	67.78%(61.62,73.39)
TLC/CRP	AA	63.56%(58.58,63.27)	83.54%(73.85,90.12)	94.84%(91.38,96.96)	32.51%(26.45,39.23)	67.03%(62.59,71.19)
	PA	96.25%(92.06,98.27)	83.54%(73.85,90.12)	92.22%(87.14,95.39)	91.67%(82.99,96.12)	92.05%(87.92,94.85)
TLC/CRP/Bilirubin	AA	36.97%(32.24,41.96)	89.87%(81.27,94.78)	94.56%(89.63,97.22)	23.05%(18.70,28.07)	46.15%(41.62,50.75)
	PA	73.75%(66.43,79.95)	89.87%(81.27,94.78)	93.65%(87.97,96.75)	62.83%(53.64,71.18)	79.08%(73.48,83.76)

Table-3: Sensitivity, specificity, positive predictive values (PPV) and negative predictive values (NPV) for white cell count (WCC), C-reactive protein (CRP) and bilirubin in all 615 patients when predicting acute appendicitis (AA) or perforated appendicitis (PA).

with PA. This observation is supported by Dipen Patel²⁴ et al who found that the mean bilirubin levels in patients diagnosed with complicated appendicitis were higher as compared to that in patients with acute uncomplicated appendicitis. Potential mechanisms that result in hyperbilirubinaemia in appendicitis could be either due to increased haemolysis by E coli and therefore increased bilirubin load³² or due to endotoxin induced cholestasis.³³ Several studies have suggested that patients with clinical appendicitis and hyperbilirubinaemia are more likely to have appendiceal perforation.¹⁵⁻²⁰ An increased bilirubin level (≥ 1.5 mmol/L) was found to have high sensitivity and high PPV for detecting PA in our study. However it did not play any major role as an adjunct to increased TLC and CRP.

TLC and CRP are non-specific inflammatory mediators. A pre-disease TLC and CRP status of patients in our study was not known, which otherwise would have helped in making a better decision regarding increased reason for increased levels of these mediators. Furthermore, levels of direct and indirect bilirubin were not separately known. Such information would have helped in a more specific analysis.

CONCLUSIONS

The results of this study showed that in addition to history and physical examination, some basic laboratory findings such as TLC, CPR and Bilirubin can be helpful in the diagnosis and decision making of patients with suspected appendicitis. A combination of TLC($\geq 9000/\text{mm}^3$) and CRP(≥ 6 mg/L) had high sensitivity (96.25%) and specificity (83.54%) to detect PA. The specificity to detect PA increased (89.87) when total bilirubin(≥ 1.5 mmol/L) was also added to the above combination of markers.

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Is Transurethral Resection of Prostate Made Safer by Preoperative Dutasteride Therapy? A Randomized Controlled Trial

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ABSTRACT

Introduction: Bleeding and hyponatremia are important complications of transurethral resection of the prostate (TURP). 5-alpha reductase inhibitors (5-ARI) are reported to reduce angiogenesis and bleeding in benign prostatic hyperplasia (BPH). We therefore performed a double blinded randomized clinical trial to assess the role of preoperative Dutasteride therapy before TURP.

Material and Methods: All patients undergoing TURP in JIPMER Urology Dept. during September 2006 - December 2010 were randomized into two groups – one receiving Dutasteride 0.5mg daily for 2 weeks and the other a placebo. The surgeons and the patients were blinded to the nature of preoperative therapy. Blood hemoglobin, hematocrit and serum sodium levels were estimated a day before and after surgery. The post-operative changes in hemoglobin, hematocrit and sodium concentrations were assessed in both groups. Blood transfusion requirements, ease of surgery and operating times were also assessed.

Results: 104 patients were randomly distributed to receive either Dutasteride (n=52) or placebo (n=52). There was no significant difference between hemoglobin difference (P value- 0.41), hematocrit difference (P value- 0.98), sodium levels (P value- 0.48), amount of resected tissue (P value- 0.67), operating times (P value- 0.24), surgeon's ease score (P value- 0.33) and blood transfusion requirements between the two groups. There were no side-effects attributable to Dutasteride.

Conclusion: There were no significant reductions in blood loss or hyponatremia during TURP with Dutasteride compared with placebo. Though the preoperative use of Dutasteride seems logical and rational, this study shows that there is no real benefit from the use of a short course Dutasteride before performing TURP.

Keywords: Resection of Prostate, Preoperative Dutasteride Therapy

INTRODUCTION

TURP still remains the gold standard for surgical treatment of BPH, despite the development of various minimally invasive therapies. However, TURP is associated with bleeding and hyponatremia during and after surgery, sometimes leading to serious adverse events, particularly in those with larger prostates.¹ Hematuria and clot retention after TURP might increase the need for blood transfusion, prolong the hospital stay and even necessitate re-operation.²

Based on the observation that 5-alpha reductase inhibitors (5-ARIs) like Finasteride reduce angiogenesis and bleeding due to BPH,³⁻⁷ pre-operative Finasteride therapy before TURP has been studied and shown to have some benefits in reducing these complications.^{1,3,8} The exact mechanism by which blood loss is reduced by 5-ARIs is unknown, but seems to involve a decrease in microvascular density (MVD)

within the prostate, leading to decreased prostatic blood flow.⁹ 5ARIs such as Finasteride and Dutasteride are known to suppress dihydrotestosterone (DHT) levels and thereby prostate growth, and also suppress the androgen dependent vascular endothelial growth factor (VEGF), leading to decreased angiogenesis.

While Finasteride inhibits only the type II 5AR isoenzyme,¹⁰ the dual 5ARI, Dutasteride, inhibits both type I and type II isoenzymes. Treatment with Dutasteride results in suppression of serum DHT in >85% of men, achieving a 90-95% reduction within 4 weeks, whereas Finasteride suppresses serum DHT by 70%, with only 49% of treated men achieving this reduction.^{11,12} Therefore, if Finasteride decreases surgical blood loss, it is logical to expect similar, or even more benefit with Dutasteride. But there are anecdotal reports on the benefits of preoperative use of Dutasteride. We therefore, performed a double blinded randomized clinical trial to assess the role of preoperative Dutasteride therapy on TURP complications.

Objectives of the study were to study the effect of pre-operative Dutasteride therapy on bleeding associated with TURP and to study the effect of pre-operative Dutasteride therapy on electrolyte changes associated with TURP.

MATERIAL AND METHODS

In this double-blind, randomized placebo-controlled study, approved by the institutional review board and ethical committee, we enrolled 104 consenting men, who were scheduled for TURP in a period that allowed 2 weeks of preoperative treatment with study medication in Urology Department, JIPMER during September 2006 to December 2010. Exclusion criteria included a history or evidence of prostatic malignancy, previous prostatic surgery, treatment with any 5ARIs within 12 months, presence of medical conditions such as liver disease, bleeding disorders or patients on treatment with aspirin and men with history of allergy to Dutasteride. The sample size was calculated using SPSS software keeping the power at 80%, based on the study by Donohue et al.²⁴ These men were randomized into two

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groups (Study group, n=52 and control group, n=52) by block randomization— one receiving oral Dutasteride 0.5mg once daily for 2 weeks and the other receiving placebo for same period of time. The surgeons and the patients were blinded to the nature of preoperative therapy. Serum hemoglobin, hematocrit and sodium levels were estimated a day before and after surgery. Surgery was either performed or supervised by experienced surgeons. Spinal anesthesia was used in all the patients. Catheter traction was applied, if clinically imperative. Weight of the resected prostatic tissue was recorded and subjected for histopathological examination. The operating time was recorded. The ease of surgery was assessed by visual analog scale ranging from 1 to 10. Blood transfusion requirements were noted.

STATISTICAL ANALYSIS

Results were analyzed using Student t test, with $P < 0.05$ considered to indicate statistical significance.

RESULTS

All 104 randomized patients underwent TURP. There was no difference between the treatment groups in baseline characteristics, ie age, prostate volume, preoperative- hemoglobin, hematocrit and serum sodium levels.(Table.1) Dutasteride was well tolerated.

After TURP, a mean decrease of 1.46gms in Hb, 2% in hematocrit and 4.92mEq in sodium concentrations were observed in Dutasteride group. A mean decrease of 1.29gms in Hb, 2.01% in hematocrit and 4.36mEq in sodium concentrations were observed in control group. In Dutasteride group, the mean weight of resectate was 28.8gms, mean operating time was 62.3minutes and mean VAS score was 2.65. In control group, the mean weight of resectate was 28.1gms, mean operating time was 64.8minutes and mean VAS score was 2.86. Statistically, there was no significant difference between the groups for these variables.(Table.2)

Clot retention occurred in 1 patient in the study group, in the immediate post op period, which required clot evacuation. Blood transfusion was required for 2 patients in each group. In Dutasteride group, histopathological examination of 2 of the resected specimen was suggestive of acute prostatitis and one was suggestive of chronic prostatitis in addition to be-

nign hyperplasia. In control group, 4 of the specimen were reported to have features of chronic prostatitis in addition to benign hyperplasia. None of the resected specimen was reported to have malignancy.

DISCUSSION

The primary objective of this randomized, double-blind, placebo-controlled study was to assess whether pretreatment with Dutasteride reduces the blood loss during TURP.

The rationale for the view that 5ARIs reduce blood loss during TURP is that these drugs reduce MVD and prostate size by inhibiting conversion of testosterone to dihydrotestosterone, thereby decreasing the activity of androgen dependent growth factors like VEGF, FGF and EGF.¹³⁻¹⁶ It is also supported by the studies showing that Finasteride, a 5ARI reduced gross haematuria secondary to prostatic bleeding.³⁻⁷ As a logical extension of this fact, a few studies have been reported on the effect of 5ARIs on blood loss associated with TURP. However, the results of these studies have been less consistent.¹⁷⁻²³

Pretreatment with Finasteride for duration of 2 weeks²⁴ and 8 to 10 weeks¹⁸ had been shown to reduce bleeding during TURP for larger glands. However, Sandfeldt et al²⁰ observed that there was no difference in blood loss intraoperatively and perioperatively even after 3 months of pretreatment with Finasteride on 30 to 90 gm prostates. The majority of the studies showing that 5ARIs are beneficial in reducing blood loss during TURP are single center trials and having less number of patients. The multicentric randomized placebo-controlled trial by Boccon-Gibod et al²² and a largest double-blind, randomized, placebo-controlled multicentre study by Hahn, R. G et al²³

have shown no significant difference between the groups treated with Dutasteride 0.5mg and placebo prior to TURP. In a series of 12 patients, Carlin et al³ noted that, hematuria associated with BPH, subsided within 2 weeks of treatment with Finasteride. Similarly, Lekas et al¹⁵ reported that prostatic blood flow decreased by upto 60% in rats treated with Finasterid for 7 days. Donohue et al.²⁵ in a randomized placebo-controlled trial showed that Finasteride reduces prostatic vascularity rapidly within 2 weeks. Based on the positive results of the above studies with a short pretreatment period,

Characteristic	Dutasteride group (n=52)	Placebo group (n=52)	P value
Mean Age-years (Range, SD)	63.8 (53-79, 6.6)	65.5 (50-85, 7.8)	0.22
Mean Prostate volume-cc (Range, SD)	39.8 (20-69, 10.4)	40.4 (26-63, 9.7)	0.76
Mean Pre-operative Hemoglobin-gms/dl (Range, SD)	11.8 (8.5-15, 1.6)	11.6 (9-14.5, 1.3)	0.56
Mean Pre-operative Hematocrit-% (Range, SD)	35.1 (27-41.7, 4.2)	34.1 (26.4-42.9, 3.8)	0.21
Mean Pre-operative Sodium-mEq/L (Range, SD)	137 (126-147, 4.6)	136 (122-147, 5.3)	0.31

Table-1: Baseline characteristics of Patients

Variable	Dutasteride group (n=52)	Placebo group (n=52)	P value
Mean Hemoglobin decrease-gms (Range, SD)	1.46 (-1.3-4.4, 1.22)	1.29 (-1.2-3.4, 0.93)	0.41
Mean Hematocrit decrease-% (Range, SD)	2.0 (-5.0-11.7, 3.39)	2.01 (-5.6-8.9, 2.78)	0.98
Mean Sodium decrease-mEq (Range, SD)	4.92 (-4.0-14.0, 3.65)	4.36 (-7.0-13.0)	0.48
Mean weight of resectate-gms (Range, SD)	28.8 (12.0-52, 8.31)	28.1 (16-50, 7.23)	0.67
Mean operating time-minutes (Range, SD)	62.3 (30-80, 10.4)	64.8 (40-95, 11.3)	0.24
Mean VAS score (Range, SD)	2.65 (1.0-6.0, 0.96)	2.86 (1.0-7.0, 1.25)	0.33

Table-2: Provide heading for the table

we used a treatment arm with 2 weeks preoperative medication with Dutasteride, which is practically a reasonable waiting period before surgery.

The most practical way to quantify blood loss during TURP is by measuring Hb in the irrigating fluid,⁸ however, irrigation fluid Hb levels are only 5–10% of that found in whole blood, therefore precision is not ensured in estimating hemoglobin concentration all the time. Moreover, the need for blood transfusion is decided based on the serum hemoglobin concentration. Hence we assessed blood loss by decrease in serum hemoglobin. Hematocrit was also estimated along with hemoglobin to overcome the effect of hydration.

In the present study, no significant difference in blood loss was found between two groups, which is consistent with the findings of previous studies on Dutasteride.^{22,23} The overall transfusion rate was 4%, as expected from previous reports.^{2,8,23} However, the incidence of clot retention was 1%, which is significantly lower than previously reported.²³ There was no observable effect of preoperative Dutasteride on the serum electrolytes.

The incidentally diagnosed prostatic cancer, following TURP was reported to be 10%.²⁶ However, in the present study, none of the resected specimen was reported to have malignancy, which might be due to non involvement of peripheral zone in the resection.

CONCLUSION

Preoperative Dutasteride 0.5 mg once daily for 2 weeks is not effective in reducing blood loss during or after TURP and also does not have effect on electrolyte changes associated with TURP. Though the preoperative use of Dutasteride seems logical and rational, this study shows that there is no real benefit from the use of a short course Dutasteride before performing TURP. This study adds to the body of conflicting evidence. Therefore, further trials need to be conducted on the efficacy of preoperative Dutasteride, its dosage and duration of treatment and also to compare the efficacy of preoperative Finasteride versus Dutasteride.

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Comprehensive Management of Keratocystic Odontogenic Tumor of the Mandible: A Case Report

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ABSTRACT

Introduction: Keratocystic Odontogenic tumor (KCOT) is a odontogenic neoplasm of jaw which has high recurrence potential.

Case Report: This paper reports a case of KCOT in left hemimandible with buccal and lingual cortical perforations. The case was treated by segmental resection with disarticulation and reconstructed with avascular fibula graft. Postoperative prosthetic rehabilitation was done with cast partial denture.

Conclusion: For complete management of KCOT involving hemimandible, a treatment plan of resection and reconstruction with long term follow up should be carried out. Also the patient's deformity should be prosthetically rehabilitated to give him a functionally and esthetically acceptable dentition.

Keywords: Odontogenic Tumor, Surgical treatment, Reconstruction, Fibula graft, Hemimandibulectomy.

INTRODUCTION

Keratocystic odontogenic tumor (KCOT), previously known as a cystic lesion was renamed as an odontogenic jaw tumor in 2005 by WHO.^{1,2}

KCOT is clinically benign but locally aggressive lesion with a slight male predilection and commonly occurs in the second and third decades of life. KCOTs can occur in any part of the jaw, but majority of the lesions are seen in the mandible, most commonly in the posterior body and ascending ramus. It is considered to be an aggressive odontogenic tumor, owing to its high recurrence rate and tendency to invade adjacent tissue. The treatment modalities of KCOT's, vary from conservative procedure like marsupialization and enucleation, with or without adjuvant physicochemical therapy (such as cryotherapy, application of cornoy's solution) to more aggressive marginal or segmental resection of jaw. The recurrence rates are significantly high and differ in various published articles, varying from 0% to 62%, depending on the site of involvement, type of surgical procedure used, and length of follow-up. Most recurrences are seen in the first 5 years after surgery.^{1,3}

In the present report, we describe a case of large KCOT originating in the left mandibular body and ramus region with buccal and lingual cortical perforations. The tumor was managed by segmental resection of mandible. Reconstruction was done using autogenous avascular fibula graft and prosthetic rehabilitation was done using cast partial denture.

CASE REPORT

A 34-year-old male patient reported to the Department of Oral and Maxillofacial Surgery, School of dental sciences, Krishna Hospital, Karad, in September 2014 with a chief complaint of swelling over lower left jaw for the past 3 months. The swelling was initially small and gradually in-

creased to the present size. There was no associated pain, paresthesia or discomfort. Extraoral examination revealed mild swelling in the mandibular left angle-ramus region (figure 1a). The swelling was non tender and the overlying skin appeared normal with no local rise of temperature. The temporomandibular joint showed normal movements and absence of tenderness and clicking. Intraoral examination showed expansion of left buccal cortical plate and obliteration of vestibule in region of 34-37 with thinning and 'Egg Shell Crackling' over the cortical plates (figure 1b). The associated teeth were non-carious and did not show mobility. Electric pulp vitality test revealed positive vitality for all the left mandibular posterior teeth. Orthopantomogram showed a well defined, corticated multilocular radiolucent lesion in the left posterior mandible, extending antero-posteriorly from the apical region of 35 to posterior border of ramus of mandible and superior-inferiorly from coronoid and condylar processes to lower border of mandible (figure 1c). Based on the clinical presentation and the radiographic findings provisional diagnosis of keratocystic odontogenic tumor was made. Differential diagnosis included ameloblastoma, odontogenic myxoma, central odontogenic fibroma and central giant cell granuloma. Aspiration of the lesion as done under local anesthesia, which revealed thick white cheesy viscid fluid with keratin flakes. Cytochemical evaluation of the aspirate showed soluble protein content of 3.4mg/dl. Incision biopsy was performed and a portion of the lesion was submitted for histopathological examination. Hematoxylin and eosin (H and E) stained section showed 6 to 8 cells thick parakeratinized stratified squamous epithelium with surface cell keratinization, hyperchromatic tall columnar basal cells with palisading and reversal of nuclear polarity. Separation of basement membrane from connective tissue at some places was appreciated. Based on the histological findings diagnosis of keratocystic odontogenic tumor was made (figure 2a, b). Computed tomography (CT) was done to study exact extent of the lesion for pre-surgical planning. CT revealed intraosseous expansile lesion involving left mandibular body and ramus with buccal cortical perforation distal to the men-

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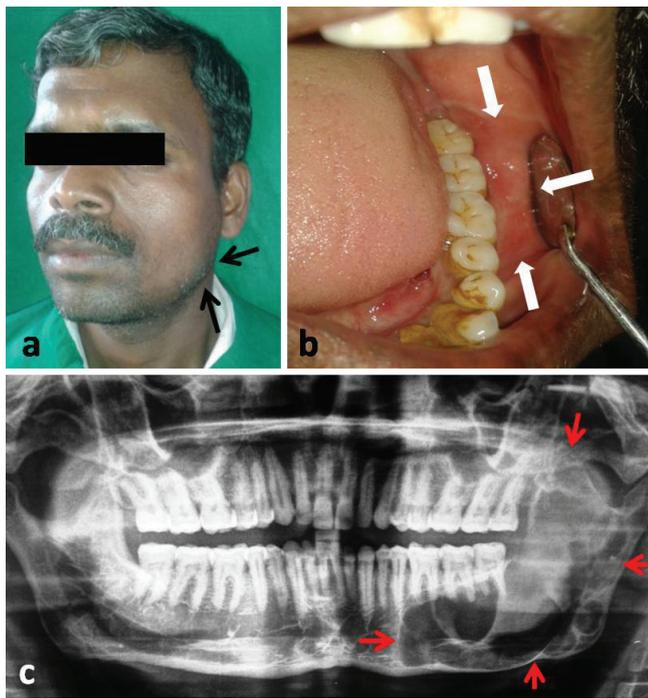


Figure-1: Clinical presentation of lesion; (a) diffuse swelling over left mandibular angle and ramus region, (b) intraoral view showing expansion of buccal cortical plate and obliteration of buccal vestibule, (c) Orthopantomogram showing well defined, corticated multilocular radiolucency in left mandibular body, angle and ramus region.

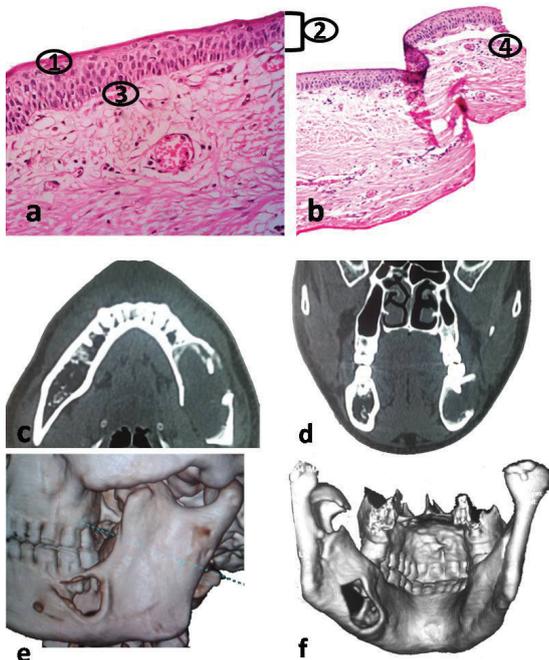


Figure-2: H and E stained section (10X magnification) showing; (a) cyst lining with surface cell keratinization(1), 6-8 layer thick parakeratinised stratified squamous epithelium(2), hyperchromatic tall columnar basal cells with palisading nuclei and reversal of polarity [Picket fence/Tombstone appearance](3); (b) underlying connective tissue showing separation from epithelium at certain places (4), Computed tomogram (c) Axial view, (d) Coronal view and (e, f) 3-D reconstruction showing expansile intraosseous lesion involving left posterior mandible with perforation of left buccal and lingual cortex, altered morphology of coronoid and condyle and cortical erosions over neck of the condyle and angle region.

tal foramen and lingually at the mylohyoid ridge. Cortical erosions at the angle of the mandible and neck of the condyle were also appreciated. There was altered morphology of the left coronoid and condylar process (figure 2c, d, e, f).

Treatment plan included resection of involved segment of mandible with disarticulation, reconstruction of the hemimandibulectomy defect with fibula graft fixated over titanium reconstruction plate with condylar head. Under general anesthesia submandibular incision was used to approach the tumor. Subplatysmal dissection was done to reach the submandibular space. In the submandibular space facial vessels were identified and ligated. Mandible was freed from all the attachments and osteotomy cuts were marked anterior to the mental foramen. Osteotomy cut was completed buccally and lingually. Osteotomized mandible segment was rotated laterally and inferior alveolar neurovascular bundle was identified and ligated. The left hemimandible was disarticulated and the specimen was excised. After resection of the mandible the soft tissue areas adjoining buccal and lingual perforations were electrocauterized to remove any possible residual pathology in situ. A fibula graft was harvested from

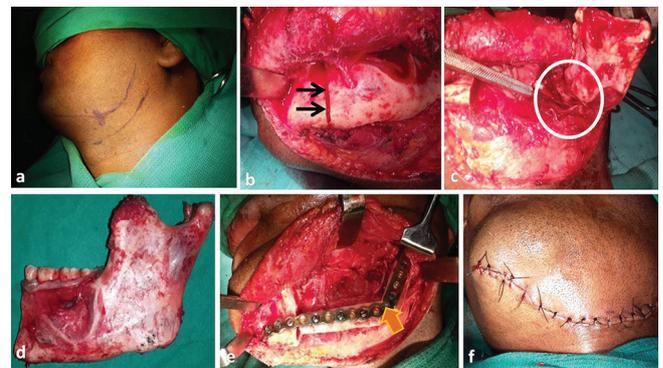


Figure-3: Surgical steps in management of lesion (a) submandibular incision marked, (b) osteotomy cuts placed anterior to mental foramen, (c) medial muscle attachments stripped and inferior alveolar bundle identified and ligated, (d) excised specimen, (e) fibula graft with reconstruction plate fixated to remaining mandible, (f) closure.



Figure-4: One year ear postoperative photographs showing (a) satisfactory facial contour, (b) adequate oral opening, (c) Intraoral view showing replacement of missing teeth with cast partial denture, (d) OPG showing osseointegration of fibula graft with mandible.

non dominant limb of the patient after measuring the length of the defect. The graft was shaped as per the shape of patient's mandible. It was then fixated with reconstruction plate and then to the patient's remaining mandible with screws. Wound was closed in layers (figure 3). Postoperative recovery was uneventful and the patient was kept on intermaxillary fixation for 2 weeks for achieving initial stability of the graft, maintenance of occlusion and prevention of mandibular deviation. Histopathologic study of the excised specimen confirmed the diagnosis of KCOT and the anterior margin of the resected specimen was free of tumor. Patient was kept on regular follow up. On one year follow up, patient's face was symmetrical with 30 mm mouth opening. Occlusion was stable with normal mandibular movements with slight deviation of to left side on opening. OPG showed osseointegration of the fibula with patient's mandible. The missing teeth were replaced with cast partial denture for prosthetic rehabilitation of the patient (figure 4).

DISCUSSION

WHO in 2005 reclassified parakeratinized variant of odontogenic keratocyst as an odontogenic tumor and the lesion was renamed as keratocystic odontogenic tumor (KCOT). Epithelial lining and connective tissue stroma of KCOT shows tumor like characteristics. The epithelial lining shows evidence of high mitotic activity with high turnover rate. There is also expression of various proliferation markers in the epithelium. The connective tissue of KCOT shows features of a tumoral stroma. There is high frequency of stromal myofibroblasts with presence of high enzymatic activity. Increased matrix metalloproteinases, mast cell tryptase and increased expression of receptor activator of nuclear factor and osteoprotegerin contribute to the aggressive tumor like nature of the lesion. The over expression of p53 protein and mutations in p53 and PTCH genes (tumor suppressor genes) also justify tumor like behaviour of KCOT.^{2,4}

Owing to its tumor like behavior with high recurrence rate these lesions needs to be managed aggressively and followed up regularly. Reconstruction of the residual defect and dental rehabilitation helps in comprehensive management of the patient. Various treatment modalities have been reported for management of KCOT (table 1) including decompression, marsupialization, enucleation and resection.

Decompression / Marsupialization of lesion

KCOT enlarges by expansion due to pressure exerted by the fluid within the lesion. Decompression is a technique that relieves this pressure by making perforation in the lesion and keeping the opening patent to prevent build up of fluid inside. Marsupialisation exposes the lesion to the oral environment thus reducing the pressure and preventing its further growth. The exposed cavity is packed with antibacterial gauze like iodoform impregnated with bacitracin. This process not only prevents further growth of KCOT but also changes the friable parakeratinised epithelium into a thicker epithelium which can be easily removed later with enucleation. This treatment plan is preferred when the lesion is large and in vicinity of vital structures, in young patients to reduce post-operative morbidity, and in systemically compromised patients where more aggressive resection or administration

1. Decompression or Marsupialization
2. Enucleation
a. Enucleation without physicochemical treatment
b. Enucleation with physicochemical treatment
i. Peripheral ostectomy
ii. Cornoy's solution
iii. Electrocautery
iv. Cryotherapy (liquid nitrogen)
v. Methylene blue
3. Resection
a. Marginal resection
b. Segmental resection
i. Segmental resection without disarticulation
ii. Segmental resection with disarticulation
Table-1: Management options for KCOT

of general anesthesia is contraindicated.^{2,3}

Enucleation of KCOT lining, with or without physicochemical treatment

Enucleation is removal a lesion by shelling it out of the bone. When used alone for management of KCOT, It has the highest recurrence rate (26.9% to 54.5%) and thus should be supplemented with physicochemical treatments like peripheral ostectomy, cornoy's solution, electrocauterization and cryotherapy (liquid nitrogen).⁵⁻⁷

Peripheral ostectomy is removal of few millimeters of bone beyond the visible margins of the lesion after enucleation. It can be carried alone or may be assisted by vital staining of the surgical bone defect.² Staining is done with help of stains like methylene blue or crystal violet. The dye penetrates into cells that have an abnormal increase in nucleic acids. This helps to identify areas that have been incompletely excised during peripheral ostectomy.⁵ Cornoy's solution is a chemical used to cauterize retained pathological tissue. It is applied to the bone cavity after enucleation of the lesion. The chemical penetrates around 2 mm of bone (after application for 3 minutes), which is then removed by peripheral ostectomy. Cornoy's solution is neurotoxic and contact with nerves for more than 2 min may lead to paresthesia. When KCOT perforates the buccal or lingual cortex into the soft tissue, to avoid the recurrence electrocauterisation of the surrounding soft tissues must be done.³ Liquid nitrogen cryosurgery has also been used to devitalize the peripheral bone after removal of lesion. Cryosurgery causes cell death by direct damage from intracellular and extracellular ice crystal formation along with osmotic and electrolyte disturbances. This technique involves rapidly freezing and slow thawing of the cavity walls after enucleation of lesion. The process affects around 1.5 mm of the bone and can cause paraesthesia if it comes in contact with nerve.^{2,3}

Resection of jaw for management of KCOT

Resection of the lesion is preferred treatment modality for aggressive jaw tumors like KCOT. It provides more definitive treatment with less recurrence rates. Resection is of two types- marginal or segmental. In marginal resection part of mandible is removed maintaining the continuity at lower border. In segmental resection a part of mandible is removed without maintaining the continuity. When condyle is removed along with the segment it is termed as disartic-

ulation.^{2,3}

KCOT shows high recurrence rate. The main reason for recurrence of KCOT is its thin lining, which is friable, and portions are easily left behind during its removal. KCOT also have daughter cysts beyond the lining of the cyst, between the cyst and the alveolar mucosa and in the area of alveolar mucosa wherever there is perforation. These further increase risk of recurrence in large cysts showing areas of perforation.² Segmental resection and electrocauterisation decreased the chances of recurrence in such cases. In the present case segmental resection of mandible with disarticulation was carried out. The soft tissue abutting the areas of lingual and buccal plate perforations were electrocauterised to remove any left out pathological tissue. Reconstruction was done with autogenous fibula graft. Fibula graft gives adequate length of bone which can be shaped easily as per the shape of the mandible. It offers a good quality of compact bone which can give stability to future prosthetic rehabilitation.

CONCLUSION

Treatment of KCOT should be meticulously planned. Choice of treatment should be based on multiple factors like patient age, size and location of the tumor, soft tissue involvement and history of previous treatment. The treatment modality that carries the lowest risk of recurrence and the least morbidity should be chosen depending on the case. Reconstruction of the surgical defect and prosthetic replacement of the missing teeth in postoperative period provide comprehensive functional and esthetic rehabilitation of the patient. Long term follow-up is always advocated to rule out recurrence.

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Effect of Steam Inhalation on Nasal Mucociliary Clearance in Normal Individuals and Nasal Disease State

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ABSTRACT

Introduction: Nasal Mucociliary Clearance is a basic defense mechanism of upper respiratory tract to maintain milieu interior. It removes obnoxious material and particulate matter along with pathogenic micro-organisms. Steam Inhalation is a simple, non-pharmacological method used in allopathy, ayurveda and naturopathy for various different purposes. Till date there are no reports to show that steam inhalation improves the nasal mucociliary clearance. Hence, this study is designed to know the effects of steam inhalations on nasal mucociliary clearance in normal individuals and in rhinitis and sinusitis. Objective of the research was to study the nasal mucociliary clearance in normal individuals and in patients of rhinitis and sinusitis and to study the effect of steam inhalation on nasal mucociliary clearance.

Material and methods: This was a case control study. All the study population were subjected to saccharine test and results were noted, steam inhalation was given and after 1 hour and 24 hour saccharine test was repeated and results were tabulated. Duration of the study was from April 2014 to May 2014.

Result: The nasal mucociliary clearance is significantly improved by steam inhalation and after repetition of remedy, more improvement was seen.

Conclusion: Research shows that steam inhalation definitely improves nasal mucociliary clearance.

Keywords: Nasal mucociliary clearance, Steam inhalation, rhinosinusitis.

INTRODUCTION

Nasal Mucociliary Clearance is a basic defense mechanism of upper respiratory tract to maintain milieu interior.¹ It removes obnoxious material and particulate matter along with pathogenic micro-organisms. Unfortunately very little attention is paid to this mechanism until last few years.

Steam Inhalation is a simple, non-pharmacological method used in Allopathy, Ayurveda and Naturopathy for various different purposes. There are some stray reports indicating that steam inhalation acts as a good adjuvant in nasal disorders like rhinitis and sinusitis. It is a method of introducing warm, moist air into the lungs via the nose and throat for therapeutic benefit. The hot steam moistens the nasal passages, thus clearing the blocked nose and opens up congested sinuses allowing breathing more easily.²

Till date there are no reports to show that steam inhalation improves the nasal mucociliary clearance. However, the reason to believe that effects of steam inhalations in relieving nasal symptoms of rhinitis and sinusitis is mostly by improving nasal mucociliary clearance.

Hence, this study is designed to know the effects of steam inhalations on nasal mucociliary clearance in normal individuals and in rhinitis and sinusitis.

Aims and objectives of our study were to study the nasal mucociliary clearance in normal individuals and in patients of rhinitis and sinusitis. Along with that our main aim is to study the effect of steam inhalation on nasal mucociliary clearance.

MATERIAL AND METHODS

This was a case control study and was carried out in the department of ENT, Dr. Shankarrao Chavan Government Medical College, Nanded, Maharashtra, India. This study was conducted between the periods of April 2014 to May 2014 i.e. 2 months.

Sample size was carried out according to the earlier study on mucociliary clearance conducted at our department. Considering mean value 17 with standard deviation of 7.3 and allowable error of 2 minutes. We calculated the sample size for this study. So the sample size for our study was 53. As this was a case control study we have taken 53 controls i.e. normal volunteers and 54 patients having nasal symptomatology. Subject selection was done as per Exclusion – Inclusion criteria as

Normal individuals (control group)

Individuals who have no rhinological disorders at least in last 1 month and desirous to participate in study were included and children below 12 years of age and those having nasal disorders in recent past or present were excluded from study.

Study group (cases)

Individuals having nasal disorders - rhinitis and sinusitis and willing to participate in the study were included in the study and children below 12 years of age and also patients with clear evidence of osteo-meatal blockage on computed tomography of paranasal sinuses and sinus endoscopy were excluded from study. Especially we had focused on those patients who were not responded to any conservative or operative procedure and their quality of life got hampered due to rhinitis or sinusitis.

Methodology

As per exclusion-inclusion criteria, study population was

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selected. After thorough ENT examination and necessary investigations they were subjected to saccharine test. Saccharine test was done by using Anderson’s technique. After noting the results patients were given steam inhalation in presence of investigator through commercially available inhaler for period of three minutes. Saccharine test was repeated after 1 hour and results were noted. After a period of 24 hour again steam inhalation given for same duration and saccharine test done after 1 hour and results were noted. Similar method was applied for control group.

Blinding was done to avoid bias in the study. Patient’s clinical examination and selection in study and control group were done by departmental residents. Patients were given unique patient identification number (patient _ id) and investigators were only got patient _ id and no other information. Investigator divided into 2 groups. They were conduct saccharine test without the knowledge whether the individual belong to study or control group and saccharine test is pre or post therapy. They were submitting the report to the principal investigator. Results so obtained were tabulated, analyzed and inferred.

Saccharine Test (Anderson’s Technique)³

The saccharin test is inexpensive and simple to perform, and its results are similar to those obtained using a radioactively labeled particle.³ Recently it has been proposed as a screening test to detect abnormal mucociliary clearance.⁴ We have used the test to measure nasal mucociliary clearance.

After taking informed and written consent, patients were subjected for saccharine test using saccharine tablet of size 1 × 1 × 1 mm.

The test was performed as follows

- Patients were kept in sitting position.
- One nostril tested at a time.
- Saccharine tablet kept in inferior meatus 1 cm posterior to the anterior end of inferior turbinate with Tilly’s forceps.
- Patient was asked to do swallowing movements every 30 sec.
- Patients must be instructed not to sniff, eat or drink and to avoid coughing and sneezing if possible.
- Time noted between the placement of tablet and feeling of first sweet taste.
- Then patient was asked to blow nose to remove undissolved tablet.

After collecting all the data, we considered a hypothesis, “Steam inhalation accelerates nasal mucociliary clearance” and applied statistical analysis was done.

RESULTS

In our study, among case group we found 37 males and 17 females i.e. total 54. And among control group we found 39 males and 14 females i.e. 53

Table-1 showing nasal mucociliary clearance time of study population before steam inhalation. In normal individuals the nasal mucociliary clearance time of normal volunteers was 8.2 minutes with standard deviation of 3.8 and in symptomatic patients it was 10.9 minutes with standard deviation of 4.4.

From table-2, effect of steam inhalation on nasal mucociliary

clearance 1 hour and 24 hour after steam inhalation among control group i.e. normal volunteers. We found that the nasal mucociliary clearance time of normal individuals was shortened in 75.5% of individuals after 1 hour and 24 hour of steam inhalation, means there is improvement in nasal mucociliary clearance in 75.5% of individuals.

Table-3 showing effect of steam inhalation on nasal mucociliary clearance 1 hour and 24 hour after steam inhalation among study group i.e. symptomatic patients. We found that the nasal mucociliary clearance time of patients was shortened in 72.2% of cases after 1 hour and 83.3% of cases after

	Subjects	Mean NMCC	SD
Controls	53	8.2 min	3.8
Cases	54	10.9 min	4.4
Total	107		

NMCC – Nasal Mucociliary Clearance

Table-1: Nasal mucociliary clearance time of cases and controls before steam inhalation.

Effect of steam inhalation on NMCC	No. of subjects	Percentage (Out of 53)	No. of subjects	Percentage (Out of 53)
	After 1 hr		After 24 hr	
Prolonged	5	9.4	10	18.9
No effect	8	15.1	3	5.6
Shortened	40	75.5	40	75.5
Total	53		53	

Table-2: Effect of steam inhalation on control group

Effect of steam inhalation on NMCC	No. of subjects	Percentage (Out of 54)	No. of subjects	Percentage (Out of 54)
	After 1 hr		After 24 hr	
Prolonged	10	18.5	6	11.1
No effect	5	9.3	3	5.6
Shortened	39	72.2	45	83.3
Total	54		54	

Table-3: Effect of steam inhalation on Case group.

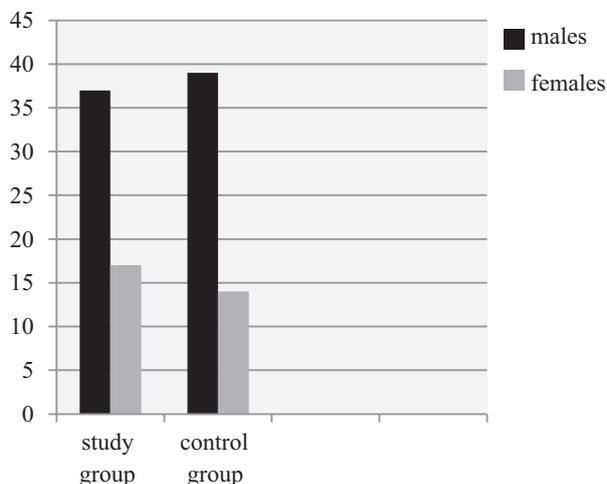


Figure-1: Bar diagram showing sample size

24 hours of steam inhalation, means there is improvement in nasal mucociliary clearance in 72.2 % and 83.3 % of patients after 1 hour and 24 hours of steam inhalation.

DISCUSSION

Mucociliary clearance is a key defence mechanism in human upper and lower airways, and its impairment, both acquired and genetically determined, predisposes to chronic infection of the nose, paranasal sinuses, and respiratory tree.^{6,7} It protects the airway against ambient microorganisms, foreign particles and noxious substances. Its mechanism is delicate but vigorous to entrap and remove particles. Many chronic nasal conditions may have detrimental effects on mucociliary transport. Acute upper respiratory tract infections may reduce the nasal mucociliary clearance by direct damage to the cilia and change in the rheological properties of the nasal secretions.⁹⁻¹¹ The Results of our study confirm those of Stanley et al⁸ that the saccharin test is an useful screening technique for measuring nasal mucociliary clearance as it is inexpensive, simple to do and reproducible.

No any human studies of the effects of steam inhalation on mucociliary function have been reported up till now. Therefore this is our sincere efforts to study the utility of steam inhalation in chronic rhinosinusitis. The saccharine test, despite being an established bedside investigation for assessing NMCC, has not been used to evaluate the effects of steam inhalation on mucociliary clearance till date. It has been suggested that the mucus transport is usually impaired in cases of chronic rhinosinusitis.⁶ Sakakura et al⁹ reported the marked impairment of nasal mucociliary clearance in chronic rhinosinusitis.

Age groups of 12 – 60 years were included in study. Most of subjects were in 3rd decade of life. In our study we found male preponderance i.e. 71 % of males and 29 % of females. This might be due to our social and cultural ethics as males forms the main source of earnings for the family and was exposed outside pollutants and females stay at home and were protected.

We found that the nasal mucociliary clearance time of normal individuals was shortened in 75.5% of individuals after 1 hour and 24 hour of steam inhalation, means there is improvement in nasal mucociliary clearance in 75.5% of individuals. Also there was no response of steam in 15.1 % and 5.6 % of individuals after 1 hour and 24 hours of steam inhalation.

We found that the nasal mucociliary clearance time of patients of rhinosinusitis was shortened in 72.2% of cases after 1 hour and 83.3% of cases after 24 hours of steam inhalation, means there is improvement in nasal mucociliary clearance in 72.2 % and 83.3 % of patients after 1 hour and 24 hours of steam inhalation. Also there is no response of steam in 9.3% and 5.6% of patients after 1 hour and 24 hours of steam inhalation. All the patients of nasal chronic rhinosinusitis in whom there were improvement in NMCC, the symptoms were drastically reduced and they were satisfied with steam inhalation.

Hence from these results, we proudly say that the nasal mucociliary clearance was significantly improved by steam inhalation and after repetition of remedy, more improvement

was seen.

'p value' after 1 hr of steam inhalation (p1) and after 24 hr of steam inhalation (p2) was calculated, both are (< 0.05) statistically significant and found that p2 > p1.

CONCLUSIONS

The nasal mucociliary clearance time for the cases before steam inhalation was 10.9 minutes with the standard deviation of 4.4. 1 hour after steam inhalation it was 9.3 minutes with standard deviation of 4.2 and after 24 hours 8.7 minutes with standard deviation of 4.1 were found.

Similarly, the nasal mucociliary clearance time for the controls before steam inhalation was 8.2 minutes with standard deviation of 3.8. 1 hour after steam inhalation it was 7.1 min with standard deviation of 3.2 and after 24 hours 6.7 minutes with standard deviation of 3.2 were found.

Hence, Steam Inhalation Definitely Improves Nasal Mucociliary Clearance and also symptomatology of our patients were drastically reduced.

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Emergency Peripartum Hysterectomy for Primary PPH- An Obstetrician's Challenge

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ABSTRACT

Introduction: Every year approximately 5,00,000 women die of maternal causes worldwide. Approximately 99 % of these of death occur in developing countries of which Asia forms 45%. PPH is responsible for around 25 % of maternal mortality worldwide (Who 2007) reaching as high as 60 % in some countries. Study was done to determine the indication, risk factors, complication and the incidence of Emergency peripartum hysterectomy

Material and Methods: Case sheet of 29 patients who had undergone EPH between 2005 September to 2015 August in the Department of Obstetrics and Gynaecology of MOSC Medical College Hospital Kolenchery were studied.

Results: There were 29 EPH among 28871 births with incidence at the rate of 1 per 1000 births.

Indications of EPH were morbid adherence of placenta (62 %), Placenta praevia (20.6%), uterine atony (13.7%) and fibroids (3.44%). A significant association between previous caesarean section (CS) and EPH was confirmed - Relative Risk 5. Association with Age and EPH - RR 2.4 was also obtained. There was one maternal death. Maternal morbidity was significant (46%), urinary tract injury and febrile morbidity were the common complications.

Conclusion: This data identified abnormal placentation as the primary cause for EPH. The data also illustrates that EPH increases significantly with increasing parity, age and previous caesarean section.

Keywords: Emergency, Peripartum hysterectomy, Abnormal placentation

INTRODUCTION

EPH implies removal of uterus at the time of delivery or in the immediate post partum period for haemorrhage which is not responding to the conservative treatments.¹ It's one of the most challenging procedure in modern obstetrics. Obstetrics is a bloody business – Dr. Jack Pritchard.² Despite advances in medical and surgical fields Postpartum Haemorrhage is still continuing to be the leading cause of maternal morbidity and mortality.³ Review by a group of experienced Obstetricians led to conclusion that the majority of the death (73%) reported from Obstetric Haemorrhage could have potentially been prevented by prompt attention to clinical signs of bleeding and associated hypovolemia.⁴

Earlier Uterine Atony and Rupture were the most common indications for EPH. Recent studies show that these indications have been replaced by abnormal placentation which include placenta praevia and morbidly adherent placenta.

Study was done to determine the indication and risk factors of patients undergoing Emergency Peripartum Hysterectomy with the objective to study the incidence and complications of patients undergoing Emergency Peripartum Hysterectomy

MATERIALS AND METHODS

This case series study was conducted in MOSC medical college Hospital Kolenchery, India after obtaining approval from the ethics committee. This study covered the period of 10 years from September 2005 to August 2015.

Inclusion criteria

All antenatal patients who had undergone hysterectomy after 20 completed weeks of gestation for uncontrolled uterine bleeding which is not responding to conservative measures at the time of delivery or within 24 hours after delivery from the period of 2005 to 2015

Exclusion criteria

All patients who had hysterectomy done for other causes in the postpartum period after 24 hours like secondary PPH, postpartum uterine infection.

All patients who had peripartum hysterectomy during the study period were identified from the labour room delivery register which included all births. Operating theatre and pathology records were also checked as to ensure that no cases were skipped. Information on demographic and clinical variables as age, obstetric score, gestational age, indication for hysterectomy, drugs given, procedures done before proceeding to hysterectomy, blood transfusion, operating time, complications, and hospitalization period were obtained by review of the maternal case notes. Information about total number of deliveries and the CS during the study period were obtained from labour room statistics.

STATISTICAL ANALYSIS

Statistical analysis was done using CDC Epi info (US Department of Health and Human Services for Disease Control and Prevention). Descriptive statistics were used to infer results.

RESULTS

During the 10 year study period there were a total of 28871 deliveries in our institution of which 18412 were vaginal deliveries and 10459 were CS deliveries. Twenty nine women underwent EPH during this period (demographic data is

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shown in table-1) with an overall incidence of 1/1000 deliveries. The rate of EPH was 2.1/1000 CS deliveries and 0.38/1000 vaginal deliveries.

The study included 4 women who were above 35 years. There were only 4 primigravida and 25 were multigravida (85.71%). 7 patients had vaginal delivery and the rest 22 had caesarean section. 22 patients (75.86%) had previous caesarean section.

Most common indication for EPH was abnormal placentation 24 women (82.6%). Out of which 18(60 %) had morbidity adherent placenta. 13.7% had uterine atony and 3.44 % cases had fibroids as the cause for EPH.

General Anaesthesia was given in 24 of these patients. Therest were given spinal. All women received oxytocin infusion, methyl ergometrine and PGF2 α . Uterine and Ovarian Artery ligation was done in 10 (35%) of cases. Internal Iliac Artery ligation was done in 6(21.4%). Suturing of placental bed was done in 10 (35.71%). Balloon tamponade was done

in one patient. Total abdominal hysterectomy was done in 25 of these patients and 4 had subtotal hysterectomy. One patient had significant bleeding from adnexae necessitating unilateral salpingo-oophorectomy.

The mean surgical time was 3.4 hr \pm 0.9(range 2.5-5.15 hrs). 28patients (96%) received blood transfusion. The mean blood transfusion received was 5.28 \pm 3.16 units. All women needed intensive care unit admissions. The mean post operative stay was 8.9 \pm 3.5 (range 7-15 days). Average baby weight was 2.48 \pm 0.66 kg.

Significant proportion of women suffered intra-operative and post operative complication which are given in table-2. Women who had injury to urinary tract were identified and repaired intra-operatively with no sequelae. None of the women had ureteric injuries.

DISCUSSION

This study has analysed the incidence and outcome of EPH in teaching hospital in south India. Hysterectomy following caesarean section was described by PORRO and was used to prevent maternal mortality due to PPH.⁵

EPH is one of the most challenging procedures in modern obstetrics. This is due to pregnancy induced anatomical changes in the organs, the need for timely intervention, blood loss and the need for performing it in an emergency setting.⁶ The incidence of EPH is 1 per 1000 deliveries in our series compares favorably with other reported incidence. Waniet el⁶ reports an incidence of 1.07/1000 where as Knee et al⁷ 0.33 and Joanna et al⁸ 0.41/1000.

Caesarean section as such increases the risk factors of EPH. In our study the rate of EPH was 2.1 per 1000 for CS deliveries as against 0.38 per 1000 for vaginal deliveries. As shown in the table-3, the relative risk of EPH was 5.53 for CS deliveries as compared to vaginal deliveries.

Increasing number of caesarean section increases the incidence of abnormal placentation. In our series 75.8% were delivered by CS and 59 % among them had 2 previous CS and 40 % had one CS. In a study by Kwee A et al the incidence of placenta accreta, increta or percreta requiring hysterectomy was 1.9/1000 deliveries in women with one prior CS which increased 47 fold to 91/1000 in women with previous CS.⁷ Waniet al⁶ reports an incidence of 83.9% CS in patients with EPH. Y. Yesbah⁹ reports an incidence of 86.2% CS in patients undergoing EPH.

Some of the known risk factors of EPH are CS, Previous CS, high parity and advanced maternal age. Many studies had shown that CS as such increase the risk factors of EPH. In agreement with these our study showed that rate of EPH was 2.1 per 1000 deliveries against .38 per 1000 for vaginal

Characteristics-	Mean \pm SD n = 29
Maternal Age	29.9+ 3.8
Parity	2.5+8
Previous LSCS	22
1 Prior CS	9
2 Prior CS	13
Prior uterine curettage	7
Myomectomy	1
Delivery	
Gestational age	35.6/(range27-38wks)
Vaginal Delivery	7
CS delivery	22

Table-1: Demographic and clinical data of 29 women who had EPH

Complications	No of women
Coagulopathy	3 (10.3 %)
Sepsis	3 (10.3 %)
Wound Infections	4 (13.7%)
Febrile Morbidity	5 (17.2%)
Respiratory Complications (Pleural Effusion, Pneumonia, Pneumothorax, ARDS)	4 (13.7%)
Blood Transfusion	28 (96%)
Stress Cardiomyopathy	1 (3.4%)
Depression	3 (10.3%)
ARF	2 (6.8%)
ICU Admissions	29 (100%)
Mortality	1 (3.4%)

Table-2: Complications associated with EPH

Risk factor for CS	No	Total	Rate of EPH	Relative Risk	95 % Confidence interval
Yes	22	10459	2.1	5.53	2.3643 To 12.947
No	7	18412	.38		

Table-3: Relative Risk of EPH with Caesarean Deliveries

Risk factor Age	No of EPH	Total	Relative Risk	95 % Confidence interval
>35	4	1775	2.4	0.85-7.01
<35	25	27096		

Table-4: Relative Risk of EPH with Age

deliveries.

Incidence of EPH is less where incidence of previous CS is less. Incidence of EPH in our series is higher than other series the reason could be attributable to higher incidence of caesarean rates.

The study concludes that relative Risk of EPH in elderly patients (Age>35) is 2.4 when compared to patients with age less than 35 (table-4). Studies by Dan O et al¹⁰ and Serena Wu et al¹¹ also reports that EPH is increased in elderly women

The Commonest cause of EPH in our series was abnormal placentation 82% followed by uterine atony (13%) and fibroids (3.4%). In accordance with recent observation our study found abnormal placentation as the commonest cause of EPH. Uterine atony and rupture are less common due to advances in pharmacological and surgical modalities for the treatment of uterine atony and better antenatal and intrapartum care. In 1984 Clark et al¹² reported that 43.4% of the emergency hysterectomies were done because of uterine atony while 30.9% were due to placenta praevia with accreta. A study from the same institution in 1993 by Stanco LM stated that primary indication was placenta accreta 45% followed by uterine atony which is 20 %.¹³

EPH is associated with high incidence of maternal morbidity and mortality. Our mortality was 3.4% and morbidity 46 %. The most common complications was urinary bladder injury with in accordance with Awan et al¹⁴ (17%) and Joanna et al⁸ (17.2%), Kwee⁷ (15%). Urological injuries are related to scarring and secondary adhesions of the vesico uterine space following previous CS. The febrile morbidity in our series was 17.2% which ranges from 6.7% to 50 % in other series. There was one maternal death in our study with in 2005 and no deaths after that. However rates of 4% with 4.5% were cited by Kwee⁷ (Nether lands) and Zorlu¹⁵ (Scandinavia) whereas much higher rates of 20 % and 23.8% were reported by Y. Yesbah¹⁶ Hamsho and Alaslakka¹⁷ (Qatar). Wound infection in our series was 13.7%, blood transfusion 87%, whereas Carolyn et al reports a 50% of wound infection and 87% for Blood transfusion.¹⁸

CONCLUSION

UN recognizes the unique significance of maternal mortality as a part of millennium declaration issued by UN General Assembly in Sep 2000. High incidence of maternal mortality is persisting in many developing countries. Obstetricians should be prepared for the possibility of EPH for massive hemorrhage in patients undergoing CS with the high risk factors. The limited experience of performing emergency hysterectomy among the younger obstetricians and the decreasing rare of abdominal hysterectomy intensifies the problem. So more effort should be undertaken to recognize the patients with increased risk for EPH. Antenatal USG, power Doppler and MRI should be done in these high risk patients. All potentially life saving devices and appropriate team should be assembled prior to delivery to decrease the maternal and neonatal morbidity associated with peripartum hysterectomy.

ABBREVIATIONS

EPH - Emergency peripartum Hysterectomy; CS - Caesarean

Section; RR – Relative Risk

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Autotransplantation of 3rd Molar with Open Apex: A Case Report

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ABSTRACT

Introduction: Autotransplantation is a fast, feasible and economic option for replacement of teeth that are indicated for extraction.

Case Report: This paper presents successful autotransplantation of a immature mandibular right 3rd molar (48) to replace mandibular left 1st molar. The mandibular 1st molar was non restorable due to extensive caries and root resorption. After extraction of mandibular left 1st molar and right 3rd molar, the recipient site is prepared and the donor tooth was reimplanted into the extracted socket of 1st molar site. After one year, clinical and radiographic examination revealed satisfactory outcome with no signs or symptoms suggestive of pathology.

Conclusion: Autotransplantation of 3rd molar with open apex can be effectively used to replace missing molars.

Keywords: Autotransplantation, Open Apex, Platelet rich plasma

INTRODUCTION

The goal of dentistry is to replace missing teeth to restore masticatory function and aesthetics. Treatment of such situation is either removable partial prostheses or a fixed bridge framework, which not only cause discomfort to the patient but also involves the preparation of one or more healthy teeth.¹

In autotransplantation, there is a transfer of the tooth from one portion of the alveolar arch to the another site in the same individual. The recipient site is formed as a result of an extraction procedure or a freshly prepared surgical site.² A tooth bud with early formation of Hertwig's epithelial root sheath (HERS) can be transplanted with a good prognosis if it is well encased in bony socket that is wrapped with soft tissues.³

A successfully transplanted tooth should provide improved esthetics, speech and arch integrity. It should promote dento-facial development and masticatory function. It also aids in maintaining natural space with little or no evidence of resorption of roots.⁴

The successful autotransplantation of third molars was initially reported by Fong in 1953.⁵ However at present, due to innovation in osseointegrated implant placements, autologous transplantation of tooth or autotransplantation is rarely indicated. However, osseointegrated implants placement is contraindicated in patients in which growth is still anticipated, thus making this procedure a possible alternative for young patients.²

The success of transplantation of tooth depends on careful selection of case and an understanding of the biological principles, which gives a clear suggestive criteria for autotransplantation of teeth such as: premature loss of tooth, impacted or ectopically erupted teeth, traumatic tooth loss, tumor, congenitally missing tooth in one arch with crowding of teeth in

the opposing arch, replacement of congenitally absent teeth.⁶

CASE REPORT

A 17 year old boy came to the Department of Pedodontics, Subharti Dental College, Meerut with a complain of pain in lower left back tooth region. He also complained of multiple carious teeth. Oral pantomograph (OPG) was taken which revealed that the 36 was grossly decayed with an evidence of external root resorption. It was decided to extract the 1st molar followed by transplantation of 3rd molar of fourth quadrant. An impression was taken with alginate and was poured with type III dental stone, through which acrylic splint was fabricated.

The procedure was performed in one stage. The 36 was extracted and the recipient site was prepared with #4 surgical carbide round bur in a low-speed handpiece under irrigation with sterile physiologic saline solution. The impacted 3rd molar of 4th quadrant was then extracted which was then placed in saline under sterile conditions. Platelet rich plasma (PRF) was placed into socket, which was obtained from the patients own blood. The donor tooth was then treated with acidulated phosphor fluoride (APF) gel and then placed into the recipient socket and its fitting was evaluated. Stabilization of transplanted tooth was achieved using a 0.8 mm stainless steel wire with acrylic splint. Splint was removed after 2 week and healing appeared satisfactory. The patient was recalled and reviewed after 3, 6 and 12 months.

DISCUSSION

Dental rehabilitation can be achieved after the loss of one or more teeth with several techniques, including removable partial dentures, fixed prosthetic framework, osseointegrated implant placement or autotransplantation. The first studies reporting on successful transplantation of autologous teeth were published in the 1950s.⁵

Autotransplantation involves placement of teeth from one site to another site in the same individual either into extracted spaces or surgically prepared sites.⁷

It is essential to establish a criteria for assessing the success or failure of autotransplantation. A key factor for successful outcome is to maintain the viability of periodontal ligament cells of the tooth to be transplanted as these cells are very

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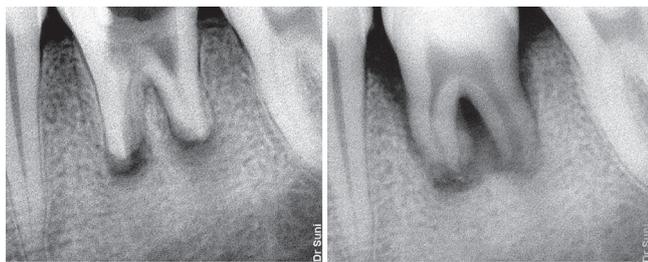


Figure-1: Pre operative radiograph of 36; **Figure-2:** Post operative - 3 month follow up

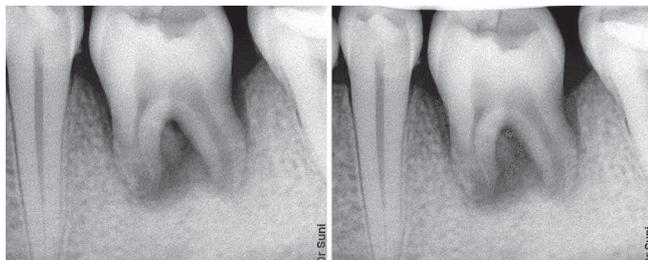


Figure-3: Post operative - 6 months follow up; **Figure-4:** Post operative – 1 year follow up

sensitive to osmotic changes. Hence, if extraoral dry time is prolonged their viability may be reduced.⁸

The earliest success rate of autogenous tooth transplantation was approximately 50% because of the difficulty in predicting development of the root after transplantation and increased rate of dental root resorption.⁹ The incidence of dental root resorption after transplantation has declined over time and the success rate has increased rapidly, drawing a rise in clinical interest towards this procedure.¹⁰ Tsukiboshi reported a 90% survival rate and an 82% success rate in 250 cases observed for 6 years.¹⁰

In the present case platelet rich plasma (PRP) is used due to its procoagulant effect, as it contains growth factors that are involved in initiation and sustainment of wound healing by accelerating bone repair, promoting fibroblastic proliferation and promoting vascularity of tissues.¹¹ Periodontal healing initiates with the restoration of the gingival attachment, which is usually completed within few weeks. The periodontal ligament fibers are re-formed after 2 to 4 weeks. Avoidance of any kind of trauma is also important for the success of the transplant. Else, trauma may become an extra cause of impaired healing.¹⁰

For better prognosis, splinting for a greater period of time or rigid splinting of the transplanted tooth is avoided as it will adversely affect its healing outcome. Most reports advise semi splinting for 7 to 10 days,⁹ as it permits some functional movement of the transplanted tooth there by stimulates periodontal ligament cellular activity and bone repair.

CONCLUSION

In growing patients, bridgework and implants are not practically feasible because they may restrict the normal growth of facial bones, particularly alveolar process and are therefore contraindicated in such cases.⁶ Therefore when space closure following extraction of tooth seems to be an undesirable option, the transplantation of a tooth with incomplete root formation may serve as an alternative option because in such

case both alveolar growth and root development will be unhindered.⁶ Although age of the patient is not only the perfect criteria for its successful outcome, but still studies indicates that better results can be achieved when it is performed at an early age.¹⁰

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Emotional Intelligence and its Relation to Coping Styles in Medical Internees

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ABSTRACT

Introduction: Emotional intelligence contributes to wellbeing, success of a person and good doctor-patient relationship. Coping styles also affect the wellbeing of a person. It is possible that these two concepts may influence one another. With this, background present study aimed to assess emotional intelligence and coping styles, in a group of medical internees and study the relation between them.

Material and methods: Study was conducted in a medical college. It was a cross sectional study. Consecutive sampling method was employed. Medical internees who consented for the study were given a brief introduction about the study. They were administered Emotional Quotient test and Coping Checklist. SPSS 17 software was used for statistical analysis. Tests for correlation and independent t test were employed for analysis.

Results: The sample had high total Emotional Quotient; high Sensitivity and Competency but low Maturity. Healthy Coping styles were more frequently used than unhealthy ones. Emotional Quotient had significant positive correlation with healthy coping styles and negative correlation with unhealthy coping styles.

Conclusion: Medical internees had overall high Emotional Quotient and used more of healthy coping styles. Emotional intelligence can influence the type of use of coping styles.

Keywords: Emotional intelligence, emotional quotient, coping styles, medical internees, doctors

INTRODUCTION

Emotional Intelligence (EI) is defined as 'the ability to perceive emotions, to access and generate emotions as to assist thought, to understand emotions and emotional knowledge and to reflectively regulate emotions so as to promote emotional and intellectual growth'.¹

Coping styles are defined as 'Efforts, both action-oriented and intra-psychoic, to manage i.e. to master, tolerate, reduce or minimize, environmental and internal demands and conflicts among them which tax or exceed a person's resources'.² Coping styles are the strategies used in adapting to stress. Coping styles are classified in many ways, but each have core concept that the strategy used to reduce stress is either helpful or harmful to the individual.

Emotional Intelligence and Coping Styles

Emotional intelligence determines how individuals differ in the extent to which they attend to, process and utilise emotional information of an intrapersonal or interpersonal nature, which can also refer to a stressful situation. Study done by Bar-On has shown that EI has significant impact on social interaction and the ability to be resilient.³ On the other hand coping may also be related to emotional competencies, self-monitoring and empathy and facilitate reduction

of the frequency, intensity and duration of distress.⁴ Hence, it can be hypothesized that EI can also influence the type of coping styles used. Individuals with high EI utilize more of problem solving strategies.⁵ They probably also have greater ability to plan and decide on coping resources that reduce harmful effect of stress.⁶ Studies done in India have revealed that high EI is associated with healthy coping styles.^{7,8} But these results are not consistent as opposite relation between the two concepts has also been reported.⁹ In this background, present study is planned to assess EI and coping styles in a group of medical internees and assess the relationship between the two.

MATERIAL AND METHODS

This was a cross sectional descriptive study in a sample of medical internees.

Method

A brief introductory script explaining the concept of EI and Coping strategies, need for the study and the procedure of self-administration of scales, were provided to all participants. Written consent was taken and feedback was given to all candidates who participated. Ethical clearance for the study was obtained from Institutional Ethical Committee Review Board.

Subjects

Internees belonging to both sexes, who were undergoing training after completing four and half years of M.B.B.S. course were included in the study using consecutive sampling method, during a one year period from December 2011 to November 2012. They were of approximately 22-24 years of age. All those who consented were given the test.

Materials

A self-designed proforma was used to elicit socio-demographic data. EI was assessed using EQ test developed by Dalip Singh and N K Chadha.¹⁰ Test contains 22 items, which measure three domains- Sensitivity, Maturity, Competency and Total EQ. Retest reliability for the test was found to be 0.94. The split half reliability in the case of odd-even items was 0.89 and for the first half and second half was 0.91. Validity was found to be 0.89. Coping checklist developed by Kiran Rao,¹¹ consisting of 70 items, was used to elicit coping

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styles used. Coping styles measured were Problem Solving, Distraction Positive, Distraction Negative, Acceptance/ Redefinition, Faith/ Religion, Blame/Denial and Social support. The test-retest reliability is 0.74 and the internal consistency (alpha) ranges from 0.75 to 0.85 indicating adequate reliability. The above Coping styles were grouped as healthy and unhealthy based on literature review.¹² The coping styles like Problem Solving, Distraction Positive, Acceptance/Redefinition, Faith/ Religion and Social support were considered as healthy coping styles and Distraction Negative and Blame/Denial were considered as unhealthy coping style.

STATISTICAL ANALYSIS

Analysis was done using SPSS 17 version of software. Scoring of Coping styles were converted from continuous to categorical variable as high and low by dividing maximum score by half, for statistical analysis. Variables like gender and substance use, which were heterogeneous across group were also included in the comparative analysis and assessed using independent t test. Pearson's correlation and independent t test were used to assess the relationship between EI and Coping styles.

RESULTS

The sample consisted of 167 participants. The mean age was

Mean scores of the sample (N=167)	
Emotional Quotient (EQ)	Mean (SD)
Total EQ	343.35 (28.55)
Sensitivity	86.47 (7.69)
Maturity	102.9 (13.15)
Competency	153.7 (19.15)
Coping Styles	
Problem solving	7.20 (1.55)
Distraction positive	7.52 (2.78)
Distraction negative	1.77 (1.64)
Acceptance/Redefinition	7.77 (1.77)
Faith/ Religion	2.5 (1.88)
Blame/Denial	3.92 (2.17)
Social support	4.01 (1.14)

Table-1: Shows mean scores of the EQ and Coping styles in the sample.

23 years, with standard deviation of 0.95. Sample had almost equal gender distribution, with 86 female (51%) and 81(49%) male participants. Majority of the sample were belonging to urban (87%) nuclear family (81%). Majority (80%) reported not to be using any psychoactive substance.

The mean scores of the sample on EQ and Coping styles are presented in table-1. The sample had high total EQ and domain-wise they had high Sensitivity and Competency but low Maturity. Coping styles like Problem Solving, Distraction Positive, Acceptance / Redefinition and Social Support were used frequently while Denial/ Blame, Distraction Negative and Faith / Religion were seldom used. Gender differences were noted in some of these domains. Men reported to be using more Distraction Negative ($t= 2.33, P = 0.02, 95\% \text{ CI } 0.09 \text{ to } 1.08$) and women more of Faith/ Religion style of coping ($t= 2.35, P = 0.02, 95\% \text{ CI } -1.24 \text{ to } -0.11$) which were statistically significant. Those who used one or more psychoactive substance had low total EQ ($t=2.17, P = 0.03, 95\% \text{ CI } 1.07 \text{ to } 22.50$). They also had lesser use of Acceptance/ Redefinition ($t= 2.57, P = 0.01, 95\% \text{ CI } 0.20 \text{ to } 1.52$) and excessive use of Distraction Negative ($t=3.87, P < 0.001, 95\% \text{ CI } -1.77 \text{ to } -0.57$) when compared to those who didn't use any psychoactive substance. All these findings were statistically significant.

Table – 2 shows the correlation between EQ and Coping Styles. Total EQ had significant positive relation with Problem Solving ($r = 0.22, P = 0.004$), Distraction Positive ($r = 0.18, P = 0.02$), Social Support ($r = 0.24, P = 0.002$) and negative correlation with Distraction Negative ($r = -0.27, P = 0.001$) and Blame/ Denial ($r = -0.34, P < 0.001$) styles of Coping. When each domain of EQ was separately tested with Coping styles, Sensitivity had significant negative relationship with Distraction Negative ($r = -0.21, P = 0.008$) and Blame/ Denial ($r = -0.16, P = 0.04$) styles of Coping. Maturity domain of EQ had positive relation with Problem Solving ($r = 0.21, P = 0.006$), Distraction Positive ($r = 0.19, P = 0.01$), Acceptance/ Redefinition ($r = 0.19, P = 0.01$) and negative correlation with Distraction Negative ($r = -0.16, P = 0.04$) and Blame/ Denial ($r = -0.29, P = 0.001$) styles of Coping. Competency domain had positive relationship with Social support ($r = 0.22, P = 0.004$) and negative relation with Distraction Negative ($r = -0.2, P = 0.001$) and Blame/ Denial ($r = -0.25, P = 0.001$) styles of Coping.

Coping Styles	EQ			
	Total EQ	Sensitivity	Maturity	Competency
Problem solving	0.22 p=0.004	0.13 p= 0.08	0.21 p=0.006	0.13 p=0.08
Distraction positive	0.18 p=0.02	0.08 p=0.33	0.19 p=0.01	0.12 p=0.11
Distraction negative	-0.27 p=0.001	-0.21 p=0.008	-0.16 p=0.04	-0.20 p=0.001
Acceptance/ Redefinition	0.08 p=0.31	-0.08 p=0.33	0.19 p=0.01	0.02 p=0.81
Faith/ Religion	0.04 p=0.65	0.02 p=0.8	0.01 p=0.94	0.04 p=0.60
Blame/ Denial	-0.34 p=0.0001	-0.16 p=0.04	-0.29 p=0.001	-0.25 p=0.001
Social support	0.24 p=0.002	0.14 p=0.08	0.13 p=0.09	0.22 p=0.004

Table-2: Correlation between EQ and Coping styles

=-0.25, $P=0.001$) styles of Coping.

Those with high EQ had significantly greater use of Problem Solving ($t = 2.73$, $P=0.007$, 95% CI 0.29 to 1.79), Distraction Positive ($t = 2.79$, $P=0.006$, 95% CI 0.55 to 3.23) and Social support ($t = 3.95$, $P < 0.001$, 95% CI 0.54 to 1.61) styles of Coping than low EI group, when compared using independent t test. Though there was an indication of frequent use of Blame/ Denial and infrequent use of Faith / Religion types of Coping in those having low EQ, they didn't reach statistical significance.

DISCUSSION

This study emphasizes the relevance of the concept of Emotional intelligence in daily life, as it empowers people to have superior self-control, ability to motivate themselves, manage and express emotions appropriately, be assertive yet sympathetic and caring. Thus EI is important for an individual, more so for doctors. Doctors are expected to be kind, caring, affectionate, have unbiased empathetic approach, adequate self-control and maintain cordial relation with one's colleagues.

Higher EI in doctors is associated with better patients' trust, satisfaction with treatment and better treatment outcome.¹³ Despite its importance in doctors, EI is neither a selection criteria in pre medical entrance nor are medical students trained in it during their course, either in India or many other countries. Intelligence alone being the deciding factor to become a doctor may produce a knowledgeable but not necessarily an efficient doctor. The association between EI and doctor's competence carries significant implications for medical training, which would be to educate doctors in EI-related skills for better achievement of their required competencies.¹⁴

Coping skills are necessary to deal the overwhelming stress. Stress is universal in all living beings. The ever expanding knowledge in the field of medicine, tougher competition and lengthier course contribute to the stress experienced by medical students.¹⁵ The burden of dealing constantly with morbidity and mortality in others' lives, the need to meet the unrealistic demand of the care givers and impreciseness of medical knowledge make the work environment of a medical practitioner stressful. So when stress is inevitable, individual better cope up.

Medical internees were chosen as the sample of study because they were in the transition period between student life and professional life. This was advantageous as they were fresh with experiences of both stages of life. This phase poses tremendous challenges and resolution of which needs capabilities like EI and Coping skills. Our assessment showed that total EQ of the sample was high. Other studies have yielded inconsistent results, reporting physicians to have high emotional competence, average EQ and poor EQ.¹⁶⁻¹⁸ As of now lesser emphasis is laid on teaching of soft skills during one's formative period or in medical colleges. Thus the high EQ in our sample may not be due to formal training in these skills. They might have acquired it through informal learning. Possibly this is the reason that doctors vary widely in EQ. But fortunately EQ is a dynamic ability and training can improve these skills.¹⁹ In this study, when the domains of

EQ were assessed individually, the sample had high Sensitivity and Competency. This means that they were Emotionally Sensitive in recognising emotions, understood emotions better and communicated/expressed emotions appropriately and also Emotionally Competent in handling emotional upsets, inter-personal relationships and had good self-esteem. This could be because the sample probably had better psychosocial environment. Exposure to EI related skills during their academic period could be another contributing factor as also observed by Satterfield et al.²⁰ The sample was not Emotionally Mature in empathising, delaying gratification and adaptation. Younger age and relative inexperience with vagaries of life might have contributed to this finding.²⁰ There was no gender difference noted in EQ in the present study but contradictory results were observed by researchers.^{14,17}

Coping Styles most frequently used by the sample were Problem Solving, Distraction Positive, Acceptance / Redefinition and Social Support. This may be due to awareness about the better ways to deal with stress or skills imbibed from seniors, teachers and /or parents who were competent in dealing with stress, serving as role models.²¹ Coping styles like Blame/ Denial, Distraction Negative and Faith/ Religion were used less frequently, as they might have been aware of negative consequences of maladaptive coping. Earlier studies done on medical undergraduates show that problem solving, planning, acceptance and positive reframing were frequently used and denial, self-blame and substance use were seldom used.^{15,21-23} Infrequent use of Faith and Religion domain of coping in the present study sample was in contrast to our understanding of existing social practices. Sami et al.²² also found similar results in Indian students but Kadayam et al.²³ found that medical students in UAE used more of religious coping. In our study significant gender differences were noted in types of coping used; Religion/ Faith coping was more used by females while Distraction Negative was more used by males. This could reflect prevailing social norms in dealing with stress.

Correlation between EQ and Coping Styles in our study showed that, total EQ, Sensitivity, Maturity and Competency had negative correlation with Blame/ Denial and Distraction Negative coping styles. This would suggest that higher EQ would prevent one from using unhealthy styles of coping. Further, it was found that being more emotionally mature would make one to utilise problem solving, accepting and redefining problem and distracting oneself adaptively from stress. Being more emotionally competent would allow one to elicit social support system in a stressful situation. Positive correlation between EQ and Problem Solving has been reported in previous studies.^{4,7,24} Social support and distraction have also been positively correlated with EQ in earlier studies.⁹ EQ was negatively correlated with maladaptive Coping Styles such as avoidance and rumination.⁷ Overall, high EQ is said to be associated with adaptive and effective coping strategies.⁶

It was observed that those who used psychoactive substances had low EQ. Conversely those who were less emotionally intelligent tended to use psychoactive substances. This suggests that they had poor emotional control and inability to deal with emotional upsets. They were also unable to use Ac-

ceptance/ Redefinition coping but used Distraction Negative excessively. This finding is in consonance with earlier studies that report association between low EQ and maladaptive Coping Styles.²⁵ But not all studies support these findings. There is contradictory evidence in literature that high EQ was associated with selective maladaptive coping.⁹

Comparing the result of present study with existing literature is beset with certain difficulties. Confusion exists in the literature regarding definition of terms like 'healthy' and 'unhealthy' coping styles and 'adaptive' and 'maladaptive' coping styles. This is because different authors use different definition/ descriptions for these terms in their studies.²² Subscales in the coping checklist used by us differ from the grouping done by the earlier researchers.^{9,23} Some of the items in this scale have combined two types of coping styles together. Thus it is difficult to score each coping styles separately. This makes comparison of results across studies difficult.

This study has certain limitations. This was a cross sectional study, hence it is possible that the prevailing mood state and motivation to participate might have had considerable bearing on the results. Self-administered questionnaire were used in the study. The questionnaire contained questions about life situations that they might have faced in the past. Some questions needed the individual to imagine a hypothetical situation and his/her reaction to that situation. But what a person would think of doing may not be same as what he/she actually does. Thus the protocol is subjected to reporting bias and recall bias. Sample consisted of a selected group of individuals in a single medical college. There was no control or comparative group. Future studies could address these issues.

CONCLUSION

Medical internees had high EQ which was probably acquired through informal learning. They also had frequent use of healthy coping and seldom use of unhealthy coping styles. Emotionally intelligent people cope with stress in a better way because effective coping strategies are acted upon based on the attributes of a person with good EQ like good affective control, empathy, postponement of gratification. Implications of this study would be the need to formally develop EI as it can have significant impact on coping skills, which are essential for healthy living.

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Introduction of Integrated Teaching Learning Module in Second M.B.B.S. Curriculum

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ABSTRACT

Introduction: An integrated approach is an effective educational strategy to teach Under Graduate Medical students. Yet, this has not been incorporated in most of the medical colleges in India. Aim and objectives of the research were to introduce the Integrated teaching learning method, to study the effect of an integrated teaching learning process among undergraduate medical students and to get feedback regarding integrated teaching learning method of students and faculty.

Material and methods: It was Cross sectional Interventional study conducted in NSCB Medical College, Jabalpur for 4th Semester MBBS students over the period of 6 month. Topics for integrated teaching were Pneumonia and Diarrhoea. Vertical and horizontal integration was adopted. Paediatrics, Community Medicine, Microbiology and Pathology departments were included for this project.

Results: Thirty seven per cent students obtained more than 60% marks while 21% students between 50-60% and 42% students <50% marks. More than half of the students strongly agreed with statement that they were attending class for optimal learning. Almost all students agreed that it was more interesting compare to Conventional way of teaching. More than half of the students strongly felt that understanding of topics was better by integrated teaching. Almost all students found integrated teaching more useful while 2/3 also said that conventional method is also a useful tool. All faculty were agreed that Integrated teaching can improve the quality of learning among UG student.

Conclusion: It is possible to adopt an integrated learning methodology in medical undergraduate teaching under a conventional curriculum in spite of all the challenges.

Keywords: Integrated Teaching Learning, Pneumonia, Diarrhoea

INTRODUCTION

"Knowledge Learnt in Isolation is Rapidly Forgotten"

Here comes the importance of integration. Integration is defined as *organization of teaching matter to interrelate or unify subjects frequently taught in separate academic courses or departments*.¹

In another definition, the term integration in education means coordination in the teaching learning activities to ensure harmonious functioning of the educational processes.²

Teaching medical curriculum is not an easy task as from student's site they have to learn many subjects at a time and teachers also having multiple roles to perform apart from teaching like administrative work, research work etc In doing so, in most of the medical colleges teachers impart knowledge in conventional way not in integrated way. Therefore, Medical Council of India desires to incorporate the of integration of medical curriculum for teaching undergraduate

students with the specific objective of providing knowledge in a holistic ways rather than fragmented learning ways.³

As it was understood that Integrated thinking leads to individualize the learning in effective way,⁴ and hence the method of integrated teaching that encouraged us to adopt this concept atdin this project and thus, we designed to introduce the method of vertical and horizontal integration for teaching undergraduate medical students for the first time in our Institution.

It has been felt that this method will enhance the skill of clinico- pathological as well preventive aspect.

Moreover, this method also helps to improve the cognitive and psychomotor domains of the students.

Aims and objectives of the research were to introduce the Integrated teaching learning method through four departments (Community Medicine, Microbiology, Pathology and Paediatrics) of NSCB Medical College, Jabalpur, to study the effect of an integrated teaching learning process among undergraduate medical students while delivering a community health topics i.e. Diarrhoea and Pneumonia and to get feedback regarding Integrated teaching learning method of students and faculty

MATERIAL AND METHODS

This was a Cross sectional Interventional study, conducted in NSCB Medical College, Jabalpur for 4th Semester MBBS students. This study was completed over the period of 6 month. Topics selected for integrated teaching were Pneumonia and Diarrhoea. For this innovation department of Paediatrics, Community Medicine, Microbiology and Pathology were included. This was Vertical and horizontal integration, where predesigned, pretested, structured self-administered questionnaire containing both open ended and close ended questions; student feedback forms and faculty feedback forms were used. The self-administered questionnaire consisted of 52 questions; among those, 14 were multiple choice question (MCQ) type and 38 were open questions; 48 questions carried 2 marks each and 4 question carries five marks each; thus the total possible scores in the test was 116. The

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study tools were developed in consultation with 5 experienced teaching staffs atleast 1 each from all participating 4 disciplines: namely Community Medicine, Microbiology, Pathology and Paediatrics.

Feedbacks form for students were designed based on LIKERT scale while for Faculty feedback SWOT analysis of Integrated Teaching was done.

Study implementation plan

- Ethical clearance was taken from Ethical committee of the NSCB Medical College.
- Project was shared and discussed with all HODs of concern department.
- HODs nominated and assigned the task to their Colleague.
- Many meetings were organised to finalized the curriculum, time table and plan to execute the lectures.
- Finally it was decided that 12 hours will required for integrated teaching (6 hours for each topic) and another two hours for assessment and Feedback session, which was conducted after completion of planned module.
- It took four weeks to complete the topics.
- Feed back was taken on integrated teaching as well routine conventional teaching.
- Feedback from Teachers were also taken.
- knowledge and skill was also assessed after completion of the topics.

RESULTS

In the assessment and Feedback session 43 students participated. It was conducted to assess the knowledge of students where Objective types questions, descriptive, one line answer, case based assessment was done. Feedbacks of students were taken on following parameters:

- Attending class for Optimal Learning
- More Interactive
- Better Understanding
- More Useful
- More interesting
- Time managed by faculty
- Appropriate imparting of knowledge and skill and ensuring their acquisition

STUDENTS' FEEDBACK

More than half of the students were strongly agreed with statement that they were attending class for optimal learning in Integrated Teaching while similar numbers of students told that they were some what agreed for conventional way of learning.

Almost all students were agreed that integrated teaching was more interesting compare to Conventional way of teaching. More than half of the students strongly felt that understanding of topics was better by integrated teaching method compare to those 1/3 students said some what agreed for conventional method.

Almost all students found integrated teaching more useful while 2/3 also said that conventional method is also a useful tool.

2/3rd students said that integrated teaching was very interesting while 1/3rd were disagreed for conventional teaching,

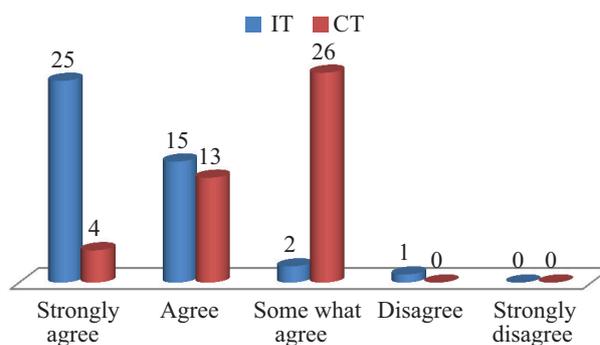
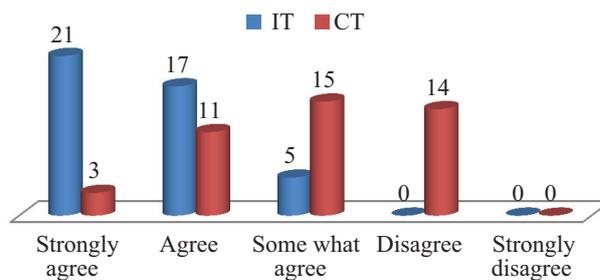
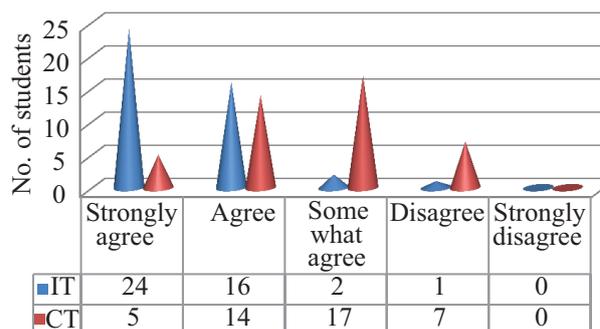


Figure-1: Attending class for optimal learning



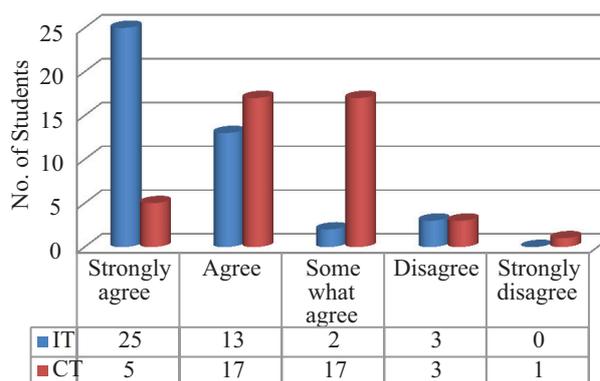
(Chi-square= 33.61, df=1, P value=<0.0001)

Figure-2: More Interactive



(Chi-square= 26.59, df=1, P value=<0.0001)

Figure-3: Better Understanding



(Chi-square= 17.65, df=1, P value=<0.0001)

Figure-4: More Useful

which was found statistically highly significant with, Chi-square= 27.25, df=1, P value=<0.0001.

Time was well managed by conventional teachers said by maximum number of students. Almost half of the students were strongly agreed that appropriate knowledge and skill was imparted by integrated method and similar proportion

of students were agreed with the statement for conventional method. It was also found to be statistically highly significant (Chi-square= 14.80, df=1, P value=<0.0001).

STUDENTS liked the BEST in Integrated teaching (Students' view points)

- Each disease taught by each aspect, each direction gave lots of better understanding
- It was Interactive and Informative
- Videos and Role play were very interesting and good teaching and learning method
- Visual AIDS were very good
- Practical aspects were taught very well helped to develop skills very effectively
- Felt that we are competent to tackle Diarrhoea and pneumonia very well.
- We could integrated knowledge of topics
- Learned well by video exercises and by doing case analysis
- Integration made learning easy
- It increased the power of understanding
- Active learning facilitated by teachers
- Looking forward for more such interactive sessions
- Good way to remember the things about diseases
- Teachers attending the class of other subjects
- Now I don't need to open many copies for these two diseases in four subjects

STUDENTS' SUGGESTIONS

- Should distribute notes of the topics.
- Black boards and chalk can be used.
- Sharing of PPT with students.
- Some time class become boring if extended too much.
- Assessment should be done in between.
- Pharmacology was missed here.
- More classes should be taken by this method.
- Want to learn Tuberculosis by this method.
- All lectures should be integrated.
- No theory classes post lunch.
- Can be done by reading by students and discussion after that.
- All important diseases should be taught by integrated pattern will help each one of us for future clinical practice.

STUDENTS' PERFORMANCE IN TEST

Thirty seven per cent students obtained more than 60% marks while 21% students between 50-60% and 42% students obtained <50% marks. One interesting thing we found that the topics covered by multiple teaching learning aid were understood and attempted well while the topics covered through one teaching learning aid i.e. didactic lecture were attempted poorly.

TEACHERS' FEED BACK

Strengths of Integrated Teaching most of the faculty told that,

1. Those were very effective sessions for effective learning of the topics as a whole.
2. Theory with demonstration made learning effective.

3. All aspects of the topics were covered simultaneously and that helped students for better understanding.
4. It was time saving approach as repetition was avoided.
5. Interaction with other department's faculty was appreciable
6. Less time required to execute the topics.

Weaknesses were

1. Case Demonstration in wards was missed.
2. Time taking to prepare time table and plan of execution of classes.
3. Difficult to introduce during normal planned schedule.

Opportunities of integrated teaching

1. Good opportunity for integration and learning deeply.
2. Opportunity for good interaction among teachers.
3. Brings faculty together for students' welfare.
4. It can be planned in better way in future with other departments and for other topics or system too.

Threats of integrated Teaching

1. Cooperation of other departments.
2. Need a very good neck to neck coordination, lacking which all programme may fail.

All faculty agreed that this program improved understanding and application of integrated teaching learning method in Undergraduate Medical curriculum. It was felt by faculty that though this was a challenging effort but outcome is appreciable. It was also felt that though it took lot of efforts for interdepartmental coordination, learning wise it was like a refresher course for faculty too. All the faculty felt that this program will help these students perform better in later days of clinical training. They all want this to be incorporated in UG curriculum in future.

DISCUSSION

In medical education many innovative methods have been introduced like self-directed learning, problem-based learning, integrated teaching (IT) and community orientation.⁵ Integration of teaching is defined as the organization of teaching matter in such a way where it interrelate or unify the subjects which are frequently taught in separate academic courses or departments.^{1,6}

Integration can be done in horizontal way means that two or more departments teaching simultaneously merge their educational identities and vertically means integration between disciplines traditionally taught in the different phases of curriculum. There are four major components in it namely:

1. Integration of experience,
2. Social integration,
3. Integration of knowledge,
4. Integration as a curriculum design.⁷

Harden described 11 steps of the integration ladder - A tool for planning, implementing and evaluating medical curriculum.⁸

As Medical education is related to health care; so our aim should be to teach our undergraduate students in such a way, where they can correlate the various subjects and we can make them better doctors. Teaching different aspects of a topic by faculty members of relevant departments instead of one department will better enhance the knowledge. Ulti-

mately this will impart the basic knowledge of the topic for better understanding of the various aspects of the diseases which will create better doctors in society who will provide good health care services for community needs. Thus to improve effective diagnosis and better treatment of the patients and to improve the quality of student's learning, integrated learning is the need of an hour.

Medical Council of India has adopted an integrated curriculum which de-emphasize compartmentalization of disciplines.⁹

At present in our institution, we have non-integrated system of the undergraduate curriculum for MBBS, which is discipline-based where teaching activity mostly involves lecturing.

It was found that integrated method was well accepted by all faculty who participated in the project and Head from respected departments. Feedbacks from student revealed that all the aspects like Attending class for Optimal learning, More Interactive, Better Understanding, More Usefulness, More interesting, Appropriate imparting of knowledge and skill and ensuring their acquisition were significantly accepted except time managed by teachers.

It happened because in integrated teaching we took extra hours due to completion of topics in planned time schedule. While in Conventional teaching teachers know that they have one hour to finish his/her topic.

Statistically extremely significant results were obtained for Students' Feedbacks on integrated teaching ($P < 0.0001$).

Thirty seven per cent students obtained more than 60% marks while 21% students between 50-60% and 42% students obtained <50% marks. One interesting thing we found that the topics covered by multiple teaching learning aid were understood and attempted well while the topics covered through one teaching learning aid i.e. didactic lecture were attempted poorly.

More than two third of the students expressed their view that this new method was very good for their learning, better understanding, and useful for future in clinical practice. Similar findings were observed by study done by Basu M et al where they found that overall rating by students about IT was very good new method. Two third of students expressed their view that this new method was very good; 16% told that it was excellent followed by 10% as good. However, nobody gave any negative feedback about IT methodology.

In our study 100% faculty were agreed that this new integrated method of teaching as very useful for students though it was time consuming with syllabus burden in conventional teaching. They told that they are interested in increased integration, but that the current level of integration was not adequate it needs lots of effort, neck to neck support, acceptance by administrators. Other previous studies also addressed this topic.¹⁰⁻¹⁵

The present study was an attempt to improve the quality of medical education with the innovative curricular strategy to teach Pneumonia and Diarrhoea in an integrated manner which revealed that IT was better than CT based on feedbacks received from students and faculty. The results of which was similar to some other previous studies,^{1,10,17-18,20} Similar studies at Seth GS Medical College, Mumbai, Maha-

rashtra by Joglekar et al.¹ at MGM's Medical College, Navi Mumbai, India by Kate et al.,¹⁶ at Pramukhswami Medical College, Karamsad, Gujarat by Ghosh and Pandya;¹⁷ at Jawaharlal Nehru Medical College, Belgaum Karnataka by Dandannavar¹⁰ and at Terna Medical College, Nerul, Navi Mumbai by Nikam and Chopade.¹⁸ revealed that the marks obtained by the students who had undergone IT was statistically significantly greater than those who did not. But unfortunately we could not compare it in present study.

However in a study done by Kadam and Sane in Maharashtra¹⁹ no significant impact of integrated lectures was found between the evaluation after integrated and traditional lectures.

In our study, the students felt a positive attitude of Integrated teaching, they told that it had enhanced the student's understanding of the topic, they recognized that integrating the medical subjects was useful and of interesting to them, and that it should be continued; they felt that there was a positive interaction which helped them to correlate whole aspect of topic, which was similar to studies by Dandannavar at Karnataka,¹⁰ Nikam and Chopade at Mumbai,¹⁸ Soudarssanane and Sahai at JIPMER,²⁰ Kadam and Sane at Maharashtra,¹⁹ Kumari et al. at Bangalore,²¹ Mahajan et al. at Ahmedabad²² and Rehman et al. at Pakistan.²³

The findings and the experience of our study supports the view of other studies that Integrated Teaching Learning Method help to increase quality learning of topics and avoids fragmented manner of teaching where teachers are not aware of what is taught in other subjects. It also develops interest in the topic.

CONCLUSIONS

Integrated Teaching was found to be more effective than the conventional one as statistical significant results were obtained by comparing feedbacks on integrated with the conventional method; which was well accepted and appreciated by students as well as faculties. It was suggested by both students and faculty to introduce it in whole curriculum. In spite of all the challenges there is possibility to adopt integrated learning methodology in medical undergraduate teaching.

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Esthetic Crowns In Pediatric Dentistry: A review

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ABSTRACT

Early childhood caries remains a significant problem challenging our diagnostic, preventive, and restorative skills. Often, caries in very young children involves the maxillary anterior teeth and the primary molars while the mandibular anterior teeth are generally not involved. Carious involvement of the maxillary incisors not only potentially compromises the integrity of the dentition, but can create an undesirable esthetic appearance. The primary maxillary incisors teeth are small and require restorations that are retentive, esthetic and resistant to fracture and wear, therefore, are difficult to treat. However, various treatment options have been described in literature to ensure proper esthetics and retention of restorations for such cases.

Keyword: Esthetic Crowns

INTRODUCTION

A primary objective of placing crown is to achieve an esthetic improvement. A remarkable change is also seen in the patient's self image after correction of the texture, shade and shape along with good physiological form and function which helps in preventing further deterioration of the mouth by prevention of tooth migration, bone loss and arch collapse.

Classification

According to Sahana S et al¹

- a) Crowns that are luted to the tooth
 - 1) Resin veneered stainless steel crown
 - 2) Facial cut out crown
 - 3) Polycarbonate crown
 - 4) Pedo pearls
- b) Crowns that are bonded to the tooth
 - 1) Strip crowns
 - 2) Pedo jacket crowns
 - 3) New millennium crowns
 - 4) ART glass crowns

Open-faced stainless steel crowns

For incisors, the main indication for stainless steel crowns is following crown fracture, when they are used to retain pulp-protecting dressings, prevent leakage, and to restore form and function, provided the crowns are trimmed and crimped properly, and the edges well-polished, they fulfil the requirements very well. The main drawback is aesthetics, and this problem is overcome by cutting out the labial face of the crown and filling in with a tooth-coloured material, such as composite. With the development of the acid-etch technique, and the improvement in handling, finishing aesthetic considerations of composite materials, these have largely replaced the use of stainless steel crowns for the repair of fractured incisors. However, when the fracture-line extends to below the gingival margin, the stainless steel crown may still

be the better choice. Hartmann CR and Helpin ML² suggested that in children with rampant carious lesions, open-faced stainless steel crowns can be used. Although some esthetics is sacrificed, increased functional stability is added to these restorations.

Procedure

The preparation begins by first the slicing the mesial and distal surface and removing 1.0 to 1.5 mm incisal edge. Little reduction is needed on the lingual surface. The crown is then extended 0.5 to 1.0 mm beneath the gingival crest and a hole is cut in the labial side of the crown. By using No.114 pliers lingual portion of the crown is adapted to the tooth. The crown is polished and cemented with zinc phosphate or glass ionomer cement and when the cement sets, a window is cut using No.58 bur. A composite resin is used to restore the facing of the primary incisor.

Roberts C et al³ conducted the first study on resin-faced stainless steel crowns used for restoring primary anterior teeth and described the clinical performance of these crowns. He concluded that these stainless steel crowns have high rate of retention and there was high prevalence of one third of the facing failure which occurred most commonly at resin-resin and resin-metal interface.

Veneered stainless steel crowns

Baker LH⁴ and Waggoner WF⁵ described the availability of veneered SSC facing materials like thermoplastic or composite resins. Esthetic veneers are retained on the stainless steel crown by a variety of mechanical and chemical bonding approaches. Four companies are currently marketing stainless steel crowns with pre bonded resin veneer facing that extend to all cosmetically prominent areas. Virtually no metallic structure is evident from usual conversational distance. Some of the crown forms are bonded to a welded meshwork on the crown, and others are simply chemically fused to the metal surface.

Waggoner WF and Cohen H⁶ have described pre veneered stainless steel crown forms for primary incisors is an esthetic option for the full coverage restoration of broken down incisors.

Polycarbonate crown

In children, the most common lesion in anterior teeth are due to nursing bottle caries. These lesions begin on the labial

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surface of all anterior and they progress rapidly as diffused demineralization of the entire surface of all existing teeth. The best a dentist can offer at this time is the stabilization of the lesion. Polycarbonate crowns are the temporary crowns which can be given in such situation as a fixed prosthesis to deciduous anterior teeth which will get exfoliated in future. Polycarbonate crowns are aromatic linear polyesters of carbonic acid. According to Nitkin DA et al⁷ these crowns exhibit high impact strength and rigidity and are termed thermoplastic resins since they can be molded as solids by heat and pressure into desired form. Their heat distortion point is about 270°F. Stewart RE et al⁸ advocated the use of polycarbonate crown as these are extremely stable dimensionally, as evidenced by +/- 0.001 inch tolerances during molding. Their weakness, as far as dentistry is concerned, is poor abrasion resistance.

Indications

Stewart RE et al⁸ summarised the various indications as:

1. Rampant caries involving three surfaces of the tooth.
2. After pulp therapy
3. Tooth malformation
4. Abutment for space maintainers

Contraindications

1. When there is inadequate spacing between teeth.
2. Crowding of anterior
3. Deep impinging bite is present
4. Severe bruxism
5. When there is evidence of abrasion in the anterior teeth.

Strip Crowns

Primary anterior strip crowns were developed as an answer to the esthetic and functional problem of stainless steel crowns. Esthetically, they provide a striking similarity to the original primary tooth. Functionally, they allowed for normal incisal wear of the primary teeth to take place. Use, however, was restricted to primary teeth having sufficient enamel for bonding retention after caries removal. Resin-bonded composite strip crowns are the first choice restoration for many clinicians, mainly because of the superior aesthetics and the ease of repair if the crown subsequently chips or fracture. However, it is the most technique-sensitive option. Moisture contamination with blood or saliva may interfere with the bond, and haemorrhage can alter the shade or colour of the material. Additionally, adequate tooth structure must remain after caries removal to ensure that there is sufficient surface area for bonding. The strip crowns are transparent crown forms which simplify composite work for Pedodontics anterior restoration. These are trimmed and filled with either chemical or light curing composite material. They contour the material and support it while it sets and then strip off easily leaving smooth surface.

Strip crown placement technique

1. Local anaesthesia is administered and teeth is isolated.
2. The teeth is prepared as for a crown to allow for the bulk of the resin in the final crown form. The length of the crown is reduced incisally using a high speed tapered diamond or tungsten carbide bur. Mesial and distal slices are cut tapering to a knife edge at the gingival margins.
3. Proper shade of the composite resin is now chosen. This

is mandatory to achieve good esthetic results.

4. Celluloid strip-crown forms are selected of right size.
5. Vent holes at the incisal-edge corners of the crown form allow air to escape when it is filled with composite resin.
6. The crown form(s) with composite resins are firmly seated on to the prepared teeth.
7. The composite resin is cured and using an excavator or probe is the celluloid and the crown form is stripped off.
8. The cured crown is smoothed and polished.

Kupietzky A et al⁹ stated following advantages of strip crowns:

- i. They are simple to fit and trim.
- ii. The removal is fast and easy.
- iii. Easily matches natural dentition.
- iv. They leave smooth shiny surface.
- v. They have easy shade control with composite.
- vi. They are superior esthetically, functionally and economically.
- vii. They are crystal clear and thin.
- viii. They are easy to repair.

Ram D et al¹⁰ in their study described the disadvantage of strip crowns as most technique sensitive option, moisture contamination with blood or saliva interferes with the bond and haemorrhage can alter the shade or colour of the material.

OTHER NEWER CROWNS

Pedo Jacket Crown

Pedo Jacket crown is made up of tooth coloured polyester material and is filled with resin material. It is left on the tooth after polymerization apart from being removed from celluloid crown form after curing of luting resin cement¹

New Millennium Crown

They were introduced in market by the Success Essentials, Space Maintain Laboratory. These crowns are made up of composite resin material that is laboratory enhanced. They are similar to Pedo jacket crown and strip crown. The advantage being that they can be finished and reshaped with a high-speed finishing bur. However disadvantages include that they are very brittle and more expensive than other crown forms and cannot be crimped.¹

Pedo Pearl

It is a new type of crown in the process of being developed and field tested. It is a metal crown form similar to a stainless steel crown, but it has been completely coated with tooth-coloured epoxy paint. These crowns are made of aluminium instead of stainless steel as the epoxy coating adheres much better to the aluminium. They serve as ultimate permanent crown in the primary dentition.

According to Sahana S et al¹, the various advantages are they are easy to cut and crimp without chipping and the composite can be added afterwards also. However they have less durability and are relatively soft.

Artglass crowns

Artglass crown commonly known as Glastech, is made up of artglass which is a polymer glass used for restoration of anterior primary teeth. It is a new multifunctional methacrylate with the ability of forming three dimensional molecular net-

works with highly cross linked structure. They have the micro glass and silica as filler materials which provide greater durability and esthetics than strip crown. It gives dual advantages which provides the bondability and feel of composites and longevity and esthetics of porcelains.¹

CONCLUSION

Several modifications and newer esthetic crowns have been presented to overcome the disadvantages of stainless steel crowns. These crowns were introduced to meet the increasing esthetic demands of patient as well as their parents. These modifications include open faced and veneered stainless steel crowns. Open faced stainless steel crowns have a facial window cut wherein composite resin is bonded onto the tooth whereas in pre-veneered crowns (NuSmile primary crowns, Kinder crowns), esthetic composite veneers are retained onto stainless steel using variety of mechanical and chemical bonding approaches. Both these crowns have superior esthetics than conventional stainless steel crowns. However, their durability is compromised because of limited crimping. These crowns are also bulky, very expensive and lack natural appearance.

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Restoring Esthetics in Fractured Anterior Teeth- Template Technique

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ABSTRACT

Introduction: A thorough discipline is required for accurate placement of predictable esthetic restorations on maxillary central incisors which can result in unnecessary provision of an indirect restoration if correct protocol are not followed. A simple protocol with adequate communication, if followed, can prove to be of valuable experience to the patient and the practitioner

Case Report: In our case, an economical and time-saving novel technique has been described for direct composite restoration in a young patient with uncomplicated fractured maxillary anterior tooth.

Conclusion: As restoring a fractured tooth is a complex procedure, this technique can prove as a simple, effective and appropriate technique that will fulfill all the requirements of dental personnel. This technique can also prove to be easy for inexperienced beginner clinicians without requiring special skills in providing the patients with direct composite restorations.

Keyword: Fractured anterior teeth

INTRODUCTION

Anterior crown fractures are common form of injury that mainly affects children and adolescents.² Uncomplicated crown fracture to the permanent teeth has an intense effect not only on the patient's appearance, but also on function and speech.³ The predictable esthetic restoration of broken incisal edge of maxillary central incisors is a demanding and technique sensitive procedure. Its success is dependent on operator's skills and knowledge and also on adhering to a systematic and problem solving approach.⁴ A logical method is used to build up morphologically correct composite restorations by careful selection of composite shades, tints and opaques. In accurate combinations, an illusion of varying translucencies and opacities become visible over natural tooth structure.¹

The dental composite has emerged as a top ranked material over other direct restorative counterparts. Their evolution since their introduction in dentistry has resulted in better bonding, optical and handling properties. Their performance has also been supported by many longevity studies.⁴

CASE REPORT

A 12-year-old boy was reported to the Paediatric Dental Department for the treatment of fractured upper front teeth with esthetic concern. Patient gave history of trauma 6 months back due to fall from a bicycle. Clinical examination revealed Ellis class II (uncomplicated) fracture in relation to 11 and 21 (figure 1). The tooth was asymptomatic without any associated soft or hard tissue injuries to the supporting tissues. Intraoral periapical radiograph confirms the absence of pulpal or periapical pathosis. Therefore, a direct composite restoration technique was planned for restoration of the frac-

tured segment. The unsupported enamel was removed via 45 degree bevel. Preliminary impressions of both the arches were made using alginate, study models were made in dental stone and mock preparation of the lost tooth structure with modeling wax was done. After crown build up, the cast was duplicated by using template of putty impression material (figure 2.) Labial surface of the putty template was removed up to middle third of the crown, to aid in the reconstruction of the lost tooth structure. A clinical try-in of the template was done to ensure adequate fit (Figure 3). After appropriate shade selection of the composite material, the build up was done to restore the fractured teeth quickly with minimal post-restoration finishing.(figure 4.).

DISCUSSION

Fracture of a permanent incisor is a tragic experience for young patient and creates psychological impact on both the parents and in children that make him target for teasing and ridicule by other children. Management of patient's with anterior tooth fracture provides great challenge to the clinicians both from a functional and an esthetic perspective. Treatment objectives may vary depending on the age, socio-economic status of the patient and intraoral status at the time of treatment planning.

Under esthetic point of view fragment reattachment is one of the best options, provided the tooth fragment is available. However, there are concerns regarding their longevity because of its tendency to fracture/debond.

Singhal R found 24-51% variations in reattached tooth with resistance in relation to intact tooth. Greater risk of biological and mechanical failure due to extensive tooth preparation occurs in fixed prosthesis.³

Hemmings et al gave a success rate of 90% with a mean follow up period of 30 months for direct resin composites placed at maxillary anterior teeth.⁵

In patients with worn dentition, satisfactory results were reported with anterior composites offering a cost effective treatment alternative where esthetics is a major concern. With further improvements in bonding chemistry, the success rate of composites is speculated to improve.⁴ A good polishing system including polishing paste, cups and wheels is recommended to achieve appropriate luster. A regular charmois brush with polishing paste can be used for obtain-

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Figure-1: Pre operative view



Figure-2: Impression taken with putty material



Figure-3: Intra oral view with putty template



Figure-4: Post operative view

ing final luster¹

CONCLUSION

The keys to success are observation and strategic control, and careful selection and manipulation of the desired composite material.¹ The successful management of a patient presenting with such condition is dependent on the dental operator having a good knowledge of the principles of occlusion, and the available materials and techniques for restoring such cases with a high level of predictability.⁵ Direct composite resin bonding agents successfully deal with esthetic problems of maxillary anterior teeth along with a painless approach providing successful outcome for the dentist and greater satisfaction for the patients⁶

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Post-Operative Complications of Periodontal Surgery

Mahira Kirmani¹, Himanshu Trivedi¹, Afshan Bey², Vivek Kumar Sharma³

ABSTRACT

Periodontal therapy in the form of nonsurgical and surgical procedures is a common practice in dental clinics. As everything has its pros and cons so as it is with periodontal surgeries. A surgical trauma in the oral cavity always causes tissue injury. The aim of this poster is to evaluate patient reported outcome measures (PROM) involving patients' perception of bleeding, pain, root hypersensitivity, swelling, trismus, bruising, flap dehiscence, perforation after periodontal surgery. Reporting and management of such occurrences is of prime importance and should be dealt with utmost concern.

Keywords: Periodontal surgery, Complications, Bleeding, Root hypersensitivity.

INTRODUCTION

Periodontal therapy in the form of nonsurgical and surgical procedures is a common practice in dental clinics. With the increase in the patients with periodontal diseases, the demand of periodontal therapy is also on rise. From the very basics of scaling and root planning to extensive periodontal procedures like flap surgeries and periodontal plastic procedures, periodontal therapy plays a vital role in the maintenance of entire dentition. As everything has its pros and cons so as it is with periodontal surgeries. The aim of this article is to focus on patients' perception of bleeding, pain, root hypersensitivity, swelling, trismus, bruising and taste changes after periodontal surgery.

Evidence showed that most of the post operative complications after periodontal therapy does not last long. It is reported in various studies that periodontal therapy whether surgical and non surgical therapy is usually accompanied with mild pain^{1,2}. Postoperative pain which is experienced within first 3 days is considered normal and usually diminishes with healing. It can be due to extensive surgical procedure, poor handling of tissues, trauma, poor infection control, use of dull instrument for incision, improper knowledge of surgical anatomy. In particular, a flap design with osseous resection resulted in the highest degree of discomfort which may be as a result of a time-consuming procedure together with and exposure of bone. Treatment consists of reassurance, use of desensitizing agent, chair side varnish, NSAIDs etc depending on etiology of pain and discomfort.

Post operative bleeding after oral and periodontal surgery is a common complication. The surgical procedure presents a challenge to the body's hemostatic mechanism. Following surgical procedures, hemorrhage can range from a minor leakage or oozing at the site, to extensive or frank bleeding at surgical site. The likelihood of this may be attributed to many factors, like the

- tissues of mouth and jaw are highly vascular
- infection
- intrinsic trauma

- presence of foreign bodies
- Even after repeated instructions patients tend to play with the area of surgery with their tongue and dislodge the blood clot, which initiates secondary bleeding.
- The tongue may also cause suction of blood by creating small negative pressures that cause secondary bleeding.
- salivary enzymes may lyse the blood clot before it gets organized.³

Post operative bleeding may be present immediately (primary hemorrhage), within 24hrs or as delayed post operative bleeding (reactionary hemorrhage). It can be due to slippage of suture, dislodgement of clots, cessation of reflex vasospasm, normalization of blood pressure.

Hemorrhage occurring after 7-14 days is secondary to trauma or surgery. The attributed cause is infection and sloughing of blood vessels. Signs and symptoms may include continuous flow, oozing or expectoration of blood or copious pink saliva. Bleeding may be accompanied by pain. Treatment includes reassurance, pressure pack, source of bleeding should be determined. If bleeding is due to residual granulation tissue or liver clot type then it should be removed by high speed suction or curettage. Bony bleeding can be controlled by crushing the bone with appropriate instrument. Soft tissue bleeding may be treated by clamping it with hemostat, if it still persists vessel ligation with sutures, laser coagulation or electrocautery may be necessary. Additional hemostatic agents may also be used.

Reduced mouth opening, pain, difficulty in masticatory capability and swelling usually accompanies periodontal surgery. Swelling hinders routine working life of patient usually in first 3 days after surgery.⁴ Type of the incision, its extension, tissue manipulation and duration of surgery are some factors that can affect swelling. Smaller incisions usually cause less postoperative swelling and pain.⁵ Extraoral swelling is common after periodontal therapy. Antibiotic prophylaxis therapy to prevent distant site infection or to control postoperative sequelae or to treat an established infection in periodontal surgery is a well accepted indication with proved efficacy. According to some authors, to obtain results with the antibiotic treatment, they must be administered preoperatively to act when the bacterial infection starts. Corticosteroids reduce inflammation, fluid transudation and edema. Various surgical strategies like piezosurgery have

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also shown to minimise discomfort after the periodontal surgeries. Beneficial effects of ice applied on a surgical wound are due to changes of blood flow which causes vasoconstriction and reduced metabolism thus reducing bacterial growth. Trismus is an inability to open the mouth. Trismus after periodontal surgery can occur due to trauma, infection. Infection of masticatory space, inaccurate positioning of needle are known to contribute to trismus during periodontal surgeries. Treatment of trismus varies depending on the aetiological factor. The degree of discomfort and dysfunction varies, but is usually mild when it is due to incorrect positioning of needle in superior alveolar or inferior alveolar nerve block. Management should consist of heat therapy, analgesics, a soft diet and muscle relaxants. Aspirin because of its anti-inflammatory properties is beneficial and given in managing the pain associated with trismus and if it is intense pain narcotic analgesic can be given. If required, diazepam (2.5–5 mg three times daily) and other benzodiazepines may be given for muscle relaxation.⁶

There is huge microbial challenge to the patient during periodontal surgery. The occurrence of post surgical bacteremia depends on amount of trauma imposed during surgery. It is documented that 88% of all blood cultures are positive after periodontal therapy. Lengthy procedures increase the chances of transient bacteremia. In postoperative bacteremia *Streptococcus viridans*⁷ has been most commonly documented by various authors. Okel and Elliot considered *Staphylococcus albus* coagulase negative as contaminants. However, McEntegart and Porterfield considered *Staphylococcus albus* coagulase negative as pathogenic micro-organisms. Transient bacteremia can be effectively reduced by giving antibiotic prophylaxis before doing any surgery. Amoxicillin is highly effective in reducing post operative bacteremia in periodontal flap surgery and thus in preventing the possible sequelae (infective endocarditis and other systemic maladies) in susceptible patients.

Taste change is also one of the complications after periodontal surgery. It can be due to any infection, trauma to any nerve, invasive procedures or idiopathic. It can also be due to any surgery requiring insertion of a periosteal elevator, sectioning of tooth, lingual flaps etc.

Nerve damage has also been linked to the experience of the operator and procedures performed under various forms of sedation. It can also be associated with the use of local anesthetic. Sometimes needle directly contact the tissues and can traumatize the nerve which can alter the sensation. Damage to smaller intraneural blood vessels can cause intraneural hematoma. Healing process can also be impeded by compression of the nerve.⁸ If the anesthetic is injected intrafascicularly or becomes deposited within the nerve as the needle is withdrawn it can cause chemical injury to the nerve. Local anesthetics (articaine, procaine, tetracaine, bupivacaine or lidocaine) can all be neurotoxic when injected directly into the nerve. Chemical trauma can cause axonal degeneration, inflammation of the surrounding nerve fibres within fascicles, demyelination which can result in breach in nerve-blood barrier and endoneurial edema. Zinc (gluconate or sulfate) may be given in the treatment of idiopathic dysgeusia, as it is an important factor in gustation. Zinc plays an important role

in the regeneration of taste bud cells.⁹ Taste function is also affected by amount of saliva. Matsuo and Yamamoto showed a significant association between saliva and taste. Thus, low saliva flow may also alter taste, which requires the use of a sialogogue. Repair of nerve damage can also be done to manage taste disturbances. In a review, Ziccardi and Steinberg found that trigeminal nerve microsurgery was one treatment modality option for patients with nerve injury. The articles reviewed suggested that injuries should be repaired within the first 90 days to increase the chances of improvement. Injuries that are not clinically observed at the time of a procedure and are accompanied by defect in nerve conduction are recommended for surgical repair up to one year from the time of the injury.

CONCLUSION

Periodontal therapy is an essential component in providing better dental care. Selection of the most suitable technique for treatment, evaluation of the complications associated with it paves the path for favorable outcomes with utmost patient satisfaction. Keeping in mind that complications may occur post surgery and managing them thoroughly by including them in treatment planning is the wise decision.

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Correlation of Echocardiographic Left Ventricular Mass Index and Electrocardiographic Left Ventricular Hypertrophy Variables

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ABSTRACT

Introduction: Hypertensive left ventricular hypertrophy is one of the major prognostic indicators of cardiovascular morbidity and mortality. If timely detected it helps in guiding future therapeutic options to change the course of events to a significant measure. Electrocardiography and echocardiography are few of the various modalities available to detect it. In this study we have tried to review the relationship of Electrocardiographic and Echocardiography criteria of Left Ventricular Hypertrophy diagnosis.

Material and methods: 151 Hypertensive patients were studied. History and examination was conducted in detail to evaluate the duration and complication of systemic arterial hypertension. Patients were subjected to 12-lead ELECTROCARDIOGRAPHIC, chest X-ray and 2D/Colour Doppler Echocardiogram.

Results: Out of 151 patients 113 (74.8%) had Left Ventricular Hypertrophy by Echocardiography and 38 (25.2%) did not majority of which 79 patients (52.3%) were present in the age group of 50- 59years. Left Ventricular Hypertrophy was diagnosed by echocardiography in 40 females(95.2%) and absent in 2(4.8%), $P<0.01$ [More Left Ventricular Hypertrophy by echocardiography in females, statistically significant]. Maximum sensitivity was for Sokow-lyon index 43.4% $P<0.001$ and maximum specificity for Gubner-Ungerleider Voltage.

Conclusions: This study confirms the poor Electrocardiographic sensitivity, high specificity and correlation with echocardiographic Left Ventricular mass and suggests: (1) further refinement of Electrocardiographic criteria alone is unlikely to improve its relationship with Left Ventricular mass; and (2) combining the electrocardiogram with other non-Electrocardiographic variables or non-invasive measurements offers the best strategy for improving Electrocardiographic sensitivity and its prognostic value.

Keywords: electrocardiography, echocardiography, ECGvariables, LVMindex

INTRODUCTION

Hypertensive left ventricular hypertrophy is one of the major prognostic indicators of cardiovascular morbidity and mortality.¹ If timely detected it helps in guiding future therapeutic options to change the course of events to a significant measure.² LVH has many underlying causes one of which is hypertension. Hypertension is prevalent in 25% of the population. in spite of the magnitude of the problem, hypertension remains undetected in about 50% of the population. Of those in whom it is newly diagnosed, less than 50% are adequately treated. Hypertension is a slow and a silent killer. For most of the initial period it causes no hemodynamic problems or symptoms. The heart copes up with the excess after load by myocyte hypertrophy, wherein the individual muscle cells enlarges due to increase in the number of its

components, myofibrils mitochondria and other constituents. This compensatory change can cope up with the excessive work load only up to a limit after which it fails. There occurs morbid changes in the other systems of the body like vasculature of the heart, brain, kidney, eyes with imminent morbidity and ultimately death.³ The hypertrophied heart is particularly predisposed to morbid events. It is prone to angina, myocardial infarction, arrhythmias and sudden cardiac death. LVH is prognostic indicator of future events in hypertensive patients. Various modalities are available to detect it. ECG and Echocardiography are better tools. In this study we have tried to review the relationship of ECG and Echocardiography criteria of LVH diagnosis. The aim of this study is to evaluate the relationship between LVM/BSA [left ventricular mass index], measured by echocardiography (Echo), and 12-lead ECG variables in hypertensive patients stratified by age, gender and BMI. Also we have reviewed the sensitivity and specificities of the following ECG variables used in LVH diagnosis 1. Sokolow- Lyon index 2. RaVL 3. Cornell voltage⁴. Gubner-Ungerleider Voltage 5. Romhilt-Estes point score

MATERIAL AND METHODS

The study was done at the author's department of medicine for one year from January 2015 to December 2015. It was an observational cross-sectional study. The study group comprised of 151 hypertensive subjects fulfilling the inclusion criteria and giving informed consent. The institutional ethics committee approval was taken and patients were subjected to 12-lead Electrocardiographic, chest X-ray and 2D/Colour Doppler Echocardiogram.

History was taken in detail to evaluate the duration and complication of systemic arterial hypertension. A complete physical evaluation was recorded, care was taken to record height, weight, pulse rate and blood pressure which was measured manually with a mercury sphygmomanometer.⁴ Three readings of blood pressure with gap of 2 minutes were measured in sitting position and the mean was taken. Hypertension was defined according to JNC 7 criteria as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90

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mmHg or patient on antihypertensive medication irrespective of blood pressure.⁵

Detailed ECG Analysis was done following criteria for detecting left ventricular hypertrophy were studied. 1) Sokolow-Lyon index:- ≥ 35 mm 2) RaVL :- ≥ 11 mm 3) Cornell voltage :- RaVL+SV3 > 28 mm in males and >20 mm in females 4) Gubner-Ungerleider Voltage :- ≥ 25 mm 5) Romhilt-Estes point score:- 5 points or more indicates LVH. Detailed Echo analysis was done as per standard protocol to see for valvular structure and function, chamber dimensions, wall motions and dimensions chamber clots, pericardial abnormality. Following parameters were specially noted 1. IVSD 2. LVED 3. LVPWD

STATISTICAL ANALYSIS

It was done as desired and Mean and Standard deviation was calculated in cases and control to characterize the study population stratified by age, sex, BMI. SPSS for windows, version 10.0 was used for all statistical analysis. A p-value < 0.05 was considered significant.

RESULTS

Patients who fulfilled the criteria were stratified according to the age, gender and BMI. In our study out of 151 patients, 42 were females (27.8%) and 109 were males (72.2%), with male:female ratio of 2.59:1. In this LVH was diagnosed by echocardiography in 40 females (95.2%) and absent in 2 (4.8%), $P < 0.01$ [More LVH by echocardiography in females, statistically significant, fig-1]

Out of 151 patients 113 (74.8%) had LVH by Echocardiography and 38 (25.2%) did not majority of which 79 patients (52.3%) were present in the age group of 50- 59 years.

In our study 65 patients (43.0%) had BMI of > 25 . In this 53 patients (81.5%) had LVH diagnosed by echocardiography 86 patients (57.0%) had BMI of < 25 . In this 60 patients (69.8%) had LVH diagnosed by echocardiography (fig. 2)

The sensitivity and specificities of the respective ECG variables used in LVH diagnosis were as follows

Sokolow- Lyon index:	Sensitivity=43.4 %
	Specificity=94.7 %
RaVL:	Sensitivity=13.3 %
	Specificity=94.7 %
Cornell voltage:	Sensitivity=15.9 %
	Specificity=94.7 %
Gubner-Ungerleider Voltage:	Sensitivity=8.0 %
	Specificity=100.0 %
Romhilt-Estes point score:	Sensitivity=15.0 %
	Specificity=92.1 %

DISCUSSION

Hypertension is a slow and a silent killer. For most of the initial period it causes no hemodynamic problems or symptoms. The heart copes up with the excess after load by myocyte hypertrophy, wherein the individual muscle cells enlarges due to increase in the number of its components, myofibrils mitochondria and other constituents. This compensatory change can cope up with the excessive work load only up to a limit after which it fails. there occurs morbid changes in the other systems of the body like vasculature of the heart, brain, kidney, eyes with imminent morbidity and ultimately death.

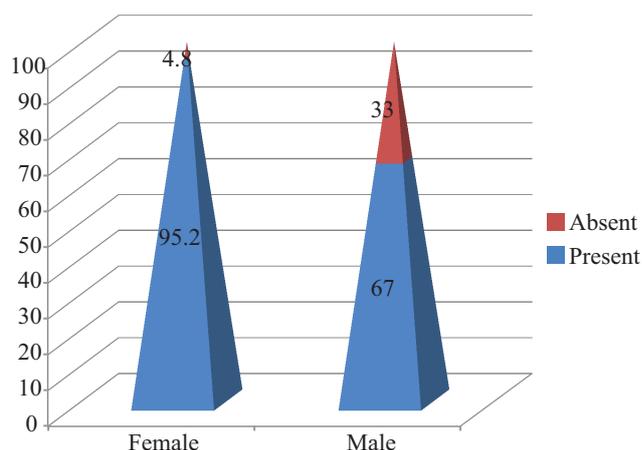


Figure-1: Correlation of gender and LVH in echocardiography

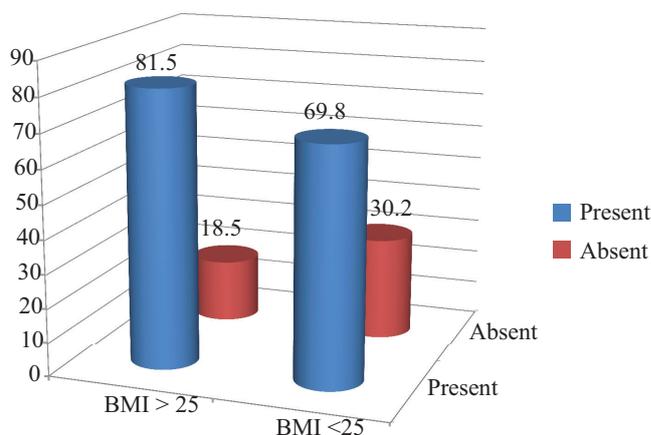


Figure-2: Correction of BMI and LVH in Echocardiography

the hypertrophied heart is particularly predisposed to morbid events. It is prone to angina, myocardial infarction, arrhythmias and sudden cardiac death. LVH is prognostic indicator of future events in hypertensive patients. various modalities are available to detect it. ECG and Echocardiography are better tools. This study has been undertaken to see whether left ventricular hypertrophy, as detected by echocardiography, has correlation with ecg variables or not.

151 hypertensive individuals fulfilling the inclusion criteria were studied, the cases were selected from Medicine, Cardiology OPD and wards of Hamidia Hospital, Bhopal.

All patients were subjected to the same battery of investigations. Patients with hypertrophic cardiomyopathy, myocardial infarction, valvular heart disease in whom pronounced variation in left ventricular wall thickness may occur were excluded from the study. In our study group, male female ratio was 2.56:1. Majority of patients were in age group 50-59 years. Left ventricular mass index was calculated in gm/m².

In 1995 Richard S. Crow and colleagues studied the Relation between electrocardiography and echocardiography for left ventricular mass in mild systemic hypertension (results from Treatment of Mild Hypertension Study).⁶ They found that the correlations between ECG and echocardiographic LV mass index were modest (< 0.40). ECG-LV hypertrophy sensitivity at 95% specificity was $< 34\%$. Highest sensitivity of 17% was shown by Casale/Devereux ECG criteria at 95% specificity for all race-sex groups. LV mass indexed to body mass index and systolic blood pressure showed better

correlation with ECG criteria.

Dr. Lian Xie and colleagues worked on correlation between echocardiographic left ventricular mass index and electrocardiographic variables used in left ventricular hypertrophy criteria in Chinese hypertensive patients.⁷ They concluded that Cornell product and Cornell voltage are the most convenient predictors for LVM/BSA with stratification only by gender. They were also the best parameters for predicting LVH in obese and overweight Chinese hypertensives, whereas estimation of LVM/BSA, LVM/H(2.7) by ECG is inaccurate in Chinese hypertensives without LVH. The cut-off point of BMI=24 kg/m² is suitable for stratification of bodyweight in further studies regarding Chinese hypertensives.

In 2012 J.K.Park and colleagues studied the comparison of Cornell and Sokolow-Lyon electrocardiographic criteria for left ventricular hypertrophy in Korean patients.⁸

The study showed better correlation of Cornell-based criteria with LVH than that of the Sokolow-Lyon criteria, however, revised cut-off values were suggested to improve accuracy.

In 2015 Ljuba Bacharova and colleagues studied determinants of discrepancies in detection and comparison of the Prognostic significance of left ventricular hypertrophy by electrocardiogram and cardiac magnetic resonance imaging.⁹ In their study despite the low sensitivity of the ECG in detecting LVH, ECG was shown to be a strong predictor of cardiovascular risk.

The higher accuracy and reproducibility of LVM measured by cardiac magnetic resonance rather than M-mode echocardiography might explain the weak relationship of their study. In our study maximum sensitivity was for Sokow-Lyon index 43.4% $P<0.001$ and maximum specificity for Gubner-Ungerleider Voltage. Also, more Left Ventricular Hypertrophy by echocardiography was found in females, $P<0.01$ [statistically significant].

CONCLUSIONS

This study confirms the poor electrocardiographic sensitivity, high specificity and correlation with echocardiographic left ventricular mass and suggests: (1) further refinement of electrocardiographic criteria alone in white men is unlikely to improve its relationship with Left Ventricular mass; and (2) combining the electrocardiogram with other non-Electrocardiographic variables or non-invasive measurements offers the best strategy for improving Electrocardiographic sensitivity and its prognostic value.

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Protective Role of Calcium Channel Blocker Flunarizine on Cisplatin Induced Ototoxicity: A Clinical Study

Sumit Prinja¹, Gurbax Singh¹, Mohit Vashisth², Tania Arora³

ABSTRACT

Introduction: Cisplatin is a well known platinum-based anticancer agent used for the treatment of various malignant tumours. A frequent side effect of cisplatin therapy is hearing loss. flunarizine is a calcium channel blocker frequently used in prophylaxis of migraine.

Material and methods: In this study we evaluated the effectiveness of flunarizine in prevention of cisplatin induced ototoxicity. The study included 40 cancer patients to be started on cisplatin. Out of 40 patients, 20 patients received flunarizine 10 mg daily and the rest 20 received placebo (control group). Serial pure tone audiograms were evaluated at 0,3 and 6 weeks.

Results: In our study, flunarizine treated patients were protected mainly at speech frequencies of 1 and 2 kHz. At 3 weeks the maximum average hearing loss in study group was 39 dB against 57 dB in the control group.

Conclusions: The patients who received concomitant flunarizine with cisplatin showed better average pure tone score over speech frequencies than control group. There were no significant side effects reported with flunarizine.

Keywords: platinum, calcium channel blocker, migraine, pure tone audiograms.

The inclusion criteria were

- Cancer patients in the age group 15 to 60 who were planned for cisplatin therapy (50-100mg/m²).
- Patients with pretreatment normal hearing sensitivity.

The exclusion criteria were

- Patients with previous irradiation to head and neck region.

Patients were distributed into 2 equal groups of 20 each with age and dose standardization. Oral flunarizine 10 mg was started to study group at start of cisplatin therapy. Patients in the control group received oral placebo. Serial pure tone audiometries were recorded at 0,3 and 6 weeks.

STATISTICAL ANALYSIS

Results obtained were tabulated and statistically analyzed using descriptive statistics.

RESULTS

40 cancer patients who were to receive cisplatin infusions in the dose range 50-100mg/m² were included in the study. Out of 40 patients, oral flunarizine tablets were given to 20 patients in the study group while control group of 20 patients received oral placebo for six weeks.

Table -1 shows that out of 40 patients 28 were male and 12 were female. Age group 51-60 had maximum number of patients.

Out of 40 patients, 31 had bilateral hearing loss (table-2).

All the patients in the control group showed loss at 8kHz at 6 week follow up (table-3).

At 3 and 6 weeks maximum patients had hearing loss in the range of 21-40 dB in both groups (table-4).

DISCUSSION

Cisplatin is one of the most widely used chemotherapeutic agent in treatment of human tumors. The risk of ototoxicity and nephrotoxicity commonly hampers the use of higher doses to maximize its antineoplastic effects. Cisplatin-induced ototoxicity lesions usually appear in early stages (from hours to days after exposure)⁵, leading to symmetri-

INTRODUCTION

Cisplatin is a widely used chemotherapeutic agent to treat solid tumours such as metastatic testicular and ovarian carcinoma. Cisplatin is highly emetic drug with various side effects like nephrotoxicity, ototoxicity, hyperuricaemia. Nearly all the patients treated with cisplatin have reported some degree of sensorineural hearing loss.¹ High frequency sounds in the range of (4000-8000kHz)² are commonly affected. Even low doses of cisplatin (10mg/kg) can be detrimental to hair cells and stria vascularis³ of cochlea. Flunarizine is calcium channel blocker used in migraine prophylaxis and various cerebrovascular disorders. Various antioxidant agents have been tried to decrease cisplatin induced ototoxicity like intratympanic corticosteroids⁴, N acetylcysteine, neurotrophins. The invasive approach to deliver the agent into inner ear and inconsistent response made their use troublesome. The purpose of this study was to evaluate the preventive effect of oral flunarizine on cisplatin induced hearing loss.

MATERIAL AND METHODS

The study included 40 cancer patients who were to receive cisplatin as a chemotherapeutic agent at G.G.S medical college, faridkot department of E.N.T from January 2014 to September 2015. Sample size was based on the inclusion exclusion criteria. Study was approved by the institutional ethical committee and was done after taking informed consent from the subjects.

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Age group	Male	Female
15-20	2	1
21-30	4	2
31-40	8	2
41-50	5	3
51-60	9	4

Table-1: Distribution of patients according to age and gender

Total	Right	Left	Bilateral
40	4	5	31

Table-2: Distribution of patients according to site

Frequency	Follow up	Study group	Control group
500 Hz	3 weeks	0	0
	6 weeks	0	0
1 kHz	3 weeks	0	2
	6 weeks	0	12
2 kHz	3 weeks	2	5
	6 weeks	4	12
4 kHz	3 weeks	8	10
	6 weeks	12	16
6 kHz	3 weeks	13	18
	6 weeks	18	19
8 kHz	3 weeks	11	15
	6 weeks	17	20

Table-3: Distribution of patients according to affected frequency of hearing loss

Degree of hearing loss	Study group	Control group
0-20 dB	3 weeks	3
	6 weeks	0
21-40 dB	3 weeks	11
	6 weeks	7
41-60 dB	3 weeks	6
	6 weeks	8
61-80 dB	3 weeks	0
	6 weeks	0
81-100 dB	3 weeks	0
	6 weeks	0
100-120 dB	3 weeks	0
	6 weeks	0

Table-4: Distribution of patients according to degree of hearing loss

cal⁶, progressive, irreversible, cumulative and dose-dependent bilateral sensorineural hearing loss. Wang et al. showed that giving a dose of 10 mg/kg cisplatin induces apoptosis of cochlear cells, especially in inner and outer hair cells, and stria vascularis.³ Nearly all patients treated with cisplatin have some degree of sensorineural hearing loss. Ototoxicity and nephrotoxicity are major dose limiting side effects of cisplatin, requiring discontinuation and subsequent replacement by other chemotherapeutic agent. Ototoxicity caused by cisplatin has effects on a number of inner ear structures,

including the stria vascularis, supporting cells, spiral ganglion cells, and outer hair cells (OHCs).⁹ Symptoms of ototoxicity include subjective hearing loss, ear pain, or tinnitus.¹⁰ Ideal otoprotectant to be used along with cisplatin should be easy to administer and should not interfere with antitumoral effect of cisplatin. Cisplatin increased cell death via increase in lipid peroxidation and altered mitochondrial permeability transition¹¹, which was inhibited by a calcium-channel blocker, flunarizine. Flunarizine is an antagonist of T-type specific calcium channels has been widely used to treat vertigo, migraine, epilepsy and tinnitus. The protective mechanism of flunarizine on cisplatin-induced cytotoxicity is associated with direct inhibition of lipid peroxidation and mitochondrial permeability transition.¹² In our study, flunarizine treated patients were protected mainly at speech frequencies of 1 and 2 kHz (Table 3). At 3 weeks the maximum average hearing loss in study group was 39 dB against 57 dB in the control group (Table 4). At 6 weeks only 2 patients in the study group had hearing loss above 40 dB while it was 4 times in the control group (Table 4).

CONCLUSION

Cisplatin is widely used anticancer agent which causes irreversible hearing loss. Various treatment modalities have been tried concomitantly to prevent cisplatin ototoxicity like intratympanic steroids, ginkgo biloba, various antioxidants like vitamin E, lipoic acid. Oral flunarizine is a novel approach to decrease the irreversible assault of cisplatin and its metabolites on auditory cells. Flunarizine is well tolerated and has minimal side effects with oral mode of administration thus making flunarizine ideal otoprotective agent to be coadministered with cisplatin infusions.

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Clonidine as an Adjuvant to Ropivacaine in Supraclavicular Brachial Plexus Block: A Randomised Double Blinded Prospective Study

Asad Mohammad¹, Sangeeta Goel¹, Anurag Singhal², Vibhor Rae³

ABSTRACT

Introduction: Peripheral nerve blocks usually use adjuvants to local anesthetics to enhance the quality and duration of analgesia. The present study was aimed to compare the onset and duration of sensory and motor blockade of 0.5% Ropivacaine alone or in combination with Clonidine during supraclavicular block for upper limb orthopedic surgeries.

Material and Methods: 60 adult ASA grade 1 and 2 patients scheduled for upper limb surgeries were randomized to receive either 30 ml of 0.5% Ropivacaine + 0.6ml saline (Group R) or 30 ml 0.5% Ropivacaine and 0.6 ml (100µg) of Clonidine (Group RC) in supraclavicular block. Onset and duration of sensory and motor blockade, duration of analgesia, postoperative pain score, and analgesic requirement were compared. The hemodynamic variability, sedation, respiratory adequacy and any other adverse effects were also recorded.

Result: The Clonidine group of patients showed an increase in the duration of sensory loss from 676 min to 885 min, motor blockade from 470 min to 770 min, and analgesia from 793 min to 912 min. There was no statistically significant difference in the onset of sensory and motor blockade between the two groups. No adverse effect of Ropivacaine and Clonidine was reported.

Conclusion: Clonidine (100µg) as adjuvant to Ropivacaine, for supraclavicular brachial plexus blockade, prolongs sensory and motor blockade and post operative analgesia, without and increased incidence of side effects.

Key words: Clonidine, Ropivacaine, supraclavicular block.

INTRODUCTION

Clonidine, has partial agonist activity at α -2 adrenergic receptor, and has been used as an adjuvant to Ropivacaine for regional anaesthesia.^{1,2} The use of α -2 adrenoceptor agonist as an adjuvant is a new addition to their clinical application, besides antihypertensive use.³

Clonidine, when combined with a local anaesthetic, has been found to extend the duration of nerve block.⁴ This action of α -2 adrenergic agonist is due to attenuation of inflammatory response, vasoconstriction and centrally mediated analgesia.⁵ Supraclavicular brachial plexus block is the most common used technique of anaesthesia for forearm and arm orthopedic surgeries in our setup. Ropivacaine is an aminoamide local anesthetic prepared as a pure "S" enantiomer. This single enantiomer composition and the lower lipid solubility have produced a drug with less cardiotoxicity than bupivacaine. It is prepared as a plain solution without epinephrine due to its unique intrinsic vasoconstrictor activity. Unlike the other amide local anesthetics there appears to be no prolongation of action with the addition of epinephrine.^{6,7} It is still not known that how Clonidine exerts its anti-nociceptive action, there are numerous theories, and a number clinical

studies have shown that clonidine when used in combination with local anaesthetics can prolong the duration of analgesia,⁸ including when injected into peripheral nerve sheaths.⁹ Clonidine is better than epinephrine in enhancing the duration of plexus blockade when used in combination with bupivacaine, besides avoiding the potential risks of epinephrine.^{10,11}

The present study was aimed to study the effect of Clonidine (100µg) as an adjuvant to Ropivacaine (0.5%) on the onset and duration of sensory and motor blockade in supraclavicular block for upper limb orthopedic surgeries.

MATERIAL AND METHODS

This prospective double-blinded randomized clinical study was conducted on 60 ASA 1 AND 2 grade patients aged between 20 and 55 years of either gender, undergoing arm and forearm orthopedic surgeries under supraclavicular plexus block. Approval from the Institutional Ethical Committee and written informed consent from all the patients were taken. Patients with a history of pre-existing cardiac or pulmonary diseases, peripheral neuromuscular disease, bleeding or coagulation disorder, allergy to local anaesthetic amides, or refusal to technique were excluded from the study. Patients with medical history of adrenergic drugs, psychotropic medications, or patients receiving chronic analgesic drugs were also excluded from the study. Patients were randomized according to computer generated number into two equal groups of 30 patients each to receive either 30 ml of 0.5% Ropivacaine with 0.6 ml normal saline (Group R), or 30 ml of 0.5% Ropivacaine with 0.6 ml (100µg) of Clonidine (Group RC) for supraclavicular brachial plexus block. The local anaesthetic solutions were prepared according to a random number table by an anaesthetic staff not involved in the study. After securing an intravenous access with an 18 G intracath, RL fluid was started at the rate of 4 mL/kg/hour in all patients, and continuous monitoring of pulse rate, oxygen saturation, ECG, non-invasive BP was started. The anaesthetist performing the block was blinded to the treatment group. All observations were carried out by a single investigator

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who was blinded to the treatment group. The supraclavicular plexus block was performed by the classic approach using a single nerve stimulator (Plexygon, VYGON, Padova, Italy) technique. The injection site was infiltrated with 1 ml of lidocaine 2% subcutaneously. Brachial plexus location was achieved by using a nerve locator (Plexygon, VYGON, Padova, Italy), and connected to a 22 G, 50-mm long stimulating needle (Braun Stimuplex Melsungen, Germany). The location end point was a distal motor response (flexion or extension at interphalangeal joints, wrist or elbow) with an output lower than 0.5 mA ($t=0.3\text{ms}; f=2\text{ Hz}$). During injection negative aspiration was performed every 5 ml to avoid intravascular injection. Sensory block was assessed by the pin prick method. Sensory blockade was assessed every minute after administration of the drug. The assessment was done in the dermatomal areas corresponding to the all four nerves (median nerve, radial nerve, ulnar nerve, and musculocutaneous nerve), and it was continued till the completion of the sensory blockade. A dull sensation to pin prick was taken as onset of sensory blockade, whereas full loss of sensation to the pin prick was taken as completion of sensory blockade.

Sensory block was graded as-

Grade 0: Sharp pin felt.

Grade 1: Analgesia, dull sensation felt.

Grade 2: Anaesthesia, no sensation felt.

Motor blockade was assessed every minute till its completion. Grade 1 motor block was taken as onset, whereas Grade 2 motor block was taken as peak motor blockade.

Modified Bromage scale for upper extremities was used in determining the level of motor blockade.¹²

Grade 0: Normal motor function with full flexion and extension of elbow, wrist and fingers.

Grade 1: Decreased motor strength with ability to move the fingers only.

Grade 2: Complete motor block with inability to move the fingers.

Failure of analgesia in the dermatomal areas of any of the above mentioned nerves even after 30 min of drug administration was considered as incomplete block, and patients were given intravenous fentanyl (1 µg/kg) and midazolam (0.02 mg/kg). A failed block was considered when more than one nerve was unaffected. In case of failed block the case was abandoned and the block was converted to general anaesthesia.

Haemodynamic parameters were monitored every 30 min after the block, and every 60 min postoperatively. Ramsay sedation score was used to assess the sedation.¹³

After completion of the operation, the quality of the operative conditions were assessed as following,¹⁴

Grade 4: (Excellent) No complaint from patient

Grade 3: (Good) Minor complaint with no need for the supplemental analgesics

Grade 2: (Moderate) Complaint that required supplemental analgesia

Grade 1: (Unsuccessful) Patient given general anaesthesia

An anesthesiologist not involved in the study, assessed the patients perioperatively. Duration of analgesia was assessed

with Visual analog scale of 0 to 10. The numeric rating scale was recorded post-operatively every 60 min till the score of 5. The rescue analgesia was given in the form of inj. diclofenac sodium (1.5 mg/ kg) intramuscularly at the Numeric Rating Scale of 5 and the time of administration was noted. The duration of sensory block was defined as the time interval between the end of local anaesthetic administration and the complete resolution of anaesthesia on all nerves. The time interval between the end of local anaesthetic administration and the complete recovery of motor function was taken as the length of the motor block.

STATISTICAL ANALYSIS

The data was analyzed by Microsoft® Office Excel® 2007. Unpaired t-test was applied for demographic data, haemodynamic parameters, onset and duration of sensory and motor blockade and duration of analgesia. Fisher exact test was applied for assessment of quality of block. P-value was considered significant if <0.05 and highly significant if <0.001.

RESULT

A total of 60 patients were randomly assigned to one of the two groups. The demographic data i.e. age, gender, weight, and the type of the surgery were comparable in both the groups [Table 1] ($p>0.001$)

Data are presented as mean±SD or absolute numbers, FA =Fore arm; ASA American Association of Anesthesiologist. The baseline haemodynamic parameters were comparable in both the groups. Relatively lower pulse rate were recorded in the Group RC, but pulse rate was never lower than 60 beats/min. The systolic and diastolic blood pressures were comparable between the Groups. The respiratory rate, and peripheral oxygen saturation were comparable between the groups. There was no incidence of breathing difficulty, use of accessory muscles, or a drop in saturation below 95%, indicating pneumothorax, or diaphragmatic palsy.

Onset of sensory block [Group RC (2.33±0.99); Group R (2.46±0.89)], and motor block [Group RC (2.4±1.10); Group R (2.86±1.22)], were faster in Group RC than in Group R, but the difference was not statistically significant [Table 2]. Time to complete sensory effect [Group R (15.26±3.57); Group RC (16.2±3.67)], and motor block [Group R (18.96±5.42); Group RC (19.7±5.58)] were faster in the Group R, but the difference was not statistically significant [Table 2]. Duration of sensory block [Group RC (885±57.81); Group R (676±48.46)], and motor block [Group RC (770±38.90); Group R (470±38.9)], were longer in the Group RC, and the difference were statistically very significant. The total duration of analgesia [Group RC (912±75.82); Group R (793±75.40)], were longer in the Group RC, and the difference was statistically very significant.

Data/groups	Group(R)	Group(RC)
Age(years)	32±10.5	33±8.7
Sex(male:female)	18:12	17:13
Weight(kg)	57.2±9.8	62.8±6.8
Region of surgery Arm/FA	14/16	18/12
ASA grade(I/II)	12/18	13/17

Table-1: Demographic profile of patients

Parameters	Group R	Group RC	P value
Onset of sensory block	2.46±0.89	2.33±0.99	>0.05
Onset of motor block	2.866±1.22	2.4±1.10	>0.05
Time to complete sensory effect	15.26±3.57	16.2±3.67	>0.05
Time to complete motor block	18.96±5.43	19.7±5.58	>0.05
Duration of sensory block	676±48.46	885±57.8	<<<0.001
Duration of motor block	470±38.9	770±38.9	<<<0.001
Total duration of analgesia	793±75.4	912±75.8	<<<0.001

Table-2: Onset and duration of sensory and motor block and total duration of analgesia

DISCUSSION

The supraclavicular brachial plexus block is the most popular brachial plexus block in our institute, for the orthopedic surgeries in arm, elbow, and forearm surgeries. The use of peripheral nerve stimulator technique for brachial plexus block improves the success rate and the quality of anaesthesia. The central actions of Clonidine are mediated through α_2 adrenoceptors, which are situated at locus coeruleus and dorsal horn of spinal cord. But, specific peripheral effects of Clonidine appear to be less obvious because α_2 adrenoceptors are not present on the axon of the normal peripheral nerve.¹⁵ The proposed mechanism of action of Clonidine as adjuvant to local anaesthetics in peripheral nerve blocks are, centrally mediated analgesia, α_2 adrenergic receptor mediated vasoconstriction, attenuation of inflammatory response and direct action on peripheral nerve.¹⁶

Dalle *et al.* proposed that Clonidine by hyperpolarizing through Na/K pump, increases the threshold for action potential, hence blockade of conduction.¹⁷

In our study we compared the addition of Clonidine (100 μ g) to Ropivacaine in supraclavicular brachial plexus block. The result of our study shows that all patients in both groups were comparable with respect to demographic profile, duration of surgery and type of surgery. Haemodynamic parameters were comparable in both the groups, the addition of 100 μ g of Clonidine doesn't cause much change in the haemodynamic parameters, though pulse rate was slower in the Clonidine group (Group RC), but it was never below 60/minute. Our study demonstrates that the sensory block lasts longer than the motor block and the duration of analgesia is longest, and addition of Clonidine to the Ropivacaine enhances the quality of anaesthesia and analgesia and decreases the amount of the post operative rescue analgesia requirement. These findings are in consistent with the other studies.¹⁸ Motor fibers are larger as compared to sensory fibers; hence these fibers require larger concentration of the local anaesthetics that is why duration of motor block is shorter than that of sensory block.¹⁹ Regarding VAS Score for the assessment of pain, only after 10 hours, the difference in score was statistically significant and the score was always better in the Clonidine group. (Group R 4.0±1.6; Group RC 1.2±0.8)

Conclusion:

Our study support the use of Clonidine as an adjuvant to Ropivacaine in supraclavicular brachial plexus block, as it increases the duration of sensory block, motor block, duration of analgesia and overall VAS Score, hence improving the qualities of both anaesthesia and postoperative analgesia. The addition of 100 μ g of Clonidine doesn't cause any hae-

modynamic or sedative complication

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Prevalence of Extended Spectrum Beta Lactamase (ESBL) Producing *Pseudomonas aeruginosa* Isolates from Burns Patients

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ABSTRACT

Introduction: *Pseudomonas aeruginosa* is a leading cause of nosocomial infections. It shows intrinsic and acquired resistance to many structurally related antibiotics including beta lactam antibiotics. There are few studies on beta lactamase producing *Pseudomonas aeruginosa* in hospitalized strains. The aim of this study was to know the prevalence of ESBL producing *Pseudomonas aeruginosa* isolates from burn wound infections and to study the susceptibility of these ESBL producing *P.aeruginosa* to various other antimicrobial agents.

Material and Methods: A total of one hundred and eight pus samples were collected from 108 randomly selected patients admitted in burns unit of a tertiary care hospital between January 2012 to June 2013. The organisms were processed and identified using standard bacteriological conventional culture methods. ESBL producing *Pseudomonas aeruginosa* isolates were detected using “Double Disc Synergy test” (DDST) and “Phenotypic Confirmatory Disc Diffusion Test” (PCDDT).

Results: Among the 108 organisms isolated, the predominant isolate was *Pseudomonas aeruginosa* 78 (72.22%), out of these 19 isolates were sensitive to 3rd generation cephalosporins (3rd GCs) and 59 were resistant. ESBL production was detected in 22 (37.28%) isolates, 19(86.36%) were positive by DDST and all 22(100%) were positive by PCDDT.

Conclusions: 37.28% strains of *Pseudomonas aeruginosa* produced ESBLs. Phenotypic Confirmatory Disc Diffusion Test was most sensitive in the screening of ESBLs than Double Disc Synergy test.

Keywords: *Pseudomonas aeruginosa*, 3rd generation cephalosporins, Extended spectrum beta lactamases, Burn wound infection.

INTRODUCTION

Pseudomonas aeruginosa is a leading cause of nosocomial infection and can cause fatal illness in a variety of patients.¹ The infections caused by these bacteria are commonly ventilator associated pneumoniae, burn wound infections and urinary tract infections.² ESBLs(extended spectrum beta lactamases) represent a major group of β -lactamases currently being identified world wide in large numbers, and are now found in significant percentage of *Escherichia coli* and *Klebsiella pneumoniae* strains. They have also been found in *Pseudomonas aeruginosa* and other *Enterobacteriaceae* strains like *Enterobacter*, *Citrobacter*, *Proteus*, *Serratiamarsescens* etc.^{3,4}

Development of generalised β lactam resistance is mainly because of inappropriate use of third generation cephalosporins.⁵ Development of resistance to beta lactam group of antibiotics is mainly due to beta lactamase enzyme production which is either plasmid or chromosomally mediated. There is limitation of therapeutic options because of increased in-

cidence of ESBL producing strains among clinical isolates. *Pseudomonas aeruginosa* shows intrinsic and acquired resistance to many structurally related antibiotics including beta lactam antibiotics and previous exposure to antibiotics often leads to multidrug resistant *Pseudomonas aeruginosa* strains.^{6,7} Therefore it is important to isolate and identify the resistant strains so that appropriate antibiotic therapy can be given.⁷ The lack of sensitivity and specificity in traditional susceptibility tests to detect ESBLs has led to the search for an accurate, less cumbersome and cost effective test to detect the presence of ESBL in clinical isolates.

ESBL production in gram negative bacteria particularly in *Escherichia coli* and *Klebsiella* species has been studied by various workers in the past but limited data on beta lactamase producing *Pseudomonas aeruginosa* in hospitalized strains prompted us to undertake this study.

The aim of this study was to determine the prevalence of ESBL producing hospital strains of *Pseudomonas aeruginosa* and also to study the susceptibility of these ESBL producing *P.aeruginosa* to various other antimicrobial agents.

MATERIAL AND METHODS

A total of one hundred and eight pus samples were collected from 108 randomly selected patients admitted in burns unit of a tertiary care hospital between January 2012 to June 2013, after clearance from ethical committee. The organisms were processed and identified using standard bacteriological conventional culture methods. *P. aeruginosa* isolates that were obtained as a pure and predominant growth from the clinical specimens were only considered for the present study. The organisms were identified based on the colony morphology and biochemical reactions. The sensitivity of the isolates to the third-generation cephalosporins (ceftazidime, cefotaxime, ceftriaxone, 30 μ g each) was determined by disc diffusion method using *P. aeruginosa* ATCC 27853 as control strain. Commercially available (Hi-Media) 6-mm antibiotic discs were used on Mueller Hinton agar (MHA). Results were interpreted according to the CLSI guidelines,

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which suggest a diameter of inhibition zone ≥ 22 mm for ceftazidime, ≥ 27 mm for cefotaxime and ≥ 25 mm for ceftriaxone as susceptible. ESBL producing *Pseudomonas aeruginosa* isolates were detected using “Double Disc Synergy test” (DDST) and “Phenotypic Confirmatory Disc Diffusion Test” (PCDDT).

Double Disc Diffusion Test (Double disk approximation method or Double disk synergy test): 0.5 McFarland standardized inoculum was swabbed onto Mueller-Hinton agar plate. An amoxicillin with clavulanic acid disc was placed in the center of the plate and one ceftriaxone disc and ceftazidime disc were placed at a distance of 20 mm (Center to center) from the amoxicillin with clavulanic acid disk. The plates were incubated overnight at 37° C and results were read. Enhancement of zone of inhibition of the cephalosporin disc towards clavulanic acid containing disc was inferred as synergy and the strain considered as ESBL producer. This increase occurs because the clavulanic acid present in the amoxyclav disc inactivates the ESBL produced by the test organism.

Phenotypic Confirmatory Disc Diffusion Test (PCDDT): 0.5 McFarland standardized inoculum was swabbed onto Mueller –Hinton agar plate. Ceftazidime disc containing 30 mcg and Ceftazidime with clavulanic acid disc 20+10 mcg were placed at a distance of 30 mm from each other. Plates were incubated overnight at 37°C and results were read. Increase in zone diameter > 5 mm with ceftazidime with clavulanic acid was inferred as positive test and the organism considered ESBL producer.

STATISTICAL ANALYSIS

Results are based on the descriptive statistics.

RESULTS

Of the 108 patients 50 (46.29%) were males and 58 (53.70%) were females. Female to Male ratio was 1.16:1. Out of the 108 samples studied 84 (77.77%) showed burn wound colonization, 54(50%) showing monomicrobial and 30 (27.77%) showing polymicrobial growth. 24 samples yielded no growth. Among the 108 organisms isolated, the predominating isolate was *Pseudomonas aeruginosa* (72.22%), followed by *Klebsiella pneumoniae* (8.33%), *Staphylococcus aureus* (8.33%) and the least isolate was *Enterococcus* species comprising about 0.92% of the total isolates (Fig-1). Out of 78 isolates of *Pseudomonas aeruginosa* tested for their antibiogram, 19 isolates have shown sensitivity to 3rd gen-

eration cephalosporins (3rd GCs) and 59 have shown resistance, the percentage being 24.35% and 75.65% respectively. Among the 59 isolates of *Pseudomonas aeruginosa* resistant to 3 GCs, ESBL production was detected in 22 (37.28%) isolates and 37 (62.72%) were Non-ESBL producers, as per DDST and PCDDT (Table1). Out of the 22 ESBL producing isolates of *Pseudomonas aeruginosa* ESBL production was detected using CAZ and CAC in 22(100%) and ESBL production was detected using CTR and CIS in 20(90.90%). Among the total (22) number of ESBL producing *Pseudomonas aeruginosa* isolates 19(86.36%) were positive by DDST and all 22(100%) were positive by PCDDT.(Table2)

DISCUSSION

The main cause of death in burns patients is shock which is prevented by the use of effective fluid resuscitation regimens. The outcome of burns patients also depends on proper wound healing for which infection is the predominant determinant. Other improvements in care that protect organ function and prevent complications have further accentuated infection as the most frequent cause of burn patient morbidity and mortality. As there is a great variability of both local and systemic clinical manifestations of invasive burn wound infection, great emphasis is being put on proper identification of the burn wound microbial flora for appropriate treatment. Moreover, microbial surveillance has a very important role in any kind of nosocomial infection including burn wound infection, more so in today’s era of drug resistance. In the present study an attempt was made to know the pattern

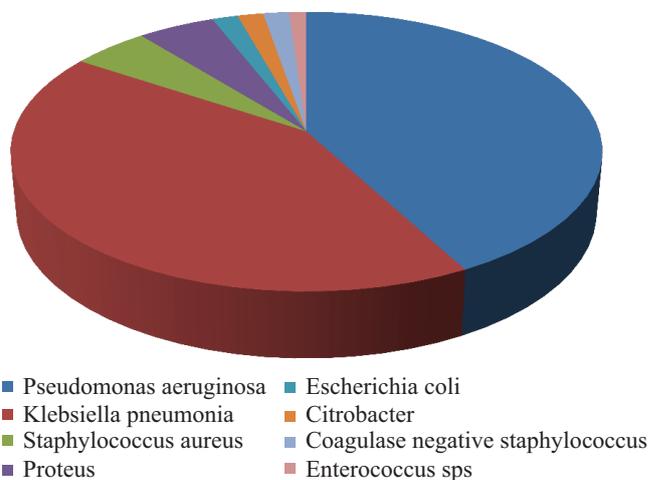


Figure-1: Showing distribution of various organisms isolated from burn wound surfaces.

Total No. of isolates resistant to 3GC	ESBL producers		Non-ESBL producers	
	No.	Percentage	No.	Percentage
59	22	37.28%	37	62.72%

3GC- 3rd generation cephalosporins

Table-1: Distribution of *Pseudomonas aeruginosa* isolates based on ESBL production

Total No. of ESBLs isolated	Zone enhancement by DDST		Zone enhancement by PCDDT	
	No.	Percentage	No.	Percentage
22	19	86.36%	22	100%

DDST- Double Disc Synergy test, PCDDT - Phenotypic Confirmatory Disc Diffusion Test

Table-2: Comparison of DDST and PCDDT in detecting ESBL production.

of burn wound bacterial colonization and the antimicrobial sensitivity profile of *Pseudomonas aeruginosa* isolates and screening for Extended spectrum beta lactamase producers. In the present study it is noted that 77.77% samples showed burn wound colonization with bacteria. B.S.Nagoba et al.⁸ Agnihotri et al.⁹ and Singh et al.¹⁰ have reported 100%, 96% and 87.5% colonization respectively. This high culture positivity rate may be attributed to the selection of cases with deep and major burn wounds.

It is also noted in the present study that monomicrobial growth (50%) was more common than polymicrobial growth (27.77%), as in various other studies such as done by Anuradha Rajput et al.¹¹

B.S.Nagoba et al.⁸ however have reported polymicrobial growth from 61.5% of samples and single isolate from only 38.5% of samples which is contrasting with the present study. In the present study, the most common isolate was *Pseudomonas aeruginosa* (72.22%), followed by *Staphylococcus aureus* (8.33%) and *Klebsiella pneumoniae* (8.33%), *Proteus* (2.77%). And the least isolate was *Enterococcus* spp comprising about 0.92% of the total isolates.

The incidence of Gram positive isolates to Gram negative isolates were 11.1% to 88.9% respectively, where the ratio of these was 1:8. The predominance of *Pseudomonas aeruginosa* and other Gram negative isolates were the most common agents which has also been reported by other workers such as O.Oncul et al,¹² Anuradha Rajput et al,¹¹ Manjula Mehta et al.¹³ This suggests that *Pseudomonas aeruginosa* is the classical pathogen in burn wound infections. This is because *Pseudomonas aeruginosa* thrives on moist wound surfaces and is highly pathogenic in thermally injured immunosuppressed patients. These bacteria usually gain access to burn patients through cross-contamination of burn wounds. The second most common isolate in this study was *Staphylococcus aureus* as in other studies from economically developing countries such as O.Oncul et al,¹² Rastegar Lari et al.¹⁴ This contrasts however with some other studies, especially from economically developed countries, which reports *Staphylococcus aureus* as the predominant organism in burn infection as stated by Ozumba et al.¹⁵

During the first week of admission the predominant isolate was *S.aureus* (89%) of which most of them were monomicrobials whereas Gram negative isolates comprised only (11%). The predominance of Gram-positive bacteria in the early phase switches to Gram-negative species 4-10 days after injury. In the polymicrobial isolates of first week *Klebsiella pneumoniae* was the major isolate among Gram negatives. During the second week of admission, Gram-negatives (65%) predominated significantly over the Gram-positives (35%) of which most of them were polymicrobial isolates, and *Pseudomonas aeruginosa* was the predominating organism. Statistically, there exists a negative correlation between Gram positives and Gram negatives as time increases. In the present study it was found that more than 80% of the *Paeruginosa* isolates were sensitive to Meropenem, Piperacillin/Tazobactam, Imipenem/Cilastin. More than 50% sensitivity was shown to Amikacin, Ciprofloxacin, Aztreonam and Colistin. Less than 40% sensitivity was shown to Gentamycin, Ceftazidime, Ceftriaxone and Cefotaxim. In a

study done by Sharma and Taneja et al,¹⁶ ninety per cent of *P. aeruginosa* were resistant to amikacin and ceftazidime, 45 per cent to ciprofloxacin and 25 per cent to piperacillin.

ESBL DETECTION

Out of 78 total isolates of *Pseudomonas aeruginosa*, 59 were found to be resistant to third generation cephalosporins (3GCs).ESBL detection was performed by Double Disc Synergy Test (DDST) using Ceftazidime, Amoxycylav and Ceftriaxone discs and Phenotypic Confirmatory Disc diffusion disc (PCDDT) using Ceftazidime and Ceftazidime-Clavulonic acid, Ceftriaxone and Ceftriaxone-Sulbactam discs. Among the 59 resistant isolates, ESBL production was detected in 22 (37.28%) isolates and 37 (62.72%) were Non-ESBL producers. There is geographic variation in ESBL producing strains of *Pseudomonas aeruginosa*. In our study 37.28% strains were ESBL producers, which is similar to a south Indian study done by Senthamarai.S, Sivasankari S et al¹⁷ among 144 strains of *Paeruginosa*, 51 (35.4%) showed ESBL production in the combined disc diffusion test, where in a study done by Abiola Olukeri Okesola and Anthony Alaba Oni from Nigeria,¹⁸ out of the 90 isolates of *Paeruginosa*, 20 (22.2%)isolates were found to be positive for ESBL production while 70(77.8%) were negative and in another study done by Varun Goel et al¹⁹ showed higher incidence of 42.31% ESBL producers. However our study is in contrast to studies conducted by others who depicted low rates, 3.7% Woodford et al.,²⁰ 4.2% Lim et al.,²¹ respectively of ESBL production in *P. aeruginosa*. In our study among the total (22) number of ESBL producing *Pseudomonas aeruginosa* isolates, 19(86.36%) were positive with DDST and all 22(100%) were positive by PCDDT, which roughly correlates with the study done by Xiaofei Jiang et al²², among the total of 34 isolates that were considered ESBL producers, 20 strains were positive with PCDDT and 10 were positive with DDST.

CONCLUSIONS

Pseudomonas aeruginosa was found to be commonest cause of burn wound infections. Isolates of *Paeruginosa* were resistant to many routine antibiotics like Ceftazidime, Gentamycin and Meropenem.

Phenotypic Confirmatory Disc Diffusion Test was most sensitive in the screening of Extended Spectrum beta lactamases than Double Disc Synergy test. Screening of burn wound infections for ESBLs will guide in therapeutic option of antibiotic and to institute the appropriate antimicrobial agent to the patient and to prevent the spread of ESBL positive organisms. Use of the simple ESBL screening test like PCDDT will be crucial step in large scale monitoring of these emerging resistant determinants. As the therapeutic options are very less, strict infection control measures and proper antibiotic regimens are the measures which will help in reducing the high morbidity and mortality in burn wound cases.

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Proseal LMA Versus Endotracheal Tube A Clinical Comparative Study of its Different Effects in Paediatric Patients Undergoing Lower Abdominal Surgeries

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ABSTRACT

Introduction: This prospective comparative trial was undertaken to compare the effects of insertion of ProSeal LMA and Endotracheal tube on haemodynamic response, evaluate the safety and efficacy of ProSeal LMA as an airway device, and evaluate other noteworthy observations in paediatric patients undergoing lower abdominal surgeries under general anaesthesia and requiring positive pressure ventilation.

Material and Methods: 60 cases which met all the inclusion criteria were selected and the study was carried out on patients of ASA I and II, aged 2 – 10 years of either sex, weighing 10 – 20 kg undergoing elective lower abdominal surgery Group-A: ProSeal LMA (PLMA) for airway management Group-B: Endotracheal Tube (ETT) for airway management.

Results: Both ETT and PLMA cause increase in hemodynamic responses, but the magnitude and duration of response is less in LMA-PS. Removal of PLMA showed that the change of HR, SBP, DBP, MAP were not significant to the base line reflecting a smooth emergence. Incidence of post-operative complications were found to be less with PLMA than with ETT.

Conclusion: ProSeal LMA can be routinely used as a safe and effective alternative airway device to endotracheal intubation for positive pressure ventilation in paediatric patients undergoing elective surgical procedure.

Keywords: Haemodynamic response; ProSeal LMA; Paediatric patients; Lower abdominal surgeries; positive pressure ventilation.

INTRODUCTION

The major cause of sympatho-adrenal response to tracheal intubation is due to the stimulation of supraglottic region by tissue irritation induced by direct laryngoscopy.¹ Direct laryngoscopy by activating proprioceptors, induces arterial hypertension, tachycardia and increased catecholamine concentration proportional to the intensity of stimulus exerted against the base of the tongue.²

Endotracheal tube is the gold standard^{3,4} device to maintain an airway and has ability to provide positive pressure ventilation, prevents gastric inflation and pulmonary aspiration.⁴ In 1981, Dr. A.I.J Brain designed the Laryngeal Mask Airway (L.M.A. classic) at London hospital, Whitechapel, London which changed the scenario from "cannot intubate, cannot ventilate" to "cannot intubate, can ventilate".⁵ The Laryngeal Mask Airway is designed to establish effective seal around the laryngeal inlet with an inflatable cuff. It is a useful advancement in airway management.⁵

The LMA is one of the most promising non-pharmacological methods to attenuate the sympathoadrenal response to tracheal intubation, causing less sympathetic response and

catecholamine release.⁶

The PLMA causes less pressure response during insertion compared to tracheal intubation and the increase in heart rate is very short lived.^{3,7} The PLMA also results in minimal coughing and produces a smooth emergence.^{8,9} LMA can be used for Pressure Controlled Ventilation with Positive End Expiratory Pressure in paediatric patients.¹⁰

Objective of the study was to compare the effects of insertion of PLMA and ETT on haemodynamic response, evaluate the safety and efficacy of PLMA as an airway device in paediatric patients.

MATERIAL AND METHODS

After obtaining approval from hospital Ethical Committee, details of the procedure was explained to the patient's guardian and a written informed consent was taken. 60 cases which met all the inclusion criteria were selected for the study. The study was carried out on patients of ASA I and II, aged 2 – 10 years of either sex, weighing 10 – 20 kg undergoing elective lower abdominal surgery in the Department of Anaesthesiology and Critical Care, Gauhati Medical College and Hospital, from 1st June 2011 to 15th September 2012.

Exclusion criteria were parent and guardian refusal for consent, patients of ASA>II, emergency cases, obese patients, patients with anticipated difficult airway.

Grouping of the patients was done using the plan generated from the site www.randomization.com (seed no 5537, Randomization plan created on 14 June 2011 16:52:05) to one of the either groups

Group-A: PLMA, size 2 (as per body weight) by digital technique was used. The cuff was inflated with 8-10ml air for size 2.

Group-B: PVC un-cuffed ETT of size 4.5 mm, 5 mm and 5.5 mm were used for intubation.

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On arrival in the preoperating room, after confirming the identity of the patient, the consent was checked; the preoperative assessment was reviewed and up dated. The nil by mouth status of the patient was confirmed and syrup Midazolam (0.5mg/kg) was given as premedication to sedate the patient 45 minutes before the surgery. Then the patient was shifted to the operation theatre. ECG, NIBP and pulse oximeter were applied and baseline readings of parameters like HR, SBP, DBP, MAP and SpO₂ were noted. ETCO₂ was attached after intubation. Intravenous line was established with 22 G IV cannula. All patients received similar premedication with intravenous Glycopyrrolate 8-10µg/kg, Tramadol and Ondansetron. A standard General Anaesthesia technique was adopted in all patients consisting of pre-oxygenation for 3 minutes, induction with Inj Propofol 1% (2mg/kg) followed by Inj. Atracurium (0.6 mg/kg).

Correct placement of both ETT and PLMA was confirmed by: Chest movement, Bilateral chest auscultation, ETCO₂ waveform, Easy passage of the nasogastric tube through the gastric tube of LMA. A nasogastric tube (8/10 French) was passed in every patient of both groups. Anaesthesia was maintained with Nitrous oxide 66% in 33% Oxygen and 0.2% halothane. Neuromuscular blockade was maintained with Inj. Atracurium with top up of 0.1mg/kg. Ventilation was set at a tidal volume of 8ml/kg, respiratory rate of 20-22 /min and I/E ratio of 1:2. Patients of both the groups were placed in the left lateral position and caudal epidural regional block with Bupivacaine 0.2% and Clonidine 1µg/kg was given for intraoperative and post-operative analgesia. After the completion of surgery, reversal of the residual neuro-muscular blockade was done with Inj. Neostigmine (0.05mg/kg) and Inj. Glycopyrrolate (0.01 mg/ kg).

Monitoring of HR, SBP, DBP, MAP and SPO₂ before induction as baseline, after intubation or placement of LMA-PS, at 1mins, 3mins, 5mins and every 5mins there after till the removal and 5mins after removal of ETT or PLMA. For both the groups, baseline value for ETCO₂ was taken after placement of airway devices (ETT/ PLMA).

Calculation of size of tube^{11,12}

The following have been used as general guidelines for selecting the proper size tube in children.

- For children below 6 years: age in years/3 + 3.75

- For children older than 6 years: age in years/4 + 4.5
- ID = age in years/4 + 4 or 3.5

Depth of insertion

The tube tip should be inserted not more than 3-4 cm past the cords in children above 1 year.

STATISTICAL ANALYSIS

Statistical analysis was done using suitable biostatistical technique on each variable in the same patient and between two treatment groups. Statistical screening of treatment effect was measured by relative risk reduction, absolute risk reduction with adjustment for a small sample size and confounders in the study. Paired t test and other appropriate tests were applied to check for presence of significant difference in outcome variable in two groups. The software Instat-Graphpad was used in the analysis.

RESULTS

Grouping of patients was done into two groups comprising of 30 patients using the plan generated from the site www.randomization.com.

Group-A: LMA ProSeal for airway management.

Group-B: EndoTracheal Tube for airway management.

The observations were compiled and the results were analyzed statistically. The observations are tabulated as:

- Demographic Variables (table-1) - Age distribution, Weight, Sex, ASA status, MPS
- Haemodynamic Variables: Heart rate, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure.
- For Ventilation: SP0₂, ETCO₂
- Complications: Sore throat, Gastric distension, Aspiration

Figure-1 shows that the heart rate variation was highly significant at placement of ETT compared to PLMA, at 1 min and 3 mins. At 5 mins the variation of heart rate was significant, after which it was not significant throughout the procedure till removal of the airway devices. At removal the rise in mean HR was significantly more with ETT than PLMA.

Figure-2 shows that there was significant increase in SBP at 1 min, 3 mins, with Group B than Group A; which became insignificant at 5 mins and there after throughout the pro-

characteristics	A(PLMA)			B(ETT)				
Age(Mean Age)	5.13			4.5				
Weight(Mean)	15.33			14.17				
Sex(%)	Male	Female		Male	Female			
	90	10		80	20			
Mallampatti Score	I	II		I	II			
	27	3		26	4			
Duration of surgery	≤30 mins	≤40 mins	≤50 mins	≤30 mins	≤40 mins	≤50 mins		
	6	11	13	2	17	11		
	Complications							
	Cough		Sore Throat*		Gastric Distension		Aspiration	
Group	-	+	-	+	-	+	-	+
LMA-PS	28	2	25	5	30	0	30	0
ETT	26	4	27	3	30	0	30	0
TOTAL	54	6	52	8	60	0	60	0

Table-1: Demographic characteristics

cedure till removal of airway devices. At removal the rise in mean SBP was significantly more with ETT than PLMA. Figure-3 shows that there was significant increase in DBP after instrumentation, with Group B showing a greater rise than Group A; which became insignificant at 5 mins and there after throughout the procedure till removal. At removal the rise in mean DBP was significantly more with ETT than pLMA.

Figure – 4 shows that increase in MAP was highly significant after instrumentation, with Group B than Group A. It became insignificant at 10 minutes and there after throughout the procedure. At removal the rise in mean MAP was significantly more with ETT than pLMA.

In the ETT group, 3 patients complained of sore throat after removal while in the PLMA group, 5 patients complained of the same. This was compared statistically by Fisher's exact test which showed to be insignificant ($P>0.05$).

In the PLMA group, 2 patients coughed after removal while in the ETT group, 4 patients coughed. This was compared statistically by Fisher's exact test which showed to be insignificant ($P>0.05$). Clinically detectable aspiration and gastric distension was not observed in any case in both the groups.

DISCUSSION

This prospective comparative trial was conducted to compare PLMA as an alternative airway device to ETT in 60 paediatric patients undergoing lower abdominal surgeries. The PLMA has been proved to be adequate in previous studies by Sinha A. et al. 2007⁸; Patel et al. 2010¹³; Lalwani et al, 2010.⁷ We compared the PLMA with ETT in terms of haemodynamic responses, efficacy of positive pressure ventilation, emergence and complications.

Patel et al 2010,¹³ found that there was no change in haemodynamic parameters in Group PLMA during insertion and removal of the ProSeal LMA whereas there was rise in both heart rates during insertion and extubation, and the change was statistically highly significant. In our study, heart rate was increased in both the groups after placement of the airway devices but the magnitude and duration of increase in HR was less in Gr A than in Gr B.

Lalwani et al 2010⁷, found that the mean pulse rate increased from a baseline value of 103.70 ± 11.56 to 109.50 ± 12.41 and from 102.46 ± 11.46 to 122.83 ± 8.30 after the placement of PLMA and endotracheal tube respectively. The increase in the pulse rate was statistically significant ($P<0.05$) in both the groups. We have found that pulse remains elevated for 1 minute in Group A after instrumentation which came down towards base line at 3 minutes. In Group B pulse remained elevated for 3 minutes after instrumentation which came down towards base line at 5 minutes.

Garima Agrawal (2011)¹⁴, found that following insertion of endotracheal tube, there was a highly significant rise in heart rate ($P=0.000$) but there was no significant rise in the heart rate ($P=0.921$) in the PLMA group.

Dave et al³, also found rise in heart rate after insertion of the PLMA which was statistically insignificant ($P>0.05$) but in our study the rise in heart rate after insertion of PLMA was found to be statistically significant (<0.01).

Shahin et al 2009¹⁵, compared LMA and ETT in 100 children

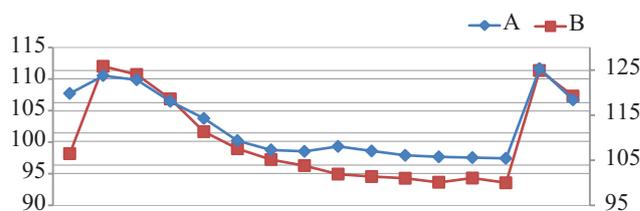


Figure-1: Mean Heart Rate

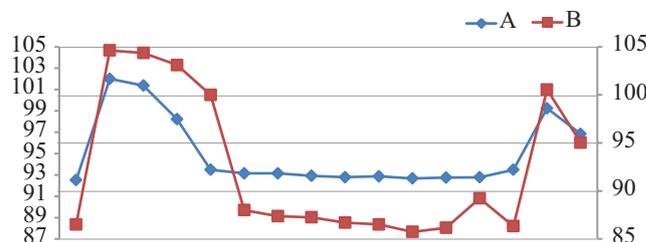


Figure-2: Mean Systolic Blood Pressure

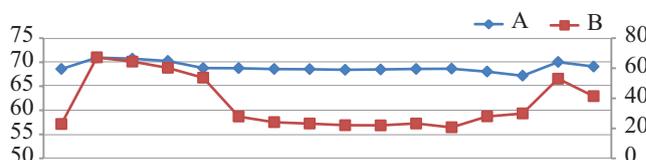


Figure-3: Mean Diastolic Blood Pressure

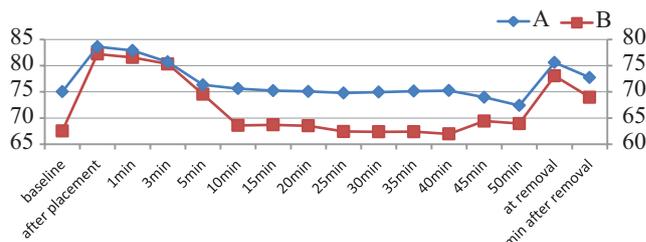


Figure-4: Mean Arterial Blood (MAP) Pressure

posted for elective surgical procedures, found that changes in heart rate at 0, 1, 3 min were highly significant in Group A as compared to Group B, similar to the findings of our study. Lalwani et al (2010)⁷ found that the increase in SBP from the baseline after insertion of PLMA or ET was statistically insignificant ($P>0.05$) in both groups. There was a statistically significant ($P<0.05$) decrease in mean SBP (mmHg) 97.86 ± 8.46 from the baseline value of 105.86 ± 9.78 , 5 min after placement of PLMA. The mean SBP of 98.26 ± 11.68 also decreased from the baseline mean SBP of 103.60 ± 12.46 , 5 min after ET intubation. ($P>0.05$)

Fujii Y et al (1998)⁹ measured SBP at 1min, 3min, 5min and 10min after tracheal extubation or LMA removal and found that SBP came to the baseline value after 5min of LMA removal whereas it came to baseline value after 10min of tracheal extubation. Similar to Fujii Y et al²³, our study had similar results.

Dave et al³ found that the systolic arterial pressure rose from a preoperative value of 79.46 ± 6.9 to 82.56 ± 9.39 post PLMA insertion which was not statistically significant ($P>0.05$). Sinha et al⁸ in their study noted similar haemodynamic stability with PLMA as compared to ETT.

Fujii et al⁹, in their study, observed that there was a significant increase in the DBP 1minute after extubation of ETT

which returned to the baseline values at around 10 minutes of extubation whereas change was less after LMA removal and the DBP values returned to baseline values at 3 minutes of removal of LMA. In our study, the rise in DBP was significant 1 minute after removal in both the groups which returned to the baseline values after 5 minutes of removal/extubation (>0.05).

Similar to our study, Shahinet al¹⁵ also observed a significant increase in mean arterial pressure in both groups just after insertion of endotracheal tube or the laryngeal mask airway. The mean arterial pressure came back to baseline value after 5 minutes in the ETT group and within 3 minutes in the LMA group. Changes in the mean arterial pressure in group ETT at 0, 1, 3 min were significant as compared to Group LMA ($P<0.001$, <0.01 , <0.01). In our study, there was a highly significant ($P<0.01$) increase in mean arterial pressure till 3 minutes of insertion of ETT and LMA but gradually became insignificant ($P>0.05$) from 10 minutes till removal of ETT/LMA.

In a similar study by Garima Agrawal¹⁴, following insertion of endotracheal tube, there was a highly significant rise in mean blood pressure ($P=0.000$) along with rise in heart rate and intraocular pressure. Whereas, they found there was no significant rise in the mean blood pressure ($P=0.327$) after insertion of the PLMA. They found that the rise in mean blood pressure in the ETT group was significant and sustained at 3 minutes post-insertion while it came towards baseline values at 5 minutes in the PLMA group. In our study the rise in MAP was sustained till 5 minutes in group B and came down towards baseline at around 10 minutes. In group A, the MAP came down to baseline values at 5 minutes post-insertion.

Patel et al¹³ compared the effects of PLMA and ETT in 60 ASA I/II children undergoing elective lower abdominal surgical procedures. Haemodynamic parameters such as, heart rate, SBP, DBP along with oxygen saturation and EtCO₂ were recorded pre-operatively and post-operatively. There was one case of displacement of PLMA after giving lateral position for caudal epidural insertion which was corrected immediately and the same patient had regurgitation due to displacement. 3.33% of patients in ETT group experienced post-operative vomiting, 3.33% had post-operative hypoxemia ($SpO_2<90\%$), 40% of the patients had coughing and 13.33% had sore throat. None of the patients from both the groups had post-operative laryngospasm, bronchospasm or limb movements during removal of the PLMA or extubation. In our study, we did not find a significant change in oxygen saturation and EtCO₂ throughout the intra-operative period ($P>0.05$). None of the patients from both groups had intra-operative regurgitation. Two patients of group A and four patients of group B coughed on removal of PLMA and ETT respectively. None reported laryngospasm, bronchospasm or any other complication during removal of PLMA and extubation or during the post-operative period.

Jaya Lalwani et al⁷ found that endotracheal intubation was done in 96.67% patients at first attempt whereas ProSeal LMA was inserted in 83.33% patients at first attempt. In their study, Patel et al inserted ETT and PLMA at first attempt in all patients. Similarly, in our study, we did not find any difficulty in placement of ET tube or the PLMA and both the de-

vices were placed in first attempts. Sinha et al⁸ and Misra et al⁴, in their studies, reported that all patients were intubated at first attempt while the PLMA was placed in 88% patients at first attempt in paediatric and adult laparoscopic surgeries, respectively. Dave et al³ reported the success rate to place the PLMA in first attempt was 93.33%. Lim et al in gynaecological laparoscopy noted that the number of attempts for successful insertion were similar for both PLMA and ET tube (86% and 85%, respectively). After extubation, there was a significant incidence of cough as compared to after removal of PLMA. Their findings were similar to the findings of the studies by Maltby et al^{16,17} and Sinha et al.⁸ They also noted bronchospasm in two cases of ETT group and none in the PLMA group. Blood on the posterior surface of PLMA was noted in six patients in group A, but in group B, two cases of blood on ET tube was observed after extubation. There was no incidence of aspiration in either groups of patients.

Dave et al³ evaluated the use of ProSeal LMA in paediatric laparoscopic surgeries. This study was conducted in 30 children, 10-30 kg undergoing elective laparoscopic surgery. All patients were maintained on controlled ventilation with nitrous oxide 60% in oxygen, isoflurane and atracurium intermittent boluses as required. PLMA provided adequate ventilatory conditions as there was no significant change in the SpO₂ and EtCO₂ values during the procedure. In only two patients, PLMA was replaced by endotracheal tube due to increase in EtCO₂. At ventilator parameters designed to maintain normocapnia, the PLMA affords adequate seal.

In our study, we did not find any significant change in the SPO₂, EtCO₂ and PLMA provided adequate ventilatory support. Also there was not increase in EtCO₂ nor any incidence of gastric distension after PLMA placement. Brimacombe et al^{18,19} in their studies on PLMA have recommended the use of gastric tube in cases of difficult insertion or where displacement of PLMA can occur intraoperatively.

Placement of nasogastric tube was successful in first attempt in all the cases of both the groups in our study. Patel et al¹³ and Dave et al,³ in their study also found that placement of the gastric tube was successful in all cases.

Lardner et al²⁰ in 2008 did a randomized controlled, single-blinded study of 51 ASA I or II children weighing 10–20 kg to compare the efficacy of ProSeal LMA and Classic LMA. They inserted both the devices (only size 4) into each patient in random order. Anaesthesia was maintained with isoflurane 1.8%–2.5% in air and FIO₂ 0.5. The number of attempts, insertion time was recorded, and ease of insertion was graded by the investigator as easy, difficult or failed. Presence or absence of blood on the LMA was noted following removal.

They found that, in children undergoing IPPV with neuromuscular blockade, the size 2 PLMA is associated with a higher leak pressure by auscultation and less gastric insufflations compared to the C-LMA. This finding was consistent with the finding of Shimbori et al.²¹ Intraoperatively, 4 patients out of 25 patients with PLMA developed complications including stridor/obstruction and 1 patient required repositioning of the PLMA. In our study, we did not find any difficulty in inserting the device and in no case endotracheal intubation required due to failure of insertion of the PLMA.

Intraoperatively, we did not find any complications. However on removal of the PLMA, two patients coughed.

Limitations

1. Number of cases in each group was only thirty (30), to find statistical significance in these groups will be very difficult as it may not show the actual outcomes.
2. A Randomized Controlled Trial, possibly triple blinded or at least double blinded in nature, involving a large number of patients with long term follow-up is clearly needed to bring the differences between the two techniques.

CONCLUSION

We concluded that both ETT and PLMA cause increase in hemodynamic responses, but the magnitude and duration of response is less in PLMA. Incidence of post-operative complications were less with PLMA than with ETT. ProSeal LMA can be used as a safe and effective alternative airway device to endotracheal intubation for positive pressure ventilation in paediatric patients undergoing elective surgical procedure.

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The Socio-Demographic Co-Relates Referral Pattern and the Diagnostic Pattern of Psychiatric Illness in the Mentally Ill Prisoners Referred to A Tertiary Care Psychiatric Unit

Mary C. D'souza¹, M.S. Kulkarni²

ABSTRACT

Introduction: The psychiatric morbidity in mentally ill prisoners is higher as compared to the general population. There are few Indian studies done on mentally ill prisoners conducted in Jails and less so in prisoners referred to psychiatric hospitals. This study was taken up to fill in this void. Aim of the research was to study the socio-demographic co-relates, referral pattern and the diagnostic pattern of psychiatric illness in the mentally ill prisoners referred to a tertiary care psychiatric unit.

Material and methods: The case file records of total 97 prisoners referred to a tertiary care psychiatric hospital for their psychological complaints between the time span of Jan 2015 to Dec 2015 were included in the study. The case file records are ideal for collecting socio demographic data, the detailed clinical and criminal history along with mental status evaluation and diagnosis. Data analyses were done by using the SPSS – 22 Version and Pearson Chi-square test.

Results: Of the total sample of 97 prisoners, 92 had genuine reason for psychological referral as they subsequently fulfilled criteria for ICD-10 Psychiatric diagnosis. 43.3% of the referred cases had Substance use disorder, 37% patients had Adjustment disorders, 5.2% were Mood Disorders and 4.1% had Psychosis.

Conclusion: Psychiatric morbidity is common among the prisoners. There is growing awareness about mental health issues among the prisoners and the jail authorities. Early detection and management of the mental health problems will lead to improvement in the mental health of the prisoners thus preventing the risk of reoffending.

Keywords: Psychiatric morbidity, prisoners, Liaison psychiatry, Substance abuse, Adjustment Disorders

INTRODUCTION

In the criminal justice system prisons and prisoners remain a major constituent. Since crime is on the rise in the modern world due to emergent reasons the prisons are seeing an influx of prisoners.^{1,2} The prisoners are seen to be languishing in the jails in need of a quicker trial or due to their incarceration for varied periods of duration, maybe even a lifetime. Such circumstances often have a toll on the physical and mental health of the inmates leading to various adjustment and emotional problems. A recent study came out with the finding that severe mental illness is 5-10 times higher than in the general population.³

A systematic analysis of 62 prison mental health surveys done by Fazel S, et al suggests that prisoners were consistently more likely to suffer from a personality disorder or a primary mood disorder or psychosis when compared with general population.⁴ Some of the salient findings of this study

were 65% had a personality disorder, among whom 47% had antisocial personality disorder, 10% mood disorders and 3.7% of men had psychotic illnesses. Among female prisoners 42% had a personality disorder, including 21% with antisocial personality disorder, 12% major depression, and 4.0% of women had psychosis.

The main reasons that are cited for the high prevalence of mental illness in the prisoners are the stressful conditions during execution of the punishment and the person's inherent conditions which otherwise lead them into committing a crime.^{5,6}

There is a dearth of Indian studies on the psychiatric morbidity in Indian prisoners. In a study done by Ayirolimeethal A. et al substance use disorder (47.1%) was the commonest diagnosis followed by Antisocial personality disorder (19.2%), Adjustment disorder was seen in 13.7%, psychotic disorder in 6.3% and mood disorder in 4.3%.⁷ Another study by Kumar V. et al came up with the prevalence of 33% of psychiatric morbidity of which 58.8% of the prisoners had drug abuse/dependence prior to incarceration and remaining were depressive (16.1%), Anxiety disorders (8.5%) and psychosis (6.7%).⁶ There was hardly any study on referral pattern of prisoners to psychiatric units and the reasons for such referrals. Also frequently it was implied that prisoners often use a pretext of a psychiatry referral to escape even if briefly from their everyday mundane lifestyle. Keeping in mind all such factors the present study was conducted to assess the mentally ill prisoners that were referred to a tertiary care mental hospital.

Aim of the study was to study the socio-demographic co-relates referral pattern and the diagnostic pattern of psychiatric illness in the mentally ill prisoners referred to a tertiary care psychiatric unit.

Objectives were:

1. To study the socio-demographic correlates in the mentally ill prisoners referred to a tertiary care psychiatric unit.
2. To study the referral pattern of the mentally ill prisoners

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(MIPs) referred to a tertiary care psychiatric unit.

- To study the reasons for referring and diagnosis in the MIPS that are referred to the psychiatric unit.

MATERIAL AND METHODS

The study was a cross-sectional, descriptive, hospital based study in which the case file records of 97 mentally ill prisoners referred to the outpatient department of a tertiary care psychiatric hospital from the various prisons in the State were included. The approval to conduct the study was obtained from the local Institutional Ethics Committee. Permission to use the case file records of the patients was obtained from the Director of the Institute. Confidentiality was maintained throughout the course of the study. Both convicts as well as under trials brought from all the different prisons in the State formed the sample of the study. The prisons were located about 20 to 30 kms away from the hospital and the prisoners were brought daily by the prison bus. The period of study was approximately one year (Jan 2015-Dec 2015). The patient when referred for the first time was registered as a new case and file was issued in his/her name. The socio-demographic data and the patient details (clinical and criminal) were entered on the semi structured pro forma specially meant for collection of such data. All the patients were evaluated by the senior resident on duty and also reviewed by the consultant psychiatrist and diagnosis was made according to the International Classification of Diseases -10 (ICD-10) Criteria. The reason for referral was obtained from the referral note or order accompanying the patient and history from the patient. The study did not involve any specific intervention and the patients continued to receive regular treatment and care.

The inclusion criterion was

- All mentally ill prisoners referred to the hospital during the period of study.

The exclusion criteria were

- Subjects below 18 years and above 60 years were excluded.
- Patients with mental retardation.

STATISTICAL ANALYSIS

The collected data was tabulated and the analysis was done using the SPSS – 22 Version. The results were expressed as number and percentages for all the qualitative variables, by using the mean and the standard deviation for quantitative variables. The Pearson Chi-square test was used for finding association between two qualitative variables with the 'p' value set to less than 0.05 to be taken as statistically significant.

RESULTS

The number of mentally ill prisoners (MIPs) referred to the tertiary care psychiatric hospital during the study period were 97 and they all formed the study sample. The socio-demographic details of the MIPs in the study group is as follows to be changed to is given in table 1. Majority of them were in the age group of 18-29 years i.e. N=53 (54.7%). The mean (\pm SD) age of the sample group was 31.7(\pm 10.8) years at the time of referral. Several of the prisoners were from a

rural background N=68, (70.1%). 91.8% (N=89) were male patients and only 8.2% (N=8) were females. More than half i.e. 60.8% (N=59), of the prisoners were unmarried at the time of study, 37.1% (N=36) were married and only 2.1% (N=2) were divorced. Regarding duration of stay in the prison, 56.7% (N=55), of the prisoners had spent below one year in prison, where as 36.1% (N=35), patients were in prison for a period between 1-5 years. Regarding literacy status, 62 patients (63.9%) were having basic education of II to X standard, 29 patients (29.9%) were up to higher secondary educated or graduates. Based on their socioeconomic status, 65 patients (67%) belonged to low SES and 32 (33%) were from middle SES background.

Table 2 shows the prevalence of Psychiatric Disorders (ICD-10) diagnoses in the referred prisoners. The most common diagnosis was that of substance use disorder N=42 (43.3%), next frequent being Adjustment Disorders N=36 (37%). There were 5 cases (5.2%) of Mood Disorders, 4 cases (4.1%) of Psychosis, 5 cases with nil psychiatric diagnosis and 5 cases belonged to other infrequent diagnostic categories (2 were Obsessive Compulsive Disorder cases, 2 had an Organic cause, and 1 was delusional disorder).

Table 3 shows the relation between the socio-demographic co-relates with the psychiatric Diagnosis that were statistically significant. Male prisoners were significantly more than females. Also regarding the duration of stay in prison a significantly large number of prisoners presented with psychiatric symptoms in early period i.e. within one year of incarceration across the various categories of diagnosis.

Table 4 depicts the reasons for referral for the mentally ill prisoners. The most commonest reason cited by the prisoners were symptoms related to substance use disorders, N=44 (45.4%) and next common reason being sleep disturbances and other somatic complaints, N=39 (40.2%). The other less common reasons were unexplained abnormal behaviour in 4 (4.1%) patients, unexplained body pains in 4 (4.1%), psychological /psychiatric evaluation by court in 2 (2.1%) patients and other reasons in 4 (4.1%).

DISCUSSION

It is now increasingly recognised that the prevalence of psychiatric morbidity in the prisoners is quite high as compared to the general population.⁸ The major limitation of our study is that it was a hospital based study so the true prevalence of psychiatric morbidity for the entire prison population in the State cannot be commented upon. There are several reasons for the high prevalence of mental illness in the prisoners. The presence of a pre-existing psychiatric illness prior to incarceration, the frequent delays in trial process, the living conditions in the jail, problems in reaching out to psychiatric services due to varied reasons are some of the situations because of which mental health needs of the prisoners are not fulfilled.⁹

In our study of the 97 prisoners included, 92 among them had an ICD-10 psychiatric diagnosis and only 5 patients were with nil psychiatric diagnosis. It is apparent that the patients and the referring authorities are well informed about mental illness and their symptoms resulting in early referral for these patients. The reason for this could be the im-

provement in the prison health care services in our State, the liaison services that are regularly provided by our hospital to these prisons twice in a month, appointment of a regular trained nurse in jail for patient monitoring and easily accessible tertiary psychiatric hospital for further needs.¹⁰

The most frequent diagnosis made in our study group was that of Substance use disorder as 43.3%. This finding is sim-

ilar to other Indian studies by 7, Kumar et al 6, and outside India by Bird SM et al¹¹, Birmingham et al¹², Steadman et al¹³, and Brooke et al. 5

The next frequent diagnosis was that of Adjustment disorder (37.0%) which is lower than study by Fido AA et al¹⁴ and high as compared to an Indian study by Ayirolimeethal et al⁷ showing a prevalence of 13.7%. Mood disorders and Psychotic disorders were less frequent diagnosis in our study sample which is in keeping with other Indian¹⁵ and Foreign studies.^{5,16}

An important finding of our study in relation to the socio-demographic profile was that most of our patients were young males, unmarried, from low socioeconomic background¹⁷, less in formal education, frequently in use of alcohol and other substances of abuse. This is in keeping with study done by Bergio Baxter Andreoli et al¹⁸ and others.^{19,20} A significant finding was the relation between the duration of stay in prison and the psychiatric diagnosis in the referred patients. A shorter duration of less than one year was significantly associated with mental illness. The reason for this could be that the most frequent diagnosis in our sample was substance use disorder and Adjustment disorder.⁷ These conditions will obviously distress patient into an early psychiatric consultation. The most common reason cited for the referral to a psychiatric hospital was substance related problems in 45.5% of the cases. The other common reason for which prisoners were referred was sleep disturbances and other vague somatic complaints in 40.2 % of the cases. There was unexplained abnormal behaviour as a presenting complaint in 4.1% of the referrals, vague pains like headache, body ache in 4.1% and 2.1% of the cases patients were referred for psychological testing directly. Also there were 2 cases that were referred for continuation of prior prescribed psychiatric medications and two cases of reported self harm. It is a well known fact

Variable Factors		
Years	Frequency (N)	Percentage (%)
1. Age (Years)		
18-29	53	54.7
30-49	38	39.2
50-69	06	6.2
2. Residence		
Rural	68	70.1
Urban	29	29.9
3. Gender		
Males	89	91.8
Females	08	8.2
4. Marital Status		
Single	59	60.8
Married	36	37.1
Others	02	2.1
5. Duration of stay in prison		
Below 1 year	55	56.7
1- 5 years	35	36.1
7 years	07	7.2
6. Education		
Illiterate	03	3.1
Primary/ Second-ary	62	63.9
HSSC/ Graduation	29	29.9
Post Graduation	03	3.1
7. Socioeconomic status (Kuppuswamy)		
L	65	67
M	32	33

Table-1: Socio demographic variables in referred Prisoners (N=97)

	Frequency (N)	Percentage (%)
1. Substance use disorders	42	43.3
2. Adjustment Disorders	36	37.0
3. Mood Disorders	05	5.2
4. Psychosis	04	4.1
5. NIL Psychiatry	05	5.2
6. Others	05	5.2

Table-2: Prevalence of Psychiatric Disorders (ICD-10) Diagnosis in referred prisoners

	Substance use disorders		Adjustment Disorders		Mood Disorders		Psychosis		Others		NIL Psychiatry		P value
	No	%	No	%	No	%	No	%	No	%	No	%	
Duration stay													
<1	31	73.8	14	38.9	2	40	4	100	4	80	0	0.0	$\chi^2 = 27.7$ df=10 p=0.002
1-5	9	21.4	20	55.6	2	40	0	0.0	1	20	3	60	
5+	2	4.8	2	2.6	1	20	0	0.0	0	0.0	2	40	
Gender													
M	42	100	32	88.9	3	60	4	100	3	60	5	0.0	$\chi^2 = 18.3$ df=5 p=0.003
F	0	0.0	4	11.1	2	40	0	0.0	2	40	0	100	
Total	42	100	36	100	5	100	4	100	5	100	5	100	

significant<0.05

Table-3: Selected Socio-Demographic correlates of Diagnosis

	Frequency (N)	Percentage (%)
1. Sleep Disturbances/Other somatic complaint	39	40.2
2. substance related problems	44	45.4
3. Unexplained abnormal behavior	04	4.1
4. Psychological / Psychiatry Evaluation	02	2.1
5. Others (certified previous treatment, self harm, mood)	04	4.1
6. Unexplained pains (headache/ chest pain)	04	4.1

Table-4: Reasons for Referral of Mentally Ill Prisoners

that mental health issues are often ignored and emphasis is given to the physical model of illness. Therefore it requires an extra effort on the part of the referring (jail) authorities and the patients to recognise the symptoms so as to obtain a psychiatric consultation. There are hardly any studies from India or otherwise which have studied the psychiatry referral pattern arising from the prison population. The present study was an attempt to fill in this void.

The present observational study has some limitations which need to be acknowledged. The data used in the study has been obtained from a case file record of the referred patients and hence only the recorded information could be accessed. It was a cross sectional, hospital based study with all its inherent shortcomings. The study overall was a genuine attempt to understand the mental health issues of the prisoners.

CONCLUSION

This study suggests that psychiatric morbidity is highly prevalent in the prisoners. Patients and the authorities are prompt in seeking the mental health services. Training the prison staff in recognizing the symptoms of mental illness and awareness of mental health issues in prisoners are essential to improving the mental health of the prison inmates. Future research should be directed towards qualitative assessment of the outcomes of the mental health care services provided to the prisoners and their satisfaction with such services.

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A Cross Sectional Study on the Health Status of Infants under the Field Practice Area of KBNIMS, Gulbarga

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ABSTRACT

Introduction: A Nations health can be measured using important indicators such as infant morbidity and mortality. As the determinants of Infant morbidity and mortality are decreasing in developed countries, it still remains a problem in developing countries. Study was done to determine the morbidity pattern among the infants and to explore the causes and risk factors affecting infant morbidity and mortality.

Material and methods: A community based cross sectional study was conducted amongst 100 infants residing in the field practice area of UHTC, KBNIMS, Kalaburgi, Karnataka.

Results: 48% of the infants were found to be suffering from acute respiratory tract infections followed by fever (26%) and diarrhoea (19%). Majority of the unhealthy Infants (95.23%) belonged to overcrowded households. This study illustrates that Joint families had more un healthy Infants (69.04%) that nuclear families (30.95%). It was found that a majority (95%) of mothers had taken antenatal visits to the hospital. Education amongst mothers was seen lacking with only 1% of postgraduate degrees and majority with secondary education. A majority of 96.42% who had normal deliveries were healthy Infants. Among the 42 unhealthy Infants, 21.42% were from pre term deliveries, 9.52% were from post term deliveries and 16.66% of the unhealthy Infants Were Low Birth Weight babies.

Conclusion: There is a need to educate the community about the effects of overcrowding. Mothers should be encouraged to take up timely vaccinations.

Keywords: Infant health, Overcrowding, LBW Babies.

INTRODUCTION

A Nations health can be measured using important indicators such as infant morbidity and mortality as there is an unparalleled consortium with several factors such as quality of maternal care, socio economic conditions, maternal health, and public health practices.¹ Infant mortality rate in developed countries showed a rapid decline during the last 50 years, while it is still a problem in developing countries.²

The different determinants of infant mortality and morbidity include age, sex, birth weight, plurality, mode of delivery, gestational age, parity of mother, vaccination, maternal education, birth spacing and socio economic conditions.³ Breast feeding is an important determinant which lowers the rate of infection related to morbidities. Worldwide sub optimal breast feeding still accounts for deaths of 1.4 million children.⁴ Sub-standard and poor complementary feeding practices show that many children remain susceptible to outcomes such as increased risk of infections such as diarrhoea and respiratory infections, improper and weak cognitive development and stunting which are more often than not irreversible.⁵

WHO expanded programme on immunisation has reduced infant mortality rate by controlling vaccine preventable dis-

eases.⁶ India is a developing country with limited resources, and the expenditure on health is 4.2% of the total budget. The distribution of health care is complex with a major burden on tertiary care centres.⁷ The demographic variation of diseases among infants has never been taken into consideration when national health policies are made therefore tertiary care centres receive greater proportion of health budget.⁸

Less than one sixth of patients utilise the government health facilities, leaving the burden on private clinics and hospitals.⁸ Among the various morbidity patterns; acute diarrhoeal diseases is one of the major causes of mortality and morbidity in the developing countries among infants and children less than 5 years of age.⁹

It may be conspicuous that nutritional adequacy may be partly determined by feeding method employed, but it also interacts symbiotically with diarrhoeal episodes.¹⁰ So this collegial relation between nutrition and diarrhoeal infection may have protracted effects on the path of normal infant growth and development.

About 90% of the global births with less than 2500 grams' birth weight occur in developing countries.¹¹ This article will therefore focus on the impact of low birth weight on morbidity. Low birth weight runs a high risk of mortality and morbidity. Not only are mortality and morbidity rates seen to decrease with optimal nutrition but there is also satisfactory weight gain that is noticed. Optimal nutritional management of these infants aims at a rate of growth equal to the intrauterine rates.¹²

The aim of this study was to study the causes and risk factors associated with Infant morbidity that eventually lead to Infant mortality.

MATERIAL AND METHODS

A community based cross sectional study was undertaken on the health status of the infants under the Urban Health training Centre of Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka from the 26th August 2014

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to 22nd November 2014. No records or registers were found showing the prevalence of infants in the community. Therefore, all Infants in the age group of 0 to 12 months during the study period in the study area were included in the study. At the end of the study 100 Infants were enumerated by census enumeration method. The data was collected via a pre tested, pre designed interview schedule and it was followed by clinical examination of the children. A house to house visit of the area was done beginning from the randomly selected household and moving along the right hand side till all the infants were covered. Whenever houses with no infants were detected; that house was skipped and we went to the next house. In the absence of respondents during the first visit, 2 subsequent visits were made to contact them. Not willing to participate (3 families) in spite of 2-3 persuasion were dropped. Thus a total of 100 infants belonging to different house-holds were included in the study.

The data was collected on age, sex, morbidities present, socio demographic parameters such as Overcrowding where the criteria was more than 2 people residing in 11 square metre or more and 1 person in 5 to 7 square metre, Kuppuswamy's Socio economic scale which was calculated using the per capita income (modified for 2015), education and occupation of the head of the family, type of family, antenatal history of the mother, educational status of the mother, type of delivery and birth weight of the infant as remembered by the mother.

STATISTICAL ANALYSIS

Microsoft Excel 2016 was used for generating tables and graphs. Descriptive statistics were used to infer results.

RESULTS

According to the study majority of the study infants were in the age group of 7-12 months i.e., 74 and 26 were in the age group of 0-6 months. 48% of the infants in the study were males and 52% were females [Table - 1]. The study indicates that 42% of the total 100 infants included in the study had one or the other morbidity. 48% of the 42 that displayed morbidity suffered from Acute Respiratory Tract Infections, followed by Fever (26%) and Diarrhoea (19%) [Figure -1]. According to the study it was found that overcrowding has a statistically significant ($P < 0.10$; Chi Square: 43.1987) impact on the health status of infants as majority of unhealthy infants i.e., 95.23% belong to houses where overcrowding is present where as a minimum 4.76% of unhealthy kids belong to the houses where overcrowding is absent. Indicating that infants were healthier where overcrowding was absent. This study illustrates that Joint families had more un healthy Infants (69.04%) that nuclear families (30.95%). This finding was statistically significant at $P < 0.01$ (Chi Square: 10.509). Out of the total 42 Unhealthy Infants, 24 were in the lower class and 18 in the upper lower class according to Kuppuswamy's Socio-economic scale and none from the lower middle class and above. However, out of the 58 healthy families, only 19 were from Lower Class, 24 from Upper Lower and 15 from Lower Middle class, thereby suggesting that Socioeconomic status was a key factor in Infant Health. This finding was statistically significant at $P < 0.01$ (Chi Square: 14.2432). Among the 100 study subjects, 48 were male and

52 were female. Out of the 48 male Infants, 25 were unhealthy and 23 were healthy. Out of the 52 female Infants, 17 were unhealthy and 35 were healthy. This finding was not statistically significant at $P < 0.01$ (Chi Square: 3.8527) [Table - 2]. According to the study it was found that majority of mothers i.e., 95% took antenatal care. Among the 5% who had not taken antenatal care, a majority of 2% had only secondary level of education. It was also seen that education among the mothers was lacking with only 1% of postgraduates and a majority with secondary education (33%) [Table-3]. According to the study, a majority of 96.42% who had normal deliveries were healthy Infants. However, among the 42 unhealthy Infants, 21.42% were from pre term deliveries, 9.52% were from post term deliveries and 16.66% of the unhealthy Infants Were Low Birth Weight babies. This comparison between the health of the infants and Preterm, Post term and Low Birth Weight at birth was found to be significant statistically at $P < 0.01$ (Chi-Square: 22.2375) [Table -4].

DISCUSSION

In this study, 48% of the study subjects were males and 52% were females. This finding was not in accordance to the Male: Female sex ratio of Karnataka i.e., 973 females to 1000 males.¹³ A study conducted in Goa, India on postnatal depression and infant growth and development in Low income countries found the male infant ratio to be 51% and female ratio to be 49%.¹⁴ This finding was also not in sync to the finding in our study. In our study, out of the 100 study infants a staggering 42 had one or the other morbidity, out of which 42% had Acute respiratory tract infections. According to a study by John S. On Respiratory Viral Infections in Infants, Respiratory infections account not only for increased

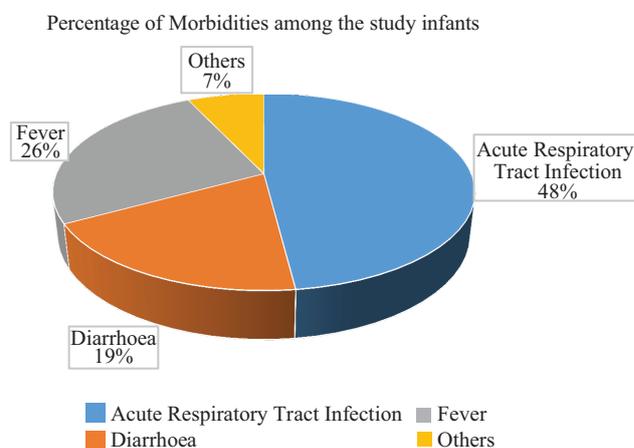


Figure-1: Showing distribution of Infants according to the morbidity pattern.

Age	Number	Percentage
0-6 Months	26	26
7-12 Months	74	74
Total	100	100
Sex of the infant	Number	Percentage
Male	48	48
Female	52	52
Total	100	100

Table-1: Showing the age and sex wise distribution of the infants.

Socio-demographic parameters	Health status			Chi-square
	Unhealthy (n=42)	Healthy (n=58)	Total	
Overcrowding				
Overcrowding present	40 (95.23%)	17 (29.31%)	57	43.1987 (P<0.01)
Overcrowding absent	2 (4.76%)	41 (70.68%)	43	
Type of family				
Joint family	29 (69.04%)	21 (36.20%)	50	10.509 (P<0.01)
Nuclear family	13 (30.95)	37 (63.79%)	50	
Kuppuswamy's socio-economic status				
Lower class according to kuppuswamy's sec	24 (57.14%)	19 (32.75%)	43	14.2432 (P<0.01)
Upper lower class according to kuppuswamy's sec	18 (42.85)	24 (41.37%)	42	
Lower middle class according to kuppuswamy's sec	0 (0%)	15 (25.86%)	15	
Gender				
Male	25 (59.52%)	23 (39.65%)	48	3.8527 (Not significant at P<0.01)
Female	17 (40.47%)	35 (60.34%)	52	

Table-2: Showing distribution according to the health of the infants and the socio-demographic parameters.

Antenatal visits	Taken		Not taken		Total	
	No.	%	No.	%	No.	%
Illiterate	16	94.1	1	5.9	17	100
Primary	24	96	1	4	25	100
Secondary	31	93.9	2	6.06	33	100
Higher	17	100	0	0	17	100
Graduation	6	85.7	1	14.3	7	100
Post-Graduation	1	100	0	0	1	100
Total	95	100	5	100	100	100

Table-3: Showing the relation between the antenatal visits taken by the mothers and their educational status

Type of delivery	Healthy		Unhealthy		Total	
	No.	%	No.	%	No.	%
Pre term	2	3.57	9	21.42	11	11
Post term	1	1.78	4	9.52	5	5
Low birth weight	1	1.78	7	16.66	8	8
Normal	54	96.42	22	52.38	76	76
Total	58	100	42	100	100	100

Table-4: Showing relation between Health of the Infants and Low Birth Weight, pre term and post term deliveries among the study group.

mortality but also for increased morbidity: between 22% (United Kingdom) and 26.7% (Belgium) of all hospitalizations and between 33.5% (Italy) and 59% (United Kingdom) of general practitioner consultations are due to respiratory viral infection.¹⁵ These findings are rather similar and along the lines of the findings of our study. In our study 19% of the infants who had morbidities were suffering from diarrhoea. The incidence of persistent diarrhoea was 6.3 per 100 child-years among those aged 0-71 months, and was highest (31 per 100 child-years) among those aged 0-11 months according to a study in rural North India on the descriptive epidemiology of persistent diarrhoea.¹⁶ This finding was more than that of our study. According to our study, Overcrowding played a major role in Infant health. 40 out of the 42 Infants who displayed morbidities were living in Overcrowded setups. A study conducted in Glasgow and Edinburg, England opined with evidence that overcrowding is a significant cause of Infant mortality.¹⁷ This finding was similar to the finding of our study. In a study conducted by Tiffany field on Teenage parenting in different cultures, family constella-

tions, and caregiving environments: Effects on infant development; it was found that Infant performance decreased with time irrespective of family type or constellation.²¹ However in our study, we found a statistical significance on comparison of the type of family and Infant Health thus suggesting that our finding was not in agreement with the finding of the study conducted by Tiffany Field. In our study we found a statistical significance of socioeconomic status and Infant Health. This finding of ours was at par with the finding of the study on Socioeconomic disadvantage and child development conducted by McLoyd and Vonnie C that opined that socioeconomic status does indeed play a role in child health and development.²² According to this study it was found that majority of mothers i.e., 95% took antenatal care. Among the 5% who had not taken antenatal care, a majority of 2% had only secondary level of education. It was also seen that education among the mothers was lacking with only 1% of postgraduates and a majority with secondary education (33%). Multivariate analysis on Maternal Education and the Utilization of Maternal and Child Health Services in India by

Pavalavalli Govindasamy and B. M. Ramesh confirmed the positive and significant influence of mother's schooling on maternal-care utilization. This study by Mr Ramesh was of the opinion that education emerges as the single most important indicator of maternal health care utilisation when the effect of all the other interceding factors are restrained.¹⁸ This finding is concordant to the finding of our study. A study in china on an overview of morbidity, mortality and long-term outcome of late preterm birth revealed that on comparison with term infants the preterm infants had considerably greater chances of increased morbidity, mortality and also long lasting side effects that extended even beyond their infancy into adult life.¹⁹ This was similar to the finding of our study where among the 42 unhealthy Infants, 21.42% were from preterm deliveries. Our study also reveals that 16.66% of the unhealthy Infants Were Low Birth Weight babies. A study on postnatal depression conducted in Goa, India revealed that 18% were underweight at birth.¹⁴ This finding was similar to the finding of our study. Another study on the Burden of Morbidities and the Unmet Need for Health Care in Rural Neonates conducted in Gadchiroli, India concluded that 42% of the study infants were underweight at birth.²⁰ This finding was however much higher than the finding of our study.

CONCLUSION

In our study the prevalence of Infant morbidities was alarmingly high, Overcrowding was extensively present and education among mothers was widely ignored. There is a need to educate the community about the effects of overcrowding. Mothers should be encouraged to take up timely vaccinations.

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CBCT Guided Flapless Implant Rehabilitation of A Missing Mandibular Second Molar-Case Report and Review of Literature

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ABSTRACT

Introduction: It is critical for clinicians to minimize trauma to the patient and produce acceptable aesthetic outcomes while understanding patients hard and soft tissue conditions. Minimally invasive surgeries have now become the norm eliminating the need for a second surgery, highlighting patient comfort in treatment planning when rehabilitating with implants.

Case report: A 51 year old male patient who reported with a missing second mandibular molar in the fourth quadrant was evaluated using cone beam computed tomography (CBCT) and successfully treated with a flapless implant procedure followed by prosthetic crown placement.

Conclusion: In the past decade due to technological advancements and introduction of the CBCT and dental implant planning software, the flapless implant surgeries have gained popularity. This procedure causes minimal trauma to the supporting structures and provides long term stability.

Keywords: flapless implant, CBCT, minimally invasive, DMLS.

INTRODUCTION

Every patient is unique and it is of paramount importance to make surgeries as comfortable and as minimally invasive as possible. Last few years have seen many modifications to the classical crestal incision technique advocated by Dr. Per Ingvar Branemark. An innovative technique of implant placement without elevating a mucoperiosteal flap, described as flapless implant surgery, has been introduced recently. It has the distinct advantage of minimal bone loss and increased patient comfort.

When dental implants are placed after reflecting soft tissue flaps, there is some bone resorption during the initial phase of healing in the crestal area of the alveolar bone.¹ Flapless surgery involves accessing the bone by either (a) punching out a small amount of soft tissue, just the amount required for osteotomy preparation and implant placement^{2,3} or (b) preparing the osteotomy site by drilling directly through the soft tissue.^{4,5}

In the punch technique, the gingiva at the centre of the implant site is removed using a surgical template and tissue punch. The incised gingival tissue is removed with a curette or mosquito haemostat.

In the second technique, the area of placement of implant is marked on the soft tissue using a surgical template and then the osteotomy site preparation is done with conventional drills, drilling directly through the soft tissue in the marked area.

Keratinized, attached, and non mobile tissue of at least 5 mm must be present, because the flapless procedure requires the actual removal of some of the tissue. This is essential to pro-

vide the epithelial and connective tissue elements needed for development of circumferential biological width to preserve soft tissue integration, without sacrificing the underlying peri-implant supporting bone.

Bone width of at least 4.5 mm must be available without undercuts of more than 15°. Since visibility is limited when using the flapless technique, it is difficult to ensure that the implant is positioned in the centre of the crestal bone. Greater ridge width offers the practitioner an extra margin of safety. Mild swelling and discomfort is seen in every surgical procedure. Using the flapless approach, we minimize the surgical trauma.

CASE REPORT

The patient, who was a 51 year old male, visited the Periodontics department, Army college of dental sciences, India with the chief complaint of desiring fixed replacement of missing right lower second molar. The tooth was lost due to decay 2 years ago. Overall examination was done and it was non contributory. Patient was explained about all the options and he opted to go for the implant. He was in good health and had adequate mesio distal and bucco lingual width with adequate attached gingiva. The periodontium of the patient was healthy. A CBCT and complete blood picture was advised, IOPA was also taken. Impressions were made to fabricate the stent for accurate implant site determination. Based on the CBCT analysis (Figure 1) of quantity, quality and morphology of bone a 4.2 × 11.5 mm (Adin Dental Implant System Ltd, Afula, Israel) root form implant was selected to be placed with the flapless technique.

Extra and intra oral antiseptics were done. Local anesthetic (xylocaine 2% with epinephrine 1:80,000, Indoco) was administered. The stent was placed at the site and marking on the soft tissue done using a round bur. A tissue punch (Figure 2) was used to perforate the tissue and sequential drilling was done to prepare osteotomy site. The implant was wrenched into place with a final torque of 45 N/cm² with good primary stability. Healing abutment was placed on the implant.

Patient was prescribed analgesics and antibiotics and in-

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structed to use 0.2% chlorhexidine rinse twice daily for 1 week. He was instructed to apply ice packs for the first 12 hours, soft diet for 3 days.

Patient was recalled after 1 week. He reported no discomfort and healing was uneventful with a smooth healthy gingival cuff formed around the healing abutment. Patient was motivated about oral hygiene instructions and recalled every month for review.

We waited for 4 months for complete osseointegration to occur and impressions were made using polyvinyl siloxane impression material (Aquasil putty and light body, Dentsply, Mannheim, Germany). Jig trial was done before final cementation of the prosthesis. Crown was fabricated by using the direct metal laser sintering (DMLS) process (Dentcare labs, Muvattupuzha, India). Final cementation was done with the prosthesis (Figures 3) providing good function. Patient was recalled every 3 months for implant and soft and hard tissue assessment. Patient was satisfied and implant was in good health with no sign of infection at the end of 1 year (Figure 4).

DISCUSSION

The final result of this case proves that flapless implant placement is an excellent treatment option in providing patient comfort, eliminating second surgery, preservation of blood circulation and maintaining of bone and surrounding soft tissues integrity. Although all cases cannot be treated with this protocol; certain prerequisites need to be met for a functional

and aesthetic result to be achieved.

Since flapless implant placement is mostly a “blind” surgical technique, placement of implants must be done with caution. Angulation is critical to prevent perforation of both lingual and buccal cortical plates, especially on the mandibular lingual molar area and the anterior maxilla. Proper patient selection with adequate width of bone available for implant placement will limit any complications.

Periosteum is the vital reactive layer of connective tissue covering the cortical bone. Minimal stripping of periosteum, consistent with sound surgical principles of access and soft tissue management, is an important consideration in implantology.

Hahn⁶ stated that avoiding the reflection of a flap results in less postoperative swelling and patient discomfort. Leaving the periosteum intact on the buccal and lingual aspects of the ridge assures a good blood supply to the site, reducing the likelihood of bone resorption.

Jeong et al.⁷ conducted an experimental study to examine the effect of flapless implant surgery on crestal bone loss and osseointegration in a canine mandible model and concluded that flapless surgery yielded superior results. Fortin et al.⁸ compared the amount of pain experienced with the two techniques using a Visual Analogue Scale and also by assessing the number of analgesics taken postoperatively from the day of surgery to six days after surgery. The results showed that pain decreased faster and also that the number of patients who felt no pain was higher with the flapless procedure. Campelo

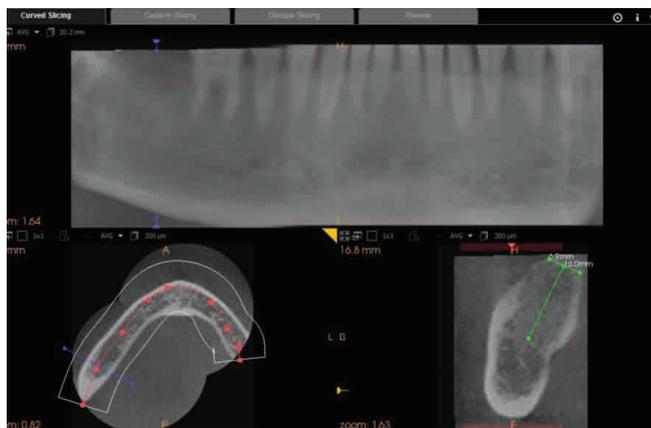


Figure-1: CBCT analysis to assess available alveolar ridge dimensions



Figure-3: Final prosthesis in place over the implant - buccal view



Figure-2: Tissue punch to guide implant osteotomy



Figure-4: Follow-up IOPA of the implant with prosthesis

and Camara⁹ carried out a retrospective clinical analysis of 770 implants in 359 patients placed with a flapless approach in which the success rate post 10 years varied from 74.1% in the first year to 100% in the last year, concluding that flapless implant surgery is a predictable procedure if patient selection and surgical technique are appropriate.

The patient was provided with the DMLS prosthesis. Laser sintering process was first introduced by Deckard and Beaman¹⁰ also known as “3D printing” as it prepares the framework in a series of thin layers. It is the latest technology in metal manufacturing. Without using any machining DMLS produces complex 3D components directly from 3D CAD data for superior fit and function.

CONCLUSION

Flapless procedures cause less discomfort due to minimal tissue manipulation leading to better healing. It also eliminates the need for a second stage surgery. Proper case selection is important to avoid any complications. It is a predictable procedure that must be incorporated in our routine dental practise.

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Computer and Internet use among Undergraduate Medical Students

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ABSTRACT

Introduction: The students in medical school have lived in presence of online technology in their whole lives. They prefer new media technologies and online learning. In the era of information and computer technology scenario of health and medical education has changed with the availability of medical literature on internet.

Material and Methods: A cross-sectional study among 200 medical students and 50 interns was undertaken after Institutional Ethics committee permission. Questionnaire was validated and administered after receiving their due consent.

Results: The average computer use by medical students was 6.58 ± 1.99 and average skill was 6.20 ± 1.88 . The average hours utilized were 2.03 ± 1.81 per day. The use and skills of computer were more in males than females, also they were more in urban students than rural students. 74.8% of medical students used internet as first preference for use on computer. 84.4% feel there is need to receive training in use of computers. 11.6% feel they do not have the opportunity to learn computers. 99.2% feel computer education is important. Students preferred Wikipedia website for academic and Google website for nonacademic use.

Conclusion: A computer teaching module is the current need for undergraduate medical students in India. They should be familiar with the computer skills for the ever changing medical field. This will be useful to enhance the use of evidence-based treatments and maintain update knowledge.

Keywords: Skills, Information technology, Teaching, Academic

INTRODUCTION

The twentieth century was a revolutionary period in the field of computer science. Today, in twenty first century information technology and computers represent an essential part of every sphere of human life, especially in process of education.¹ In past decades use of computer and internet has increased among college students² and in medical students it is increasing.³

Today's students in medical school have lived in the omnipresence of online technology in their whole lives. They prefer new media technologies and online learning. Their technology-integrated lives create new ways of learning.⁴ The internet is cost-effective, fast and has the advantage of assessing information from any source.³

In the era of information and computer technology scenario of health and medical education has changed with the availability of medical literature on internet. All the fields of medical and allied sciences require adequate computer skills. In order to improve quality of health care, information processing and information technology is essential in this modern world. This helps the students to acquire the knowledge of medical science as well as recent advances in their respective field.^{2,3,5}

The development of online databases allows medical professionals throughout the world to have immediate access to hundreds of e-journals, a striking contrast to many of their colleagues in developing countries.⁵ However in developing country like India the use of Information technology has increased tremendously especially in younger generation.⁶ With the advance in medical field where most of the information is easily available on the internet, there is increase in the number of medical students using computer and internet to upgrade the knowledge and skills.³ Also attitudes toward computer oriented instruction is an important for success in online learning.⁷ However there are no studies in India that throw a light on the use of computer and internet in undergraduate medical students. Thus we planned to assess the use of computer and internet in undergraduate medical students and interns of medical college and tertiary care hospital.

MATERIAL AND METHODS

A cross-sectional questionnaire based study of 250 medical students which included 50 medical students from each year and 50 interns, was conducted in medical college and tertiary care hospital. Institutional Ethics Committee permission was taken before starting the study (IEC number: RGMC/CSMH/IEC/12 dated 10/1/2015). The study was conducted in department of Pharmacology and Physiology, Rajiv Gandhi Medical College from 01 February 2015 to 31 January 2016. The procedures followed in the study were in accordance with the ethical standards of Institutional Ethics committee on human experimentation and with the Declaration of Helsinki, adopted by the 18th World Medical Assembly, revised in 64th General Assembly, Fortaleza, Brazil, October 2013.

The questionnaire was designed through the review of questionnaires from previous studies, with some changes to suit local environment.⁸⁻¹⁵ A pilot study was conducted on 10 students and based on pilot study result, modifications were made in the questionnaire. The validity (content and criterion) and reliability (test-retest reliability) of the questionnaire was tested. The content and face validity of the questionnaire was obtained by five experts in the field of medical education. Test-retest reliability was estimated with a subsample

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of 20 students by taking two interviews seven days apart, these were not included in the final analysis. Internal consistency reliability by Cronbach's-alfa coefficient was 0.72. Participation in the study was voluntary and students willing to give informed consent were enrolled in study. The objectives of the study were explained to the participants and written informed consent was taken. The demographic profile and study questionnaire were administered and collected after 20-30 minutes. Those students not willing to participate, did not return the questionnaire or returning incompletely filled forms were excluded from the study. Total 286 questionnaires were distributed, 278 collected out of which 250 were selected. Data collected during the present study was kept confidential. The questionnaire consisted of information regarding computer and internet access, computer activities, computer training, skills, place of access to computer and internet, sources of information and factors restricting students from using the computer. The use and skills related to computer were assessed on visual analog scale (VAS) scale of 0-10 where zero stands for no satisfaction and ten stands for complete satisfaction.

STATISTICAL ANALYSIS

Data was entered in MS Excel 2010 responses were coded

Academic year	Use	Skills	Hours
I MBBS	5.86 ± 1.85 ***	5.58 ± 1.73 ***	1.9 ± 1.08
II MBBS	7.55 ± 2.13	7.37 ± 1.69	2.24 ± 1.51
III MBBS	6.26 ± 2.11 #	5.66 ± 2.06 ###	2.12 ± 1.02
IV MBBS	6.42 ± 1.85	6.14 ± 1.90 \$	1.62 ± 1.45
Interns	6.80 ± 2.02	6.26 ± 2.04 @	2.28 ± 1.51
Average	6.58 ± 1.99	6.20 ± 1.88	2.03 ± 1.31

*: I MBBS vs II MBBS, #: III MBBS vs II MBBS, \$: IV MBBS vs II MBBS, @: Interns vs II MBBS
#, \$, @: p<0.01 ***, ### p<0.0001

Table-1: Rating of computer use, skills and hours by medical students at different academic years

Academic year	Age (years)				Total
	<10 years	10-15 years	15-20 years	> 20 years	
I MBBS	22	24	4	0	50
II MBBS	24	21	5	0	50
III MBBS	14	27	9	0	50
IV MBBS	15	25	10	0	50
Interns	18	25	5	2	50
Total	93	122	33	2	250

Table-2: First time use of the computers by medical students at different academic years

Academic year	Everyday	2-3 days/week	Once a week	Once a month	Total
I MBBS	19	14	13	4	50
II MBBS	17	16	11	6	50
III MBBS	23	11	7	9	50
IV MBBS	18	14	8	10	50
Interns	27	11	6	6	50
Total	104	66	45	35	250

Table-3: Frequency of computer use by medical students at different academic years

and analyzed. Data was expressed in terms of actual number, frequency and percentage, mean ± standard deviation. P value <0.05 was considered to be statistically significant. Chi square test was used to test the association of different variables of the participants. Parametric tests (Student's unpaired t-test, one way ANOVA and Tukey's post hoc test) were used to compare the scores among medical students. The statistical analysis was done using statistics software GraphPad Prism version 5.0 for Windows, GraphPad Software, San Diego California USA, www.graphpad.com" and SPSS version 20.0.

RESULTS

In this study out of 250, 151 (60.4%) were females and 99 (39.6%) were males, 210 (84 %) were from Urban and 40 (16 %) from rural area. The average age in our study was 21.64 ± 1.74 years (range 19-28 years). 183 (73.2 %) were from English medium, 55 (22 %) from Marathi, 11 (4.4 %) from Hindi and one (0.4 %) from Urdu medium of education in school. Within 250 students, 98 students had combination of desktop, laptop, smartphone while 91 had only smartphone, 37 had only laptop and 24 had only desktop. 249 (99.6%) have email id and 239 (95.6%) have access to internet. Out of 239, 98 had access on smartphone, 81 on laptop and 60 on desktop.

The use, skills and hours related to computer use is given in table 1. The use of computer by males was 6.68 ± 0.46 and by females was 6.14 ± 0.34 (p<0.001). The skills of using computer by males were 6.29 ± 0.49 and by females was 5.91 ± 0.44 (p<0.001). The use of computer by urban students was 6.92 ± 0.73 and by rural students was 5.81 ± 0.65 (p<0.001) and skills by urban students was 6.77 ± 1.05 and by rural students was 5.70 ± 1.12 (p<0.001).

Out of 250, 213 (85.2 %) use the computer in home/hostel, 21 (8.4 %) use in medical college and 16 (6.4 %) internet café. Among 250, 130 (52 %) had access to printers where 76 had access to printer at home/hostel, 43 at internet café and 11 at medical college. The first time use of computer by the medical students at different academic years is given in table 2.

Out of 250, 124 (49.6 %) feel confident, 80 (32.00 %) feel they can cope, 44 (17.6 %) feel some confidence and 2 (0.8%) completely lack in confidence in using computers. The students familiarize themselves to the computer 151 (60.4 %) through self-learning, 51 (20.4 %) by parents, 34 (13.6 %) by friends and 14 (5.6 %) by special course. While using the activities on computer 187 (74.8%) students gave first preference to Internet followed by 27 (10.8 %) gave first preference in using word document, 16 (6.4%) gave first preference to using Multimedia and 20 (8.0 %)

gave first preference to using Medline. Frequency of computer use by medical students is given in table 3.

For academic activities 39 use computer every day, 84 use 2-3 days/week, 57 use once a week, 70 once a month. For personal use 88 ($p < 0.0001$) use computer every day, 64 use 2-3 days/week, 56 use once a week, 42 ($p=0.0027$) once a month.

To acquire knowledge of computers 98 (39.2 %) acquired by Independent work on the computer, 45 (18 %) learned it in school, 36 (14.4 %) at home, for 23 (9.2%) students someone else taught work on computers while 48 (19.2 %) had attended computer courses. Among 48, 30 had done Maharashtra State Certificate in Information Technology (MSCIT), 8 Java, 4 C-programming, 3 Basic course and one each of Animation, Web design, Hardware and Networking.

For upgrading medical knowledge 203 use supplementary online resource materials, 189 use reading text material, 163 use images, 79 use animation, 65 use audio and 60 interactive media. Out of 250, 211 (84.4 %) feel there is need to receive training in use of computers while 39 (15.6 %) feel there is no need. 94 students had responded to reasons for not using computer, among them 44 feel that there is no need of computer in medical field, while 3 feel they do not know how to use computer properly, 18 feel they do not have interest and 29 feel that they had no opportunity to learn computer of which 28 were from rural area.

Out of 250, 248 (99.2%) feel that computer education is important while 2 feel it is not important at all. 151 (60.4 %) would like to use computer as a replacement for theoretical teaching. Regarding the relevance of computers to medicine 214 (85.6 %) expect that computers will deliver great benefits to doctors and their patients, 10 (4.0 %) feel computers are overused by doctors and physician, 19 (7.6 %) think that computers is encroaching on medicine while 7 (2.8 %) students don't think that computers will ever play an important role in medicine.

The websites used by students for academic activities is given in table 4 and for nonacademic activities is given in table 5. The different computer skills used by medical students are given in table 6.

DISCUSSION

Information Technology is fast becoming a part of our everyday life. The Internet has given us easy access to information at the click of few buttons.⁹ Now-a-days health and medical education have been modified from conventional mean of teaching to modern teaching methodology including information technology.²

In our study the computer use and skills was more in males and statistically significant as compared to females also more and statistically significant in urban students compared to rural. A study by Chowdhury et al had students within 20 -22

Academic year	Website (Number of students)						
	Pubmed	Webmed	Medscape	Medline	Wikipedia	Youtube	Google
I MBBS	9	1	2	1	25	33	7
II MBBS	16	5	8	5	19	21	11
III MBBS	18	2	11	1	27	14	9
IV MBBS	13	5	19	3	27	25	6
Interns	11	3	14	4	30	16	8
Total	67	16	54	14	128	109	41

Table-4: Computer website used for academic at different academic years

Academic Year	Website (Number of Students)					
	Facebook	Wikipedia	Google	Youtube	Yahoo	Shopping
I MBBS	29	17	32	15	0	16
II MBBS	20	24	18	16	4	0
III MBBS	18	29	35	28	1	16
IV MBBS	20	29	29	21	0	13
Interns	18	23	26	25	1	12
Total	105	122	140	105	6	57

Table-5: Computer website used for nonacademic use at different academic years

	Computer Skills (Number of Students)										
	1	2	3	4	5	6	7	8	9	10	11
I MBBS	50	50	48	48	45	43	37	9	29	24	9
II MBBS	49	49	50	49	48	47	24	25	33	36	0
III MBBS	49	49	47	48	46	44	39	18	43	35	9
IV MBBS	50	49	49	46	43	39	38	5	24	21	5
Interns	50	49	47	46	43	40	37	8	39	36	5
Total	248	246	241	237	225	213	175	65	168	152	28

1: Able to turn a computer on and off, 2: Able to use a mouse, 3: Able to use pendrive/hard disk, 4: Cut and paste information from one application to another, 5: Print out a document, 6: Set up folders or file directories, 7: To word process an essay or a letter, 8: To analyze data using a statistical package, 9: Send a file as an email attachment, 10: To install a software package, 11: Design a web page

Table-6: Usage distribution of computer skills by medical students at different academic years

years in which 54.7% were females and the average computer skill was 61.8%, 66.8% had own computer at home while 52.2% had laptop and 69.6% used computer mostly for personal purpose.¹⁶ Study by Ahmed et al stated that consultants rated 60% and junior doctors rated 53.1% as their computer abilities.¹⁷ A study by Safdari found that 61.6% medical students had smart phone.¹⁸ The findings related to computer use in our study were similar to other studies.

In our study 74.8% of the students used Internet as first preference in using computers, 95.6% students had access to internet. 122 students had first use of computer around 10-15 years of age. According to Chowdhury et al medical students used internet every alternative day, 35.7% email and browsing.¹⁶ Study by Ahmed et al stated that 84.4 % of consultants and 78.9% students use Internet. 55.0% of consultants used Internet daily as compared to 18.2% of junior doctors.¹⁷ A study by Mattheos suggest that 72% have access to the Internet.¹⁹ Study by Asgari-Jirhandeh had email as the most frequent used application.²⁰ The findings related to internet use in our study was similar to other studies.

There was no significance in the hours utilized by the students at various academic years. The Interns, II and III MBBS students utilized more hours for computers than IV and first year students, this might be due to more syllabus to be covered in less time. In our study students preferred Wikipedia followed by Pubmed for academic use and Google followed by Wikipedia for Nonacademic use. According to Egle the most commonly used websites were Uptodate, Google, Medscape, Wikipedia and Epocrates.²¹ According to Kraenbring et al Wikipedia is increasingly used by students for knowledge acquisition and learning. It is an accurate, comprehensive source for drug related information for undergraduate medical education.²²

The positive attitude was reflected in our study where 85.6% feel that computers will deliver great benefits to patients and doctors while study by Chowdhury et al 59% of students consider computer as a hindrance in their study while 38.2% found it helpful to improve study¹⁶ and study by Mattheos 60% of students use computers for their education.¹⁹

In our study the time for nonacademic use was more than the academic use. The excessive use of computers should be integrated to learn more of their professional knowledge. All the fields of medical and allied require adequate skills of computer and Internet sciences.² The major goals of education are to encourage medical students to increase their knowledge of medical science and become life-long learners.³ The use of computers should be channelized to acquire more professional knowledge and skills. This will not only improve the quality of care but also enhance the use of evidence-based treatments, to maintain and update knowledge.¹¹ In our study 99.2% feel computer education is important, 84.4% feel there is need to receive computer related training, 11.6% feel had no opportunity to learn computers while 19.2 % had some form of computer training. In our study the students were lacking in using a statistical package and designing web page, this can be part of the computer training module for medical students. In study by Asgari-Jirhandeh the average score for computer knowledge on scale of 0-10 was 4.19 and 86% of students agreed that computer skills

will be beneficial to them in future and 62% students wanted a structured course in computer.²⁰ Study by Mattheos stated that only 23.2 % students had some form of computer course training while 38.4 % had never learned any computer related programme.¹⁹ A study by Safdari stated that training courses required for familiarity and way of using applications on smartphone be held.¹⁸ Our study and other studies have highlighted the need of computer training in medical students.

In the present study 39.8% acquire knowledge by independent work, while 203 students used supplementary online resources for upgrading their knowledge. Computer based training is effective for basic surgical skills training in medical students.²³ Studies have shown that with the help of computer assisted learning there is improvement in performance at Multiple Choice Questions, Objective Structured Clinical Examination, problem solving skills and also increases student satisfaction. Computers are being increasingly utilized as aid in undergraduate medical education and also increasingly utilized in postgraduate teaching programmes that play an essential role in Continuing Medical Education activities. Thus it is evident that having competent computer skills has become vital for medical undergraduates.⁶ According to Wilkinson for the students to increase the use of e-learning require development in computer and technology advances.²⁴ However, for this to be successful, students must be adequately skilled at using computer.⁹ Thus there is urgent need of a computer learning module for the medical undergraduates in India to remain up-to-date with the ever changing medical field. The foundation of computers knowledge will help in efficiently using e-learning modules in various fields of medicine. This will help in enhancing the performance of medical undergraduates so they will be at par with the global standards in medical field.

Limitations

It was conducted at one medical college and tertiary care hospital, so the results may not be indicative of the entire population. It was a questionnaire based study, it depends on the recall ability of the respondents.

CONCLUSION

There is a need to efficiently use computer for academic use in medical students especially from rural area. This can be done by increasing computer training or by introducing a computer training module for the students in undergraduate programme. The course should include statistical software's, and also ability to search the content in the right website. As the students lack understanding and also technical skills, the course should integrate student's competency of computer skills, in their medical education, as to be update in academic and professional career.

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Rectal Gastrointestinal Stromal Tumor: A Case Report

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ABSTRACT

Introduction: Gastrointestinal stromal tumors are the most common mesenchymal neoplasms of the gastrointestinal tract but gastrointestinal stromal tumor arising from rectum is a rarity. Biopsy of the lesion and immunohistochemistry for CD117 confirms the diagnosis. Surgery remains the standard of care and only potentially curative therapy for patients with primary, resectable, localized gastrointestinal stromal tumor. However, chemotherapy with Imatinib is added in neoadjuvant or adjuvant form according to clinical situation.

Case report: We present a case of rectal gastrointestinal stromal tumor in a 55 years old male who presented with bleeding per rectum and altered bowel habits of 2 years duration. Patient was managed with abdomino-perineal excision and total meso-rectal excision and permanent colostomy. Histopathological examination revealed gastrointestinal stromal tumor of rectum (spindle cell type) measuring 7.2 x 6.4 x 5.1 cm having mitotic index >10/50 HPF. Immunohistochemistry showed marked positivity for CD117. Patient was given adjuvant chemotherapy with Imatinib and he is still disease free after 1 year of follow up.

Conclusion: Although rectal gastrointestinal stromal tumor is extremely uncommon, it should be included in differential diagnosis of rectal mass because this tumour has different biology which guides its treatment. Although complete surgical resection with negative margins is the principal curative option for primary and non-metastatic tumors, more studies are needed for determination of treatment strategy of the rectal gastrointestinal stromal tumors.

Key words: Rectal, Gastrointestinal stromal tumor, Imatinib.

INTRODUCTION

Gastrointestinal stromal tumours (GISTs) are rare neoplasms which represent only 0.1-3% of all gastrointestinal malignancies.¹ The term "GIST" was coined in 1983 by Mazur and Clark to describe intra-abdominal non-epithelial neoplasms without features of smooth muscle cells and immunohistochemical characteristics of Schwann cells.² Actual cells of origin of GISTs are pluripotent mesenchymal stem cells which further differentiate into the interstitial cells of Cajal. These are GI pacemaker cells and are largely responsible for initiation and coordination of gastrointestinal (GI) motility. GISTs nearly always express the transmembrane receptor tyrosine kinase KIT (CD117) and show gain-of-function mutations in the corresponding c-kit proto-oncogene.³ Some GISTs lacking KIT mutations have activating mutations in a gene encoding a related receptor tyrosine kinase, the platelet derived growth factor receptor alpha (PDGFRA).⁴ The most common GIST sites are the stomach (60%-70%) followed by the small intestine (20%-25%), whereas only about 5% of all GISTs start in the rectum. Rectal GISTs make up 0.1% of all tumours originating in the rectum.⁵ In this report, we describe a rare case of GIST of the rectum.

CASE REPORT

A 55- years old diabetic hypertensive male presented with chief complaints of bleeding per rectum on and off and altered bowel habits for 2 years. He had negative family history for any abdominal malignancy. Digital rectal examination revealed an ulceroproliferative growth on anterior and lateral walls of rectum 4 cm from anal verge, firm to hard in consistency involving $\frac{3}{4}$ circumference. Upper margin of growth could not be felt and on withdrawal finger was stained with blood.

Transanal proctoscopic incisional biopsy was done from the rectal growth and it was found to be a case of rectal GIST. The diagnosis was confirmed by immunohistochemistry showing immunoreactivity (score 3+ i.e. immunoreactive in 51-75% cells) to CD117.

Colonoscopy confirmed the presence of irregular rectal growth of ulceroproliferative nature of size 6 x 4 cm, starting 4 cm from anal verge. Rest of the colonic examination negated the presence of any synchronous tumour.

Abdominopelvic CECT showed gross circumferential thickening of rectum of size 3.1 x 6 cm with heterogenous enhancement and loss of layers of differentiation suggestive of rectal mass abutting the prostate [figure - 1]. No regional lymphadenopathy or distant metastases were found.

Serum CEA was within normal limits. Apart from microcytic/hypochromic anaemia, other hematological parameters were normal. After proper consent, patient underwent abdomino-perineal excision (APE) with total mesorectal excision (TME) and permanent colostomy. Postoperative period was uneventful except for seroma in the perineal wound which was managed conservatively. Patient was discharged on 10th postoperative day.

Gross observation of the resected specimen showed 35 cm long colon and rectum with their mesentery. Cut open specimen revealed a grey brown mass of size 7.2 x 6.4 x 5.1 cm in rectum. Cut section showed grey white mass involving full thickness of rectal wall. Histopathological examination of the APE specimen confirmed it as rectal GIST (spindle cell type) involving muscular layer up to serosal layer with mitotic count > 10/50 HPF. Proximal, distal and circumferen-

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tial radial margins were uninvolved by the tumor. Specimen lymph nodes were also uninvolved by the tumour (figure - 2, figure - 3).

Following the histopathological confirmation and risk assessment, patient was started on adjuvant therapy with Imatinib mesylate 400 mg OD, to decrease the risk of recurrence. After one year of follow up and patient on continued Imatinib, no signs of disease progression have been found.

DISCUSSION

Rectal GIST constitutes 5% of all GISTs and 0.1% of all tumors originating in the rectum. Common sites of metastasis for GIST include liver, peritoneum and omentum; lymph node and extra-abdominal metastases are rare.⁶

In the past decade the understanding and treatment of GIST has reached remarkable advances due to (a) the identification of constitutively active signals (due to mutation of *c-kit* and *PDGFRA* genes encoding receptor tyrosine kinases) and (b) the development of therapeutic agents that suppress tumor growth by specifically targeting and inhibiting these signals. As the incidence of rectal GIST is much lower than that of GIST in the stomach or small intestine, the clinicopathological profiles of rectal GIST have not yet been accurately characterised, and therefore it is the tendency to validate the same prognostic factors for the latter as for such tumours at other sites, particularly gastric GIST. The three established prognostic factors for GIST are tumor size, mitotic index and tumor site of origin, with mitotic count the most important (Table 1).^{7,8} Individuals with rectal GIST have higher risk of progression than those with small bowel or gastric GISTs of comparable size and mitotic count. Degrees of cellularity and atypia have also been suggested as useful criteria, but their reproducibility is more problematic. The epithelioid phenotype, which seems to lead to a worse outcome, together with symptoms lasting for at least a year, might be considered as further prognostic factors.

It is generally agreed that complete surgical resection with negative tumour margins is the principal curative procedure for primary and non-metastatic tumours, particularly for those at a low risk.⁹ For rectal GIST, various surgical procedures may be considered, including local excision, anterior resection of the rectum and abdomino-perineal resection. The choice of procedure depends on tumour size and location.

Neoadjuvant imatinib may enhance the resectability of inoperable malignant GIST and may allow for optimal surgical timing. Therapy with imatinib is also used in the adjuvant post-operative treatment of tumours at a high risk or in cases of incomplete surgical resection. A randomized trial has

demonstrated prolonged recurrence-free survival in patients assigned to one year of imatinib therapy compared with

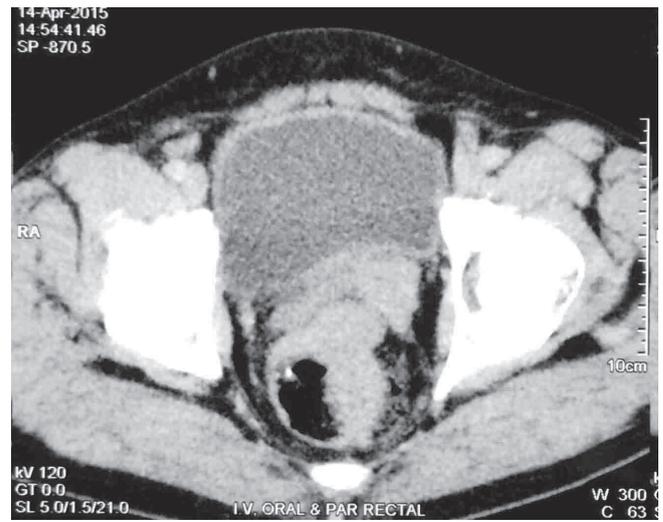


Figure-1: CECT of pelvis with I.V. and per-rectal contrast, axial section showing gross circumferential thickening of rectum with heterogenous enhancement and loss of layers differentiation suggestive of rectal mass abutting the prostate

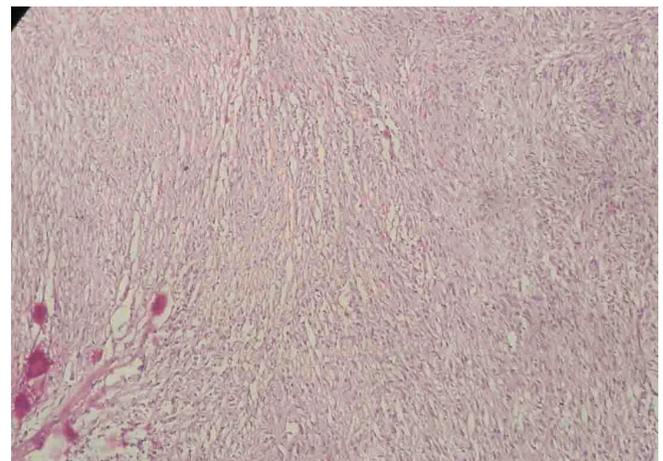


Figure-2: Typical spindle cell gastrointestinal tumor composed of interlacing fascicles of cells with cigar-shaped nuclei (HE x 100)

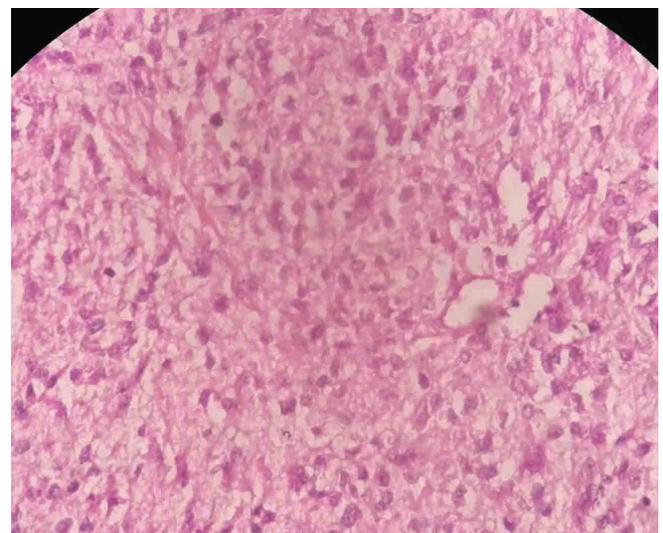


Figure-3: Shows few mitotic figures (HE x 400)

	Size	Mitotic Count
Very low risk	< 2 cm	< 5/50 HPF
Low risk	2–5 cm	<5/50 HPE
Intermediate risk	< 5 cm	6–10/50 HPF
	5–10 cm	<5/50 HPF
High risk	> 5 cm	> 5/50 HPF
	> 10 cm	Any mitotic rate
	Any size	> 10/50 HPR

Table-1: Defining risk of aggressive behavior in GIST⁷

those assigned with placebo.¹⁰ So it is accepted that imatinib is a valid treatment for advanced or metastatic tumours as well as localized GIST post surgery, but further evidence for the efficiency of this drug is needed in the case of high risk tumours and for the neoadjuvant therapy.

CONCLUSION

Although rectal GIST is extremely rare, it should be included in differential diagnosis when a tumour in the rectum is detected. The diagnostic workup of rectal GIST is essentially the same as that advised for any other type of rectal neoplasia. Preoperative biopsy of the tumour is important, since it can reach a certain preoperative diagnosis by means of the immunohistochemical characterization of CD34 and CD117 and management can be tailored accordingly especially with regards to neo adjuvant therapy. Because of small body of evidence especially in rectal GIST, it is difficult to assess the necessary extent of surgical resection and lymphadenectomy, indication for treatment with imatinib and optimal length of the adjuvant therapy. Further studies with large series of patients and long term follow up of ongoing trials are necessary to establish the most effective treatment strategy for patients with rectal GIST.

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Chorlinergic Urticaria Due To Acquired Generalized Anhidrosis in a Young Male Nigerian

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ABSTRACT

Introduction: Cholinergic urticaria (CU) is a rare condition, even in Nigeria, which is sometimes associated with hypohidrosis/anhidrosis and pulse steroid therapy is recommended as first line therapy. We report this 18years old male Nigerian with CU due to acquired generalized anhidrosis.

Case Report: Mr CH, an 18years old student, seen with 3 months of recurrent generalized urticarial rashes in response to increased environmental temperature or on mild exertion which commenced on arrival to Nigeria after spending 1 year in Europe. He had been on various antihistamines, montelukast/levocetirizine and low dose prednisolone without improvement.

On consultation, he volunteered that he doesn't sweat, which equally started at time of onset of urticaria. Blood count showed eosinophilia (12.4% of total white cell count), and elevated IgE level. A diagnosis of CU due to acquired generalized anhidrosis was made and he was commenced on tab dexamethasone 100mg daily for three (3) days every month (to have a total of six cycles). He started sweating after the first cycle and urticaria severity reduced markedly.

Conclusion: A diagnosis of CU due to anhidrosis requires a high index of suspicion. A multidisciplinary approach and appropriate literature search is essential in achieving desirable treatment.

Keywords: chorlinergic urticaria, anhidrosis, generalized, Nigerian

INTRODUCTION

Cholinergic urticaria (CU) can be described as a condition characterized by pruritus and wheals usually associated with physical exercise, hot showers, sweating, anxiety, or other conditions that causes an increase in the body's core temperature presenting in a localized or generalized fashion.¹

Magerl et al in a consensus panel stated that this CU should be differentiated from exercise-induced anaphylaxis which involves no passive warming and should be considered a differential diagnosis.¹ Cholinergic urticaria is a chronic urticaria which may also be precipitated by a warm bath while exercise-induced anaphylaxis follows exercise.² Cholinergic urticaria can be conveniently divided into the following subtypes³: Cholinergic urticaria with poral occlusion, Cholinergic urticaria with acquired, generalized hypohidrosis, Cholinergic urticaria with sweat allergy and, Idiopathic cholinergic urticaria.

The exact mechanism(s) of urticaria formation in CU has been unclear but it is thought to be due to a strong sweat-hypersensitivity to autologous sweat, which can be non-follicular with development of satellite wheals and a lack of positive autologous serum skin tests (ASSTs) or, a follicular type wheal with positive ASST but no hypersensitivity to

autologous sweat or satellite wheals.² In the first instance, patients are hypersensitive to unknown substances in their sweats and develop urticaria in response to sweat substance leaking from the syringeal ducts to the dermis possibly by obstruction of the ducts.⁴ Acetylcholine is thought to play a role in development of CU in a dose-dependent fashion and occasionally accompanied by anhidrosis or hypohidrosis.⁵ Serum histamine, considered to be the principal mediator, increases in concentration with induced exercise, along with eosinophil and neutrophil chemotactic factors and tryptase.⁶ Also, a reduction in the alpha1-antichymotrypsin level, similarly seen in some other forms of urticaria, is present. Patients with atopic dermatitis and cholinergic urticaria are thought to develop skin reactions and histamine release of basophils in response to autologous sweat.⁶

Also, CU associated with acquired generalized hypohidrosis is thought to be due to leakage of sweat antigen into the surrounding dermis after occlusion of the intraepidermal sweat ducts, leading to mast cell activation by binding of surface IgE molecules to sweat antigen.⁴ Most reported cases of patients with acquired generalized hypohidrosis/anhidrosis were also observed to have had episodes of cholinergic urticaria.⁷

Anhidrosis or hypohidrosis have been reported to be due to absence of sweat glands, dysfunctional sweat glands, occlusion of the pores or dysfunction of sympathetic nerves in neuropathies.⁷ Cholinergic urticaria usually presents with itching, burning, tingling, warmth, or irritation which precedes the onset of numerous small (1-4mm in diameter), pruritic wheals with large, surrounding flare appearing anywhere on the body, except on the palms or the soles and rarely in the axillae. In more severe cases, patients may experience systemic symptoms, like: fainting, abdominal cramps, diarrhea, excessive salivation or headaches. Hepatocellular injury, angioedema, asthma, and even anaphylactic reactions have been reported in literature.

There are various treatments for CU that have been tried. Omalizumab, an anti-IgE antibody, is effective in severe CU⁸ suggesting that an IgE mediated response is involved in the pathogenesis of CU. Anti-histamines used alone are thought

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to have a limited effect but combining H₁ and H₂ antagonists was observed to be more effective in complete control of cholinergic urticaria with lower rates of relapse.⁹ In CU with anhidrosis and or hypohidrosis pulse therapy with a high dose of corticosteroid is considered a first line option.⁵ This decreases the lymphocytic infiltrate around the sweat glands and allow acetylcholine receptor to re-express, resulting in the improvement of sweating and CU. Methylprednisolone or dexamethasone may be used for steroid pulse therapy at 20-30mg/kg (500-1000 mg/m²) and 4-5 mg/kg (100-200 mg) per pulse respectively.¹⁰

In this report we present a case of an 18 years old Nigerian male who complained of features in keeping with anhidrosis with cholinergic urticaria.

CASE REPORT

Mr CH is an 18 years old university student who left Nigeria fifteen (15) months prior to presentation to us for Europe, for the first time, to commence his university academic education. Shortly after returning for holidays three (3) months prior to presentation, he began to experience intermittent but frequent episodes of generalized pruritic maculo-papular wheals. This he experienced two or three times each day lasting sometimes from a few minutes to up to three (3) hours. Rashes are precipitated by increased environmental temperature or increased body heat from physical exertion like exercise. He sometimes has to take cold showers several times in the day or use a wet towel to wipe his body to relieve the symptoms. He could not tolerate a warm environment and had to wear very light clothing and sometimes no shirts at all while at home over a two (2) month period prior to presentation. He had had various prescriptions for antihistamines like chlorpheniramine and loratidine as well as a combination of montelukast/levocetirizine (10/5mg daily) including a low dose of prednisolone (5mg daily for a week) with short lasting or sometimes little relief. He was then referred to our service.

On consultation, additional history revealed he had generalized anhidrosis of equal duration (3 months) similar with the urticarial rashes. He had no respiratory or ocular symptoms, or history of allergies. There was no prior ill-health or previous hospital admission, use of recreational drugs or exposure to radiation. He was not on any medication(s) prior to the onset of anhidrosis or urticaria rashes. On examination, he appeared normal generally with normal vital signs (pulse and blood pressure) except that his whole body remained dry, including his palms and soles, even after a few minutes of exercise. He had normal mentation and no signs of neurological deficit.

Investigations done include: total white cell count 3.29x 10⁹/L (neutrophils 23.8%, lymphocytes 58.4%, eosinophils 12.4%, monocytes 4.2%, basophils 1.2%); hemoglobin 13.8g/dl (packed cell volume 42%); with normal mean corpuscular volume and mean corpuscular hemoglobin; platelets 165 x 10⁹/L; erythrocyte sedimentation rate 3mm in 1st hour (Westergreen method); serum IgE was markedly elevated (1465 IU/ml); a random blood sugar was 92mg/dl. A urinalysis and, stool microscopy and culture did not reveal any abnormalities.

A diagnosis of cholinergic urticaria due to a possible acquired idiopathic generalized anhidrosis was made. He was commenced on a trial of high dose dexamethasone 100mg daily for three (3) days every month (to have a total of six cycles).

After the first cycle, anhidrosis resolved and he started sweating on exertion or with increased environmental temperature, a situation he described as normal for him. Urticarial rash intensity and frequency also markedly reduced. He occasionally now (about twice a week) has urticarial rashes on sweating after a vigorous exercise. He was prescribed tab loratidine 10mg daily in between cycles.

DISCUSSION

Urticaria is a common but benign skin condition. However, cholinergic urticaria is uncommon especially among Nigerians as no documented case is yet to be reported. It can very easily be missed or misdiagnosed as was the case in our patient. In addition, he also had generalized anhidrosis. Anhidrosis/hypohidrosis has been associated with development of CU.^{4,5,7} A cause of the generalized anhidrosis was not readily known to us as his history of possible cause and physical examination was unremarkable. Perhaps the change of environment from Nigeria to Europe may have contributed. However, he had similar clinical presentation; with lack of sweating which was generalized, rash precipitated by exertion and a need to shower several times daily, as other reported cases of CU due to acquired idiopathic generalized anhidrosis.^{4,5,7} CU is commonly associated with bronchial hyper-responsiveness which is unrelated to gender, disease duration, intolerance to NSAID, positive autologous serum skin test or respiratory allergy in addition to urticarial rashes¹⁰, but our patient showed no evidence of this.

The markedly elevated eosinophil count and IgE levels observed in our patient suggests an allergic response which involves activation of mast cells.⁴ Mast cell activation by binding of circulating IgE in response to sweat antigens is associated with CU due to anhidrosis/hypohidrosis.⁴

CU due to other causes respond well to combinations of H₁ and H₂ antihistamines, scopolamine⁸ and danazol⁹, but pulse steroid therapy is first line treatment for CU due to anhidrosis/hypohidrosis.⁵ It is therefore not surprising that our patient did not respond appropriately to initial treatment with antihistamines like chlorpheniramine, loratidine; and a combination of montelukast/levocetirizine. Only after he was commenced on high dose dexamethasone did we observe a positive response to the symptoms.

CONCLUSION

A diagnosis of CU due to anhidrosis/hypohidrosis is rare among Nigerians and requires a high index of suspicion. With a multidisciplinary approach and appropriate literature search, achieving a desirable treatment outcome is possible.

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Clinical And Microscopic Correlation of Vaginal Discharge

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ABSTRACT

Introduction: Vaginal discharge in the reproductive age group is the most common complaint encountered everyday both by gynecologists and general practitioners.

Among the cases of symptomatic vaginal discharge Bacterial vaginosis is commonest cause followed by Candidiasis and Trichomoniasis. Multiple infections can also coexist but these three conditions account for majority of all etiologies of abnormal vaginal discharge.

Material and methods: It is a cross sectional study. The study reported here attempts to present the clinico-cytological evaluation of vaginal discharge in a survey of two hundred patients suffering from vaginal discharge complaint. The study included the examination of the vaginal status of all women with gross characteristics of vaginal discharge and discharge material was obtained from the posterior fornix with a sterile swab stick for wet mount with normal saline and 10% of KOH, Whiff test and Gram stain. Papinaculaou smear taken in all the cases of the patients in reproductive age group.

Results: Bacterial vaginosis constitutes the most common cause of vaginal discharge, followed by Candidiasis and then Trichomoniasis in our set up. Pap smears revealed that 7 patients out of 200 were having various grades of cervical dysplasia. For the etiological diagnosis of symptomatic vaginal discharge the microbiological diagnostic approach is best.

Conclusion: In low resource setting, primary clinical diagnosis based on simple microscopy, pH and amine test with WHO algorithms should be made prior to treatment.

Keywords: Vaginal discharge, Bacterial vaginosis, Candidiasis, Trichomoniasis.

INTRODUCTION

The most common complaint in the reproductive age group is vaginal discharge. Symptomatic vaginal discharge is caused by inflammation due to infection of the vaginal mucosa. It occurs in 1-14% of all women in the reproductive age group and the prevalence of vaginal discharge in India is estimated to be 30%.¹ Inflammation of vagina leads to vaginitis. If untreated, it predisposes to pelvic inflammatory diseases, infertility, endometriosis, urethral syndrome, pregnancy loss, preterm labour. Among the cases of symptomatic vaginal discharge Bacterial vaginosis is commonest cause followed by Candidiasis and Trichomoniasis. Multiple infections can also coexist but these three conditions account for majority of all etiologies of abnormal vaginal discharge.² Most of the time a presumptive diagnosis is made based on the nature of the discharge (clinical diagnosis), which is often inaccurate and incomplete. This eliminates the laboratory component (Microbiological diagnosis) leading to treatment mismanagement. To address the limitations of clinical diagnosis, the World Health Organisation (WHO) developed and advocated the syndromic management approach. Syndromic approach of WHO is based on the identification of a relatively con-

stant combination of symptoms and signs (syndrome) and on the knowledge of the most common causative organisms of these syndromes and their antimicrobial susceptibility. The main disadvantage of this management is, the cost of over diagnosis and over treatment when multiple antimicrobials are given to patient where infection is caused by none or only one organism. Also to be considered are the risks of adverse drug reactions, alteration of normal vaginal flora and also the potential for developing antibiotic resistance in the community. The addition of a simple microscopic evaluation by Gram stain of the vaginal smear has evolved as a sensitive noncultural diagnostic technique for Bacterial vaginosis and Candidiasis.¹ Direct microscopy (wet smear) of the vaginal discharge to visualize the motile *Trichomonas vaginalis* has been determined to be as accurate as culture for the diagnosis of Trichomoniasis. The present study was conducted to determine that symptomatic vaginal discharge can not only be diagnosed by clinical examination but simple microscopic techniques such as wet smear and Gram stain can aid in the accurate diagnosis of this common condition and to know the most common cause of vaginal discharge in our set up.

Aims and objectives of the study were to evaluation of patients complaining of abnormal vaginal discharge by clinical and microscopic methods, to correlate the clinical and microscopic methods of vaginal discharge, to find out the most common cause of vaginal discharge in our set up and finally to detect Carcinoma cervix in early stages.

MATERIAL AND METHODS

This cross sectional study was conducted in patients attending Gynecology OPD, Government hospital, Pune from September 2009 to September 2011. 200 non pregnant patients of 20-70 years age group complained of vaginal discharge as their main or subsidiary symptom, which they either complained of by themselves or on questioning. The study reported here attempts to present the clinico-cytological evaluation of vaginal discharge in a survey of two hundred patients (200) suffering from the above complaint.

Inclusion Criteria

Age group of 20-70 years

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Complaining of vaginal discharge
Non pregnant women

Exclusion Criteria

Age group < 20 years and > 70 years
Pregnant women

Menstruation at the time of presentation

Recently biopsied or operated cervix

Clinically obvious carcinoma- ulcer, cauliflower growth.

Methods of the study

A detailed clinical history- the age of the women, socio economic condition, religion and marital status are noted. The complaints of white discharge per vagina was elaborated to include the

quantity, colour, consistency, odour, relationship to menstruation and other associated symptoms like itching vulva, burning sensation of vulva, urinary complaints, dyspareunia are enquired. In obstetric history a careful note was made regarding married life, number of pregnancies, number of abortions. In menstrual history relationship of leucorrhoea to menstrual cycle and date of last menstrual period is noted. Past history for having taken treatment for similar complaints. Personal history in regard to use of contraception, recent use of antibiotics, steroid therapy was obtained. Vulvovaginal, per speculum and bimanual examination carried out in all patients.

Clinical observation

The study included the examination of the vaginal status of all women in conjunction with gross characteristics of vaginal discharge. All 200 patients were classified into four categories on the basis of vaginal discharge characteristics. Tenderness of vaginal walls with inflammation of vulva and a green or yellow offensive irritating discharge associated with or without multiple small punctate strawberry spots on the vaginal vault and portio vaginalis of the cervix Trichomonal infection. Cases revealing redness of vaginal wall with white patches or plaques of cheesy material adherent to the vagina with profuse irritating curdy type of vaginal discharge constituting monilial infections. Cases revealing thin, frothy, homogenous, irritating discharge which was malodorous but showed no gross pathological changes of the vagina and of vulva was suggestive of Bacterial vaginosis. The remaining were assigned to unclassified category since the discharge presented mixed characteristics.

Cusco's speculum was introduced per vaginally and then vaginal material was obtained from the posterior fornix with a sterile swab stick for 1) Wet mount-with normal saline and 10% of KOH 2) Whiff test 3) Gram stain

Gram stain slide is interpreted by using Nugent score.

The diagnostic criteria used for microbiological diagnosis are:

1) **Bacterial vaginosis** – A Gram stain score of seven or more based on the scoring system by Nugent *et al.*

2) **Candidiasis** – If gram positive budding yeasts and pseudohyphae are seen on Gram stain.

3) **Trichomoniasis** – If wet smear microscopy is positive for motile Trichomonas vaginalis.

Haemoglobin estimation, peripheral blood smear examination, urine routine examination and microscopic examination carried out for each patient in OPD.

Pap (papinaculaou) smear taken in all the cases of the patients in reproductive age group.

This gave a cytological diagnosis and provided for the correlation between cytological changes, and vaginal infection

RESULTS

The study was conducted to determine the correlation between the clinical and microscopic diagnosis of white discharge per vaginum. White discharge per vaginum was the chief complaint in 200 cases attending Gynaecological OPD. The mean age of the study cases were 34.3 years. More than 42% were in their 30. It shows parity of women in the study. Majority (39%) of the cases were of parity 2, followed by parity 3 in 25%. The most common complaint was itching seen in 33.3% cases, followed by backache seen in 29%. Less common complaint was prolapse seen in 1% of cases.

This table shows the duration of white discharge per vaginum. Maximum cases are seen within first month of infection. In this study, 200 women presented with vaginal discharge. A diagnosis was obtained for 161 (80%) of them and in 39 (20%) the etiological diagnosis could not be found.

This table shows prevalence of bacterial vaginosis by clinical diagnostic approach was more than microbiological approach, while prevalence of candida and trichomoniasis by microbiological approach was more than clinical approach.

Out of 200 cases, clinically Bacterial vaginosis was found to be positive in 108 cases and microscopically in 106 cases. 96 cases were both clinically and microscopically positive for Bacterial vaginosis. While clinically Candidiasis was found to be positive in 45 cases and microscopically in 51 cases. 40 cases were both clinically and microscopically positive for Candidiasis. Clinically Trichomoniasis was found to be positive in 8 cases and microscopically in 6 cases. 5 cases were both clinically and microscopically positive for Trichomoniasis.

Clinical diagnosis has higher sensitivity (90.6%) for diagnosing bacterial vaginosis and moderate sensitivity (83.3%) for Trichomoniasis and (78.4%) for Candidiasis. Clinical

Age(years)	No of patients	(%)	Parity	No. of cases	%	Associated Morbidity	No. of cases	%
20-29	61	30.5	0	14	7.0	Back ache	58	29.0
30-39	84	42	1	27	13.5	Prolapse	2	1.0
40-49	40	20	2	77	38.5	Itching	67	33.5
>50	15	7.5	3	49	24.5	Dyspareunia	31	15.5
			4	12	6.0	Urinary Complaints	22	11.0
			5+	21	10.5	Pain abdomen	20	10.0

Table-1: Age and Parity distribution with Associated Morbidity

Duration	Number of cases	%
<1 month	65	32.5
1-3months	64	32.0
4-7months	36	18.0
8-11 months	8	4.0
≥12 months	27	13.5
Total	200	100

Table-2: Duration of vaginal discharge

Diagnosis	Clinical diagnosis n=200(%)	Microscopic diagnosis n=200(%)
Bacterial vaginosis	108(54)	106(53)
Candidiasis	45(22.5)	51(25.5)
Trichomoniasis	8(4)	6(3)
Undiagnosed	39(19.5)	37(18.5)

Table-3: Prevalence of various infection based on two diagnostic approaches

Clinical Findings	Microscopic Findings		Total
	Positive	Negative	
Bacterial vaginosis			
Positive	96(88.9%)	12(11.1%)	108(54%)
Negative	10(10.9%)	82(89.1%)	92(46%)
Total	106	94	200
Candidiasis			
Positive	40(88.9%)	5(11.1%)	45(22.5%)
Negative	11(7.1%)	144(92.9%)	155(77.5%)
Total	51	149	200
Trichomoniasis			
Positive	5(62.5%)	3(37.5%)	8(4%)
Negative	1(0.5%)	191(99.5%)	192(96%)
Total	6	194	200

Table-4: Comparison of clinical and microscopy Findings in each infection

Clinical diagnosis	Bacterialvaginosis (%)	Candidiasis (%)	Trichomoniasis(%)
Sensitivity	90.6	78.4	83.3
Specificity	87.2	96.6	98.4
Positive Predictive	88.9	88.9	62.5
Negative Predictive	89.1	92.9	99.5

Table-5: Validation of clinical diagnosis with microbiological diagnosis as the gold standard

Microscopic diagnosis	PAP Smear diagnosis						Total
	Normal study	Inflammatory smear	ASCUS	LSIL	HSIL	Bacterial Vaginosis	
Bacterial vaginosis	20	57	2	2	1	24	106
Candidiasis	15	36	-	-	-	-	51
Trichomoniasis	3	2	-	1	-	-	6
Undiagnosed	12	20	-	1	-	4	37
Total	50(25%)	115(57.5%)	2(1%)	4(2%)	1(0.5%)	28(14%)	200

Table-6: PAP smear results

Clinical Diagnosis	Rekha et al (%) ⁴				Present study (%)			
	Sensitivity	Specificity	PPV	NPV	Sensitivity	Specificity	PPV	NPV
Bacterial vaginosis	97.1	36.8	44.7	96.1	90.6	87.2	88.9	89.1
Candidiasis	58.3	82.0	41.2	90.1	78.4	96.6	88.9	92.9
Trichomoniasis	99.9	99.9	99.9	99.9	83.3	98.4	62.5	99.5

Table-7: Efficacy of clinical diagnosis of vaginal Efficacy of clinical diagnosis of vaginal

diagnosis has higher specificity (98.4%) for Trichomoniasis and(96.6%) for Candidiasis, and moderate specificity for Bacterial vaginosis. Trichomoniasis has got the negative predictive value of 99.5%

Pap smears revealed that 7 (3.5%) patients were having various grades of cervical dysplasia. Cytology reports were found to be normal in 25% of cases and 57.5% had inflammatory smears, and 14% had Bacterial vaginosis.

DISCUSSION

This cross sectional study of 200 patients was conducted in women attending gynaecology outpatient department at a Government Medical College Hospital, from September 2009 to September 2011. Two hundred women were included in the study. The etiological diagnosis was reached in 161 (80.5%) of the patients included. In the remaining 19.5% of the patients, diagnosis could not be made with the microbiological diagnostic approach. Similarly other studies showed that in10 to 58% of the patients complaining of vaginal discharge, diagnosis could not be reached using any of the diagnostic approaches under consideration.³ This group of patients probably may have normal physiological discharge or less frequently viral vaginitis, aerobic vaginitis or vaginal lactobacillosis which are not routinely detected. Vaginal infections commonly occur in women of reproductive age i.e between 25-35 years as noted in several other studies. In Rekha et al⁴ age group was 26-30years while in Jyothi et al¹ it was 27-31years. In our study we found most common in 30-35years age group.

In present study patients sought medical help within 1-3months, when compared to Rekha et al⁴, where they sought medical help at least 1-6 months after the onset of symptoms. This showed a tendency towards decreased sequelae or complications associated with the infections.

White discharge per vaginum was the chief complaint of all

the patients included in the study. In this study, itching was the commonest symptom. Similar findings were noted by other authors.

Prevalence of bacterial vaginosis, candidiasis, trichomoniasis in the present study of 2011 was 54%, 22%, 4% respectively.

In the study of 2010 by Rekha et al⁴ the prevalence of bacterial vaginosis, candidiasis and trichomoniasis was 47%, 10% and 3% respectively. Studies conducted by Rao et al² in 2004 showed 26%, 38% and 1.2% prevalence respectively while Khan et al⁵ in 2009 showed 28%, 12% and 5% respectively. Ryan et al⁶ in 1998 showed 30% prevalence of bacterial vaginosis and 30% of candidiasis. Similarly Snehalata et al⁷ in 2000 showed 26% and 10% prevalence and Sanchez et al⁸ in 1998 showed 30% and 7.3% prevalence respectively.

Efficacy of clinical diagnosis of vaginal infections in two different studies:

Bacterial vaginosis was the commonest diagnosis by the Clinical approaches in this study. When the Clinical diagnostic approaches were compared with the microbiological diagnosis, clinical diagnosis was noted to have moderate sensitivity for Bacterial vaginosis and Trichomoniasis, moderate specificity for Trichomoniasis; lower sensitivity for Candidiasis and lower specificity for Bacterial vaginosis. This implies that if the clinical approach is used to diagnose the infections, Bacterial vaginosis and Trichomoniasis would be over treated while Candidiasis would be under treated. Also the positive predictive value is low for Trichomoniasis with moderate negative predictive values for all infections.

Our analysis of the clinical approach showed that it does not deal adequately with the management of abnormal vaginal discharge. By adding simple tests as recommended by WHO, the sensitivity of Clinical diagnosis for all the vaginal infections improved, but only minimal change was noted in the specificity. These findings were similar to studies done by some authors which show that addition of simple Gram staining of the vaginal smears to the clinical diagnosis has a very good sensitivity (89-93%) but a low specificity of only 70%. WHO recommends that all women complaining of abnormal vaginal discharge be treated empirically. This study showed that 18.5% of patients had no Trichomoniasis, Bacterial vaginosis or Candidiasis by the microbiological diagnostic approach while the clinical approach diagnosed 22.5% of the cases with candidiasis only. If blanket treatment is advocated to all the women complaining of abnormal vaginal discharge then majority of the women would receive metronidazole and antifungal therapy unnecessarily.

Over diagnosis has financial as well as social consequences in the community.⁹ Oral metronidazole is associated with anorexia, nausea, vomiting. Antifungal therapy is associated with renal and hepatic complications, hypersensitivity reactions, nausea and vomiting, flatulence that's why FDA condemns blanket therapy and combination therapy for treatment of vaginal infections without proof of infections.¹⁰

Pap smears revealed that 7 (3.5%) patients out of 200 were having various grades of cervical dysplasia as compared to another study in which 8 (2.67%) patients out of 300 cases were having cervical intraepithelial neoplasia.¹¹ However it was not significant enough to prove their causation in carcinoma cervix, but still their association with carcinoma

cervix cannot be denied. And it was concluded that cervical intra epithelial neoplasia is common in our set up and can be diagnosed early by Pap smears.

When the Clinical diagnostic approaches were compared with the microbiological diagnosis, clinical diagnosis was noted to have moderate sensitivity for Bacterial vaginosis and Trichomoniasis, moderate specificity for Trichomoniasis; lower sensitivity for Candidiasis and lower specificity for Bacterial vaginosis. This implies that if the clinical approach is used to diagnose the infections, Bacterial vaginosis and Trichomoniasis would be over treated while Candidiasis would be under treated.

CONCLUSION

Pap smears revealed that 7 (3.5%) patients out of 200 were having various grades of cervical dysplasia as compared to another study¹¹ in which 8 (2.67%) patients out of 300 cases were having cervical intraepithelial neoplasia. However it is not significant enough to prove their causation in carcinoma cervix, but still their association with carcinoma cervix cannot be denied. Hence, regular follow up with Pap smear is mandatory.

It is concluded that cervical intra epithelial neoplasia is common in our set up and it can be diagnosed early by Pap smears. In a low resource setting, primary clinical diagnosis based on simple microscopy, pH and amine test with WHO algorithms should be made prior to treatment. Further studies are needed to know the utility of the various diagnostic approaches and the best approach that could be implemented in the rapid and accurate diagnosis of symptomatic vaginal discharge.

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Ocular Manifestations in Down's Syndrome

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ABSTRACT

Introduction: Down syndrome is also known as trisomy 21. It is a genetic disorder caused by presence of all or part of 3rd copy of chromosome 21. It is typically associated with delay in physical growth, characteristic facial features and mild to moderate intellectual disability. The parents are genetically normal and the extra chromosome occurs by chance. Ocular abnormalities like cataract, strabismus, and refractive errors are common. The aim of the present study was to report clinically significant ophthalmic abnormalities in children with Down's syndrome.

Material and methods: A prospective study was done in sixty four children with Down syndrome between the age group 1 year to 14 years. All children underwent ocular examination which included visual examination, slit lamp examination and fundus examination.

Results: Sixty four patients with Down syndrome (mean age, 8 years; range, 1 year 6 months to 14 years) underwent eye examinations. Clinically significant refractive errors were present in 32% of the subjects, strabismus in 32%, nystagmus in 3%, and cataract in 7%. Six year and younger patients showed a higher prevalence of hyperopia than those who are in older age groups; pts between 6-10 years old had a higher prevalence of astigmatism.

Conclusion: This study shows early detection of ocular abnormalities in children with Down syndrome has greater importance in reducing visual abnormalities.

Keywords: Refractive error, strabismus, cataract, visual acuity, retinal abnormalities

INTRODUCTION

Down's syndrome is the most common genetic chromosomal disorder of chromosome 21 (trisomy 21) and is associated with significant ocular morbidity. It varies in severity, causes lifelong intellectual disability and developmental delays. Most common features are flattened facial features, small head, short neck, protruded tongue, upward slanting eyes, small eyes, poor muscle tone, broad short hand with single crease in the palm. The abdomen is often protuberant and cardiac malformations are common. Ocular findings include strabismus, cataract, refractive errors, accommodative insufficiency, blephritis, retinal abnormalities, epicanthal folds.^{1,2} Most reported studies of ocular findings in Down syndrome have been performed in Caucasians.^{2,3} In the present study, our aim was to study the patients with Down syndrome to identify the characteristic ocular findings and to find the prevalence rate.

MATERIAL AND METHODS

The study was done in the department of ophthalmology and in coordination with department of pediatrics, RRMCH Bangalore. It was a cross sectional study conducted for the duration of 1 year 6 months (January 2014 to September

2015). The study subjects includes all the patients diagnosed with Down Syndrome during the period of study with age between 1 year to fourteen years and patients below the age of 1 year and above age of 14 years were excluded from the study. Total sixty four patients were examined. Informed consent from patient's attendees was taken and ethical clearance from the ethical committee was obtained. Clinical examination of the eye included visual assessment with cycloplegic refraction, ocular motility, ocular adenexa, slit lamp examination, fundus examination, glaucoma evaluation and systemic examination.

A clinical history was obtained from parents regarding patients age, maternal age of conception, history of wearing glasses, onset of strabismus and/ or nystagmus, occlusion therapy for amblyopia, previous external infections, watering, photophobia, treatment modalities, previous history cataract or strabismus surgery inquired. All details about previous cardio-vascular surgery any complications related to Pulmonary, endocrine, GI examination, neurological examinations were inquired.

The visual acuity was evaluated according to the patient's intelligence and responsiveness. In a non verbal patient vision is evaluated in terms of location (eccentric or central fixation) and duration. In verbal patients it is tested using optotypes (snellens chart, tumbling E chart, Tellen cards) few were tested with pattern vep.^{3,4} Palpebral fissure was measured with the help of a straight ruler which was placed over the bridge of nose at the level of inner and outer canthus. Horizontal and vertical displacement was measured.

The lid margins and conjunctiva were assessed for abnormalities such as blepharitis, hordeola, chalazion and conjunctivitis and some pts may have nasolacrimal duct obstruction.^{5,6} The diagnosis of nasolacrimal duct obstruction was based on history of epiphora or recurrent mucopurulent discharge since infancy and by the reflux of mucus with pressure over lacrimal sac. The presence of keratoconus, keratoglobus and iris abnormalities such as Brushfield's spots and stromal hypoplasia was also evaluated.⁷ Lens was evaluated for developmental or congenital cataract. Cycloplegic refraction was performed in all patients, regardless of age, 45 min after three to five instillations of one drop of cyclopentolate 1%. Emmetropia was defined as refractive error between -0.75 diopter (D) and +0.75 D spherical equivalent.^{8,9} Hyperopia

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was defined as more than +0.75 D spherical equivalent and myopia was defined as less than -0.75 D spherical equivalent. Astigmatism was defined as refractive error more than +/- 0.75 of the cylinder.^{10,11}

Direct and indirect ophthalmoscopy after cycloplegic retinoscopy was used to examine the retina, choroid and optic disc, and included a full assessment of vessels in relation to optic disc.

STATISTICAL ANALYSIS

Data was analyzed using SPSS version 19. Results are based on descriptive statistics.

RESULTS

Sixty four patients with Down syndrome (mean age, 8 years; range, 1year 6months to 14 years) underwent eye examinations. Clinically significant refractive errors were present in 32% of the subjects, accommodative insufficiency in 34%, nystagmus in 3%, and cataract in 7%, retinal abnormality in 10%, epicanthal folds in 90%, lacrimal system obstruction in 12%, blephritis in 18%, iris abnormalities in 12%, upward slanting of palpebral fissure with outer canthus in 93%. Strabismus was present in 21 patients (32%), 14 of whom had esodeviations and 7 of whom had exodeviations. Nystagmus was observed in 2 patients (3%), usually in the hori-

zontal-pendular type (table-1). Six year and younger patients showed a higher prevalence of hyperopia than those who are in older age groups; patients between 6-10 years old had a higher prevalence of astigmatism. Patients older than 10 years had more cataract, strabismus, iris abnormalities. Myopia is more common in patients with cardiac abnormalities. Patients develop amblyopia due to strabismus and refractive error. Brushfield spots and keratoconus were not found.

We observed that majority of the patients had upward slanting of the palpebral fissure. On examining the fundus it showed numerous vessels >18 crossing the optic disc margin and extending towards retinal periphery. In one patient retinal pigment epithelium showed focal hyperplasia. In the bar chart below incidence of ocular abnormality in Down syndrome is shown (figure-1)

DISSCUSSION

The incidence of strabismus in our study was 32% which is similar to that in other studies from da Cunha and Moreira (38%)¹² or Lowe (33%)¹³ or Hiles et al (34%).¹⁴ Asians are shown to have higher prevalence of exotropia as compared to Caucasians.¹⁵ Racial factors may play a role in this strikingly high incidence. Upward slanting of palpebral fissure, the most frequent ocular finding, is present in 60 patients(93%). Epicanthal folds, the second most prevalent feature, were found in 58 patients (90%).The prevalence of these two abnormalities has been reported as low as 9% and as high as 100%. This variation might be related to age and racial factors. Several authors have reported a decrease in prevalence with increased age as shown in table 2.

Nystagmus was present in 2 patients (3%), which is in accordance with previous reports of 4-30%.The patients having nystagmus in the present study usually had refractive errors, which are in accordance with other studies reporting nystagmus associated with refractive errors.¹⁶ The incidence of cataract (7%) was similar to that in the studies done by Shapiro and France (7%)¹⁶ and Roizen et al (5%)¹⁷, but quite lower than 11-86% of other reports by Berk et al (11%)¹⁸ and da Cunha and Moreira (20%).¹² This varying incidence rate might be related to the differences in age distribution and diagnostic criteria.

The incidence of keratoconus varies between 0 and 30%. But

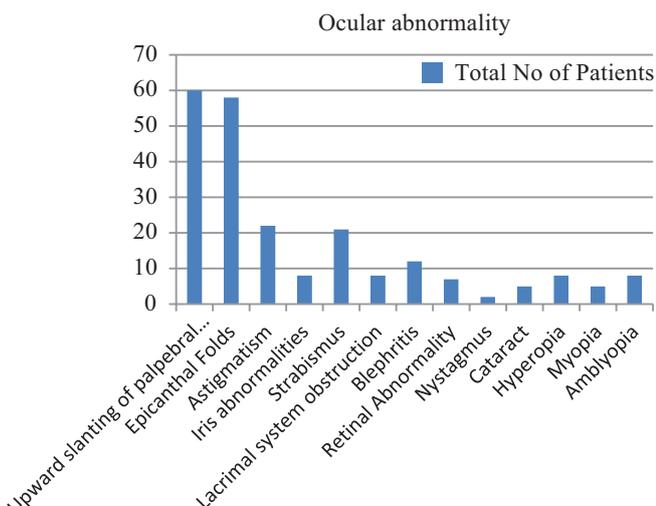


Figure-1: Incidence of ocular abnormality in Down syndrome

Sr. No.	Ocular Abnormality	Sample Size	Positive Findings	
1	Upward slanting of palpebral fissure with outer canthus 2mm or higher than inner canthus	64	60	93.75%
2	Epicanthal Folds	64	58	90.63%
3	Astigmatism	64	22	34.38%
4	Iris abnormalities	64	8	12.50%
5	Strabismus	64	21	32.81%
6	Lacrimal System Obstruction	64	8	12.50%
7	Blephritis	64	12	18.75%
8	Retinal Abnormality	64	7	10.94%
9	Nystagmus	64	2	3.13%
10	Cataract	64	5	7.81%
11	Hyperopia	64	8	12.50%
12	Myopia	64	5	7.81%
13	Amblyopia	64	8	12.50%

Table-1: This table shows ocular abnormality with prevalence rate

Comparison of ocular findings in previous studies with our findings	Present study	Wong and Ho (1997) ¹⁹	Da Cunha and Moreira (1996) ¹²	Berk et al (1996) ¹⁸	Caputo et al (1989) ²⁰	Shapiro and France (1985) ¹⁶
Number of patients	64	140	152	55	187	53
Nationality	Indian	Hong Kong	Brazil	Turkey	US	US
Range of age (years)	1 yr 6month - 14	0-13	0-18	0-25	0-26	7036
Mean age (years)	8	3.74	-	7.2	5.8	17.4
Upward slanting (%)	60(93)	140	125(82)	-	-	47(89)
Epicanthus (%)	58(90)	140	92(61)	13(24)	-	-
Refractive errors (%)	35(54)	137(98)	149(98)	60	122(65)	35
Hyperopia	8	42	39	29	39	17
Myopia	5	12	19	7	42	18
Astigmatism	22	8	91	24	41	12
Strabismus (%)	21(32)	28(20)	57(38)	12(22)	107(57)	23(43)
Esotropia	14		51	11	97	22
Exotropia	7		0	1	4	
Hypertropia	0		4	0	6	
Nystagmus (%)	2(3)	15(11)	28(18)	7(13)	55(29)	5(9)
Nasolacrimal duct obstruction (%)	8(12)	-	46(30)	12(22)	9(5)	-
Blepharitis (%)	12(18)	8(7)	45(30)	19(35)	-	25(47)
Number of retinal vessels >= 18 (%)	6(9)	16	42	21(38)	-	-
Lens opacities (%)	5(7)	4	20(13)	11(20)	21(11)	7(13)
Focal RPE hyperplasia (%)	1(1.5)	-	-	-	-	-
Glaucoma (%)	0	1	-	-	10(5)	-
Corneal opacities (%)	0	-	-	-	-	-
Keratoconus (%)	0	0	-	-	-	8(15)
Brushfield spots (%)	0	0	79(52)	20(36)	-	43(81)

Table-2: Comparison of ocular findings in previous studies with our findings

no keratoconus was seen in our study because the median age was very low. The children might be young so keratoconus might not have developed but as their age increases the chances it might occur. Unlike higher prevalence rate up to 90%, our study showed iris abnormality up to 12.50% and no brushfield spots were seen. This can be explained by dark brown and black irises in our children. Wong and Ho¹⁹ also reported that non of Hong Kong children showed these conditions either.

As shown above in the results our study results coincide with that of other studies done as shown in table 2.

CONCLUSION

Early awareness and detection of clinical features of Down's syndrome will decrease the complications and sight threatening conditions. This study suggests that children having Down syndrome are at a greater risk of visual impairment and therefore, early detection should be emphasized to prevent ocular related problems. This article provides a more information of the prevalence and severity of the complications in patients with Down's syndrome.

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Evaluation of Soft Tissue Facial Profile in Adult Bengali Population by Photogrammetric Method with Angular Measurements

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ABSTRACT

Introduction: Social acceptance, psychological well-being and self-esteem of an individual are related to physical appearance. With emphasis on achievement of balanced facial harmony and smile esthetic, proper clinical photographic record has become more essential for good treatment planning and follow-up. The study aimed to evaluate the soft tissue facial profile using angular photogrammetric norms and gender difference from standardized photographs of adult Bengali population.

Material and methods: The study was conducted among 100 dental students aged 18-25 years with Angle's class I occlusion, normal overjet-overbite, normal growth and development, normal maxillary and mandibular arches with all teeth excluding third molars. The dental students were selected from family with a minimum of three consecutive Bengali generations. Individuals with pleasing facial profile were judged by 1 layman, 8 post-graduate students and 2 orthodontists. Profile photographs were obtained at natural head position. Soft tissue landmarks were marked.

Result: Comparison of mean soft tissue profile measurement between male and female subjects using unpaired *t*-test showed statistically significant gender differences (<0.01) in facial, total facial, nasolabial and upper lip angles.

Conclusion: The derived mean values can be considered as normal values for Bengali population. It can be used for comparison of subjects with malocclusion. Further studies are required in this area.

Keywords: Esthetic; Facial profile; Natural head position; Photogrammetric analysis

INTRODUCTION

Physical appearance is a significant feature of the face and self-esteem is strongly influenced by facial appearance.¹ So, evaluation of the patient's soft tissue profile become one of the most important components of orthodontic diagnosis and treatment planning.² It has been established that the primary goal of orthodontic treatment is to attain and preserve optimal facial attractiveness.³

Radiographic cephalometrics and photographic systems are the most suitable and most commonly used for facial soft tissue evaluation. These photographic systems do not expose the patient to potentially harmful radiation and could provide better evaluation of the harmonic relationships.⁴

Nowadays with more and more emphasis from the orthodontic community on the achievement of balanced facial harmony and smile esthetics for the patients, in addition to the traditional orthodontic treatment objectives of a proper alignment and functional dentition, a well clinical photographic record of the patient has become more obvious and essential for good treatment planning and follow-up.⁵

The soft tissue profile features vary for different ethnic

groups.⁶ In India, the population comprise of different ethnic groups belonging to different race and Bengali population constitutes a large section of the Indian sub-continent. They are included in the Caucasoid type of human race. The other two types are Mongoloid and Negroid. The Caucasoid type includes the Europeans, the white Americans, the Punjabis, the Bengalis, etc. So it is an accepted fact that norms for different ethnic groups can differ widely. Therefore it is not correct to apply the norms for the western population blindly to the Indian population. Hence there is a need to develop norms pertaining to Indian ethnic groups.

The aim of this study was to establish angular photogrammetric norms from standardized photographs of adult Bengali population and to identify possible gender differences between adult Bengali males and females.

MATERIAL AND METHODS

It was a cross-sectional study conducted in the department of orthodontics of Dr. R. Ahmed Dental College and Hospital, West Bengal, India. The study population comprised of 100 dental students (50 males and 50 females) aged 18-25 years. The criteria of selection included Bengali population, family with a minimum of three consecutive generations with no previous history of orthodontic or surgical treatment, Angle's class I occlusion with normal overjet-overbite relationship with minimal or no crowding, normal growth and development, normal maxillary and mandibular arches and all teeth present except third molars and good facial symmetry. Individuals with pleasing facial profile were judged by 1 layman, 4 post-graduate students and two orthodontists before inclusion.

The photographic set-up was done with a tripod for supporting the digital camera (Nikon D80, Thailand). All the pictures were taken in the aperture priority mode of camera with aperture at 11 and built in flash light was used for uniform or constant illumination. Adjustment of the tripod height allowed the optical axis of the lens which was maintained in a horizontal position during the recording, adapted to each

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subjects' body height. In a standing position, each subject was asked to relax with both the arms hanging freely beside the trunk. The camera to the subject distance was maintained at a constant distance of 5 feet for all the subjects. The subject was asked to look at an object at his or her eye level. Then the subject was asked to keep the lips in relaxed position so that the right-side profile record was taken in Natural Head Position (NHP). The same procedure was repeated for every subject. The subject's forehead, neck and ear were clearly visible and their lips were in repose.

The width was kept 6 inch and height at 8 inch for all photographs. Computerized printout of all photographs was taken out. Tracing was done using 0.003-inch acetate matte tracing paper and 3H hard lead pencil. Soft tissue landmarks were marked and angular photogrammetric analysis was carried out.

The landmarks used for the study are given in figure 1. Angular parameters used are given in figure 2.

STATISTICAL ANALYSIS

Data entry and analyses was done using the Statistical Package for Social Sciences (SPSS) for Windows software version 21.0. Descriptive statistics such as mean and standard deviation (SD) were used. The p-value less than 0.01 will be treated as significant. Unpaired t-test was done for comparison between male subjects and female subjects.

RESULTS

Descriptive statistics data including mean and the result of the Student's t-test for male and female Bengali photogrammetric angular measurements are shown in Table 1.

The nasolabial (Cm-Sn-Ls), mentolabial (Li-Sn-Pg) and nasomental (N-Prn/N-Pg) angles were larger in Bengali males when compared to those of females. The facial (G-Sn-Pg), total facial (N-Prn-Pg), nasofrontal (G-N-Nd), nose tip (N-Prn-Cm) and upper lip (Sn-Ls/Sn-Pg) angles were larger in Bengali females than those of males. The projection of upper lip to chin angle (N-Pg/N-Ls) was slightly larger in males (8.610°) than in females (8.092°), whereas the projection of lower lip to chin angle (N-Pg/N-Li) was slightly larger in females (3.938°) than in males (3.828°). Statistically significant gender differences were present in four angles such as facial (G-Sn-Pg; p = 0.0001, total facial (N-Prn-Pg; p = 0.0012, nasolabial (Cm-Sn-Ls; p = 0.0077 and upper lip (Sn-Ls/Sn-Pg; p = 0.008) angles. The nasofrontal (G-N-Nd; p = 2.507), mentolabial (Li-Sm-Pg; p = 0.459), projection of upper lip to chin (N-Pg/N-Ls; p = 0.182), projection of lower lip to chin (N-Pg/N-Li; p = 0.771), nose tip (N-Prn-Cm; p = 0.139) and nasomental (N-Prn/N-Pg; p = 1.372) angles showed no statistically significant gender differences.

Figure 3 represents the chart for comparison of mean soft tissue parameters between male and female subjects.

DISCUSSION

The thickness of soft tissue is variable over different parts of facial skeleton. However, correlation of hard tissues to normal values need not always bring about the improvement in the facial esthetics. Soft tissue appearance is only partially dependent on underlying skeletal structure. To this end, a lateral cephalometric radiograph is probably the most valuable



Figure-1: Profile photograph of female. The soft tissue landmarks used for the study: glabella (G), nasion (N), nasal dorsum (Nd), pronasal (Prn), columella (Cm), subnasal (Sn), labial superior (Ls), labial inferior (Li), supramental (Sm), pogonion (Pg).

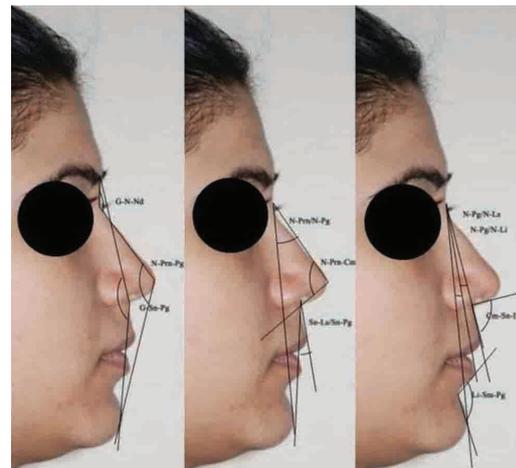


Figure-2: Angular measurements: G-Sn-Pg, N-Prn-Pg, G-N-Nd, N-Prn-Cm, N-Prn/N-Pg, Sn-Ls/Sn-Pg, Cm-Sn-Ls, Li-Sm-Pg, N-Pg/N-Ls, N-Pg/N-Li.

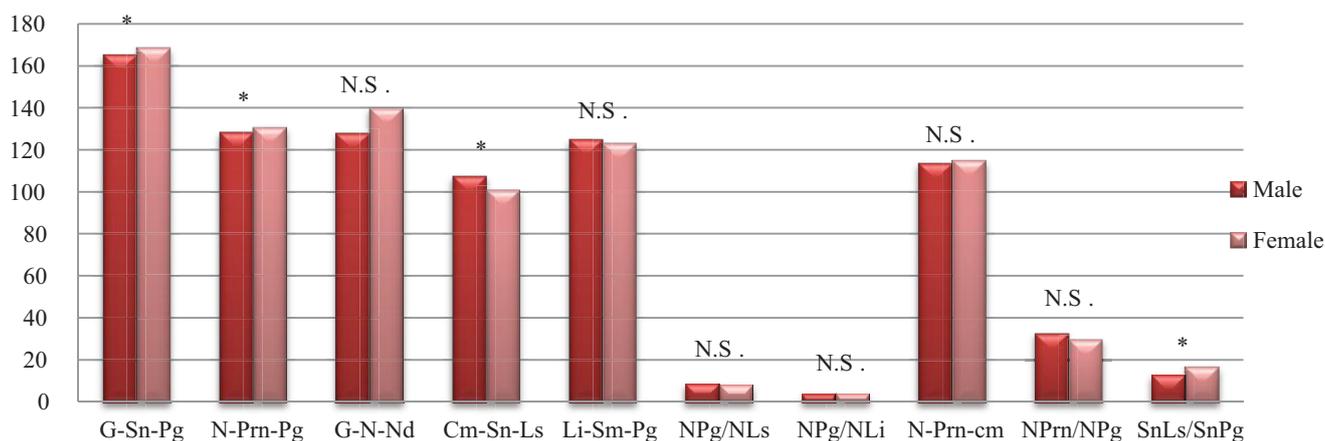
Parameter	Male	Female	p-Value	Significance
G-Sn-Pg	165.138	168.52	0.0001	*
N-Prn-Pg	128.502	130.552	0.0012	*
G-N-Nd	128.06	139.568	2.507	NS
Cm-Sn-Ls	107.39	100.882	0.0077	*
Li-Sm-Pg	124.85	123.064	0.4593	NS
N-Pg/N-Ls	8.61	8.092	0.1821	NS
N-Pg/N-Li	3.828	3.938	0.7715	NS
N-Prn-Cm	113.532	114.762	0.1394	NS
N-Prn/N-Pg	32.604	29.534	1.372	NS
Sn-Ls/Sn-Pg	12.846	16.528	0.008	*

* - Statistically significant; NS - Statistically not significant

Table-1: Mean soft tissue profile measurements and comparison between male and female subjects

diagnostic tool available. In this context, photogrammetric analysis was brought for soft tissue assessment as a photograph picturizes how a face actually looks.^{7,8}

The study was based on the photographs of aesthetically pleasing and balanced soft tissue profiles. Standardized photogrammetric records taken in NHP were used for analysis.



*Statistically significant ; N.S. Statistically not significant

Figure-3: Comparison of Mean Soft Tissue Parameters between Males and Females

Several studies have also been performed based on the records taken in NHP.⁹⁻¹²

In the study, the value for the facial angle (G-Sn-Pg) for Bengali males ($165.1 \pm 3.3^\circ$) and females ($168.1 \pm 4.1^\circ$) showed statistically significant gender difference ($p=0.0001$). The previous studies by Riveiro PF et al^{11,12} (males = 168.2° ; females = 167.0°), Milosevic SA et al¹ (males = 168.78° ; females = 169.05°), Malkoc S et al² (males = 170.60° ; females = 168.78°) and Arnett and Bergman^{9,10} (males = 169.4° and females = 169.3°) showed no significant gender difference.

In the study, total facial angle (N-Prn-Pg) for males (128.50°) and females (130.55°) showed statistically significant gender difference ($p = 0.0012$). Riveiro PF et al^{11,12} found no significant gender difference (males = 139.9° ; females = 139.2°). Milosevic SA et al¹ (males = 130.47° ; females = 130.19°) and Malkoc S et al² (males = 142.35° ; females = 142.57°) also found no significant gender difference.

In the study, the nasofrontal angle (G-N-Nd) was 128.06° for males and 139.56° for females with no statistical significant gender difference. However, Riveiro PF et al^{11,12} found gender difference (males = 138.57° ; females = 141.98°). Milosevic SA et al¹ also found gender difference (Caucasian males = 136.38° ; females = 139.11°). Malkoc S et al² found no significant gender difference (Turkish males = 146.03° ; females = 148.61°) supporting the present study.

In the study, the nasolabial angle (Cm-Sn-Ls for males = 107.39° ; females = 100.88°) showed statistically significant gender difference in agreement with the findings of previous study by Milosevic SA et al.¹ They found the nasolabial angle as the most significant angular variable between the genders (Croatian males = 105.42° and females = 109.39°). Malkoc S et al² also found this angle with large variations between males and females (Turkish males = 101.09° ; females = 102.94°). This should be interpreted with caution.² According to Bergman³, this angle should be $102 \pm 8^\circ$ for every indicated orthodontic or surgical correction. This is useful for assessing the upper lip position and used as a part of extraction decision.³ Burstone¹⁵ reported a nasolabial angle of $74 \pm 8^\circ$ in a Caucasian adolescent sample with a normal facial appearance. Riveiro PF et al^{11,12} found no gender difference (males = 137.6° ; females = 134.5°).

In this study, the mentolabial angle (Li-Sm-Pg) was found

no significant gender difference (males = 124.8° ; females = 123.06°). According to Bergman³, in Class II and vertical maxillary deficiency cases, a more pronounced mentolabial angle can be observed. This angle tends to be more when the lower incisors are uprighted³ In a study by S. Anic-Milosevic et al.¹ in Croatian sample, there was a great gender difference for this angle (males = 129.6° ; females = 134.50°). In a study of Turkish adults, Malkoc S et al² also found significant gender difference (males = 130.19° ; females = 137.19°). These results differ from those of Riveiro PF et al¹¹ in agreement with the present study. Lines et al¹³ in a study of silhouettes reported that deeper mentolabial sulci were preferred in males and it ranged between 120 and 130 degrees.

The study showed no statistical significant gender difference on projection of upper lip to chin angle (N-Pg/N-Ls = 8.61° for males; 8.09° for females). Similar finding was also observed by Milosevic SA et al¹ in their study in Caucasian population. Arnett et al¹⁴ measured this angle from subnasal to upper lip and found that this angle was another angle that reflected the position of upper incisors and the thickness of the soft tissue overlying these teeth.

The projection of lower lip to chin angle (N-Pg/N-Li) in the present study was $3.8 \pm 1.8^\circ$ in males and $3.9 \pm 1.9^\circ$ in females. The angle was found with no gender difference. This finding showed in agreement with Milosevic SA et al¹ where mean value was $3.27 \pm 1.7^\circ$ for males and $3.6 \pm 1.4^\circ$ for females with no gender difference among Caucasian population.

The nose tip angle (N-Prn-Cm) in the present study was found having no significant gender difference (males = $113.53 \pm 4.4^\circ$; females = $114.76 \pm 3.7^\circ$). Milosevic SA et al.¹ in Caucasian population with good soft tissue profile found gender dimorphism ($p<0.001$; $79.85 \pm 6.36^\circ$ for male; $84.1 \pm 5.2^\circ$ for female). According to Lines et al¹³ in silhouette profiles, it is most acceptable between $60-80^\circ$ in agreement with Milosevic SA et al, but it is lower than those of Bengali subjects.

In this study, the nasomental angle (N-Prn/N-Pg) showed no significant gender difference (males = $29.5 \pm 2^\circ$; females = $29.5 \pm 2^\circ$). Milosevic SA et al¹ stated no gender differences (males = $29.5 \pm 2.5^\circ$; females = $30.4 \pm 2.4^\circ$) supporting the present study. According to Lines et al¹³ this angle showed

statistically significant gender differences that a more prominent nose in relation to the chin is preferable for males and the opposite in case of females. This angle is most acceptable within a range of 20-30°. ¹³ Clements¹⁶ stated that in most faces illustrated in art throughout history, the nasomental angle was around 30° or less.

In this study, the upper lip angle (Sn–Ls/Sn–Pg) showed statistically significant gender difference ($p = 0.008$; males = $12.8 \pm 5.7^\circ$; females = $16.5 \pm 7.7^\circ$). Milosevic SA et al¹ also found no gender difference in Caucasian population (males = 11.7° ; females = 12.9°). Burstone⁷ used an angle called ‘total facial contour’ defined as the intersection of the upper facial (G – Sn) and anterior lower facial (Sn – Pg) planes. The mean value from a sample of lateral and frontal photographs of 40 young Caucasians with aesthetically pleasing faces found was $11.3 \pm 4^\circ$. For assessing convexity/concavity of the facial profile, the profile angle was used.⁷ According to Arnett et al¹⁴, the position of the upper incisors and the thickness of the soft tissue overlying these teeth can also be assessed by using this angle.

CONCLUSION

The derived soft tissue values can be considered as normal values for Bengali population and used for comparison of subjects with malocclusion, thereby providing orthodontists for proper diagnosis and treatment plan of any malocclusion associated soft tissue segments of the face.

However, further experiments are to be suggested with larger sample size through a meticulous screening procedure for standardization of norms.

LIST OF ABBREVIATIONS

Glabella (**G**); Soft tissue nasion (**N**); Nasal dorsum (**Nd**); Pronasal (**Prn**); Columella (**Cm**); Subnasal (**Sn**); Labial superior (**Ls**); Labial inferior (**Li**); Supramental (**Sm**); Soft tissue pogonion (**Pg**); Facial angle or angle of facial convexity excluding the nose (**G-Sn-Pg**); Total facial angle or angle of facial convexity including the nose (**N-Prn-Pg**); Nasofrontal angle (**G-N-Nd**); Nasolabial angle (**Cm-Sn-Ls**); Mentolabial angle (**Li-Sm-Pg**); Projection of upper lip to chin angle (**N-Pg/N-Ls**); Projection of lower lip to chin angle (**N-Pg/N-Li**); Nose tip angle (**N-Prn-Cm**); Nasomental angle (**N-Prn/N-Pg**); Upper lip angle (**Sn-Ls/Sn-Pg**)

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Management of C Shaped Canals: 3 Case Reports

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ABSTRACT

Introduction: Thorough knowledge of the root canal morphology is essential for successful endodontic therapy. C-shaped canal configuration is commonly seen in mandibular second molars. These canals are challenging to negotiate, debride and obturate because of the high incidence of anastomoses, lateral canals, and apical deltas. Inability to detect and debride C-shaped canal anatomy can lead to endodontic failure.

Case report: This case report highlights the management of three different cases of C- shaped canal configurations using thermoplasticised gutta-percha technique and management of associated pulpal floor perforation

Conclusion: Complex intricacies and diverse morphology of C shaped canals can be managed with advanced irrigation and obturation techniques.

Keywords: C- shaped canal, perforation, thermoplasticised gutta-percha

INTRODUCTION

C-shaped canal anatomy was first documented by Cooke and Cox in mandibular second molar.¹ Canal configuration has a high prevalence in mandibular second molars (2.7% - 45.5%).²

C-shaped canal configuration results from the failure of the Hertwig's epithelial sheath to fuse or its inadequate development during the root embryologic stage. Failure of the Hertwig's epithelial sheath to fuse on the buccal side will result in the formation of a lingual groove, and failure to fuse on the lingual would result in a buccal groove. Failure of the sheath to fuse on both the buccal and lingual sides will result in the formation of a conical root.³

The C-shaped canal configuration has racial predilection. Higher incidence reported in countries belonging to the Asian continent like Chinese (31.5%) and Koreans (44.5%).^{4,5}

CASE 1

A 25 year old female patient reported to the department of Conservative Dentistry and Endodontics with a chief complaint of pain in lower left back tooth. Intraoral examination revealed dental caries on tooth 37 and tenderness to percussion. Radiographically, a large coronal radiolucency was seen in tooth 37 closely approximating the pulp space along with an associated periapical radiolucency (Figure 1a). Tooth was conical in shape with fused mesial and distal roots. After proper isolation and anesthesia, an access cavity was prepared and Fan et al C1 type canal anatomy was found. After working length determination, canal was prepared with ProTaper rotary files (Dentsply Maillefer, Switzerland) up to F3 followed by circumferential filing with hand K files (Dentsply Maillefer, Switzerland) (Figure 1b). 5% sodium hypochlorite (Acrylates, India) was used as an endodontic irrigant which was activated with Endo activator

(Dentsply Maillefer, Switzerland). Calcium hydroxide (RC Cal Prime Dental Products, Thane, India) was placed as an intracanal medicament. After 1 week, fit of the master cone was checked and obturation was completed with thermoplasticised gutta-percha (Calamus, Dentsply Maillefer, Switzerland) (Figure 1c). Post endodontic restoration with amalgam was done (Figure 1d).

CASE 2

A 45 year old male patient reported to the department of Conservative Dentistry with a chief complaint of pain in lower left back tooth. Patient gave the history of prior dental treatment of the same tooth at a private clinic. Clinically, temporary restoration was seen in tooth 37. On removing the restoration, perforation was seen in the floor of the pulp chamber. Radiographically, a large radiolucency in the crown and the floor of the pulp chamber was seen. Two fused roots indicating a C-shaped canal anatomy was observed (Figure 2a). On examining the floor of the pulp chamber using 2.5 X magnifying loupe (STAC, Mumbai), pulpal floor perforation was seen between the mesial and distal canal orifices (Fan et al C3 type canal) (Figure 2b). After local anesthesia administration and rubber dam placement, working length was determined (Figure 2c). Orifices were preflared with #2 Gates-Glidden drills, then the canals were blocked with appropriate sized gutta-percha points before perforation repair. Mineral trioxide aggregate (MTA – ANGELUS; Peterborough, UK) was mixed as per manufacturer's recommendations and carried to the perforation site with an amalgam carrier and gently condensed (Figure 2d). Moist cotton pellet was placed on MTA, gutta-percha points were removed from the canals, followed by temporary restoration. After two days, canals were prepared with ProTaper rotary files (Dentsply Maillefer, Switzerland) up to F2 followed by thermoplasticised gutta-percha obturation (Calamus, Dentsply Maillefer, Switzerland) (Figures 2e and 2f). Post endodontic restoration with fiber reinforced composite (GC everX posterior, GC Europe) was done (Figures 2g and 2h).

CASE 3

A 31 year old female reported to the department with a chief complaint of pain on eating food in lower left back tooth. Clinically, tooth 37 was carious and tender on percussion.

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Radiographically, occlusal radiolucency was evident involving the pulp. A single fused root with a wide canal sugges-

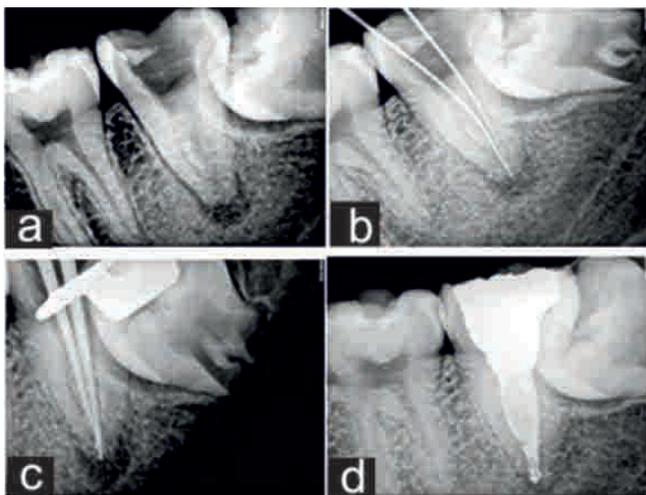


Figure-1: (a) Preoperative radiograph, (b) Working length radiograph, (c) Master cone radiograph, (d) Post obturation radiograph

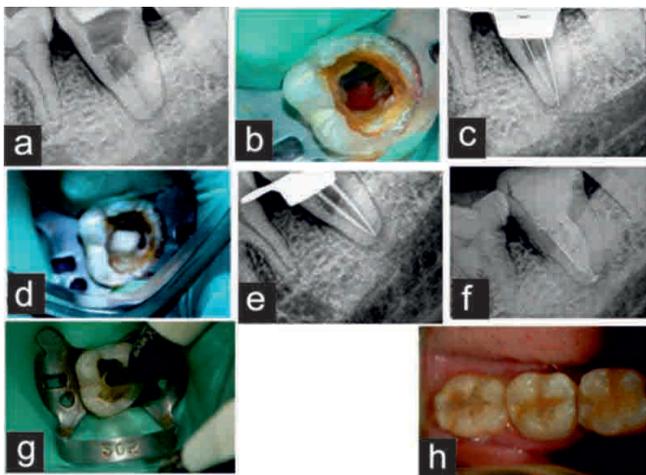


Figure-2: (a) Preoperative radiograph, (b) Preoperative photograph, (c) Working length radiograph, (d) Perforation repair with MTA, (e) Master cone radiograph, (f) Post obturation radiograph, (g) Fiber reinforced composite build up, (h) Post operative photograph

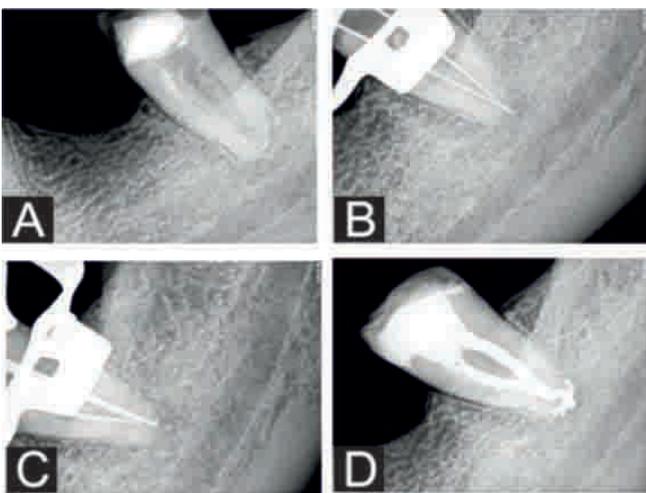


Figure-3: (a) Preoperative radiograph, (b) Working length radiograph, (c) Master cone radiograph, (d) Post obturation radiograph,

tive of a C-shaped canal anatomy was seen (Figure 3a). After rubber dam isolation and profound anesthesia, an access opening was prepared. Working length was determined after locating two separate canals (Fan et al C2 type anatomy) in the pulp chamber floor (Figure 3b). Canals were prepared with ProTaper rotary file system (Dentsply, Maillefer) upto F2 and radiograph was taken to confirm fit of the master cone (Figure 3c). Obturation was done with thermoplasticised gutta-percha (Calamus, Dentsply Maillefer, Switzerland). Canals were seen joining in the apical third in the post obturation radiograph. Post endodontic composite restoration was carried out (Figure 3d).

DISCUSSION

Various classifications of C-shaped canals have been proposed to make the diagnosis and treatment planning easier. Melton et al proposed a classification based on the cross-sectional shape of the canal viz; continuous C shaped (C1), semicolon (C2) and separate canals (C3). Fan *et al* modified Melton's classification and considered that this type of canal system had to exhibit all of the following three features: (i) Fused roots, (ii) a longitudinal groove on the lingual or buccal surface of the root, and (iii) at least one cross-section of the canal belonging to the C1, C2, or C3 configuration. Fan *et al* also classified C-shaped roots according to their radiographic appearance.⁶

Treatment of the C-shaped canals should be accompanied by additional measures for complete debridement and thorough cleansing of the complex root canal anatomy. Access cavity design modification may be required to locate and negotiate the entire root canal system.⁷ Magnifying loupes, microscope and CBCT aids in better understanding the canal system in the pulpal floor.⁸ Self - adjusting file system is found to be efficacious in cleaning and shaping C-shaped canals.⁹ Circumferential filing should be done to ensure maximum tissue removal and care should be taken to avoid strip perforation. Calcifications in the pulp chamber should be negotiated with ultrasonic tips to reveal the canal anatomy completely. Copious irrigation with 5.25 % NaOCl should be done to debride the intricacies of the C-shaped canal. Irrigant should be activated using ultrasonics or sonics.¹⁰

It is challenging to obtain a three dimensional obturation of the C-shaped canals due to its complex configuration. Thermoplasticized gutta-percha technique was used for all the cases which is the recommended technique for C- shaped canals.¹⁰

CONCLUSION

This case report shows management of four different C-shaped canal anatomies successfully using thermoplasticised guttapercha technique. It also highlights basic treatment regimen for C-shaped canals.

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A Prospective Study of Clinicoradiological Outcome Assessment in Proximal Femoral Fractures Treated with Proximal Femoral Nail

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ABSTRACT

Introduction: Proximal femoral Fractures are a major source of morbidity and mortality in today's ageing population. The incidence of pertrochanteric femoral fractures has increased significantly during recent decades. The goal of the treatment of these fractures is stable fixation, which allows early mobilisation of the patient. Hence we conducted a prospective study to assess the clinical and radiological outcomes in pertrochanteric fractures treated with PFN.

Material and methods: 22 Patients aged >20yrs with proximal femoral fractures treated surgically with proximal femoral nail in our institution were included in the study from June 2013 to November 2014. Detailed clinical and radiological assessment of injured limb done and suitably classified according to seinsheimer. All fractures were managed surgically with PFN. Assessment of the end result was done by the kyle's¹⁵ criteria.

Results: 22 patients are treated in study period. 16 cases were in the age group between 50-70 years. 17 patients were male and 5 were female. 86% patients were involved in motor vehicle accidents, 14% in fall from height. Right side was involved in 18 cases and left in 4 cases. Mean duration of radiological union was 4 months. Early complications include shortening in 2 cases, rotational deformity in 4 cases, superficial infection in 2 cases and late complications include Non union in 1, delayed union in 2, malunion in 3 cases, knee stiffness in 2 cases. Kyle's criteria is used for assessment of outcome.

Conclusion: Unstable proximal femoral fractures tend to occur in the very elderly and debilitated, resulting in a relatively high rate of complications. PFN is a good minimally invasive implant for unstable proximal femoral fractures when closed reduction is possible. We believe that the PFN is the implant of choice for stabilising subtrochanteric fractures. We also believe that the use of the PFN for unstable trochanteric fractures is very encouraging.

Keywords: Clinicoradiological Outcome, Proximal Femoral Fractures, Proximal Femoral Nail

INTRODUCTION

Proximal femoral Fractures are important cause of morbidity and mortality these days in aged population.¹ More than ninety percent of hip fractures occur after the age of 65 years and they are frequently associated with age related diseases.² The incidence of pertrochanteric fractures are rising these days due to rise in population and it continues to rise till control of rise in population.^{3,4} The goal of the treatment of these fractures is stable fixation, which allows early mobilisation of the patient. To return to preinjury function and activity levels, early operative interventions have become the preferred solution for the treatment of senile femoral intertrochanteric fracture.⁵ The DHS and its variants had been considered the standard implant in the treatment of

perthrochanteric hip fractures⁶ with a high cost performance for stable intertrochanteric fracture.⁷ However, for unstable intertrochanteric fractures, the failure rate is higher.⁸⁻¹⁰ The load bearing in the proximal femur is mainly through posteromedial cortex i.e. calcar femorale and fixation with sliding hip hip screw is definitely inferior to intramedullary devices due to load sharing property of intramedullary devices. (Fig 1). And hence sliding hip screw cannot be used in unstable and subtrochanteric fractures. For stable fractures, biomechanical failure of sliding hip screw does not appear to result in a significant difference in failure rate and so the DHS is preferred implant. For unstable fractures, the failure rate for a DHS is as high as 21%.¹¹

The proximal femoral nail (PFN) was introduced to increase the efficiency of rotational instability and it also has property of load bearing, sliding with a neck screw. Proximal femoral nail was introduced way back in 1997 and many clinical studies^{12,13} have shown good results with few intra-operative problems and a low rate of complications.¹⁴ We felt there was a need to investigate the clinical relevance of the presumed advantages and lower complication rates associated with use of a PFN for pertrochanteric fractures in our setup. We therefore initiated a prospective study to assess the clinicoradiological outcomes in pertrochanteric fractures treated with PFN.

MATERIAL AND METHODS

After obtaining ethical clearance from the institute (Bangalore medical college and research institute) and consent from the patients, study was conducted between June 2013 to November 2014, 22 patients with proximal femoral fractures treated surgically with proximal femoral nail in our institution were included in the study. Patients who fulfilled the inclusion criteria were included in the study. Inclusion criteria were 1. All proximal femoral fracture including intertrochanteric and subtrochanteric region. 2. Age of the patient > 20 years. Exclusion criteria were 1. Age of the patient < 20 yrs. 2. Compound fractures. 3. Pathological fractures. 4. Patients with associated injuries in the same limb or other limbs. After hemodynamic stabilization of the patients, AP and

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lateral views of the involved extremity was obtained along with routine blood investigations. Age, gender, pre-fracture walking ability, ASA grade and mechanism of injury were recorded preoperatively. The operation was usually performed within two days of admission, in most cases. All fractures were reduced by closed means with a fracture table. The standard PFN (with a length of 240 mm) and diameter of 9 mm, 10 mm or 11 mm was used by using a 5-cm skin incision which extended from the cranial part to the tip of the greater trochanter. After penetrating the fascia and muscles, a 2.8 mm K-wire was inserted at the tip of the greater trochanter under fluoroscopic control in both planes. The proximal part of the femoral shaft was reamed with a 17-mm reamer. The nail was then introduced manually into the femoral shaft. Using C-arm control the first guide wire for the neck screw was placed in the femoral neck so that the screw could be placed in the lower half of the neck on the anteroposterior view and centrally/or slightly posterior on the lateral view. Then the guide wire for the antirotational hip screw was introduced. Depending on the type of fracture, distal static or dynamic interlocking was done using the distal aiming device. All patients received a prophylactic dose of an intravenous antibiotic, and were also treated with low-molecular-weight heparin during their stay in hospital. Patients were allowed to perform quadriceps-strengthening exercises the next day. Partial weight-bearing was allowed. Sutures were removed on post op day 14. In case of stable fractures full weight bearing was allowed at 6 weeks and in unstable fractures weight bearing was delayed until patient is free of pain and bony union is seen in xrays. Post operatively patients were followed up at 6 weeks, 3 months, 6 months, and 12 months. At each follow up patients were assessed with xrays by AP and lateral views of the operated limb and functional assessment was done in terms of pain, ROM, return to work was carried out. The functional outcome was assessed by kyle's¹⁵ criteria.

Data collection: The following data were collected: patient's demographic information, medical history, causes and classification of each fracture, fracture union, the time to union, osteosynthesis complications, wound infection, deep vein thrombosis, pulmonary embolism and cardiovascular events. Bone union was defined if AP and lateral X-ray showed bone formation across fracture site within 6 month after fixation. Delayed union was defined if bone union occurred 6 to 9 months after fixation. Non union was defined if patients had consistent pain and bone union failed to occur even after > 9 months after fixation.

RESULTS

Of the 22 cases included in the study, 16 (72.7%) cases were in the age group between 50-70 years. 17 (77.2%) male and 5 female patients were included in the study. In our study 86 % of the patients had injuries due to road traffic accident, remaining 14 % sustained injury by fall from height. 18 fractures (81.8%) were right sided fractures. The fractures were classified according to seinsheimer's classification and 8 (36.4%) cases were type 3 fractures involving the unstable variety of fractures. 16 (72.7%) cases were subtrochanteric fractures of which 4 (18.3%) fractures had extension into

the intertrochanteric region i.e seinsheimer type 5 fractures. 6 (27.3%) cases were pure intertrochanteric fractures. The mean duration of surgery in 18 cases was about 90 min (35-110min) and in the rest it was more than 90min. The average duration of union in our subtrochanteric fractures was 4 months (3.7- 5.6months). Of the 16 subtrochanteric fractures 13 cases showed union (Fig 1,2,3), 2 cases showed delayed union which went on to unite within 9 months and 1 case of non union which had to be revised. In the intertrochanteric fracture group all the 6 cases went on to unite in an average span of 3.8months (3.4- 4.2months). Excellent and good re-



Figure-1: Subtrochanteric fracture.



Figure-2: Immediate post OP X-ray; Figure-3: 4 Months post OP X-ray.



Figure-4: Non union and implant failure.

sults according to Kyle's criteria was considered satisfactory outcome and fair and poor results was considered unsatisfactory outcome. In our study 17 (77.2%) cases had satisfactory outcome.

Complications in our study were divided into early and late complications. The same is shown in table 1, 2.

In our study superficial infection was encountered in 2 patients which settled with wound debridement and IV antibiotics. Shortening and rotational deformity was seen in 4 patients with subtrochanteric fractures. 1 implant failure (Fig 4) occurred in subtrochanteric fracture patient. We did not encounter any intraoperative complications during our study period.

DISCUSSION

The treatment of pertrochanteric fracture is still associated with some failures. The reasons are attributed to biomechanics, overestimation of potentials of new surgical techniques and new implants, or poor adherence to established procedures. The discussion about the ideal implant for treatment of proximal femoral fractures continues. From the mechanical point of view, a combined intramedullary device inserted by means of a minimally invasive procedure seems to be better in elderly patients. Closed reduction of the fracture preserves the fracture hematoma, which is very crucial for fracture healing. The advantage of Intramedullary fixation is minimal soft tissue dissection which in turn reduces surgical trauma, blood loss, infection, and wound complications. Before proximal femoral nail, intramedullary device used for these fractures was the Gamma Nail, which was discontinued because of its high failure rate as high as 10 percent.¹⁶ These failures are collapse of the fracture area, cut-out of the neck screw and fracture of the femur shaft at the tip of the implant. In order to eliminate these drawbacks a new device was developed by AO/ASIF: the proximal femoral nail (PFN), with as main differences an additional antirotational hip pin preventing rotation and collapse of the head and neck fragment and an especially shaped tip together with a smaller distal shaft diameter resulting in less stress concentration at the tip. Placement of the lag screw must be central in lateral view and inferior in AP view in order to provide space for the anti-rotation hip pin or else this screw might be placed in anterior or superior position risking a high rate of cut out or back out. In the literature, cut-out frequencies in proximal femoral fractures have been reported in up to 10%.¹⁷ Among the patients in whom cut out of implant was occurred, 80 percent of them are associated with difficult reduction and non anatomical but acceptal position of neck screws. In our study there was no case of screw cut out as great care was taken in proper positioning of the screw and adequate length of the screw. Another complication is the lateral protrusion of the proximal screws, because of impaction of the fracture. Suboptimal reduction, malpositioning of the implant, or the combination of both may contribute to collapse of the fracture, irrespective of the implant used, and may facilitate the dynamisation and lateral protrusion of the hip screw(s). In our study there was no such complication encountered, we neither had any case of intraarticular penetration of the proximal screw so called 'Z' effect. There was one case of

Sl. No.	Complications	No. of patients	
		Subtrochanteric	Intertrochanteric
1	Shortening	2	
2	Rotation deformity	2	2
3	Superficial infection	1	1
4	Deep infection	0	0
5	Bed sores	0	0
6	Mortality	0	0

Table-1: Early complications.

Sl. No.	Complications	No. of patients	
		Subtrochanteric	Intertrochanteric
1	Malunion	2	1
2	Non union and implant failure	1	0
3	Delayed union	2	0
4	Knee stiffness	2	0

Table-2: Delayed complications.

implant failure in our study. The fracture had failed to unite and the patient was walking independently, so the nail was taking all the patient's weight. The non union was due to the mechanical problem of distraction at the fracture site. The implant broke at the distal locking bolt level. The broken implant was removed, the fracture site was debrided and the bone was grafted, and another PFN was inserted. The fracture united at 3.5 months

CONCLUSION

Unstable proximal femoral fractures tend to occur in the very elderly and debilitated, resulting in a relatively high rate of complications. PFN is a good minimally invasive implant for unstable proximal femoral fractures when closed reduction is possible. The surgical technique involved is relatively straight forward, involves very minimal soft tissue handling. Post-operatively, we found a good union rate at 4 months, no cut-out for unstable fractures and no low energy fractures below the tip of the implant. We believe that the PFN is the implant of choice for stabilising subtrochanteric fractures. We also believe that the use of the PFN for unstable trochanteric fractures is very encouraging.

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Fine Needle Aspiration Cytology in Evaluation of Lymphadenopathy in Pediatric Age Group: Our Experience at Tertiary Care Centre

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ABSTRACT

Introduction: Lymphadenopathy is a common problem in children. The aim of the present study is to evaluate the role of FNAC in the diagnosis of pediatric lymphadenopathy and to study varied cytomorphological patterns and their frequency in lymph node aspirates.

Material and Methods: Total number of cases of lymphadenopathy in the pediatric age group (<16years) during the study period were 498, out of which 325 were retrospective and 173 were prospective cases respectively. Aspirated material was stained with Leishman and Giemsa stain, Papanicolaou, Hematoxylin and Eosin and Ziehl Neelsen stain (wherever required). For histological analysis, H and E stained sections were studied.

Results: Most of the patients were in the age group of 5-10 years i.e. 242/498 cases (48.59%). Cervical lymph nodes were the most commonly involved in 482/498 cases (96.79%). The largest group of lesions comprised of non-neoplastic lesions 456/498 (91.57%) cases. Only 8/498 (1.61%) cases were in the neoplastic category, whereas in 34/498 (6.82%) cases, material was inadequate for diagnosis. Among the non-neoplastic lesions, diagnoses in order of frequency were:- Non-specific reactive lymphadenitis (324 cases)- 71.05%, Tuberculous lymphadenitis (78 cases) – 17.11%, Granulomatous lymphadenitis (38 cases) – 8.33% and Acute suppurative lymphadenitis (16 cases)- 3.51%. Among the neoplastic lesions (8/498), five cases showed features of Hodgkin's lymphoma, whereas two cases were classified as Non-Hodgkin's lymphoma and one case as metastatic deposit from rhabdomyosarcoma to lymph node.

Conclusion: FNAC is an important diagnostic tool in the pediatric population. As a safe, minimally invasive and rapid procedure, clinicians can reliably utilize FNAC in the management of lymphadenopathy in children. Results of FNAC are comparable with those of tissue biopsies. So, it can be easily done in a cost-effective manner.

Keywords: Fine needle aspiration, pediatric lymphadenopathy

INTRODUCTION

Lymphadenopathy is a common problem in children.¹⁻³ Evaluation of a child with lymphadenopathy is a common clinical scenario for the pediatricians.² Lymph nodes are a part of reticuloendothelial system. They serve as the termination point for lymphatic vessels draining lymph from most tissues of the body. Presence of abundant phagocytic cells, antigen presenting cells and lymphocytes provides ideal first line of defense against pathogens. As a result, most of the normal children have small palpable cervical, axillary and inguinal lymph nodes.^{2,4,5} They are not considered enlarged until their diameter exceeds 1cm for cervical and axillary nodes and when it is more than 1.5 cm for inguinal nodes. Other lymph

nodes usually are not palpable or visualized with plain radiographs.⁶ Palpable supraclavicular nodes are always considered abnormal.^{4,7}

A wide variety of diseases and conditions may present as lymphadenopathy. An understanding of these conditions is essential to determine the most appropriate diagnostic work-up.³

Aspiration of lymph nodes for diagnostic purpose was first reported in 1904 by Grieg and Gray in the diagnosis of Trypanosomiasis.⁸⁻¹⁰ In 1921, Guthrie attempted to correlate lymph node aspiration cytology with various disease processes.^{8,10} Fine needle aspiration cytology (FNAC) is particularly helpful in the workup of cervical masses because biopsy of cervical adenopathy should be avoided unless all other diagnostic modalities have failed.¹¹

FNAC is now recognized as a rapid diagnostic technique because it is relatively painless, gives a speedy result and is inexpensive.¹² Nowadays, FNAC is increasingly being applied to pediatric lesions as it permits rapid diagnosis with minimal intervention.

The dilemma to approach a child with lymphadenopathy, its evaluation and management, considering various differential diagnoses, prompted us to take up this study. We conducted this study to evaluate the role of FNAC in the diagnosis of pediatric lymphadenopathy and to study varied cytomorphological patterns and their frequency in lymph node aspirates.

MATERIAL AND METHODS

We conducted this study in the Department of Pathology, LLRM Medical College, Meerut. This included a retrospective as well as prospective analysis during the period January 2012 to June 2015. Total number of cases of lymphadenopathy in the pediatric age group (<16years)¹³ during the study period were 498. Number of retrospective and prospective cases were 325 and 173 respectively.

All the cases fulfilling the following criteria were included in the study:-

- Age \leq 16 years.¹³
- Lymph node enlargement with diameter exceeding 1cm for cervical and axillary nodes and 1.5cm for inguinal

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nodes.⁶

Following exclusion criteria were applied:-

- Un-cooperative child.
- Overlying skin showing acute inflammatory changes.

Five cases for which preoperative cytological findings and subsequent histological diagnosis were available during this period were included in the study and cyto-histological correlation was done.

Retrospective cases

Cytology smears of 325 cases of lymphadenopathy in the pediatric age group were retrieved from records of Pathology Department. In each case, cytomorphologic features were analysed and correlated with histology findings, wherever available.

Prospective cases

Detailed history, clinical and laboratory data of these patients were recorded on a structured proforma. Thorough general physical examination was carried out. Palpable peripheral lymph nodes were examined noting their size, location, consistency, number, mobility, presence of matting and any local changes like redness, discharge or sinus formation.

FNAC was performed in 173 cases by non-aspiration/aspiration technique using the syringe with 22-24 gauge needle fitted in Franzen's handle. Depending on the aspirate obtained, minimum of two smears were air dried and stained with Leishman and Giemsa stain and two smears were wet fixed (ethyl alcohol) and stained with Papanicolaou and Hematoxylin and Eosin stain. Wherever required, Ziehl Neelsen staining for demonstration of AFB was done.

Stained smears were examined under the microscope. Smears stained with Ziehl Neelsen stain were observed for AFB and results were reported as positive and negative accordingly.

Histological analysis

For histological analysis, we used formalin fixed paraffin embedded H and E stained sections. The cytomorphologic features were correlated with the concomitant histology sections, wherever available.

STATISTICAL ANALYSIS

For data analysis, we used Statistical Package for the Social Sciences (SPSS) version 10. Age, gender, site of FNAC and cytomorphological patterns were expressed as frequency and percentage. Correlation of cytodiagnosis with age and gender was done on the basis of Chi-Square test (χ^2), taking into consideration the degrees of freedom (df). Significance was estimated by p-value.

RESULTS

Age and gender distribution

The study group was divided into three age groups – 0-5 years, 5-10 years and 10-16 years.

Most of the patients with lymphadenopathy were in the age group of 5-10 years 242/498 cases (48.59%), followed closely by 10-16 years age group 176/498 cases (35.34%) and least in 0-5 years age group 80/498 cases (16.06%). Lymphadenopathy was much more commonly observed in male children 349/498 cases (70.08%) than in female children 149/498 cases (29.92%). The male to female ratio was found

to be 2.34:1.

Among the patients in age group 0-5 years, 61/80 were males and 19/80 were females with M: F ratio 3.21:1. In 5-10 years age group, 187/242 were males and 55/242 were females with M: F ratio 3.4:1. In 10-16 years age group, 101/176 were males and 75/176 were females with M: F ratio 1.35:1.

Distribution according to the site of FNAC

Out of 498 cases, cervical group of lymph nodes were most commonly involved in 482/498 cases (96.79%), followed by axillary lymph nodes in 9/498 cases (1.61%), whereas inguinal and supraclavicular lymph node enlargement was found in four (0.80%) and three cases (0.60%) respectively.

During the study, 287/498 (57.63%) patients presented with multiple lymph node involvement as compared to solitary lymphadenopathy seen in 211/498 (42.37%) cases.

In 37 cases, more than one group of lymph node was involved. Among the cases with single lymph node involvement, anterior cervical group was involved in 233 cases, posterior cervical in 140 cases, submandibular in 42 cases, submental group in 14 cases, postauricular in 13 cases, axillary in 8 cases, occipital group in 5 cases, inguinal in 4 cases and supraclavicular in 2 cases 9 (Table-1).

Cytomorphological patterns

On the basis of cytomorphology, lymphadenopathy was classified into one of the following categories - Non-neoplastic, Neoplastic and Inconclusive.

Criteria for adequacy of smears¹⁴

All those smears were considered inconclusive where lymphoglandular bodies could not be identified in the FNAC sample or cytologic material obtained was insufficient to give definitive diagnosis or smears contained only blood.

Varied cytomorphologic patterns obtained during the study period showed the following distribution (Table-2):-

- Non-specific reactive lymphadenitis (324 cases)- 71.05%
- Tuberculous lymphadenitis (78 cases) – 17.11%
- Granulomatous lymphadenitis (38 cases) – 8.33%
- Acute suppurative lesions (16 cases)- 3.51%
- Neoplastic lesions (8 cases)- 1.61%
- Inconclusive (34 cases)- 6.83%

Among the neoplastic lesions (8/498), five cases showed features of Hodgkin's lymphoma, whereas two cases were classified as Non-Hodgkin's lymphoma and one case as me-

Lymph node groups	No. of cases	Percentage
Axillary	8	1.6
Supraclavicular	2	0.4
Inguinal	4	0.8
Anterior cervical	233	46.8
Posterior cervical	140	28.1
Submandibular	42	8.4
Submental	14	2.8
Postauricular	13	2.6
Occipital	5	1.0
More than one group	37	7.4
Total	498	100

Table-1: Distribution according to groups of lymph nodes involved

tastasis to lymph node (Table-2).

Correlation of age group with cytodiagnosis

Agewise distribution of cytomorphologic patterns of diagnosed cases (n=464) showed that non-specific reactive and acute suppurative lymphadenitis were more commonly seen in 5-10 years age group (169/324 and 10/16 cases), granulomatous and tubercular lymphadenitis were more common in 10-16 years age group (18/38 and 41/78 cases). Among the neoplastic cases, Hodgkin's lymphoma was more common in 10-16 years age group 3/5 cases, whereas one case each of Non-Hodgkin's lymphoma was seen in 5-10 years and 10-16 years age group. Only one case of metastatic lymph node was seen in 5-10 years age group (Table-3).

Association of male: female ratio with cytodiagnosis

Males more commonly had acute suppurative, non-specific reactive and granulomatous lymphadenitis. Among the neoplastic lesions, both the cases of Non-Hodgkin's lymphoma were seen in males, whereas four out of five cases of Hodgkin's lymphoma were found in males.

AFB positivity among granulomatous lesions

Out of 78 cases of tuberculous lymphadenitis, 76 cases showed granulomas on cytologic examination, whereas 2 cases showed features of suppuration. In all these cases, ZN stain was used. Among the granulomatous lesions, ZN stain showed presence of acid fast bacilli in 76/114 (66.67%) cases whereas 38/114 (33.33%) cases did not reveal acid fast bacilli.

Histopathologic examination

Four cases of Non-specific reactive lymphadenitis on FNAC were sent for histopathologic examination and the final diagnosis remained same. In one case, metastasis of small round cell tumour to lymph nodes was seen on FNAC and on histopathologic examination, diagnosis of Embryonal Rhabdomyosarcoma was made which was confirmed by immunohistochemistry.

DISCUSSION

Age and gender correlation

In this study, maximum number of patients were in the age group of 5-10 years (48.59%) followed by 10-16 years age group (35.34%). Wakely PE Jr, Kardos TF and Frable WJ. also reviewed FNACs in <16 years age group and found that majority cases were seen in age group of 6-11 years (34.82%).¹⁵ Similar results were seen in a study done by Ponder TB, Smith D and Ramzy I.¹⁶ Normal peak lymphoid growth occurs in the age group of 4-8 yrs, nearly reaching pathological size. So with on-going antigenic stimulus, the lymphoid growth may exceed the normal limits. This could be the reason for maximum number of cases in this age group.

In our study, incidence in males (70.08%) was more than that in females (29.92%) with male to female ratio 2.34:1. Male predominance was more evident in age group of 5-10 years (M:F= 3.4:1). Similar results were obtained in studies of Bezabih M, Mariam DW and Selassie SG (1.3:1)¹⁷ and Mitra S, Ray S and Mitra PK (1.3:1).¹⁸ This could be due to the prevailing custom of paying more attention to male children in Indian society rather than the actual increased bi-

Cytodiagnosis	No. of cases	Percentage
Non-neoplastic lesions		
Non-specific reactive	324	71.05
Tuberculous	78	17.11
Granulomatous	38	8.33
Acute suppurative	16	3.51
Total	456	100
Neoplastic lesions		
Hodgkin's lymphoma	05	62.5
Non-Hodgkin's lymphoma	02	25.0
Metastatic tumor	01	12.5
Total	08	100

Table-2: Spectrum of non-neoplastic and neoplastic lesions

Cytologic diagnosis	0-5 Year	5-10 Year	10-16 Year	Total
Non-specific reactive	60	169	95	324
Granulomatous	3	17	18	38
Tuberculous	12	25	41	78
Acute suppurative	2	10	4	16
Hodgkin's lymphoma	0	2	3	5
Non-Hodgkin's lymphoma	0	1	1	2
Metastatic	0	1	0	1
Total	77	225	162	464

Table-3: Correlation of age group with cytodiagnosis (n=464)

ological susceptibility in boys. Other studies showed almost equal incidence in males and females in the groups studied by - Haque MA and Talukder SI¹⁹ and Pandit AA, Candes FP and Khubchandani SR.²⁰ A study done by Ahmad T et al. showed reverse ratio (0.47:1) with predominance of females in the study group.²¹

Sites of lymphadenopathy

In the present study, cervical group of lymph nodes was most commonly involved (96.79%), followed by axillary group (1.81%). Among the cervical group, anterior cervical group (51.64%) was most frequently involved followed by posterior cervical group (31.60%). Multiple lymph node involvement (57.63%) was more commonly seen as compared to solitary lymphadenopathy (42.37%) in this study. Other studies done by Haque MA and Talukder SI,¹⁹ Pandit AA, Candes FP and Khubchandani SR,²⁰ Steel BLS, Schwartz MR and Ramzy I²² and Hussain M et al.²³ also showed predominantly cervical lymph node involvement. In a study by K Alam et al., maximum number of aspirations were done from cervical lymph nodes (74.2%).²⁴ The reason behind this may be the easy accessibility of cervical lymph nodes for examination and evaluation.

In present study, only three cases were found to involve supraclavicular lymph node (two of right side and one on left side), out of which only one was diagnosed as Hodgkin's lymphoma on FNAC. In a study by K Alam et al., frequency of malignancy was found to be higher in males (M:F=2.4:1).²⁴

Cytomorphologic patterns

Spectrum of pediatric lymphadenopathy on FNAC in various studies

Cytomorphologic patterns obtained in this study were predominantly non-neoplastic 456/498 cases (91.57%) as com-

pared to neoplastic lesions 8/498 cases (1.61%). Similar results were seen in studies done by Kumral A et al.²⁵ and Wakely PE Jr, Kardos TF and Frable WJ.¹⁵

Among the non-neoplastic lesions in this study, non-specific reactive lymphadenitis was the most common pattern 324/456 (71.05%), followed by tuberculous lymphadenitis 78/456 (17.11%), granulomatous lymphadenitis 38/456 (8.33%) and acute suppurative lymphadenitis 16/456 (3.51%). Other studies showing similar results with non-specific reactive hyperplasia as the predominant pattern, were done by Lake MA and Oski FA,²⁶ Annam V, Kulkarni MH and Puranik RB²⁷ and Hag IA et al.²⁸

In our study, both granulomatous lesions and tubercular lymphadenitis were frequently seen in 10-16 years age group. Male preponderance was seen in granulomatous lesions (24/38 males: 14/38 females), whereas almost equal male: female ratio was seen in cases of tuberculous lymphadenitis (38/78 males: 40/78 females). Thomas JO, Adeyi D and Amanguno H in their study concluded that tuberculosis was more common in <20 years age group and involved cervical group of lymph nodes most frequently.²⁹

In this study, only 8/498 cases (1.61%) were neoplastic, out of which five cases were of Hodgkin's lymphoma whereas two were Non-Hodgkin's lymphoma. Only one case of metastasis was detected in this study group. Other studies involving children with lymphadenopathy where similar incidence of neoplastic lesions was seen along with predominance of lymphomas were done by Bhandari B and Jain AM,³⁰ Lake MA and Oski F,²⁶ Annam V, Kulkarni MH and Puranik RB,²⁷ Wakely PE Jr, Kardos TF and Frable WJ,¹⁵ Hussain M et al.²³ and Ponder TB, Smith D and Ramzy I.¹⁶

In this study, 34/498 (6.83%) were included in inconclusive category as the cytological material was inadequate for reporting. Other studies done by Ahmad T et al. (8%),²¹ Annam V, Kulkarni MH and Puranik RB (3.57%),²⁷ Pandit AA, Candes FP and Khubchandani SR (8.04%),²⁰ Steel BL, Schwartz MR and Ramzy I (10.88%),²² Ponder TB, Smith D and Ramzy I (4.72%)¹⁶ and Hussain M et al. (3.71%)²³ showed similar incidence of unsatisfactory samples for diagnosis.

CONCLUSION

FNAC is an important diagnostic tool in the pediatric population. As a safe, minimally invasive and rapid procedure, clinicians can reliably utilize FNAC in the management of lymphadenopathy in children. Moreover, FNAC permits a rapid diagnosis with additional availability of ancillary techniques such as flow cytometry, cytogenetics, electron microscopy and cell block preparation with immunocytochemistry for definitive diagnosis. Results of FNAC compare favourably with those of tissue biopsies. So, it can be easily done in a cost-effective manner at places where facilities of histopathology are not available, as well as a preliminary diagnostic procedure to plan the management of lymphadenopathies in pediatric age group.

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Mycetoma due to *Alternaria*: A Case Report

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ABSTRACT

Introduction: Mycetoma is a chronic granulomatous infection characterized by a triad of swelling, draining sinuses and discharge of granules. The etiological agent causing mycetoma may either be a filamentous bacteria (actinomycetes) or a true fungi (eumycetes).

Case report: Here, we report a case of mycetoma foot due to *Alternaria* in a 70 years old female. She was farmer by occupation. She had swelling, discharging sinuses on plantar aspect of left foot over the period of 1 and half year. She did not remember history of injury. She had taken treatment from multiple doctors without any relief.

Conclusion: Though mycetoma is clinical diagnosis, causative agent must be isolated and identified for proper treatment. Treatment of botryomycosis, actinomycosis and eumycotic mycetoma is different. Prognosis depends on correct diagnosis and treatment accordingly. Mycetoma caused by *Madurella spp* need amputation. But Mycetoma caused by relatively opportunistic or saprophytic fungi responds well to antifungal therapy. Patient's limb was saved in our case due to proper identification and treatment.

Keywords: Mycetoma, botryomycosis, eumycetoma, actinomycosis, *Alternaria*

INTRODUCTION

Mycetoma, commonly known as 'Madura foot' is a chronic, localized, slowly progressing, granulomatous subcutaneous infection. It is characterized by swelling (tumefaction), interconnected sinus tracts which opens to the skin discharging exudates containing grains representing the etiological agent of the infection.¹ It may be caused by fungi and termed as eumycotic mycetoma or by filamentous higher bacteria, termed actinomycotic mycetoma. The most common causative agent include the fungus *Madurella mycetomatis* and the actinomycetes *Nocardia brasiliensis*, *Actinomadura madurae*, *Sreptomycetes somaliensis* and *Actinomadura pelletieri*.²

The natural reservoir of most of the etiological agents of mycetoma is soil and the infection usually follows a traumatic inoculation of the pathogen into subcutaneous tissue.³

Mycetoma is commonly found in tropical and subtropical climates. Most cases occur in Sudan, Somalia, Senegal, Mexico, Venezuela, India and Pakistan.² In India, actinomycetoma is prevalent in south, southeast Rajasthan, and Chandigarh; while eumycetomas are common in north India.⁴ Mycetoma occurs typically in young men, especially farmers, who are exposed to contaminated soil.²

Identification of causative agents of Mycetoma is very essential for proper and effective management. Eumycetoma needs adequate antifungal therapy and surgical management, while actinomycetes require antibacterial therapy.

Here, we report a case of mycetoma foot caused by *Alternaria* in a Dhule district of Maharashtra.

CASE REPORT

A 70 years old female, from a rural area in Dhule district, Maharashtra, came with the complaint of wound on left foot since one and half years. The patient had been investigated and treated at private hospitals but still there was no relief of the symptoms and also no etiological diagnosis could be reached. The patient did not give history of any trauma to the affected part. There was no history of diabetes mellitus and any other underlying diseases.

On local examination, there were swellings on plantar aspect of the left foot with discharging sinuses (Figures 1 and 2). The discharge was seropurulent with black colored granules. Laboratory test results revealed no abnormalities in the hemogram. X-ray of her left foot showed no bony lesions (Figure 3).

The black grain from the discharging wound were collected on sterile gauze pad (Figure 4) for microscopy and culture. The grains had soft consistency and different sizes and shapes.

One of the grains was taken and crushed between two glass slides and examined microscopically using 10% KOH. Brown colored septate hyphae were seen. The grains were inoculated on two sets of Sabouraud's dextrose agar (SDA) media each containing SDA with and without antibiotic. One set was incubated at 37°C and other at 25°C.

Fungal growth appeared within 48-72 hours. Colonies were grayish to black, and were floccose. The reverse side was brown to black (Figure 5).

The microscopic examination of the fungus performed by teased mount and lacto-phenol cotton blue preparation, showed light brown colored septate hyphae and conidia. Conidia were ovoid, with rounded base and short conical apex, with transverse and oblique septations and were found singly and in chains (Figure 6).

From the above macroscopic and microscopic features, the isolate was identified as *Alternaria*.

DISCUSSION

Alternaria is a dematiaceous fungus which has a worldwide distribution. It is a very large and complex genus that includes hundreds of species. Most of the species are found as saprophytes in the soil, air and variety of other environmen-

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Figure-1 and 2: Swellings on plantar aspect of the left foot with discharging sinuses



Figure-3: X-ray left foot showing no bony lesions; **Figure-4:** The black grains from the discharging wound collected on sterile gauze pad

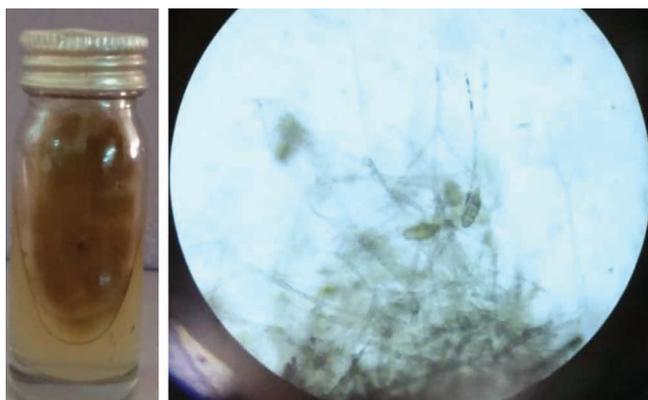


Figure-5: Grayish to black mould like growth on Sabouraud's dextrose agar, **Figure-6:** Brown colored septate hyphae and conidia, with rounded base and short conical apex and with transverse and oblique septations on lactophenol cotton blue mount

tal habitat. These are opportunistic fungi and infections tend to occur in high risk patients, such as patients undergoing immunosuppressive therapy, bone marrow or solid organ transplant, acquired immunodeficiency syndrome, cushing disease, hematologic disease.⁵

In the review made by Pastor FJ *et al.* which included all cases of alternariosis reported in the literature up to 2007, the most common clinical manifestations of Alternariosis was cutaneous and subcutaneous infections (74.3%), followed by oculomycosis (9.5%), invasive and noninvasive rhinosinusitis (8.1%) and onychomycosis (8.1%).⁶

Here, we reported a case of mycetoma foot caused by *Alternaria*. To the best of our knowledge, mycetoma caused by *Alternaria* is not reported till now. Old age and farmer by occupation only appears to be risk factors for development of mycetoma by *Alternaria* in our case.

Patient responded well to antifungal therapy.

CONCLUSION

As treatment of Mycetoma depends on causative agent, it must be identified in every case. If patients are treated accordingly, they can be either cured and unnecessary treatment trials can be avoided or doctors will not face legal complications of amputation where limb can be saved by Medical treatment.

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Efficacy of Combined Epidural General Anaesthesia for Attenuating Haemodynamic Responses in Gynaecological Laparoscopic Surgery

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ABSTRACT

Introduction: General anaesthesia is preferred technique for Laparoscopic surgeries, but laparoscopy itself associated with significant haemodynamics stress response which may impose a challenge to anaesthesiologist. Epidural anaesthesia along with general anaesthesia can have added advantage to provide stable haemodynamics in such situations. The present study aimed to evaluate the efficacy of epidural anaesthesia in combination with general anaesthesia for maintaining stable haemodynamics and better operative field in laparoscopic gynaecological surgeries.

Material and Methods: Fifty patients of American society of anaesthesiologist status I and II, aged between 18-60 years, underwent elective laparoscopic gynaecologic surgeries, were randomly allocated into two equal groups of 25 each. Control Group received plain GA (GA) while Study Group received combined GA with Epidural anaesthesia (CEGA). Haemodynamics were compared at various stages (at preinduction, post induction, insufflation, desufflation and extubation). Surgeons satisfaction about operating conditions in form of poor, good and excellent were also noted. Statistical analyses were performed using unpaired t-test. A $p < 0.05$ was considered as significant.

Results: Systolic and diastolic pressures were successfully attenuated in CEGA group while heart rate didn't change significantly. There was significant rise in heart rate, systolic blood pressure, and diastolic blood pressure in plain GA group. Operating conditions subjectively assessed by surgeons, which was excellent in CEGA group, and not good in plain GA group.

Conclusion: Combined epidural and general anaesthesia technique can be used in laparoscopic surgery, where we want to avoid stress response, maintain better haemodynamics without hypotension and bradycardia with better surgical field due to bowel contractions.

Keywords: Combined epidural and general anaesthesia, gynaecological laparoscopic surgery, haemodynamics, stress response

INTRODUCTION

Laparoscopy is becoming one of the most common surgical procedures performed in gynaecological surgeries as well as in general surgeries. General anaesthesia, epidural anaesthesia and combined general plus epidural anaesthesia are the options available for such surgeries.¹ Anaesthesiologists have to compensate for haemodynamic and respiratory changes, majority of which are due to CO₂ pneumoinflation and various positions given for surgery.^{2,3} Adding epidural to general anaesthesia can attenuate the haemodynamic changes associated with pneumoinflation by decreasing systemic vascular resistance (SVR), decreasing mean arterial blood pressure (MAP) and maintaining cardiac index as

well as it will decrease the requirements of various anesthetic agents.^{2,4} It may provide better haemodynamic stability when combined with general anaesthesia during laparoscopic surgery. It also improves surgical field by contraction of bowels due to sympathetic blockade.⁴⁻⁶ Epidural analgesia in the postoperative period may improve respiratory function, decrease perioperative cardiac complications, improve well being of the patients and facilitate early ambulation as well as return of bowel function.^{3,6} Thus we decided to study the comparison of haemodynamic effects of general anaesthesia plus epidural anaesthesia versus general anaesthesia for gynaecological laparoscopic surgery.

MATERIAL AND METHODS

A prospective randomized study titled, "Efficacy of Combined Epidural General Anaesthesia for attenuating Haemodynamic responses in Gynaecological Laparoscopic Surgery" was carried out in 50 patients after Institutional Ethics Committee approval, who were divided into 2 groups with 25 patients in each group according to computer generated random digits. Sample was based on inclusion exclusion criteria. Group I (GA) Patients received plain GA and Group II (CEGA) - Patient received GA and epidural anaesthesia. Patients, aged 18-60 years, of American Society of Anaesthesiologists (ASA) I and II scheduled for elective gynaecological laparoscopic surgery lasting for 2-4 hours were selected. Exclusion Criteria were patient's refusal, pregnant patients, having allergy to propofol / local anaesthetic, contraindication to epidural anaesthesia (e.g. local site infection, increase ICT etc.) and surgeries converted into open surgery. Our aim was to compare following parameters in combined general and epidural anaesthesia versus general anaesthesia given for laparoscopic surgeries. Haemodynamic responses which include heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP), surgical field and side effects / complications.

After written informed consent was obtained, all patients were preloaded with 8-10 ml kg⁻¹ Ringer Lactate. Standard monitoring including HR, electrocardiogram (ECG), non-invasive blood pressure (NIBP), oxygen saturation (SpO₂),

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and endtidal carbondioxide (EtCO₂) was done in both the groups. CEGA group received lumbar epidural (L₂₋₃ / L₃₋₄) in sitting position under all aseptic precautions. Catheter was fixed with 5 cm length in epidural space and test dose of 2% adrenalised lignocaine was administered to rule out intravascular or intrathecal catheter placement. After 5 min, patient received premedication with intravascular (iv) glycopyrrolate (0.002mgkg⁻¹), ranitidine (1mgkg⁻¹), ondansetron (0.08mgkg⁻¹), midazolam (0.03mgkg⁻¹) and fentanyl (2µgkg⁻¹).

Standard general anesthesia technique was used in both groups. After preoxygenation with 100% oxygen for 3 minutes, Induction was done with propofol and endotracheal intubation facilitated by iv succinylcholine. Maintenance was done with O₂+N₂O (FiO₂ 0.4) and propofol infusion along with intermittent dose of vecuronium. After induction 4cc bolus 0.25% epidural bupivacaine was given in CEGA group. 20min after the bolus, 0.25% bupivacaine continuous epidural infusion 4ml/hr was started. Intraabdominal pressure was maintained below 15 mm Hg. Propofol and epidural infusion were stopped after desufflation and total pneumoperitoneum time was noted. Any incidence of hypotension and bradycardia was noted. Hypotension defined as SBP < 90mmHG or >20% reduction in preoperative SBP and bradycardia defined as pulse rate (PR) < 50/min.

Monitoring of HR, SBP, DBP, SpO₂, and EtCO₂ was done every 5 min. and at specific stages like pre-operative, after premeditation, after induction, after trendelenberg position, after insufflation, after desufflation, reversal and every 10 min in postoperative period. Blood loss, surgical field were noted. Surgeon's opinion was taken regarding field of surgery with respect to bowel contraction and blood loss and asked them to grade as excellent, good or poor. Reversal was with i.v. atropine 0.02mg/kg and i.v. neostigmine 0.05mg/

kg. and extubation was carried out after standard criteria's were achieved.

Postoperative haemodynamics monitoring, SpO₂, and respiratory rate (RR) for both groups was done for one hour. For postoperative pain relief iv tramadol 1mg/kg for GA group and epidural tramadol 1mg/kg for CEGA group with iv ondansetron was administered. Patients were observed for any post operative complications.

STATISTICAL ANALYSIS

Continuous data are presented as mean±{standard deviation, (S.D.)}. Study was analyzed by using unpaired t test for intergroup and paired t test for intragroup variables. p-value <0.05 was considered as statistically significant.

RESULTS

Both groups were comparable with respect to age, sex, weight, height and baseline haemodynamics parameters. Following induction in CEGA group HR, SBP, DBP were 80±10, 116.64 ± 11.83, and 78.36 ± 6.04 respectively and in GA group HR-83±12, SBP-126.56±8.02, DBP-84.84±7 (Figure 1,2,3). In CEGA group increase in SBP and DBP were successfully attenuated (P<0.05) while no statistically significant change in heart rate was observed. However; in GA group SBP and DBP increased by 10.6% and 10.9% respectively which was statistically significant (P < 0.05).

At the stage of pneumoinsufflation, in CEGA group the HR, SBP, DBP were 83±11, 113±11, 73±7 respectively and in GA group HR, SBP, DBP: 94±9, 131±14, 83±8, respectively. As evident from figure 1,2,3 in CEGA group combined epidural and general anaesthesia successfully attenuated stress response to pneumoperitoneum while in GA group plain GA failed to attenuate stress response to pneumoperitoneum as

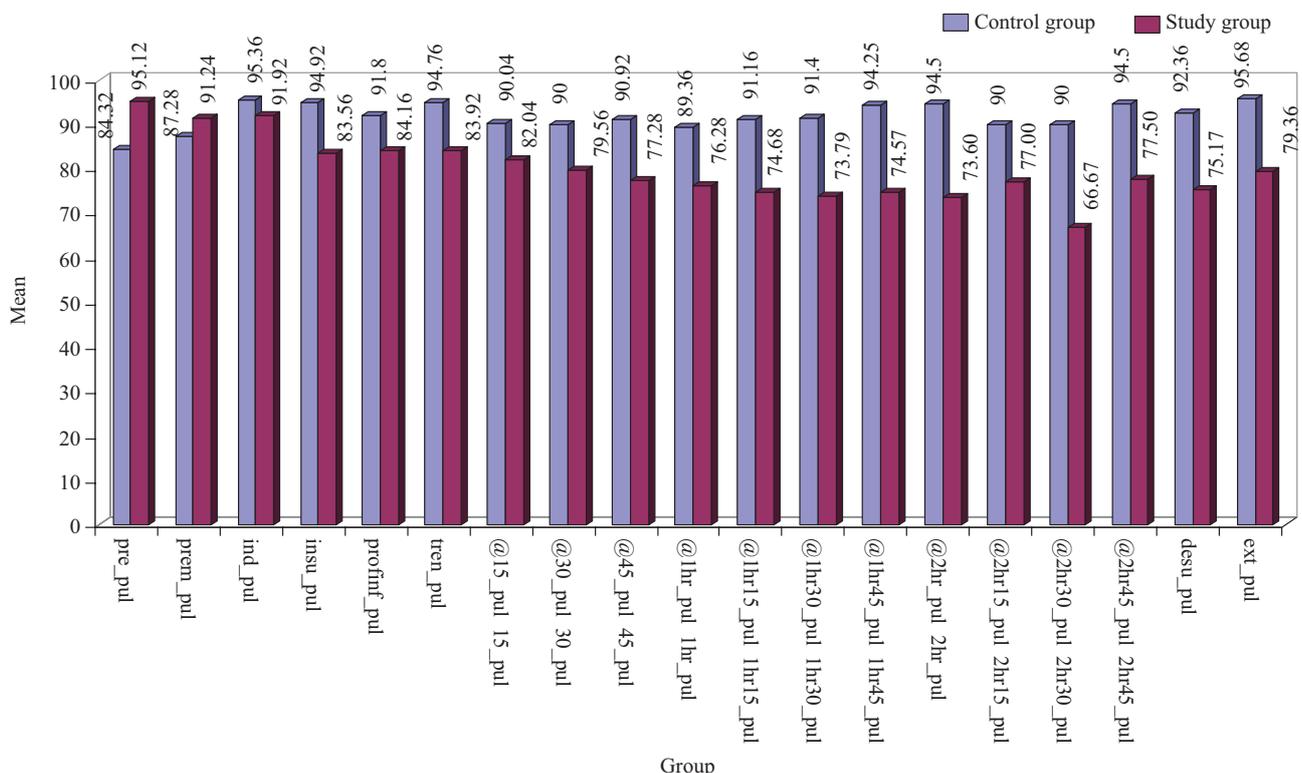


Figure-1: Comparison of mean of pulse (/min) of study(CEGA) and control group (GA)

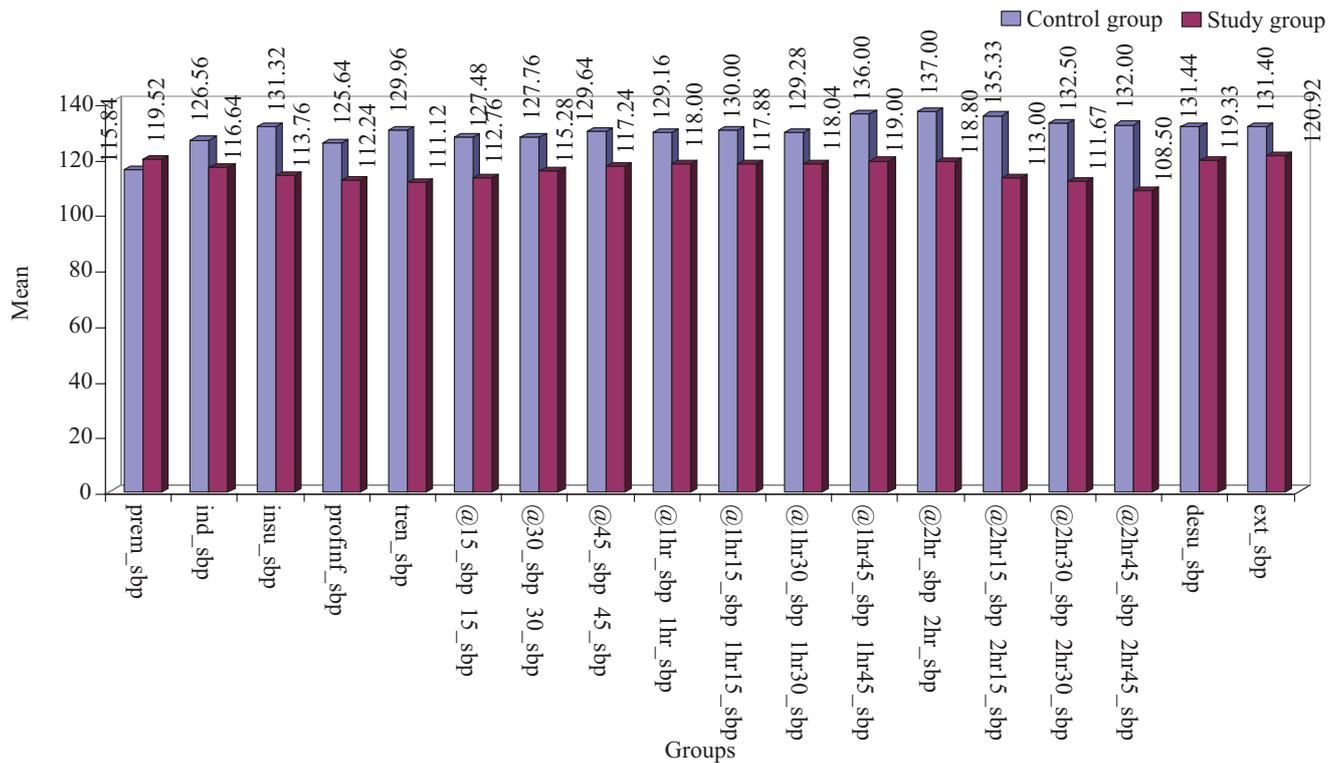


Figure-2: Comparison of mean of systolic blood pressure (in mm Hg) of study (CEGA) and control group(GA)

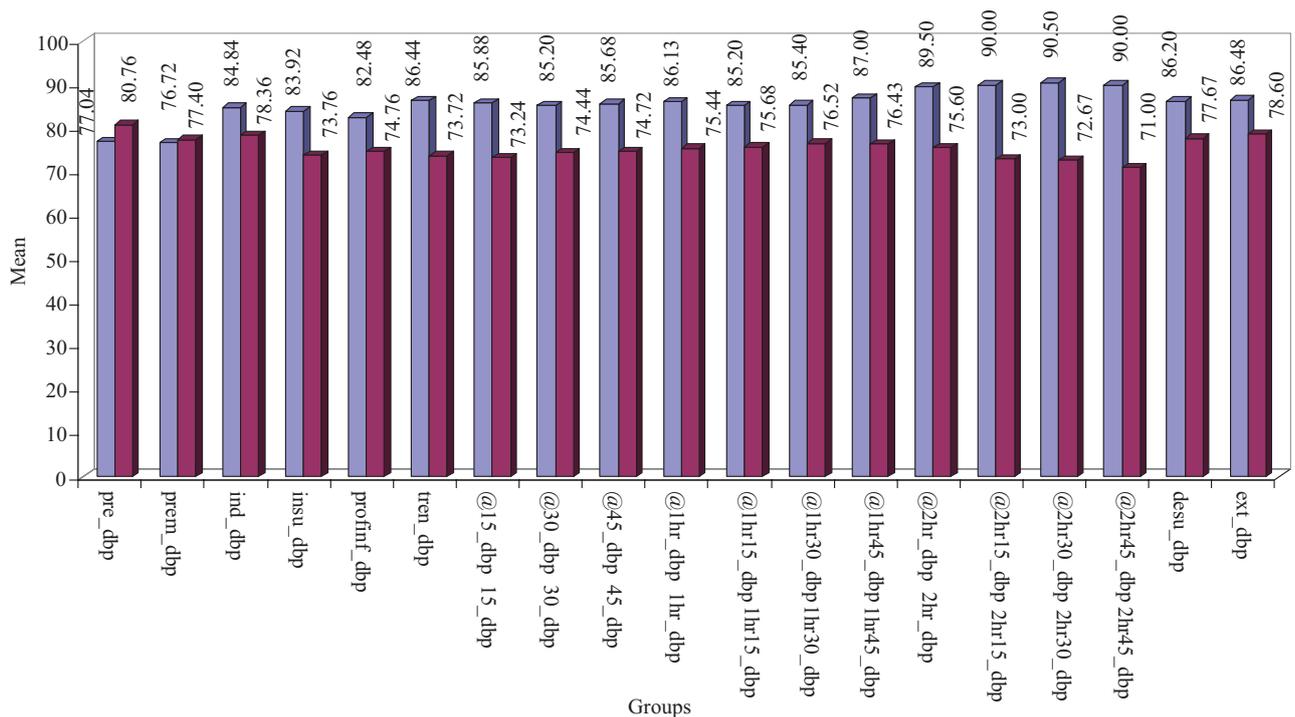


Figure-3: Comparison of mean of diastolic blood pressure (in mmHg) of study (CEGA) and control group (GA)

HR, SBP, DBP ↑ by 12%, 11%, 12% respectively which was statistically very significant with P value <0.03. Similarly, intraoperative at various stages, general anaesthesia with epidural anaesthesia was better in maintaining haemodynamic parameters while in plain GA group general anaesthesia failed to attenuate the stress response associated with pneumoinsufflation, Trendelenberg position, desufflation and extubation with P< 0.05 which was statistically significant. In both groups no complications like hypotension,

bradycardia or any other side effects were observed. In our study operating conditions assessed subjectively by surgeons were better in the CEGA group. In CEGA group it was “excellent” in 18 cases i.e.72%, “good” in 6 i.e. 24% and in one case (4%) it was poor. In GA group it was “good” in 17cases (68%) and “poor” in 8 (32%) cases (Table 1).

DISCUSSION

Laparoscopy is a minimally invasive procedure allowing en-

Operating Condition	Excellent	Good	Poor
Group I (control)	0 cases (0%)	17cases (68%)	8 cases (32%)
Group II (Study)	18 cases (72%)	6 cases (24%)	1case (4%)

Table-1: Comparison of Operating conditions in study(CEGA) and control group (GA)

doscopy access to the peritoneal cavity after insufflation of a gas (CO₂) to create space between the anterior abdominal wall and the viscera. This space is necessary for the safe manipulation of instrument and organs. The three major forces that uniquely alter patient's physiology during laparoscopy are; the increase in intra abdominal pressure and volume which are transmitted to the thorax, the effects of patient positioning Trendelenberg, reverse Trendelenberg and lateral position and Carbon dioxide pneumoinflation which is not inert. It may have profound effects at local tissue level. These three forces separately or in combination have profound effects on the patients' haemodynamic, respiratory and metabolic functions.^{7,8}

Pharmacological and interventional methods have been used to attenuate the haemodynamic stress response during laparoscopic surgery in various studies.⁹⁻¹⁴ Novak JV et al⁹ used clonidine successfully as epidural for blunting the stress response. Maharjan SK¹⁰ concluded in his study that propranolol a beta blocker effectively blunts the stress response during laparoscopic cholecystectomy. Regional techniques also being used to blunts the stress response in combination with general anaesthesia for laparoscopic surgeries.¹¹⁻¹⁴

In our study, at the time of premedication HR, SBP, DBP were comparable in both the groups. Following induction and at the stage of pneumoinflation in CEGA group, increase in haemodynamics was successfully attenuated and remained stable throughout the procedure while in GA group, plain GA failed to attenuate stress response. Calvo et al¹² observed post pneumoperitoneum in GE group SBP and DBP were reduced to 6-8% from base line and stable throughout the surgery. Pan YS¹⁵ et al had observed that intraoperatively MAP was significantly lower in the GE group than that in the G group and the difference was statistically significant ($P < 0.05$). Intraoperatively, HR in the GE group was reduced compared with that of the G group. At all time points, the MAC concentration of isoflurane inhaled was significantly lower in the GE group than that of the G group.¹⁵ Tekelioğlu UY et¹⁶ studied haemodynamics responses in gynaecological laparoscopic surgery under plain GA and found that MAP and HR were significantly increased from 69.7±1.55 to 82.9±3.05 ($p < 0.05$) and 76.9±9.43 to 95.2±12.1 ($p < 0.05$) respectively during pneumoperitoneum. Therefore, we can state that EA helps to provide stable haemodynamics in laparoscopic surgeries along with GA. Even the surgeries which are not laparoscopically done but epidural anaesthesia has proved its effectivity in maintaining stable haemodynamics when combined with GA such as Funayama T et al¹⁷ found that MAP was depressed significantly in study group (combined general anaesthesia and thoracic epidural anaesthesia) ($P < 0.05$) without depressing CO and pulmonary haemodynamics and they concluded that combined thoracic epidural and general anaesthesia maintained systemic haemodynamics well without depressing pulmonary haemodynamic in thoracic surgery.

In the present study at different stages of laparoscopic surgery e.g. at Pneumoinflation, Trendelenberg position, desufflation, extubation in CEGA Group systemic haemodynamic changes were attenuated and vital parameters were maintained stable ($P < 0.05$) without any complications like hypotension and bradycardia. Luchetti M. et al¹⁸ showed CEGA can control pain due to CO₂ induced peritoneal irritation, providing intra and postoperative analgesia in laparoscopic cholecystectomy. Hence, apart from maintaining stable haemodynamics one of the added advantages of epidural anaesthesia is providing intraoperative and prolonged postoperative analgesia if required. Yun-song et al¹⁹ used epidural anaesthesia as preemptive analgesia in retroperitoneal laparoscopic adrenalectomy and they found decreased in requirement of anaesthetic agents and other vasoactive drugs to blunt the stress response.

The epidural anaesthesia can effectively block the nerve conduction pathway of noxious stimulations.^{12,20} Thus, general anaesthesia combined with preemptive epidural analgesia can provide a good surgical environment and a lighter stress status for retroperitoneal laparoscopic surgeries. Q DM²¹ et al and Vera Von Dossow, et al²² showed that combined general anaesthesia and epidural anaesthesia blunt the stress response during thoracic surgery. Q DM²¹ et al also reported that the cortisol concentration in CEGA group was significantly lower as compare to in plain GA group and it is the main steroid hormone responsible for stress response.

In presence of epidural anaesthesia as requirement of anaesthetic drugs is decreased thus resulting in quick awakening and extubation at the end of surgery. The use of other vasoactive drugs is also reduced in presence of epidural anaesthesia such as esmolol, metoprolol, nicardipin for attenuating the stress response. Calvo et al¹² compared the efficacy of both regional techniques, combined general epidural anaesthesia and spinal anaesthesia in laparoscopic surgeries and found the results were comparable in both groups in blunting the stress response during pneumoperitoneum. Ghodki PS et al¹⁴, Studied the effectivity of combined spinal and general anaesthesia (SGA) for laparoscopic surgery and found that the average requirement of isoflurane and metoprolol during pneumoperitoneum was significantly higher in group GA as compared to group SGA ($P < 0.001$). However; the Use of spinal anaesthesia in combination with GA may result into exaggerated and uncontrolled hypotension while CGEA provides effective control over haemodynamics.

De Canniere D²³ et al showed that combination of lumbar epidural with general anaesthesia for colon surgery maintained contracted bowel and excellent field of surgery due to its preponderance of the parasympathetic nervous system allowing the release of hormones with intestinal tropism. In our study operating conditions were excellent in the group CEGA. It was graded by surgeons as "excellent"; "good"; "poor". It was "excellent" in 18 cases i.e.72% in CEGA

group, "good" in 6 i.e.24% and in one case (4%) it was poor in CEGA group. It was "good" in 17cases (68%) and "poor" in 8 (32%) cases in GA group.

CONCLUSION

In conclusion, a combined epidural and general anaesthesia technique attenuated systemic haemodynamic changes due to stress response and maintained stable vital parameters at different stages of laparoscopic surgery without any complications like hypotension and bradycardia. In addition, excellent surgical field due to bowel contraction makes it acceptable amongst surgeons. Thus this technique can be used in all patients including hypertensive patients and patients with cardiac disease undergoing laparoscopic surgeries for attenuating stress response and maintaining stable haemodynamic parameters.

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Keyhole Approach for Hepatic Hydatid Cyst Disease in Haryana

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ABSTRACT

Introduction: Hepatic Hydatid Cyst disease occur as endemic disease in several parts of the world. Surgery is most important modality in its treatment. Our objective is to determine the outcome of Keyhole laparoscopic approach of hepatic hydatid Cyst disease.

Material and Methods: In this retrospective study, 7 patients of hepatic hydatid Cyst disease during January 2013 - January 2015 were taken up. Operative time, clinico-pathologic features, conversion to laparotomy, and recurrence rates were analysed.

Results: The majority of the patients presented in the 4th decade (43.3%) with female sex predisposition (58% females). The right lobe of the liver was most commonly involved. The average operative time was shortened to about 70 minutes. The average postoperative period was 6 days. The average follow-up period is 6 months.

Conclusion: The authors concluded that Keyhole laparoscopic approach for hepatic hydatid Cyst disease is feasible, practical, safe and effective treatment in properly selected patients. It eliminates the disadvantages of big surgical incision, reduces post-operative pain and shortens the hospital stay and offers all the advantages of minimally invasive surgery.

Keywords: Hydatid Cyst, Laparoscopic.

INTRODUCTION

Hydatid disease is caused by the parasite, *Echinococcus granulosus*, that lives in the small intestine of dogs and other canines. Its eggs are eliminated in the feces and after ingestion, liberates their larvae in the intestine of an intermediate host. Humans become accidental intermediate hosts. The larvae via the portal system reach the hepatic sinusoids and develops into cysts. In a World Health Organization study in the central Peruvian Andes, the incidence of hydatid disease was reported in about 9.1% of human beings.¹

In humans, Hydatid cysts occur mainly in the liver (50-75%), then in the lungs (25%), and 5-10% distribute along the arterial system to any organs from the great toe to crown of the head, except hair, nail and teeth.²

With the passage of time, the treatment for hydatid liver cysts has been undergoing revolutionary changes. But surgery is the mainstay of treatment for hydatid disease of the liver. The era of open surgery with its associated large incision and prolonged stay is now being challenged by lesser invasive procedures.³

In the last decade, laparoscopic treatment of hepatic hydatid disease has been increasingly popular due to various advantages over open surgery. With increased use, the technique has been refined and standardized, and laparoscopic treatment has become the gold standard for management of hydatid liver disease. This study presents our experience in seven patients with hydatid cysts of the liver, treated with a keyhole laparoscopic approach in a Haryana.

MATERIAL AND METHODS

Study was done from January 2013 - January 2015 in the Department of Minimally Invasive Surgery, Jaspal Hospital, Ambala, Haryana. Study was done after taking Ethical approval from local bodies and written informed consent from subjects. 7 patients with solitary hepatic hydatid cysts were treated by keyhole laparoscopic approach. The study consisted of 3 men and 4 women. Most commonly presenting complaint was abdominal pain, followed by nausea and dyspepsia. Patients were diagnosed with the help of ultrasonography (US) and computed tomography (CT). We excluded the following cases:

- Cysts less than 3 cms in diameter.
- Interparenchymal location of the cyst.
- Multiple hydatid cysts or a cyst located near vascular liver element, and those located in segment 1,2 and 7 as they are considered in blind area for laparoscopic procedure.
- Gharbi IV.
- Patients unfit for general anaesthesia.
- Preoperatively, all patients were given a tablet of Albendazole 15 mg /Kg body weight for two weeks.

All procedures were performed under general anesthesia, in supine position with right tilt, surgeon and camera assistant standing on the left and the scrub nurse standing on the right side of patient. With CO₂ a pneumoperitoneum of 12 mmHg was obtained. Prophylactic antibiotics were administered 30 minutes prior to the surgery. All patients were given 8mg of dexamethasone injection 60 minutes prior to surgery, as prophylaxis for anaphylaxis as an anaphylactic reaction has been reported in a few studies.⁴

keyhole laparoscopic exploration was performed with four ports, one supraumbilical 10 mm port through which a 30° telescope is inserted; another 10 mm working port in the epigastrium as near as possible to the cyst and two additional 5 mm port were inserted according to the cyst location. After locating the cyst, gauzes soaked with 10% povidine-iodine 5% saline (as ascolicidal agent) were introduced into the abdominal cavity from the 10 mm epigastrium port, and was placed surrounding the cyst.

The cyst was punctured with laparoscopic aspiration needle connected to 10cc syringe through the epigastric port to aspirate, identify and confirm the contents. Another suction irrigation apparatus was introduced through the right 5 mm working port to avoid accidental spillage of the cyst content.

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After aspirating cystic fluid 10% povidine-iodine / 5% saline (as ascolicidal agent) was injected inside the cyst and then the cyst was aspirated again.

A needle puncture in the cyst was enlarged sufficient enough to accept the suction tip and then the suction tip was introduced inside the cyst cavity; the contents along with germinal membrane were aspirated. The deflated cystic wall was deroofed with the help of a hook by diathermy or Harmonic scarpel. The laminated membrane and daughter cysts were carefully removed and were put into the endobag.

A telescope was put inside the cavity for better visualization and to exclude any biliary communication or retained daughter cysts. One of the patient had biliary communication which was closed by intracorporal suturing with 2-0 vicryl. The cystic cavity was irrigated, washed with povidine-iodine several times. Endobag with contents were carefully removed from 10 mm epigastric port. Omentoplasty was done in all the cases. Two drains were placed, one in the cyst cavity and another in the pelvis. The postoperative period in all the cases was uneventful. Oral fluid intake was allowed on the next day of operation; the cyst drain was removed 72 hours after operation, after confirming no bile in the drain and pelvic drains were removed after 4 days. Patients were discharged on fifth day. All patients were prescribed tablet albendazole for 6 weeks, post-operatively period. The patients were planned to be followed up on one month, three month, and six month by ultrasound.

RESULT

During our study period from January 2013- January 2015, 7 patients with solitary hepatic hydatid cysts were treated by keyhole laparoscopic approach in the Department of Minimally Invasive Surgery. In the study we noticed the female preponderance (4 females) with maximum number of patients in fourth decade of life; The average age of the patient was 37.6 years (range: 23-58years). Of the total, 6 patients (85.7%) had a rural agrarian background while one patients (14.2%) were coming from an urban setting.

The commonest presenting complaint was abdominal pain or heaviness, exacerbated by meals, a symptom reported by 4 (57.2%) of the patients. Nausea and dyspepsia was reported by 2 patients (28.6%). An upper abdominal swelling or mass was noticed only by 1 patients (14.2%). All the patients had a single cyst. The mean cystic diameter was 11 centimeter (range 8 – 15 centimeter). All patients were prescribed a tablet of Albendazole 15 mg /Kg body weight for two weeks before surgery. An abdominal ultrasound and abdominal C.T scan were done to confirm the diagnosis of a hepatic hydatid cyst in all patients. Operative duration ranged from 55 min to 120 min (mean: 86 minutes). No conversion to an open procedure was required. None of our cases developed anaphylaxis during the procedure. One of the patient had biliary communication which was closed intra-operatively by intracorporal suturing with 2-0 vicryl. ly, None of the patients had post-operative port site infection. A minor biliary leak was found in two patients. The hospital stay ranged from 3 to 9 days. During the follow up period the patients were called at intervals of 1 month, 3 months and 6 month. During the follow up period none of the operated patients had

recurrence.

DISCUSSION

Hydatid disease is caused by the parasite, *Echinococcus granulosus*, that lives in the small intestine of dogs and other canines. Its eggs are eliminated in the feces and after ingestion, liberates their larvae in the intestine of an intermediate host. Humans become accidental intermediate hosts. The larvae via the portal system reach the hepatic sinusoids and develops into cysts. In humans, 50-75% of cysts occur in the liver; 25% are located in the lungs and 5-10% distribute along the arterial system. Via systemic circulation, approximately 10-15% may reach any other organs from the great toe to crown of the head, except hair, nail and teeth.²

In this study, 7 patients with hydatid cysts in liver were treated with Keyhole laparoscopic approach, with the principles of conventional surgery like inactivation of scolices with 20% hypertonic saline, aspiration of cysts contents, unroofing the cavity and evacuation of entire cysts contents. A similar study from University Hospital in Turkey has also reported simple drainage of cysts with a special trocar and cannula in 16 patients and unroofing and drainage in another 20 patients with good results and low recurrence.⁵ Ertem et al. has reported successful laparoscopic cystectomy and partial cystectomy with drainage in 33 patients along with omentoplasty in 15 patients with conversion to open surgery in only 2 patients.⁶

In our study the average age of the patient was 37.6 years (range: 23-58 years), which is in keeping with the average age of presentation in other series.^{7,8} Females were predominantly affected in our study as in some other studies.^{8,9} The commonest presenting complaint was abdominal pain or heaviness, exacerbated by meals, a symptom reported by 4 (57.2%) of the patients, which has also been reported by other authors.⁷⁻⁹ In this study, the most common pathology was a solitary cyst in the right lobe of liver. Same was reported in studies from India and Uruguayan community.^{7,10} Ultrasonography (US) and CT are both effective for detection of liver hydatid disease. US is useful in detection of cystic membranes, septa and hydatid sand, while CT exhibits cyst wall calcification and cyst infection are best demonstrated by CT.¹¹

Surgery remains the mainstay of treatment for hepatic echinococcosis.^{12,13} Laparoscopy is ideal in patients with superficial and fluid-filled cysts.¹⁴ Laparoscopic pericystectomy can be regarded as the gold standard for management of small, peripherally located hydatid cysts lying away from major vessels.¹⁵ The first report of laparoscopic treatment of hydatid cyst of the liver was published in 1994¹⁶ followed soon thereafter by the first report of anaphylactic shock complicating laparoscopic treatment of hydatid cysts of the liver.⁴ In fact, an exaggerated fear of anaphylaxis seemed to discourage surgeons from more widely adopting minimal access techniques for the treatment of hydatid cysts.¹⁷ However, gradually reports started appearing in the world literature detailing laparoscopic management of liver hydatid disease.¹⁸ Various Laparoscopic techniques described are total pericystectomy, puncture and aspiration of contents followed by marsupialization, unroofing and drainage, unroofing and omentoplas-

ty.^{19,20} Total pericystectomy seems to be the best operative procedure for small and peripherally located cysts. For large and deeply located cysts, the more extensive cystectomy and hepatectomy are accompanied by higher morbidity.⁶ In our study, we have performed procedure laparoscopically, the remnant cyst was dealt with by omentoplasty. We have used the regular Trocar Canula system, to obtain a totally contamination-free management of liver hydatid disease.

Keyhole Laparoscopic surgery has well known advantages, as it offers lower morbidity outcome and shorter hospital stay. The laparoscopic approach is associated with faster surgery recuperation and possible resolution of concomitant abdominal surgical problems.²¹ The Keyhole laparoscopic approach of hepatic hydatid Cyst disease offers an advantage of better visual control of the cyst cavity under magnification, which allows better detection of small open bile ducts that leak bile. These are taken care of by direct suturing or cauterization and better visualization of the remains of germinative layer of the cyst. One of the patient had biliary communication which was closed intraoperatively by intracorporeal suturing with 2-0 vicryl. Despite the above-mentioned advantages, the keyhole laparoscopic evacuation of liver hydatid cyst has its limitations and risks i.e. hydatid dissemination and anaphylaxis mainly at the time of needle insertion through a puncture. The first case report of anaphylactic shock complicating laparoscopic treatment of hydatid cyst has been reported in 1998⁴ the author suggested that anaphylaxis developed secondary to direct contact of the hydatid fluid with blood stream, due to inadvertent laceration of the liver. To avoid such anaphylactic shock during laparoscopic evacuation we should include cysts surfaces into peritoneal cavity laparoscopically. The cyst should be approached through its fibrotic capsule and adequate precaution should still be used to avoid liver parenchymal injury.⁴ In our study, we have performed procedure keyhole laparoscopic approach, the remnant cyst was dealt with by omentoplasty. We used 10% povidine-iodine / 5% saline (as ascolicidal agent) to irrigate the gauze that surrounded the cyst and during aspiration and injection of the cyst cavity but after evacuating all the content we resorted to ascolicidal agent for irrigation. Another important issue in laparoscopic hydatid cyst surgery is the removal of the germinative membrane.⁶ Several techniques and instruments have been used, i.e. aspiration-grinding apparatus others used a large – bore suction catheter.¹⁸ We used a wide bore suction catheter without valve system for evacuating the cyst content. Some groups have reported a 23% to 27% conversion rate^{5,22} and 4% to 25% morbidity rate.^{5,22,23} The incidence of conversion from laparoscopic to open surgery is variable and can be reduced by proper selection of cases. Cases with calcified cysts, those located in the deeper portions of the liver and those with biliary communications are not suitable for laparoscopic management. Due to proper case selection in our study, there was no incidence of conversion.

CONCLUSION

The authors have no doubt to conclude that Keyhole laparoscopic approach for hepatic hydatid Cyst disease with regular trocar canula system is feasible, practical, safe and

effective treatment in properly selected patients. Its efficacy was found to be optimum for preventing spillage, evacuating contents of hydatid cysts and visualization of cyst-biliary communication. It shortens the postoperative hospitalization period, reduces the number of complications as well as the overall costs. Keyhole Laparoscopic approach eliminates the disadvantages of big surgical incision, reduces post-operative pain and shortens the hospital stay and offers all the advantages of minimally invasive surgery.

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A Comparative Study of Role of Topical Diltiazem 2% Organo Gel and Lateral Internal Sphincterotomy for the Management of Chronic Fissure in Ano

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ABSTRACT

Introduction: Fissure in ano is a common proctologic disease affecting both men and women of all age groups particularly young. They require surgery like manual anal dilation or lateral internal sphincterotomy which heal the fissure in more than 90% cases but with a significant risk of impaired anal continence. Newer non surgical therapies such as topical 2% diltiazem gel, topical glyceryltrinitrate have shown good efficacy without impairing anal continence. Hence this study was taken up to compare 2% diltiazem organo gel topical application and lateral internal sphincterotomy for the treatment of chronic fissure in ano.

Material and Methods: 100 patients diagnosed with chronic fissure in ano were randomly divided into Diltiazem and lateral internal sphincterotomy groups. Patient were followed up at regular interval for symptomatic relief and healing of fissure.

Result: In 89.36% of patients in diltiazem group and 100% of patients in lateral internal sphincterotomy group fissure healed completely between 4-8 weeks. In the diltiazem group pain relief was fairly good. 42 patients (89.4%) had pain relief at the end of 14 weeks. 5 patients (10.6%) had no pain relief. But the pain relief in lateral internal sphincterotomy group was excellent with 100% patients having complete pain relief by 8 week's time. Mild headache was experienced with diltiazem by 3(6.4%) patients. 1 patient (2.1%) complained of flatus incontinence with lateral internal sphincterotomy.

Conclusion: We conclude that lateral internal sphincterotomy is the gold standard treatment for the chronic fissure in ano but chemical sphincterotomy using 2% topical diltiazem organo gel can be considered a good second line treatment option in those unfit for surgery or for those not willing for surgery.

Keywords: fissure in ano, Sphincterotomy, pruritis ani, constipation

INTRODUCTION

Fissure in ano is a common proctologic disease affecting both men and women of all age groups particularly young. Anal fissure is defined as linear ulceration of the squamous lining of the distal and canal.¹ Anal fissures are associated with bleeding per anum, constipation, pain on defecation and pruritis. The etiopathogenesis of the fissure in ano is not well understood. Fissure is commonly attributed to passage of hard stool, dietary irregularities, spicy food, poor local hygiene, forceful passage of foreign body causing trauma to the distal anal canal lining.² In females traumatic delivery have been found to be associated with anterior anal fissure.³ Anal fissure are of two types, acute and chronic. Acute anal fissure usually resolve spontaneously with stool softeners and high fibre diet whereas chronic anal fissure does not heal spontaneously with lifestyle modification, unlike acute

anal fissure.⁴ They require surgery like manual anal dilation or lateral internal sphincterotomy which heal the fissure in more than 90% cases⁵ but with a significant risk of impaired anal continence.⁶⁻⁸

This has led to research of alternate non surgical therapies such as topical 2% diltiazem gel, topical glyceryltrinitrate which has shown to heal fissure without impairing anal continence.⁹

The present study aims at comparing 2% diltiazemorgano gel topical application and lateral internal sphincterotomy for the treatment of chronic anal fissure.

MATERIAL AND METHODS

The study was undertaken at Rohilkhand Medical College and Hospital from December 2013 to March 2015. 100 patients diagnosed with chronic fissure in ano on the basis of history of painful defecation with or without bleeding per rectum of more than 6 weeks and per rectal examination findings were enrolled in this study after obtaining an informed written consent from them. The sample size was based on inclusion, exclusion criteria mentioned in the study. Ethical approval was obtained from the ethical committee of the institute. Exclusion criteria included tuberculosis, anal malignancies, haemorrhoids, immunocompromised patients, IBD, anorectal abscess, previous history of fecal incontinence or anal stenosis or anal surgeries, patients with bleeding diathesis and cardiac problems.

Systemic examination and routine investigations were done. Patients were randomly divided into 2 groups. (Group A and Group B), each containing 50 patients. Group A patients were subjected to local application of 1.5 cm length of 2% Diltiazem organo gel into the anus thrice daily for a period of 8 weeks.

Group B patients underwent lateral internal sphincterotomy under spinal anesthesia.

Cases from both groups were advised high fibre diet, sitz bath and laxatives like Cremaffin (milk of magnesia 11.25 ml, liquid paraffin 3.75 ml, per 15 ml of emulsion) three tea-

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spoon at bed time.

Patients were reviewed in the OPD at 2,4,6,8,14 weeks and 6 months. During each visit details on fissure healing and anal tone on per rectal examination and pain relief was assessed from a visual analogue score and noted.

Also, specific questions were asked, regarding the leakage of flatus and faecus particular for group B and headache, vertigo and local irritation for group A.

STATISTICAL ANALYSIS

The results were tabulated and analyzed using SPSS software. Descriptive statistics was used to infer results.

RESULTS

In our study most of the cases belonged to age group 21 – 30 years (figure 1) with slight male preponderance (figure 2).

It was noted that 100% patients, both males and females had painful defecation which was followed by constipation, bleeding per anum, local pruritis and discharge per anus (figure 3). Majority of the fissures were posterior in location with sentinel pile present in 78% of the patients.

Cases were followed up at 2,4,6,8,14 weeks and 6 months for fissures healing, pain alleviation, side effects and recurrences. Three patients from group A and 2 patients from group B were lost to follow up and hence not included in statistical analysis. In 89.36% of patients in Group A and 100% of patients in group B fissure healed completely between 4-8 weeks.

In the group A, who underwent treatment with 2% Diltiazemorgano gel pain relief was fairly good. 42 patients (89.4%) had pain relief at the end of 14 weeks. 5 patients

(10.6%) had no pain relief. But the pain relief in group B patients, who underwent lateral internal sphincterotomy, pain relief was excellent with 100% patients having complete pain relief by 8 week’s time (figure 4). Mild headache was experienced by 3(6.4%) patients in group A (Diltiazem group). In group B, 1 patient (2.1%) complained of flatus incontinence and none in group A.

1 patient (2.1%) in the diltiazem group had recurrence which was subsequently managed by lateral internal sphincterotomy and fissure healed in 4 weeks after surgery. There was no recurrence in lateral internal sphincterotomy group.

DISCUSSION

Anal fissure is linear ulceration of the squamous lining of the distal anal canal causing pain on defecation, bleeding per anum and pruritis.¹

It most commonly effects middle aged adults with no sex preponderance.¹⁰ In our study most effected age group was 21-30 and there was slight male preponderance.

Anal fissures can occur in posterior midline, anterior midline or both with commonest being posterior midline because of lack of muscular support of the anal canal epithelium posteriorly and also poor blood supply posteriorly.¹¹ In our study also posterior midline was the most common position affecting 92% of the patients.

The exact pathogenesis of fissure in ano is unknown. It has been generally accepted that hypertonicity of the internal anal sphincter is responsible for anal fissure. Hence therapies like anal dilatation and lateral internal sphincterotomy which aims at reducing resting anal pressure have been effective in treating anal fissures.³

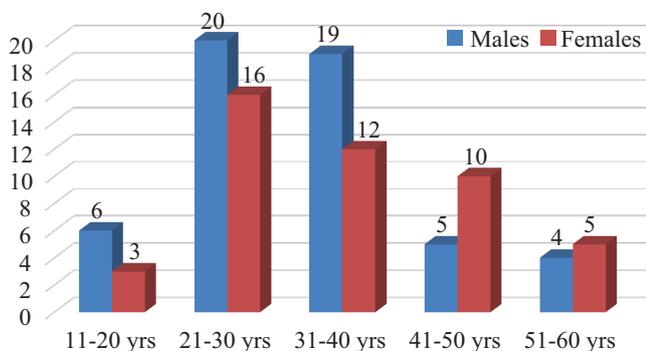


Figure-1: Age and sex distribution of the patients

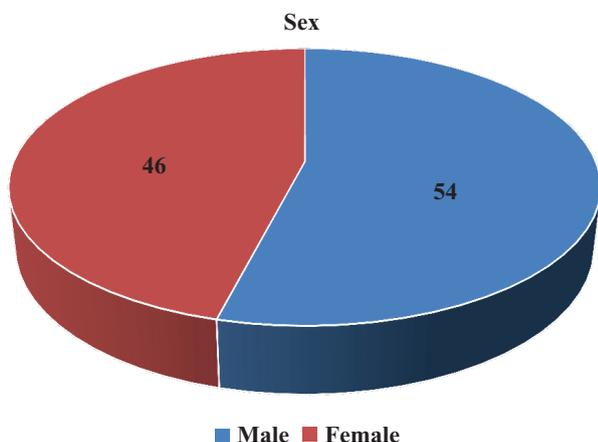


Figure-2: Sex distribution

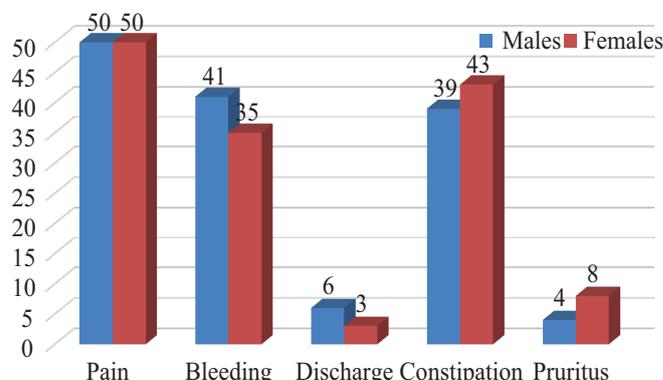


Figure-3: Various symptoms according to sex and age

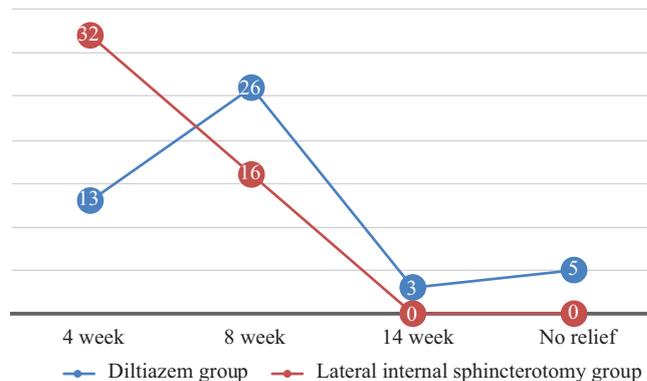


Figure-4: Pain relief in diltiazem and lateral internal sphincterotomy group

Anal fissure are divided into two types acute and chronic. Chronic anal fissures unlike acute anal fissures do not heal spontaneously with dietary modifications and stool softeners and persist beyond six weeks.⁹ They are characterised by indurated edges, visible internal sphincters at floor, sentinel pile and hypertrophied anal papilla. Surgeries like anal dilatation and lateral internal sphincterotomy have been the gold standard for the treatment of chronic and fissures.⁵ Newer non surgical therapies such as calcium channel blocker like diltiazem, nifedepine and nitrates like glyceryl trinitrates, have taken their place as first line of treatment for chronic anal fissures in many centers because of decreased fecal or flatus incontinence rate and OPD based treatment.¹²⁻¹⁴

Rithin Suvarna et al reported a healing rate of 69.23% with 2% topical diltiazem gel and healing rate of 95.87% with lateral internal sphincterotomy.¹⁵

Giridhar C.M. et al reported a healing rate of 88.46% in 5 weeks with 2% diltiazem gel and 100% healing rate by 4 weeks with lateral internal sphincterotomy.¹⁶

In our study, fissure healed completely in 89.36% of patients treated with 2% topical diltiazem organo gel with 89.4% of patients having pain relief at the end of 14 weeks. 10.6% of patients had no pain relief and 2.1% of patients in the group had recurrence.

In LIS group fissure healed in 100% of patients by 4 weeks and 100% of patients had pain relief by 8 weeks. 1 patient (2.1%) in this group had fecal incontinence.

CONCLUSION

We conclude that lateral internal Sphincterotomy is the gold standard treatment for the chronic fissure in ano but chemical sphincterotomy using 2% topical diltiazem organogel can be considered a good second line treatment option in those unfit for surgery or for those not willing for surgery.

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Assessment of Quality of Life in Oral Cancer Patients Following Pectoralis Major Myocutaneous Flap Reconstruction

Atanu Bhanja¹, DSJ D'Souza², Collin Roy³, RN Poddar⁴

ABSTRACT

Introduction: The aim of modern-day onco-surgical therapy is now centered on the overall Quality of Life of the cancer survivor. The final outcome following primary surgery for oral and oropharyngeal cancer and long-term effects need to be evaluated and kept in mind before taking therapeutic treatment decisions. A study was undertaken to evaluate the Quality of Life of oral cancer patients who had undergone surgical reconstruction with pectoralis major myocutaneous flap.

Material and Methods: 65 oral cancer survivors over a span of three years, who had undergone reconstruction with pectoralis major myocutaneous flap, were assessed after 12 months utilizing University of Washington questionnaire. Physical function, social-emotional sub-score, composite scores and global scores were compared between the subgroups created using unpaired t-Test.

Result: Average physical function (74.6±18.2), social-emotional sub-score (65.2±17.6) and composite scores (69.9±16.6) were good and within acceptable range. Mood (46.5±23.7) and anxiety (56.6±26.9) scored poorly among 12 domains. Statistically significant difference ($P<0.05$) was found in the domain score in relation to age, sex, tumour size, neck dissection, radiotherapy and recurrence. There was no significant difference in quality of life scores in relation to postoperative complications of pectoralis major myocutaneous flap, which supports enhanced utilization of this flap.

Conclusion: The study emphasizes the importance of counselling to counteract fear and anxiety among cancer survivors. The outcome of the study reinforces the belief that the pectoralis major myocutaneous flap has excellent functionality and may be increasingly utilized in the reconstruction of maxillofacial region, especially in the low socio-economic group of patients.

Key words: Quality of life, mouth neoplasms, pectoralis muscles, myocutaneous flap

INTRODUCTION

Patients who have been diagnosed with cancer of oral and maxillofacial region, face a variety of physical, functional, social and psychological challenges. This consequence is not merely from the diagnosis but as a result of the overall treatment outcomes.¹ It is a well-accepted reality that surgical removal of the tumour and the reconstruction of the resulting defect is not the end but rather the beginning of the rehabilitation process. The focus of all onco-surgical therapy is now based on the overall Quality of Life (QOL) of the cancer survivors. The patients' outcome following primary surgery for oral and oropharyngeal cancer and the long-term effects need to be evaluated and kept in mind before advising them of a particular treatment decision.

The published data on QOL studies have shown varying differences correlating to tumour size, flap reconstruction

and adjuvant radiotherapy. Swallowing, speech, and saliva are regarded as other important issues. Other factors that significantly affect domain scores are stage of the disease, neck dissection, reconstruction, complications, radiotherapy and time since operation.²

A QOL study was undertaken to evaluate the oral cancer patients who had undergone surgical reconstruction by using pectoralis major myocutaneous flap following resection of the primary tumour.

MATERIAL AND METHODS

A retrospective, cohort study was carried out to assess the Quality of Life of patients of oral cancer who had undergone post-resectional reconstruction with Pectoralis Major Myocutaneous (PMMC) Flap. The study was conducted in the Department of Oral and Maxillofacial Surgery of a Dental College. Ethical clearance from Institutional Ethical Committee was obtained prior to conduct of the study. All oral cancer patients, who had undergone reconstruction of onco-surgical defect with PMMC flap and reporting to the maxillofacial surgery OPD were considered as the cohort group for the study.

The inclusion criteria of the study group were: Oral cancer patients, who had completed 12 months of postoperative period, with history of resective surgery (with or without adjuvant radiation), followed by immediate reconstruction using Pectoralis major myocutaneous flap.

The exclusion criteria were: Those who were unwilling to be the part of the study; Patients with insufficient retrospective data regarding the following: tumor characteristics; treatment received (extent of surgery, etc); and complications encountered in post-operative period. These patients were excluded as this information were the essential criteria used in the comparative study.

The study was conducted by means of personal interviews with the subjects, 12 months following the primary surgery, when patients reported for regular follow up. They were interviewed using a local language translated and validated

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version of University of Washington Quality of Life (UW-QOL-ver 4) questionnaire, by trained nursing staff, who were not directly involved in the patient care. The verbal response to each question were recorded in the score sheet by the interviewer. All patients were then separately interviewed by at least one of the investigators and the recorded responses cross-checked and verified. The data regarding demographic particulars, cancer stage, site of primary lesion and treatment history were tabulated from the patients' existing medical history records. A total of 65 patients; 56 male and 9 female patients participated in the study.

UW-QOL questionnaire

UW-QOL (Version 4)³ is a well-validated questionnaire to analyze physical, functional, and emotional quality of life of head and neck cancer patients. It records various aspects related to patient comfort and quality of life, during preceding 7 days under 12 different domains namely: pain, appearance, activity, recreation, swallowing, chewing, speech, shoulder function, taste, saliva, mood and anxiety. Individual domain score is determined by the graded response from the patient in Likert scale. Each response is later given a score ranging from 0 to 100 as described in the UW-QOL table. This score is not revealed to the patient or interviewer. Higher scores under each heading indicate better quality of life.

The composite score was calculated as arithmetic mean of 12 domains. Physical function sub-score and social-emotional sub-score were computed following the criteria of Rogers et al⁴ (2010). Physical function sub-score consisted of arithmetic mean of 06 domains – chewing, swallowing, speech, taste, saliva, and appearance. The social-emotional sub-score was determined on the mean of scores of the other 06 domains – anxiety, mood, pain, activity, recreation, and shoulder function.

The questionnaire also included a separate section where the same domains could be graded as 'most important' issues over preceding 7 days, and upto 3 fields could be chosen. The third section consisted of a general questionnaire which contained 03 questions measuring overall status and well-being of the patient. Here one question measured QOL as compared to before the surgery in a five point Likert scale

and other two scales graded Health related QOL and overall QOL in a six point Likert scale.

Statistical Analysis

All the primary data was initially recorded in the format of MS Excel worksheets (Excel 2010; Microsoft Corp, Washington). The mean and standard deviations for each of the domains were then calculated. Further to this, statistical analysis of the results obtained was carried out using Statistical Package for Social Sciences software 10.0 (SPSS Inc, Chicago version III). The Physical function, Social-Emotional sub-score, composite scores and global scores obtained from UW-QOL (version 4) were compared between the subgroups created according to patient demographics, tumour characteristics and treatment variable using unpaired t-Test. Outcome was considered to be significant when P value was less than 0.05.

RESULTS

Total 65 completed questionnaires were collected from 56 males and 9 female patients in a span of three years. Age range of the patients was from 21 years to 65 years with a mean of 50±9 yrs (Figure1). Most common site (Figure 1) of tumor was buccal mucosa (44.6%), followed by alveolus (32.3%) and tongue and floor-of-mouth (13.8 %). Majority of the patients presented in high stage of the lesion (TNM classification: UICC 2002) that is Stage III and Stage IV (83%), and stage II (17 %). Wide excision of the primary lesion along with radical neck dissection (RND) or modified radical neck dissection (MRND) in continuity was done in 42 patients (64.6 %); rest of the patients had selective neck dissection (SND) upto supra-omohyoid level. Postoperative radiotherapy was given in 43 patients (66.1%). In 07 patients with T4 lesion, Delto-pectoral flap (03) and Forehead flap (04) was used along with PMMC flap for reconstruction at the primary site. Recurrence of disease was observed in 6 patients (9.2%), who were undergoing palliative therapy. In the immediate postoperative period, 19 patients (29.2%) suffered flap related complications.

Average score in 12 domains of UW-QOL is presented in Table-1. Average physical function sub-score was 74.6± 18.2

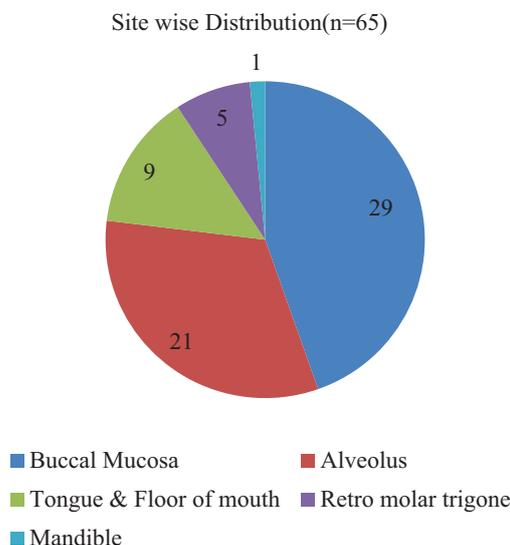
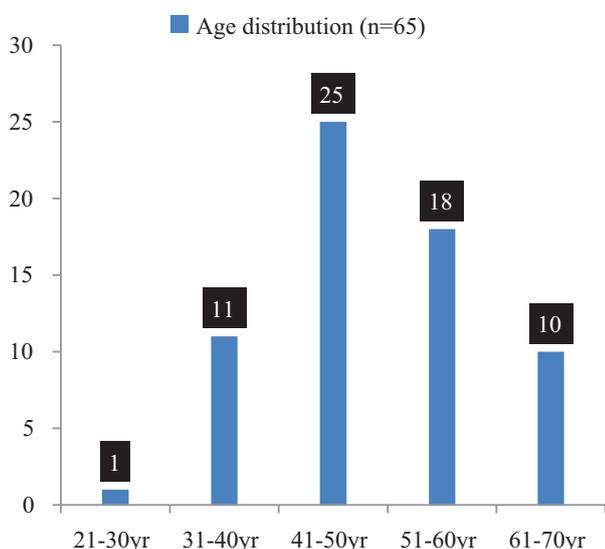


Figure-1: Age wise distribution of patients and site wise distribution of lesion

and social-emotional sub-score was 65.2±17.6. Mean composite score of our study sample was 69.9±16.6. Patients scored well in speech (91.7±24), taste (87.4±23) and pain (81.5±18.4) domains. In comparison, mood (46.5±23.7), anxiety (56.6±26.9) and saliva (59.5±33.2) domains scored poorly. In most important domain section (Figure 2), however, patients chose saliva (44.6%), chewing (36.9%), shoulder (27.7%) and activity (26.1%) domains.

UW-QOL and variable (Demographic, tumor, treatment): Table-2

Statistically significant ($P < 0.05$) difference was found in relation to age, sex, tumour size, extent of neck dissection, presence or absence of postoperative radiation, recurrence of cancer and flap use in physical functional, social-emotional subscore and composite scores of UW-QOL. The difference ($P < 0.05$) was also found to be significant in the activity score in relation to age; in the appearance score between male and female; in the shoulder function between SND and RND/MRND subgroups and also in the saliva score between patients with or without radiotherapy.

However, flap related complications did not produce any significant difference in physical functional ($P=0.06$), social emotional ($P=0.19$) and composite score ($P=0.08$) at the end of 12 months.

In Health Related Quality of Life (HR-QOL) and Overall

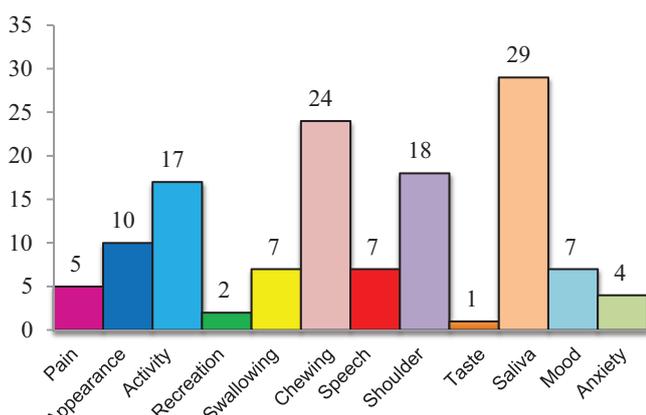


Figure-2: 'Most important' domain UW-QOL (v4)

Quality of Life (OR-QOL), significant ($P < 0.05$) difference was found in relation to age, tumour size, neck dissection, post operative radiotherapy, recurrence and flap use. However, difference was insignificant in HR-QOL ($P=0.15$) and OR-QOL ($P=0.13$) score in relation to sex. Flap related complication also failed to produce any significant difference in HR-QOL ($P=0.72$) and OR-QOL ($P=0.65$) score.

DISCUSSION

Treatment of oral and oro-pharyngeal cancer has a significant effect on the physical, psychological and social well-being of patients. While providing a disease-free life to a cancer patient is definitely an important goal; however the ultimate aim is to provide an acceptable quality of life for the comprehensive physical, emotional and social well-being of all patients.⁵

The oral and maxillofacial region plays a vital role as it not only serves as the primary identification of a person but also is associated with important life-maintaining functions like, breathing, mastication, speech, etc. The surgical resection of oral cancer often results in disfigurement of face, alteration of speech, decreased ability of mastication, change in taste etc. Shoulder dysfunction can be the result of radical neck dissection due to sacrifice of spinal accessory nerve. Adjuvant radiation has got known adverse effects of reduced salivation and increased fibrosis with resultant decrease in mouth opening and poor retention of maxillofacial prosthesis. So, assessment of quality of life is an important issue for obvious reasons.⁶

“Quality of life” (QOL) is presently considered as the most important parameter and is being increasingly used to assess health status and the impact of therapeutics especially in cases of cancer. WHO has defined it as “the individuals perception of his or her position in life, within the cultural context and value system he or she lives in, and in relation to his or her goals, expectations, parameters and social relations”.⁷

Several survey instruments exists for measuring quality of life in head and neck cancer patients.² Among those, UW-QOL questionnaire is a well accepted instrument for its psychometric validity and reliability.⁸ The simple questions,

UW-QOL v4	0	25	30	50	70	75	100	Mean	SD	Best Score%	Best Rank
1. Pain		1	*	8	*	29	27	81.5	18.4	41.5	3
2. Appearance		6	*	7	*	45	7	70.4	18.7	10.7	6
3. Activity			*	25	*	30	10	69.2	17.5	15.4	7
4.Recreation		2	*	31	*	22	10	65.4	19.6	15.4	8
5. Swallowing	1	*	5	*	37	*	22	76.0	21.8	33.8	4
6. Chewing	4	*	*	41	*	*	20	62.3	28.0	30.8	9
7. Speech	2	*	4	*	2	*	57	91.7	24.0	87.7	1
8.Shoulder		*	13	*	30	*	22	72.2	25.1	33.8	5
9. Taste		*	7	*	11	*	47	87.4	23.0	72.3	2
10. Saliva	2	*	30	*	11	*	22	59.5	33.2	33.8	10
11. Mood	6	14	*	30	*	13	2	46.5	23.7	3.1	12
12.Anxiety	6	*	15	*	39	*	5	56.6	26.9	7.7	11
Physical function subscore								74.6	18.2		
Social-emotional subscore								65.2	17.6		
Total composite Score								69.9	16.6		

* denotes values do not exist for that domain

Table 1: Mean domain scores, sub-scores and composite scores UW-QOL (v4)

Factors: n	Physical functional		Social emotional		Composite		HR-QOL		OR-QOL	
	Mean	P value	Mean	P value	Mean	P value	Mean	P value	Mean	P value
1. Age										
<50:37	79.8	.007	73.3	<0.001	76.5	<0.001	36.8	<0.001	36.8	<0.001
>50:28	67.7		54.6		61.1		20		20.7	
2. Sex										
Male: 56	76.7	.02	67.3	.02	72.0	.01	30.7	.15	31.1	.13
Female: 09	61.1		52.7		56.9		22.2		22.2	
3. Tumour Size										
T2: 22	91.1	<0.001	79.9	<0.001	85.5	<0.001	38.2	.002	37.3	.007
T3/T4: 43	66.1		57.8		61.9		25.1		26	
4. Neck Dissection										
SND: 23	83.2	.004	79.6	<0.001	81.4	<0.001	39.1	.002	40.0	<0.001
RND/MRND: 42	69.8		57.4		63.6		24.3		24.3	
5. Post operative Radiotherapy										
No: 22	92.3	<0.001	81.4	<0.001	86.9	<0.001	41.8	<0.001	40.9	<0.001
Yes: 43	65.4		57		61.2		23.3		24.2	
6. Recurrence										
No: 59	78.8	<0.001	68.5	<0.001	73.6	<0.001	32.2	<0.001	32.5	<0.001
Yes: 06	32.8		33.3		33.1		3.3		3.3	
7. Flap use (single vs. multiple)										
PMMC: 58	77	.002	67	.02	72	.003	31	.03	31.4	.03
PMMC+ other flap: 07	54.6		50.7		52.7		17.1		17.1	
8. Flap related complication										
No: 46	67.9	.06	60.8	.19	64.3	.08	28.4	.72	28.4	.65
Yes: 19	77.3		67.1		72.2		30		30.4	

Table-2: Mean score of factors influencing Physical function, social-emotional, composite scores along with global health scores of UW-QOL (v4)

self-answerable by the patients and uncomplicated scoring methods make it easy to administer.^{6,9} It is also designed to specifically assess, impacts of post-surgical treatment of the maxillofacial region. Almost all of our patients came from very poor socio-economic strata with a high illiteracy rate. In order to gauge the responses accurately the questionnaire was first translated into the local language. Thereafter the questionnaire was verbally read out to the patient, one by one and individual response was recorded by a healthcare worker who was blinded as to the purpose of collection of the data to eliminate any bias.

Several studies have been done regarding QOL in head and neck cancer patients. Vartanian et al⁶ in 2004 showed, chewing and swallowing function was more affected in oral cancer than in patients with laryngeal cancer. Patients with advanced tumors also scored poorly in composite score, than primary stage tumors. Zuydam et al¹⁰ in 2005 demonstrated that clinical parameters like tumour size, site, staging, radiation, type of surgery and extent of resection of posterior tongue and soft palate determined speech and swallowing scores. A study by Millsopp et al¹¹ in 2006, on disfigurement after oral cancer surgery, among 278 patients reported that 41% were concerned about facial appearance and a positive correlation was found with the clinical parameters. In a similar study by Katre et al¹² in 2008, younger age group, higher primary stage and radiotherapy were the key factors determining appearance domain. Kazi et al⁵ in 2008 evaluated QOL in 38 patients with partial glossectomy and found swallowing (47.1%), speech (44.1%) and saliva (44.1%)

were the most frequently cited domain and majority (71.8%) quoted their overall QOL as good or very good. However patients with neck dissection, radiotherapy, reconstruction and complications demonstrated poor outcomes. Gabriela et al⁷ (2010) studied QOL after 1 year in Brazilian population and reported that survivors reflected overall poor QOL and significantly ($P<0.05$) reduced score in activity, recreation, chewing, swallowing, speech, shoulder and saliva domains. In a recent study, Efunkoya et al¹³ (2015) in a Nigerian tertiary hospital, showed appearance, recreation and chewing were most important determinant in their study group of 68 patients which comprised higher percentage of females as compared to our study group.

QOL assessment studies in oral cancer patients with pectoralis major myocutaneous flap reconstruction are very few^{14,15} and to the best of our knowledge ours is the first study being reported from the Eastern region of the country. We have compared physical functional, social-emotional sub-score, composite score, HR-QOL, OR-QOL across our cohort of 65 patients between various sub-groups determined by patient demographic, tumour characteristics and treatment variables. In our study, the average physical function, social-emotional subscore and composite score was good and in the acceptable range. Mean scores were excellent in speech, taste and pain domains. However the domains of mood and anxiety scored poorly among 12 domains. This is in contrast to most of the earlier studies where post-operative mood and anxiety scores improved. The explanation for this finding may be attributed to the fact that all of our patients belonged to

very poor socio-economic status. For this group of daily wage earners, the 'fear factor' associated with this dreadful disease coupled with the economic burden of treatment, loss of regular monthly income etc. results in higher degrees of depression and anxiety which is the outcome as depicted in our findings. This is also similar to the findings of Humphris et al¹⁶ (2003) who showed high prevalence (72% at 7 month) of fear of recurrence and depression among oro-facial cancer patients. Reisine et al¹⁷ (2005) and Chen et al¹⁸ (2013) identified sociodemographic risk factors for depression among cancer survivors and stressed on early management and supportive care to provide assurance. Gritz et al¹⁹ (1999) showed although head and neck cancer survivors had improved scores in other physical domains, the score had declined in marital ($P = .002$) and sexual functioning ($P = .017$), with an increase in scores of alcohol abuse ($P < .001$). It is therefore imperative that all healthcare workers be aware of these issues and ensure that the patients and relatives are adequately counselled regarding all aspects of the disease and treatment outcomes.

In our study, in the 'most important' domain section of UW-QOL, patients chose saliva, chewing, shoulder and activity domains. This also reflects the importance to the daily functions of mastication and those related to the capacity to return to their occupation as manual labourers.

We found statistically significant ($P < 0.05$) difference in scoring, in relation to age, sex (M/F), tumour size (T2/T3 and T4), extent of neck dissection (SND/RND and MRND); with or without radiation; recurrence; flap use (single vs multiple). This shows the relative importance of each of these parameters that healthcare professionals have to keep in mind when deciding on the future treatment options for the oral cancer survivors under their care.

However Health Related QOL and Overall QOL failed to show statistically significant difference between male and female patients. This again could be due to the fact of the economic status of the cohort wherein the concerns of both male and female patients would be fairly similar. Another important finding of our study is the absence of statistically significant difference between subgroups created on the basis of flap-related complication. This finding highlights the fact that, despite the fact that higher initial flap related complication (16% - 63%) have been reported²⁰ with PMMC flaps the overall QOL after 01 year is independent of any initial complication. This would encourage maxillofacial surgeons to continue to use this 'workhorse flap' for reconstruction of defects in the head and neck region.

CONCLUSION

"Quality of life" (QOL) can arguably be considered to be the most significant parameter to assess the rehabilitation and evaluate the therapeutic options for patients being treated for head and neck cancers. A detailed study was carried out in economically backward cohort of patients who are oral cancer survivors to evaluate their long-term outcome after rehabilitation using the PMMC flap for defect reconstruction. In our study, the average physical function, social-emotional sub-score and composite scores were good and in the acceptable range. Mood and anxiety scored poorly among

12 domains. Statistically significant difference was found in the domain score in relation to age, sex, tumour size, neck dissection, radiotherapy, recurrence. Our finding emphasizes the importance of counselling to combat the fear and anxiety associated with the disease among cancer survivors. The outcome of the study is indeed heartening as it reinforces the literature that the PMMC flap has excellent utility and plays an integral role in the comprehensive rehabilitation in the maxillofacial region.

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Hand Washing Practices of Mothers Attending Immunisation Clinic at a Tertiary Care Hospital of Lucknow

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ABSTRACT

Introduction: Hand washing with soap has been viewed as one of the most cost-effective modes of diminishing the overall burden of infectious diseases predominantly diarrhoea and respiratory infections. Objective: The present study aimed at determining the knowledge and practice of hand washing among the mothers with children aged 0-23 months attending immunisation clinic at a tertiary care hospital of Lucknow, capital of Uttar Pradesh

Material and Methods: A hospital based cross-sectional study was conducted at immunisation clinic, King George's Medical University from January 2015 to September 2015. A pre-designed, pre-tested and semi-structured questionnaire was used for interviewing 240 mothers with children 0-23 months old attending immunisation clinic.

Results: Most of the mothers (70.0%) knew the importance of hand washing in preventing diseases. Practice of hand washing was although average after defecation (70.8%) but low for events like after cleaning child who had defecated (38.7%), before preparing meal (37.0%) and before feeding child (24.5%). The association between practice of hand washing with soap after cleaning the child who had defecated was found to be statistically significant with age of mother, socio-economic status, level of education of mother and place of residence. Also hand washing before preparing food was found to be comparatively lower among mothers who belonged to low socioeconomic status (30.2%) as well as those residing in rural and slum communities (17.9% and 37.1% respectively).

Conclusion: There is a need to increase understanding about importance of proper and adequate hand washing among the mothers through health education activities highlighting the importance of correct method of hand washing with soap and water.

Keywords: Hand washing, slum, Practices.

INTRODUCTION

Diarrhoea and Acute Respiratory infections alone contribute 15% and 18% of all under-five childhood deaths globally.¹ Of all 1.7 million deaths that occur annually due to diarrhoeal diseases world-wide are due to unsafe water, sanitation and hygiene among under-five children and virtually all these deaths occur in developing countries.² Young children are unable to properly wash their own hands and thereby provide an opportunity that favours the transfer of pathogens between their hands and their mouth. However, the chances for transmission of diarrheal pathogen from parents to children, who wash their hands more frequently with soap and water is quite less.³ It is observed that young children and their mothers in developing countries fail to wash their hand adequately after faecal contact.⁴ The problem is more in slums areas because of sub-optimal access to safe water and sanitation services. Mothers of only few children

used to maintain a basic cleanliness and hygiene practices at all times to prevent occurrence of diarrhoea.⁵ Many previous had concluded that hand washing with soap and water can effectively let down the diarrheal incidence rates by 47%^{6,7} with about 23% reduction in incidence of respiratory tract infections.⁸ Interventions that promote hand washing with soap are therefore important in public health; however changing behaviour is quite difficult. India has experienced unhygienic hand washing practices over the past decades, yet much significance has not been given to ideal hand washing practices as a tool for prevention of communicable diseases.⁹ Therefore the present study was conducted to assess knowledge and practice of hand washing among the mothers with children aged 0-23 months attending immunisation clinic at a tertiary care hospital of Lucknow.

MATERIAL AND METHODS

The Cross-sectional descriptive study was conducted at immunisation clinic of KG's Medical University, Lucknow.

Study population: A maximum of 240 mothers with children 0-23 months old attending immunisation clinic were enrolled in study during the study period of nine months from January 2015 to September 2015. Children not accompanied with their mother were excluded, as it would have given incorrect information about hand washing practices following critical moments like after toilet use, after cleaning a child who had defecated, before handling food etc.

Data Collection Tools: A total 240 mothers with children aged 0-23 months attending the immunisation clinic were interviewed about hand washing practice of mothers after the critical moments like after defecation, after cleaning child who had defecated, before cooking, before feeding child using pre-designed, pre-tested and semi-structured questionnaire after availing informed verbal consent were assessed.

STATISTICAL ANALYSIS

Data was analysed with the help of SPSS version 21. Descriptive statistics was used to generate results.

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RESULTS

Biosocial characteristics of the study population

The mean age of mothers was 34.3±9.0 years. Majority

Characteristics	Number	Percentage (%)
Age of mother		
≤ 20	103	42.9
21-30	117	48.8
≥31	20	8.3
Religion		
Hindu	198	82.5
Non-Hindu	42	17.5
Type of Family		
Nuclear	171	71.3
Joint	69	28.8
Level of education of mother		
High school and below	187	77.9
More than high school	53	22.1
Working status of mother		
Working	70	29.2
Non-working	170	70.8
Socio-economic status *		
I and II	58	29.2
III and below	170	70.8
Residence		
Urban	166	69.2
Rural	39	16.3
Urban Slums	35	14.6

*Modified B.G. Prasad socioeconomic classification 2014

Table-1: Socio-demographic characteristics of the mothers. (N=240)

Knowledge	Number	Percentage (%)
Prevention of communicable diseases		
Yes	168	70.0
No	72	30.0
Benefits of hand washing [#]		
Prevention of diarrhoea	132	78.6
Prevention of ARI	109	64.8
Prevention of other intestinal infections	113	67.2
Prevention of skin and eye infection	72	42.9
Critical moments where hand washing is necessary [#]		
After defecation	214	89.1
After cleaning child who has defecated	198	82.5
Before taking meals	180	75.0
Before feeding children	142	59.1
After using the toilet for urination	104	43.3
Before preparation of food	197	82.0
After routine work	102	42.5
Sufficient to wash hands with water alone		
Yes	156	65.0
No	84	35.0

[#] Multiple response

Table-2: Knowledge of mothers regarding benefits of hand washing (N=240)

(82.5%) of them were of Hindu religion and about 71.3% belong to nuclear family. Out of 240 mothers interviewed only one-fourth of the mothers were educated more than high school. Majority (70.8%) belonged to socioeconomic class III or below according to Modified B G Prasad socio-economic classification. About one-third (29.2%) of the mothers were working currently, with majority of them were unskilled workers. Majority (69.2%) of the mothers reside in urban area followed by rural and urban slums. (16.3% and 14.6% respectively)

Knowledge regarding hand washing

About two-third (70.0%) of the mothers opined that hand washing had important role in preventing the spread of communicable diseases. But in contrast to that, 65.0% mothers felt that use of water alone for hand washing is sufficient. Majority of the mothers knew that hand washing could prevent diarrhoea, acute respiratory tract and other intestinal infections (78.6%, 64.8% and 67.2% respectively). However only 42.9 per cent mother knew its role in prevention of skin and eye infection. More than 80% of the mothers believed hand washing as important and crucial activity after defecation, after cleaning child who has defecated and before preparation of food. However less than half of them thought that hand washing as crucial after using toilet for urination and routine work (43.3% and 42.5% respectively).

Practice of hand washing with soap

Majority (70.8%) of the mothers used to wash their hand properly using soap after defecation. However the practice of hand washing properly with soap was quite less after cleaning the child who had defecated, before preparing meals and before feeding child (38.7%, 37.0% and 24.5% respectively). Majority of these mothers use to was their hand thoroughly only with water before performing these activities.

Factors affecting hand washing practices (with soap)

Practice of hand washing after cleaning the child who had defecated was found to be statistically associated with age of mother, socioeconomic status, level of education of mother and place of residence. Near about only one-third of the mothers used to wash their hand with soap in each age-group with lowest proportion (10.0%) in those aged 31 years and above. Only 28.0 per cent of the mothers who belonged to low socio-economic status (III and below) used to wash their hand. Also the practice regarding same was lowest among those residing in rural area. Also association between practice of hand washing with soap and water after defecation with place of residence and religion was found to be significant. The practice of same was found to be lowest (45.7%) among those residing in urban slums. Similarly practice of hand washing with soap before preparing food was found to be comparatively lower among mothers who belonged to low socioeconomic status (30.2%) as well as those residing in rural and slum communities (17.9% and 37.1% respectively).

DISCUSSION

About 70.0 per cent of the respondents knew about importance of hand washing with respect to prevention of communicable diseases and about two-third (65.0%) believed

Variable	Total (N=240)	After defecation (n=170)		After cleaning child who has defecated (n=93)		Before preparing food (n=89)		Before feeding child (n=59)	
		No.[%]	p	No.[%]	p	No.[%]	p	No.[%]	p
Age of mother									
≤ 20	103	73[70.8]	0.31	38[36.9]	0.01	43[41.7]	0.29	23[22.3]	0.77
21-30	117	80[68.3]		53[45.3]		41[35.0]		31[26.5]	
≥31	20	17[85.0]		2[10.0]		5[25.0]		5[25.0]	
Socio-economic status									
I and II	58	38[65.5]	0.30	42[72.4]	0.00	34[58.6]	0.00	18[31.0]	0.19
III and below	182	132[72.5]		51[28.0]		55[30.2]		41[22.5]	
Level of education of mother									
≤10 std	187	137[73.3]	0.08	65[34.8]	0.02	65[34.8]	0.16	45[24.1]	0.72
>10 std	53	33[62.3]		28[52.8]		24[45.3]		14[26.4]	
Working status of mother									
Working	70	53[75.7]	0.28	25[35.7]	0.50	22[31.4]	0.20	12[17.1]	0.08
Non-working	170	117[68.8]		68[40.0]		67[39.4]		47[27.6]	
Residence									
Urban	166	124[74.7]	0.00	73[44.0]	0.01	69[41.6]	0.02	47[28.3]	0.06
Rural	39	30[76.9]		7[17.9]		7[17.9]		4[10.3]	
Urban Slums	35	16[45.7]		13[37.1]		13[37.1]		8[22.9]	
Religion									
Hindu	198	154[77.8]	0.00	82[41.4]	0.06	75[37.9]	0.58	55[27.8]	0.01
Non-Hindu	42	16[38.1]		11[26.2]		14[33.3]		4[9.5]	
Type of family									
Nuclear	171	120[70.2]	0.75	62[36.3]	0.21	75[43.9]	0.00	41[24.0]	0.71
Joint	69	50[72.5]		31[44.9]		14[20.3]		18[26.1]	

Table-3: Factors affecting hand washing practices (with soap and water) among the mothers.

that washing hand with water alone is sufficient. This was quite similar to study conducted in Tamil Nadu by Datta et al.¹⁰ However, this was in paradox to a study from Karnataka by Aithal et al.¹¹ where 16.7 % of the mothers felt that water alone was sufficient for proper hand washing and 98.7% thought that hand washing was important for disease prevention.

The present study showed that majority of the mothers were aware that washing hands was important for prevention of diarrhoea and acute respiratory tract (78.6% and 64.8% respectively); while more than eighty per cent believed hand washing to be crucial after defecation and after cleaning child who had defecated. Similar findings were also reported by Aithal et al.¹¹ However the results were much higher as compared to that conducted by Datta et al.,¹⁰ where only 38.88% and 24.92% respectively thought that this practice could prevent from diarrhoea as well as acute respiratory tract among children, however about 56.90% and 15.96% mothers respectively opined washing hands was crucial after defecation and after cleaning the child who had defecated.

Of the 240 mothers surveyed, 70.8% were found to practice hand washing by soap after defecation. Similar type of findings were also described in a study by Pati et al.,¹² in Odisha and Datta et al.,¹⁰ where 72.0% and 73.1% of the women practised hand washing by soap after defecation. However it was quite lower to that reported by Thapa et al.,⁵ but higher as compared to study conducted by Ray et al.,¹³ The practice of hand washing after defecation was found comparatively less among those residing in slums, which might be attributed to the fact that people in slums used to live in underpriv-

ileged condition with lack of basic amenities and sanitation facilities.

Practice of hand washing with water along with soap after cleaning the child who had defecated (38.5%) was found to be statistically associated with age of mother, socioeconomic status, level of education of mother and place of residence. Similar results were also conveyed in other studies.^{10,13,14} Although the knowledge of hand washing after cleaning child who had defecated as one of the crucial moment was stated by majority (82.5%) of the mother but in spite of that practice regarding the same was quite sub optimal. Therefore this practice needs to be encouraged as it could help to significantly reduce infectious diseases in children.

It was quite discouraging that only 37.0% washed hand with soap and water before preparing food; a finding similar to other studies.^{10,11} The practice of same was found least among those belonging to low socio-economic status and those residing in rural and slums communities. A large proportion of mothers (75.5%) did not wash their hands with soap before feeding their children. Lack of knowledge and awareness regarding significance of hand washing while food handling might be the reason for casual attitude of the mothers.

Limitations

As the present study was conducted at immunisation clinic; therefore the generalizability of the findings is quite limited since only those mothers were who were conscious about their health and were coming to the centre for immunization.

CONCLUSION

Proper hand washing practices can play an important role in

reducing the burden of childhood morbidity and mortality and other communicable diseases like diarrhoea, and other infections. The findings revealed gap between knowledge and practice of hand washing. The favourable change in behaviour towards hand washing could be achieved by intensive and continuous health education activities highlighting the importance of correct method of hand washing with soap and water specially before taking food, after defecation and before feeding babies. Apart from that, provision of soap at subsidised costs especially in rural and urban slums communities may possibly help in adoption of hygienic hand washing attitude by mothers.

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Assessment of Viability of Human Periodontal Ligament Cells in Different Fat Content of Milk at Different Time Intervals

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ABSTRACT

Introduction: Traumatic injuries are a common occurrence that require both expedient and informed management by Pediatric dentist. The greatest success of a replanted exarticulated tooth occurs when it is immediately replanted, which is not always practical. The purpose of this present study was to identify a storage medium which is effective, economically favourable and readily available for the general population.

Material and Methods: In this study, 60 human premolars undergoing extraction for orthodontic purpose were selected. The teeth were kept in the test tube containing the 3 experimental storage media for 1,2,4,6 and 24 hours intervals. The teeth were then treated with collagenase and were incubated for 60 min after the addition of fetal bovine serum. The apical two third of the roots were scraped to obtain periodontal tissue and slides were prepared using trypan blue stain and cells were counted and statistically analyzed.

Results: Statistical analysis showed that Low fat milk preserved significantly more viable PDL cells ($p < 0.05$) compared with Medium and High fat milk.

Conclusion: Low fat milk appeared to be a superior storage media in maintaining PDL cell viability when compared to Medium and High fat milk solution.

Keywords: Trauma, Exarticulated teeth, Tooth replantation, Storage media, PDL cells

INTRODUCTION

Avulsion is complete displacement of the tooth from its alveolar socket. It is characterized compromised neurovascular supply, loss of periodontal ligament cell and pulp vitality. The treatment for an avulsed permanent tooth is immediate replantation.^{1,2}

Replantation is widely accepted as an effective treatment option for an avulsed tooth. However, it is dependent on various factors such as the time interval between avulsion and replantation, method of storing the avulsed tooth, the vitality status of pulp or periodontal tissues, and method of splinting. The appropriate selection of storage media is an important clinical factor affecting the postoperative prognosis of avulsed tooth following replantation.

Research has shown that exarticulated teeth can be replanted without complications if the tooth is re-inserted into the socket as soon as possible. When the tooth is dry for more than 20 mins, its periodontal ligament cell begins to necrose and on replantation, inflammation and resorption in proportion to the extra-oral dry time develops. The maintenance of viability of the cells of the periodontal ligament and cementum is essential for long term success of replanted teeth. An appropriate storage medium could maintain or improve the vitality of the cells during extra-alveolar period by preventing cell desiccation.

Presently, several medias like Milk, Viaspan, H.B.S.S, Saliva, Water and many others are recommended as storage medias. Nevertheless, synthetic media are seldom available near the site of an accident rendering their use rather impractical and only of academic interest. Therefore, it would be useful to find an easily effective, accessible, readily available and economically favourable storage media for the general public which is ideal to maintain the PDL cell viability.

MATERIAL AND METHODS

The study was carried out in the Department of Pediatric Dentistry, S.D.M. College of Dental sciences, Sattur, Dharwad, Karnataka, India to assess the viability of the Periodontal ligament cells in milk of varying fat content at five different time intervals.

60 caries free human premolars with apparently normal periodontium and closed apices undergoing extraction for orthodontic treatment were selected for the study. The extractions were performed atraumatically with utmost care taken to prevent damage to periodontal ligament cells. Following extraction, the teeth were held with forceps at the coronal region and coronal 3mm of periodontal ligament cells on the root surface was scraped from the cervical margin using BP blade no.15 to remove the cells that might have been damaged during extraction. The teeth were then randomly divided into 3 groups of twenty teeth and were transferred in each storage medium namely low fat milk, medium fat milk, high fat milk which were stored in sterile test tubes. Every tooth was maintained for 1, 2, 4, 6 and 24 hours at room temperature.

Harvesting of PDL cells: After the stipulated time interval, the teeth were taken to the clinical laboratory where further procedures were carried out. The teeth were handled by the anatomical crown during the procedure to prevent damage to the periodontal cells. All teeth were then held with tweezer by grasping the coronal portion and cleansed by irrigating with phosphate buffered saline (PBS) to remove the debris, storage media etc. The teeth were incubated for 60 minutes in 10 ml test tubes with a 2.5 ml solution of 0.2 mg/ml of

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collagenase CLS 2 in PBS to minimize the exposure of cells to active trypsin and to preserve maximum cell viability. After incubation, 50µl of fetal bovine serum was added to each tube to halt the enzymatic activity of collagenase. The tube was then centrifuged for 4 minutes at 1000rpm. The supernatant was then removed with sterile micropipettes. The apical two third of the roots were scraped using number 15 BP blade to obtain periodontal tissue. These scrapings were then transferred onto the sterile slide and the cells were labelled with 0.4% trypan blue for determination of viability of the cells.

The number of viable and non viable cells were counted under light microscope with a Hemocytometer at 20X magnification (Figure 1).

The viability percentage of the cell population of each sample was obtained by applying the following mathematical equation;

$$(UC/ TC) \times 100 = \%$$

Where,

UC- unstained cell count (viable cells), TC- total cell count (stained + unstained cells).

There are two methods for evaluating the efficacy of different storage media in preserving the viability of dental fibroblasts.

STATISTICAL ANALYSIS

Analysis of the data was accomplished by using One-way anova and Tukey post hoc test. (Table. 1)

RESULTS

The difference was evident at the early time points when cell viability remained greater than 90% in the cells maintained in group 1 during the first 1 hour, while viability decreased to approximately 77% for group 3. The mean values of viable cell count at 1, 2, 4, 6 hours showed a higher significant values in Group 1 when compared to other groups. (p< 0.05). After a period of 4 hours it was seen that group 2 and 3 had no statistical significant difference. Beyond 6 hours, cell viability was significantly reduced when compared to initial values regardless of the fat content of the milk. After a period of 6 hours it was seen that group 1,2 and 3 had no statistical

significant difference, therefore low fat milk is maintained cell viability at a significantly greater levels than medium and high fat milk (Figure-2).

DISCUSSION

According to the World Health Organization classification

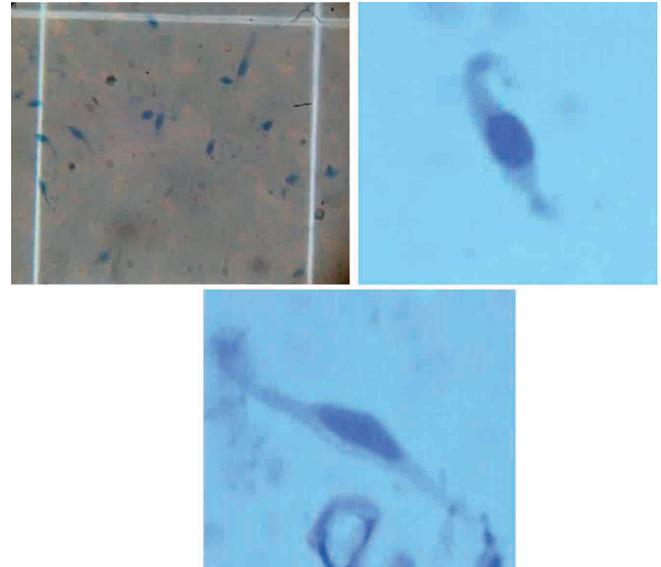


Figure-1: Non viable PDL cells under low and high power

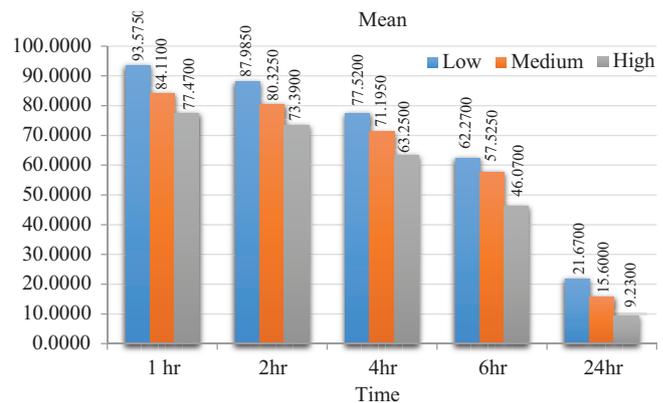


Figure-2: Percentage of viable cell count in the different study groups at different time intervals.

Variables	Source	Sum of Squares	df	Mean Square	F-value	Sig.
1hr	Between Groups	2620.3120	2	1310.1560	187.9390	0.0000
	Within Groups	397.3580	57	6.9710		
	Total	3017.6700	59			
2hr	Between Groups	2131.8920	2	1065.9460	144.5400	0.0000
	Within Groups	420.3610	57	7.3750		
	Total	2552.2530	59			
4hr	Between Groups	2045.0770	2	1022.5390	104.8910	0.0000
	Within Groups	555.6720	57	9.7490		
	Total	2600.7490	59			
6hr	Between Groups	2774.4800	2	1387.2400	109.2010	0.0000
	Within Groups	724.1010	57	12.7040		
	Total	3498.5820	59			
24hr	Between Groups	1547.8360	2	773.9180	77.1610	0.0000
	Within Groups	571.7040	57	10.0300		
	Total	2119.5400	59			

Table-1: Intra and inter comparison of study groups at time interval by one way anova

for traumatized teeth, exarticulation is the complete displacement of a tooth from its alveolar socket due to trauma. This causes severe insult to the periodontal tissues. Recent clinical studies have shown that avulsed permanent teeth should be replanted as soon as possible.³ Immediate replantation is the ideal treatment of choice as it re-establishes the natural nutrient supply to periodontal ligament cells on the root surface, minimizing further damage, and expedites the healing process. Unfortunately, immediate replantation is not always possible. When such conditions exist, the tooth should be stored in a medium that maintains periodontal ligament cell viability until definitive dental treatment can be accomplished.

The ideal storage medium should be able to preserve cell vitality, adherence and mitogenic and clonogenic capacity⁴ and should be readily available at the site of accident or be easily accessible.⁵ With non-physiologic storage (e.g. prolonged tap water storage, chloramines, chlorhexidine and alcohol) the chances of pulp revascularization are minimal. With storage in physiologic media (e.g. saline, milk or saliva), there is only a weak relationship between the duration of storage and chances of pulp revascularization. The factors that play an important role in the healing of periodontal ligament after avulsion injuries are primarily the amount of physical damage to the root surface and the type of medium in which the avulsed tooth is stored. Periodontal ligament cells with normal anatomy and physiology present osmolality of 320 mOsm/Kg and pH of 7.2.⁶ Optimal growth of cells is obtained between pH 7.2 to 7.4, but they can survive for long periods of time between pH 6.6 to 7.8.⁷ The way which the tooth is transported also affects significantly the degree of success. The periodontal ligament fluid supplies the tooth with the nutrition necessary for the periodontal ligament cells to survive. The periodontal ligament remaining on the root after injury is dependent on a supply of vital metabolites. Cell destruction begins when these metabolites are withheld. If these cells survive, they will catalyse the reproduction of new cells, which can differentiate and reinstate the supporting tissues. The main philosophy of this survival may involve prevention of protein synthesis in the bacterial cell, encouraging the action of fibroblasts and healing of connective tissue, which contributes to the recovery of periodontal ligament after injury.⁸

Trypan blue differentiates nonviable cells from viable cells. The cells which exclude the dye were viable as the chromopore present on the cell membrane is negatively charged and take up the stain unless the membrane is not damaged. Milk is one of the most commonly consumed dairy products. Milk is economical, simple to use and easily available to the general population and has osmolality of 230 – 270 mOsm/kg and a pH of 6.5 – 6.8 required for optimum growth of cells.

The present study used milk of varying fat content included with low fat milk containing 3% fat, medium fat milk containing 3.5% fat and high fat milk containing 4.5% fat. The mean values of viable cell count at 1, 2, 4, 6 hours showed a higher significant values in low fat when compared to medium and high fat milk. The results revealed that low fat milk maintained cell viability at a significantly greater levels than

medium and high fat milk. Beyond 6 hours, cell viability was significantly reduced when compared to initial values regardless of the fat content of the milk.

Several investigators namely Blomlof and Otteskog 1980⁵, Marino et al. 2000⁹, compared milk with several other storage media and found that milk was gold standard to the others in maintaining the viability. Marino et al. 2000⁹ showed that both regular pasteurized milk and long shelf life milk were more effective in maintaining human periodontal ligament cell viability than other storage medias. Blomlof et al. 1982⁵ found that milk was capable of preserving 50% of the periodontal ligament cells from culture for up to 12 hours. In the present study the percentage of mean viable periodontal ligament cells for Milk at the different time intervals of 1,2,4,6 and 24 hours were 86, 79 74, 59 and 42 respectively. The osmolality of milk being within physiologic limits makes it a more suitable medium than hypotonic solutions. Milk contains important nutrients such as amino acids, carbohydrates and vitamins which provide a suitable environment for the survival of the cells. Another possible explanation for milk performing better in this study can also be attributed to the growth factors that are present in milk.

Belford 1997¹⁰ in an experiment using human skin and embryonic lung fibroblasts, found that the addition of an extract of bovine milk that was rich in naturally occurring growth factor was a source of potent growth promoting activity for all mesodermal-derived cells tested. Vitamin A which is present in milk is a known antioxidant. It has been suggested that storing exarticulated teeth in a medium containing one or more antioxidants might increase replantation success.

Studies have also shown that, in cool conditions, cells have a higher percentage of viability than at room temperature, as cooler temperatures reduce cell swelling, increase cell viability, and improve recovery, all of which promote wound healing. Also, not all types of milk are equally effective as storage media. Some evidence supports the use of cold milk as an interim storage medium for avulsed teeth. Avulsed teeth stored in chilled milk for up to 1 hr can maintain sufficient number of viable periodontal ligament cells to support replantation of the tooth and the possibility of periodontal ligament healing.¹¹

Commercially available milk is pasteurized which may inactivate enzymes that are potentially harmful to the periodontal ligament cells. Regular pasteurised milk has a short shelf life and requires refrigeration, which makes it less readily available at the trauma site. Thus long shelf-life milk having identical composition, pH, and osmolarity to regular milk with a storage capability of 6 months without the need for refrigeration has gained more acceptance.¹² Therefore milk, cold or otherwise, can be used as a storage medium of choice for extended extra-alveolar storage (1 to 6 hr).

As with many in-vitro studies, limitations and variability often exist. Milk although superior to water and saliva as storage medium, has not shown to have the capacity to reconstitute lost cellular metabolites. It also doesn't have the ability to maintain morphological integrity of the periodontal ligament cells.

It has been recommended that even if avulsed tooth be soaked in HBSS for 30 min before replantation, be soaked

in HBSS for 30 min before replantation as saline and milk cannot replenish depleted cell metabolites.¹³

Trypan Blue staining technique has been used to assess the cell viability in most of the studies including the present study. The health status of viable periodontal ligament cells are critical in preventing resorptive sequelae of post replantation and the Trypan blue stain used here only assess vitality of the cell and not actual physiologic health or metabolic capabilities of the cell, restraining the study. Thus, more auxiliary studies are required in this regard. There is also the possibility of intra observer bias, by the observer in counting the viable periodontal ligament cells. Despite the in-vitro limitations and variability encountered in this study, Milk demonstrated promising results in terms of maintaining periodontal ligament cell viability for a prolonged period of 6 hours and hence poses to be most reliable and gold standard storage media.

CONCLUSION

Immediate replantation is the best treatment for an avulsed tooth, provided the tooth has viable PDL cells at the time of replantation. Storage media helps in preserving the viability of the periodontal ligament cells when immediate replantation is not possible. This study evaluated the post-traumatic periodontal ligament cells viability following storage in low, medium and high fat content milk as storage media at different time intervals.

From the present study, it is concluded that Low fat milk stands first in maintaining the PDL cell viability for longer duration than medium and high content milk. There is steady decline in number of viable cell in all the experimental storage medias as time passes. Milk can also be used as a storage medium but for a short period of about 6 hours after which its efficacy declines.

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Clinical Relevance of Superoxide Dismutase and Glutathione Peroxidase Levels in Management of Diabetes Type2

Brown Holy¹, Briggs Ojoye Ngoye¹

ABSTRACT

Introduction: Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. It is associated with increased oxidative stress. This study evaluated the levels of the antioxidant enzymes superoxide dismutase (SOD) and glutathione peroxidase (GPx), as a measure of antioxidant status in Type 2 diabetics.

Material and methods: A total of 182 subjects were involved in the study, of which 109 were diabetics (Test) and 73 non-diabetics (Controls). The mean age of the test group was 48.7 ± 12.6 years while that of the control group was 45.4 ± 13.9 years. The criterion for the classification as a diabetic was based on subjects having glycated haemoglobin (HbA1c) levels $\geq 6.5\%$. HbA1c was estimated quantitatively by immunochemical method. SOD and GPx was measured by the sandwich-enzyme linked immunosorbent assay (ELISA) method. Glucose oxidase method was used for the determination of fasting plasma glucose (FPG). Body mass index (BMI) was calculated by taking measurements of height and weight. Mean SOD and GPx values in the diabetic subjects were significantly lower ($p < 0.05$) as compared with that of the controls.

Result: The BMI values showed a significant difference ($p < 0.05$) with that of the diabetics ($32.64 \pm 7.57 \text{ Kg/m}^2$) higher than the controls ($27.19 \pm 5.09 \text{ Kg/m}^2$). Type 2 diabetes is associated with decreased antioxidative status as the levels of the antioxidant enzymes SOD and GPx were significantly reduced in the diabetic subjects.

Conclusion: As the disease condition progresses, antioxidative parameters are further depleted, showing an increase in oxidative stress. Also obesity plays a key role in the development of Type 2 diabetes. It is thus recommended that antioxidative therapy be incorporated in the management/therapy of Type 2 diabetics, to supplement the endogenous anti-oxidative system, as this could prevent or delay progression of the disease and the development of late diabetic complications

Keywords: Superoxide Dismutase, Glutathione Peroxidase, Diabetes Type2

to oxidative damage of cell components.² ROS production in diabetes plays a key role in the pathogenesis of diabetic complications.³ ROS accelerates important molecular mechanisms involved in hyperglycaemia induced oxidative tissue damage. These molecular pathways are involved in ROS formation and ROS induced damage. These pathways are related to oxidative stress in diabetes and most of them are linked to glucose and/or lipid metabolism. The pathways are; activation of protein kinase C (PKC), increased hexosamine pathway flux, increased advanced glycation end-product (AGE), increased polyol pathway flux.⁴

The mechanisms involved in nerve injury are not clear, however, it is linked to the polyol pathway, AGE formation and ROS activities.⁵ Oxidized proteins as well as lipoproteins interact with receptors in the membrane of neurons, triggering inflammatory signalling activities which further produce ROS, leading to the damages in cell components and neurons.⁶

ROS accelerates important molecular mechanisms involved in hyperglycaemia induced oxidative damage; it increases the stress signalling pathways that lead to beta-cell apoptosis.⁷ ROS stimulates oxidation of low density lipoproteins (LDL), oxidized LDL are not recognized by the LDL receptors and are therefore taken up by scavenger receptors in macrophages, forming foam cells that eventually lead to the formation and deposition of atherosclerotic plaques in blood vessels.⁸ More so, the accumulation of oxidized lipids from LDL particles in the endothelial lining of arteries, leads to arterial wall rupture and acute vascular infarction in addition, to platelet adhesion and hypercoagulability which increases the risk of vascular occlusion in Type 2 diabetes.⁵ In a related study it has been proposed that increased production of superoxide ion is the major mediator of endothelial tissue damage, leading to the direct inactivation of two antiatherosclerotic enzymes, endothelial nitric oxide synthase (eNOS) and prostacyclin synthase. Also the activation of oxidative stress has been implicated to be involved in the pathogenesis of diabetic complications.⁹ SOD, GPx and CAT are the antioxidant enzymes with the most antioxidant activity against ROS.⁹ Antioxidants instrumental in repairing damages caused by free radicals and the resulting oxidation; these enzymes how-

INTRODUCTION

Diabetes mellitus is one of the most important diseases worldwide, reaching epidemic proportions. Global estimates predict that the proportion of adult population with diabetes will increase by 69% for the year 2030.¹ It is a complex and chronic illness that requires continuous medical attention, with a high disease burden on the patients. Type 2 diabetes is accompanied with increased formation of free radicals otherwise called reactive oxygen species (ROS) leading

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ever, go a step further by attempting to stop damage before it occurs by triggering chemical reactions that rid the body of free radicals and ROS.¹⁰

Of all the enzymes, SOD, GPx and CAT are the ones with the most antioxidant activity and thus considered the main antioxidant enzymes that regulate free radical activity. They constitute a mutually supportive team of defence against ROS.¹¹ SOD is considered a first-line defence against ROS and is present in nearly all cells. It converts superoxide ion (O_2^-) to hydrogen peroxide (H_2O_2). H_2O_2 may still react with other free radicals; it is thus degraded by either one of the other two antioxidant enzymes, GPx or CAT. GPx removes H_2O_2 by coupling its reduction with the oxidation of glutathione (GSH). GPx can also reduce other peroxides, such as fatty acid hydroperoxides. CAT which is localized primarily in peroxisomes, detoxifies the H_2O_2 converting it into water and molecular oxygen.¹¹ It is imperative to measure the antioxidant status of Type 2 diabetics as an adjunct to standard diagnostic tools in management of diabetic complications. This study aimed to determine serum levels of the antioxidant enzymes (SOD and GPx) in Type 2 diabetic mellitus patients, as a measure of antioxidant status.

MATERIAL AND METHODS

Study Design

This cross-sectional study was carried out at the Braithwaite Memorial Specialist Hospital (BMSH), located in Port Har-

court, Rivers State. One hundred and eighty two subjects (182) aged between 20 and 80 years constituted the study population. Seventy three (73) apparently healthy non-diabetics were used as controls and one hundred and nine (109) diabetics used as test subjects. A total of eighty six (86) males and ninety six (96) females were involved in the study. All subjects were advised to be on 10 to 14 hours overnight fast prior to collection of samples. The test subjects (diabetics) were those whose glycated haemoglobin (HbA1c) values were \geq (greater than or equal to) 6.5% and the control subjects (non-diabetics) were those whose HbA1c values were $<$ (less than) 6.5% (WHO, 2011; ADA, 2015). Ethical clearance was obtained from the ethical committee of the hospital and informed consent gotten from all subjects. A structured questionnaire was used to collect data on age and duration of illness. Also measurements of weight and height were made as to ascertain the body mass index (BMI) of the subjects.

Sample collection and Storage

Proper venepuncture technique was employed in the collection of the 5ml blood sample from the subjects with a sterile hypodermic needle. Fasting plasma glucose HbA1c, SOD and GPx, levels were determined following the manufacturer's standard operating procedures.

RESULTS

The results show that the mean FBS levels of the diabetic

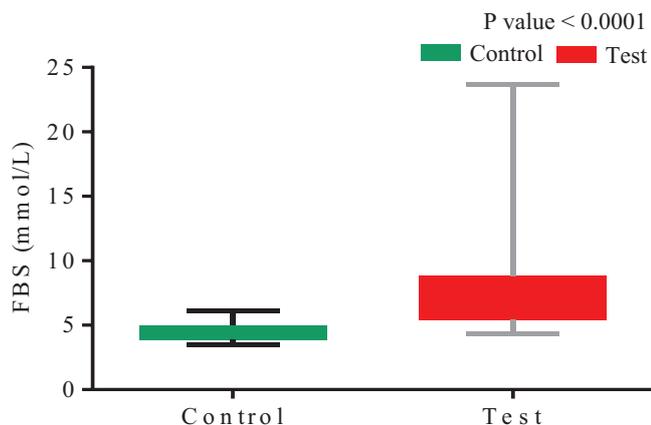


Figure-1: A Box and Whiskers plot showing the mean FBS values of test and control subjects, including minimum and maximum values.

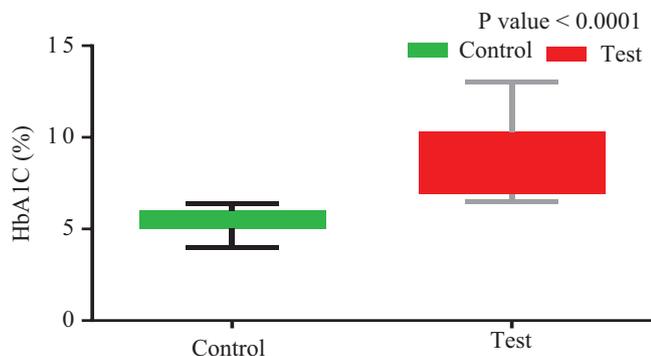


Figure-2: A Box and Whiskers plot showing the mean HbA1c values of test and control subjects, including minimum and maximum values.

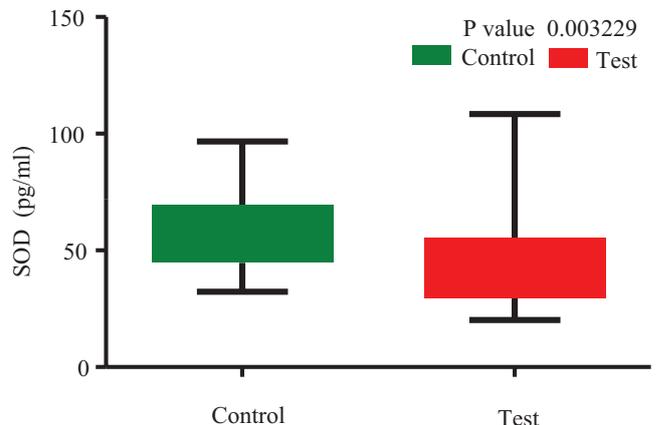


Figure-3: A Box and Whiskers plot showing the mean SOD level in test (diabetic) and control subjects, including minimum and maximum values.

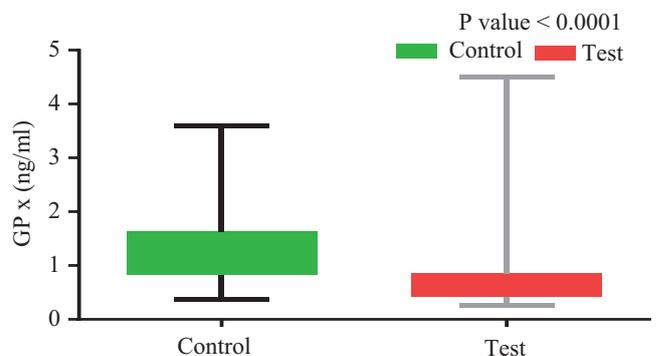


Figure-4: A Box and Whiskers plot showing the mean GPx level in test (diabetic) and control subjects, including minimum and maximum values.

subjects were significantly higher ($p < 0.05$) when compared with that of the control subjects. Also the mean values of HbA1c concentrations for the diabetics were significantly higher ($p < 0.05$) than that of the control subjects. SOD and GPx values of diabetics were significantly lower ($p < 0.05$) as compared with that of the control subjects.

The mean fasting blood sugar, HbA1c, SOD and GPX values of diabetic and control subjects, depicting maximum and minimum values are further illustrated with a Box and Whiskers plot as shown in Figures 1-4 below.

DISCUSSION

The antioxidant enzyme levels of 109 diabetic subjects and 73 non-diabetic controls have been brought to focus. The results from our study showed that the mean values of FBS and HbA1c for Type 2 diabetics were significantly higher ($p < 0.05$) when compared with that of the control subjects. HbA1c(%) levels of 8.65 ± 2.21 for the test group as against 5.48 ± 0.57 for the control group show the degree of glycaemia in the test group, which could be attributed to the deteriorating beta-cell function in diabetics resulting in relative or absolute insulin deficiency and hyperglycaemia in the face of insulin resistance.¹²

The levels of the antioxidant enzymes SOD and GPX were found to be significantly lower in the diabetics ($p < 0.05$) than that of the control subjects. These findings show that Type 2 diabetes maybe associated with decrease in antioxidant enzyme levels resulting from increased oxidative stress. This agrees with the findings of,¹³ in which they discovered a reduced systemic anti-oxidative defence in patients with Type 2 diabetes mellitus. Our findings are also in line with findings of,¹⁴ who reported reduced erythrocyte SOD activity in diabetics as compared to non-diabetics,¹⁵ also found impaired GPX activity and lower erythrocyte GSH in Type two diabetic patients. Several other literatures like those of^{16,17} have also reported reduced activity of the antioxidant enzymes CAT, SOD and GPX in diabetics further agreeing with the findings of this study.

CONCLUSION

Type 2 diabetes is associated with decreased antioxidative status as the levels of the antioxidant enzymes SOD and GPx were significantly reduced in the diabetic subjects. Hyperglycaemia, an inevitable consequence of Type 2 diabetes and increased generation of ROS depresses the endogenous antioxidant defence system, exposing cells to damage from oxidative stress which could lead to the development of diabetic complications.

It is hereby recommended that antioxidative therapy be incorporated in the management/therapy of Type 2 diabetics, to supplement the endogenous anti-oxidative system, as this could prevent or delay progression of the disease and the development of late diabetic complications.

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Evaluation of Antibiotic Dose Adjustment in Patients with Renal Insufficiency in a Tertiary Care Center

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ABSTRACT

Introduction: Renal dysfunction may lead to accumulation of drugs and their metabolites. It may lead to toxicity of drugs. Therefore many drugs need adjustment of doses in renal failure. Appropriate dose adjustment can optimize therapeutic efficacy and minimize toxicity of drug.

Material and methods: The study is retrospective and cross sectional. Records of all patients with renal dysfunction in any department where nephrology unit was consulted were screened. Inclusion criteria were eGFR of < 60ml/minute, age>16 years and administration of at least 1 antibiotic. Prescribed dosage of the drug was compared with dosage recommended by guidelines to assess appropriateness of dose in renal dysfunction. GFR was calculated by Cockcroft Gault equation.

Results: Study group comprised of 242 patients. Gender ratio was 1.23:1(male: female). Mean age of patients was 43.8± 11.3 years. Patients received 615 antibiotics. There was need of antibiotic dose adjustment in 562(91.39%) antibiotic dosages. Physicians did not do any dose adjustment for Amoxicillin clavulanate, Cefazidime and Vancomycin. There was no adjustment of doses in 63.22% patients and partial dose adjustment was done in 23.96% cases. Only 31 patients (12.8%) got appropriate doses as per GFR. Appropriate doses were given in 31.49 % doses.

Conclusion: This study showed that there was no adjustment done in drug doses in 63% patients with renal insufficiency and 23.9% got adjustment for some drugs. 24 patients (9.9%) developed adverse drug reaction attributable to excessive doses. There is need to create awareness among physicians for drug dose adjustment in renal dysfunction.

Keywords: Renal dysfunction, appropriate drug doses, estimated glomerular filtration rate, drugs, toxicity of drug

INTRODUCTION

Kidneys have major role in excretion and metabolism of many drugs. There is rise in patients with renal insufficiency with aging population. Some kind of renal dysfunction is observed in 10% patients.¹ Impairment of renal function can lead to impaired excretion of drug and its metabolites.² It may lead to accumulation of drug and its metabolites. Chronic renal failure is also responsible for impaired activity of drug transporters and drug metabolizing enzyme.³ Therefore many drugs need dosage adjustment in renal failure according to severity of renal dysfunction. Drug related problems are commonly due to medication dosing errors in renal failure.⁴ Appropriate dosage adjustment for drugs in renal failure can optimize efficacy and help in reducing toxicity and cost.⁵ Inappropriate dosing in patients with kidney dysfunction can lead to either toxicity or ineffective therapy.⁶ Renal elimination of drug correlates better with the glomerular filtration rate (GFR) than serum creatinine level. It is

better to use eGFR (estimated GFR) or eCrCl (estimated creatinine clearance) for drug dose adjustment in patients with renal dysfunction.² There are two major approaches for dose adjustment in renal failure i.e. either to lengthen the interval between doses or to reduce the dose. Occasionally both interval and dose adjustments are needed to adjust dose in renal insufficiency.⁷

Objectives of the study were to determine the percentage of antibiotics needed dosage adjustment in patients with renal failure and to determine percentage of antibiotics with inappropriate doses whether high or sub therapeutic. We also looked for adverse effects due to inappropriately high doses of drugs.

MATERIAL AND METHODS

The study was retrospective descriptive study. The study was done in at our institute a tertiary care center and teaching hospital in uttarakhand. Hospital has all medical and surgical departments with indoor beds more than 800. The study period was January 2013 to May 2015. Study sample comprised of 242 patients, which was based on inclusion exclusion criteria.

Records of all patients with renal dysfunction in any department where nephrology unit was consulted were screened. Serum creatinine of 1.4 mg% was kept as cut off. Inclusion criteria were as follows.

1. Patients with eGFR < 60 ml/minute were included.
 2. Patients with age of more than 16 years and of either sex were included
 3. Patients who received at least one antibiotic
- Patients with eGFR > 60 ml/minute and who were not on any antibiotic were excluded from the study. Data were collected by investigators on the extraction of data from patient files. Patient chart review was used to collect individual patient data including age, sex, serum creatinine, blood urea nitrogen, and co-morbid condition, reason for admission, medications prescribed during hospitalization and medications that need dose adjustment. Actual weight was recorded and for those who were critical and immovable patients, either

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the patient, if conscious, or the care giver was asked to provide the most recent weight of the patient. Any adverse event which could be attributed to drug was also noted. There were 242 patients who fulfilled inclusion criteria.

Cockcroft Gault equation⁸ was used to calculate glomerular filtration rate from serum creatinine (SCr) as shown below for men and women respectively:

Men: CrCl (ml/min)=[(140-age)×weight (kg)]SCr (mg/dl)×72

Women: CrCl (ml/min)=[(140-age)×weight (kg)]×0.85(SCr (mg/dl)×72)

Prescribed dosage of the drug was compared with dosage recommended by guidelines to assess appropriateness of dose in renal dysfunction.⁹

STATISTICAL ANALYSIS

SPSS version 16.0 was used to analyze data. Description of data was done with help of descriptive statistics like mean, standard deviation and percentage

RESULTS

In the study group of 242 patients, there were 135 males and 107 females in the group. Mean age of patients was 43.8± 11.3 years (17-82 years). Demographic data for the patients is shown in table 1. Patients received 615 antibiotics with a mean of 2.54 per patient. Maximum number of patients were in GFR 15-29 ml/ minute group. Chronic kidney disease (CKD) was cause of renal insufficiency in in 77% patients (n=202) and Acute kidney injury (AKI) was responsible in 33% (n=40) patients. Figure 1 shows different causes of CKD in this cohort. Most commonly used antibiotics were Piperacillin tazobactam, Meropenem, Amoxicillin clavulanate, Ceftriaxone, Imipenem, Teicoplanin, Levofloxacin and Ciprofloxacin. Other antibiotics were Linzolid, Vancomycin, Ceftazidime, Cefuroxime, Cefoperazone, Polymixin and Colistin. Table 2 shows the frequency of different antibiotic usage and dose adjustment done.

There was need of antibiotic dose adjustment in 562(91.39%) antibiotic dosages and 8.59% doses did not need any adjustment. Piperacillin tazobactam (120 doses) was most commonly used but adjustment of dose was done in 58.5% doses only. Meropenem and Imipenem dose adjustment was done in 49% and 21% doses. Levofloxacin and Ciprofloxacin doses were not adjusted in 87.5% and 83.3% cases. Cefoperazone was used in appropriate dose in all cases. Linzolid and Clindamycin doses were not appropriate in 41.6% and 31.25% cases as doses were reduced but no adjustment is needed in renal failure. There was no adjustment of doses in 153(63.22%) patients and partial dose adjustment was done in 58 (23.96%) cases. Only 31 patients (12.8%) got appropriate doses as per GFR. Appropriate doses were given in 31.49 % doses only while remaining 68.51% doses were inappropriate.

Most of the patients (88.63%) with GFR 30-60 ml/minute got inappropriate doses and 67% patients with GFR 29-15 ml/minute got inappropriate doses. 70% of patients with GFR<15 ml/minute got inappropriate doses and 71.4% patients on dialysis received inappropriate doses

Adverse drug reactions due to inappropriate doses were seen

Serial No	Parameter	value
1	Age (years)	43.8±11.3
2	Males	135
3	Females	107
4	Mean S.creatinine (mg %)	2.6±1.1
5	Mean Urea (mg %)	86±11.7
6	Mean eGFR(mi/min)	28.7±8.9
7	Hemoglobin (gm %)	9.2±1.9
8	Total Leukocyte count (permm3)	12900±587

Table-1: Showing demographic data

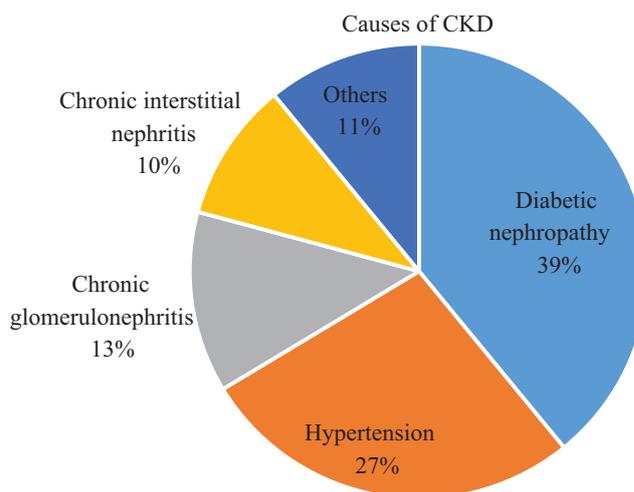


Figure-1: Showing causes of CKD

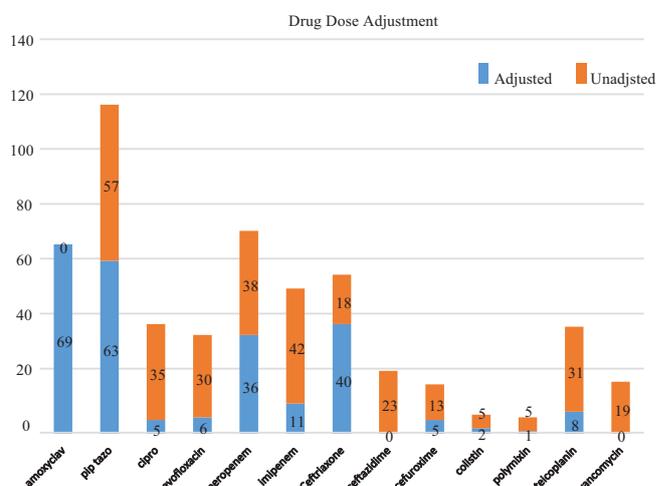


Figure-2: Showing drugs and dose adjustment

in 24 patients. Seizures were noted in 5 patients on imipenem and 2 patients on Ceftazidime. Encephalopathy could be attributed to ceftazidime, Piperacillin tazobactam and Amoxicillin clavulanate in 10 patients. Ototoxicity was seen in 4 patients on vancomycin. Hemorrhagic complications were observed in 2 patients on ceftazidime.

DISCUSSION

Our study looked into the drug dose adjustment in hospitalized patients with renal insufficiency for various reasons. There was no adjustment of doses in 153(63.22%) patients and partial dose adjustment was done in 58 (23.96%) cases.

In our study 153 patients received no dose adjustment while it is reported 39.3% by Fahimi et al and 31% by Henok et al.^{10,11} Fifty eight (23.96%) patients received adjustment for at least one drug but Henok et al reported in 41% patients.¹¹ All drugs were adjusted according to GFR in 12.8% patients in our study. Henok et al reported adjustment in all drugs in 28 % patients and another study reported adjustment for all drugs in 23.4 % cases.^{11,12} Study by Prajapati et al from India also showed that adjustment was done in 18.89% prescriptions only but prescriptions were adjusted in 31.49 % prescriptions in our study.¹³ Similar rates of drug dose adjustment are described by Decloedt et al. (32 %) and Sweileh et al. (26.42 %).^{14,15} Prescriptions were adjusted in 43% in another study.¹⁰ There was no adjustment was done for ceftazidime, vancomycin and Amoxicillin clavulanate. Fahimi et al also reported that Vancomycin doses were least frequently adjusted.¹⁰ There has been description of least adjustment of Amoxicillin, levofloxacin and ciprofloxacin.¹³ Authors also described that antimicrobials needed drug adjustment most commonly. Though it had not been reported by other studies we found use of sub therapeutic doses of Linzolid and Clindamycin in 41.6 and 31.25% doses used in patients with renal failure. It may lead to poor control of infection. We found that dosing errors were high in early stages of renal failure. Doses were inappropriate in 88.63% in patients with GFR 30-60 ml/minute while it was 70% in advance stages of renal failure. Prajapati et al also observed same finding in their study.¹³ There are higher chances of adverse reactions due to use of higher doses of antibiotics. We found association of seizures and encephalopathy with Imipenem, Ceftazidime, Piperacillin tazobactam and Amoxicillin clavulanate in our patients with inappropriately high doses. There are several reports of neurotoxicity with use of imipenem, cephalosporins and other beta lactam antibiotics in renal insufficiency.¹⁶⁻¹⁸ We found bleeding complications in two patients on ceftazidime. Third generation cephalosporins and beta lactum antibiotics can interact with function of platelet membranes through interference with ADP receptors and can lead to hemorrhagic complications in uremia.¹⁹

CONCLUSION

Current study showed that there was no adjustment done in drug doses in 63% patients with renal insufficiency and 23.9% got adjustment for some drugs. Linzolid and Clindamycin doses were sub therapeutic in 41.6% and 31.25% cases. 24 patients (9.9%) developed adverse drug reaction attributable to excessive dose given according to GFR. Errors in drug dosage could lead to toxic effects or sub therapeutic doses. It would result increased financial burden due to high dose of antibiotic and increased duration of hospitalization. There is need to educate physicians about need of adjustment of drug dosages in patients with renal dysfunction.

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Cutaneous Manifestations in Patients with End Stage Renal Disease on Hemodialysis

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ABSTRACT

Introduction: Cutaneous alterations in patients with End Stage Renal Disease (ESRD) are frequently found but are variable. They present with multiple skin abnormalities which have a significant impact on the quality of life of patients. The objective was to study the incidence of various cutaneous manifestations in patients on dialysis.

Material and Methods: A hospital based cross sectional study was conducted which included 100 consecutive cases of ESRD on hemodialysis for at least a period of 1 month. Cases were classified as ESRD on the basis of Cockcroft-Gault formula, abnormal urinary imaging and urinary abnormality. Complete mucocutaneous examination was done in all patients. Investigations including renal function tests (RFT) and serum electrolytes were done in all patients.

Results: 98% of cases had atleast one cutaneous finding attributable to ESRD. The maximum number of cases was in the age group of 55-65 years with a male to female ratio of 2.8:1. Xerosis was the most common finding and was observed in 67% of cases followed by pallor (65%), hyperpigmentation (26%), edema (17%), pruritus (15%), ecchymosis (9%) and elastosis (3%). Among infections fungal infections (11%) were more common than bacterial infections (4%). In nail changes half and half nails (21%) and longitudinal ridging (20%) were frequently seen followed by leuconychia (15%), onycholysis (7%), Beau's lines (7%), koilonychia (2%), Mees' lines (2%) and Meurhcke's lines (2%). Hair changes such as sparse scalp hair (7%) and lustreless hair (7%) were seen. Oral changes such as angular cheilitis (4%), uremic breath (2%) and macroglossia (1%) were present. Iatrogenic manifestations like gynaecomastia (1%) and A-V shunt dermatitis (1%) were also observed.

Conclusion: Dermatological manifestations increase with increasing duration of renal disease. Our observations necessitate a joint effort between dermatologists and nephrologists for the early recognition and management of these dermatoses which may reduce the morbidity and significantly improve the quality of life of patients.

Keywords: Chronic Kidney Disease, Dialysis, Cutaneous Manifestations

INTRODUCTION

The number of patients with ESRD on regular haemodialysis has increased exponentially over the recent years. Studies report the prevalence of Chronic kidney disease (CKD) to be 17.3% in India.¹ Mucocutaneous manifestations are commonly observed among patients with End stage renal disease (ESRD) undergoing dialysis. An earlier study by Udaykumar et al² reported all patients with ESRD on hemodialysis to have atleast one skin manifestation. Certain skin changes may also be observed in patients with CKD before progression to ESRD. Rarely skin manifestations may be the first sign of kidney disease.³ The skin manifestations may

be due to the fact that at present dialysis is not as efficient as a normal kidney and cannot replace its endocrine function resulting in electrolyte imbalance and build-up of uremic substances. Some of the manifestations may be as a result of dialysis and immunosuppressive drugs used.

The aim of the study was to analyse the mucocutaneous manifestations in patients with ESRD on hemodialysis. An effort was made to correlate the biochemical parameters of renal function tests and cutaneous findings in patients with ESRD.

MATERIAL AND METHODS

A hospital based cross sectional study was conducted on 100 consecutive cases of ESRD (CKD stage 5) on hemodialysis for atleast a period of 1 month. Cases were classified as ESRD and were included in the study on the basis of Cockcroft-Gault formula, abnormal urinary imaging and urinary abnormality. After obtaining the ethical approval from IRB an informed consent was obtained from all patients. Detailed history regarding duration of renal failure, duration for which the patient has been on dialysis and details of onset of skin lesions was elicited. Complete mucocutaneous examination was done in all patients and the details were recorded in a pre-structured proforma. Investigations including renal function tests (RFT) and serum electrolytes were done in all patients. Other relevant investigations such as potassium hydroxide (KOH) mount, Gram stain and skin biopsy were done wherever indicated. Patients who had undergone renal transplantation, peritoneal dialysis or had serious comorbidities such as malignancy were excluded.

STATISTICAL ANALYSIS

Statistical analysis was done using Chi-square test to find associations between various cutaneous manifestations. Biochemical values were expressed as mean. To explore the relationship of cutaneous findings and biochemical parameters the unpaired t test was used. A p value of less than 0.05 was considered significant.

RESULTS

98% of patients recruited in this study had at least one cutaneous manifestation. Of the 100 patients 26 were females

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and 74 were males. The age of patients ranged from 15-78 years with the mean age being 50.32 years. Majority of the patients belonged to the age group of 45-65 years. Diabetes mellitus (DM) was the most common cause (45%) of renal dysfunction followed by hypertension (HTN) in 35% cases and glomerulonephritis in 4% cases (Table 1). The duration for which patients were on dialysis ranged from 1 to 10 years with a mean duration of 20.52 months. The observed cutaneous manifestations and their incidence are summarised in Table 2. Xerosis was the most common cutaneous finding and was reported in 67% cases. Pallor of skin due to anaemia was observed in 65% and hyperpigmentation in 26% patients respectively. Pruritus was observed in 15% cases and ecchymosis in 9% cases. Among infections fungal infections (11%) were more common than bacterial infections (4%). Among nail findings half and half nails or Lindsay’s nails was seen in 21% cases and longitudinal ridging in 20 % cases. Other findings were leuconychia (15%), onycholysis (7%), Beau’s lines (7%), koilonychias (2%), Mee’s lines (2%) and Meuhrcke’s lines (2%).The nail findings are summarised in Figure 1. Hair changes such as sparse scalp hair and lustreless hair were seen in 7 cases each. Few oral changes such as angular cheilitis (4%) uremic breath (2%) and rare iatrogenic manifestations like gynaecomastia and A-V shunt dermatitis were observed in 2 patients. There was no significant association between biochemical parameters and various cutaneous findings ($p>.05$). There was no significant association between duration of dialysis and cutaneous manifestations ($p>.05$).

DISCUSSION

ESRD represents a clinical state where there is irreversible loss of endogenous renal function. Xerosis was the most commonly encountered cutaneous manifestation. It was seen in 67% of cases and this was similar to the incidence reported by previous studies. Reported incidence ranged from 46-90%.²⁻⁴ Xerosis is graded into grade 0, grade 1 and grade 2 based on the grading by Morton.⁵ Of the 67 cases of xerosis 13 were classified as grade 2 xerosis. It can be correlated with decreased sweating and lowered levels of lipids in the skin surface. The decreased sweating may be due to a decrease in the size of the eccrine duct.^{2,6} Pallor of the skin due to anemia was observed in 65% of patients. This was consistent with the findings of Udaykumar et al who reported it in 60% of patients.² The anemia may be due to anoxia and decreased erythropoiesis due to reduced erythropoietin secretion by the kidney.⁷ Skin hyperpigmentation is another common finding in patients with ESRD. In our study 15% of cases had hyperpigmentation. Similar incidence was observed by Tawade and Gokhale⁸ and Pico et al.⁶ This may be attributed to the accumulation of Melanocyte Stimulating Hormone (MSH) due to failure of kidneys to excrete it. Extremities and photoexposed areas were more severely affected. Pruritus is one of the most distressing cutaneous symptoms seen in patients on dialysis. It was observed in 15% of cases. In most of our patients it affected the quality of sleep and daily activities. In a study done by Tawade and Gokhale⁸ it was reported in 34% of patients while Udaykumar et al² reported an incidence of 53%. Recent studies have reported a decline in the incidence

Etiology	Male	Female	Total cases
Diabetes	33	12	45
Hypertension	29	6	35
Glomerulonephritis	2	2	4
Polycystic kidney disease	4	2	6
Obstruction	3	0	3
Others	3	4	7

Table-1: Etiology of Chronic renal failure

Manifestation	Number of cases
Xerosis	67
Pallor	65
Hyperpigmentation	26
Pruritus	15
Ecchymosis	9
Fungal infection	11
Bacterial infection	4
Viral infection	1
Half and half nails	21
Longitudinal ridging	20
Mee's lines	2
Muehrcke's lines	2
Koilonychia	2
Absence of lunula	6
Beau's lines	7
Leukonychia	15
Onycholysis	7
Macroglossia	1
Lusterless hair	7
Diffuse alopecia	7
Papules with keratotic plug	2
Angular cheilitis	4
Uremic breath	2
SEB keratosis	1
IGH	1
Gynaecomastia	1

Table-2: Skin manifestations and their incidence

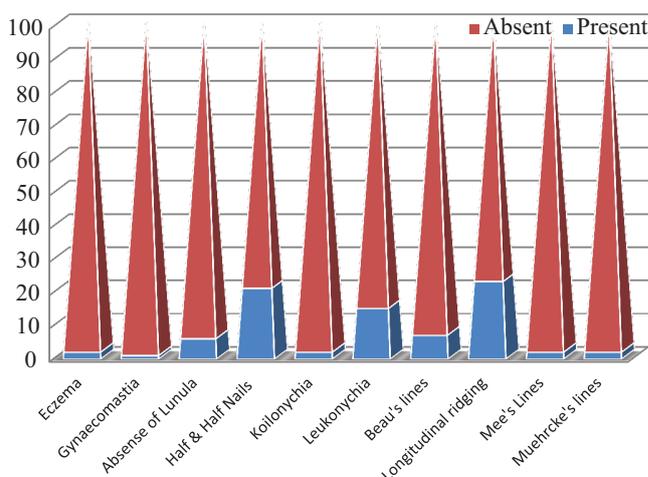


Figure-1: Incidence of various nail findings

of pruritus possibly due to better dialysis techniques.⁹ Uremic pruritus is defined as pruritus which appears just prior to dialysis or any time after that and cannot be explained by any other disease process. The pruritus may be due to pruritogen-



Figure-1: Half and half nails

ic substances such as Histamine.¹⁰ Among nail changes Lindsay's nails (21%) and longitudinal ridging (20%) were the most commonly encountered findings. This was comparable to the results of other studies.² Lindsay's nails also known as half and half nails are characterized by a proximal white part and a distal reddish pink part that does not fade on pressure. These two zones show a sharp demarcation between them. An increase in the prevalence of bacterial, viral and fungal infections has been reported among ESRD patients.¹¹ This may be due to the poor immunity as a result of decreased immune surveillance, decreased B cell activity and altered T lymphocyte activity. In our study fungal infections were seen in 11% of cases and bacterial infections in 4% cases. Among fungal infection dermatophyte infections (5%) were the most common followed by onychomycosis in 4% of cases. Sultan et al reported an incidence of 33% for fungal infections¹² and Udaykumar et al reported bacterial infections in 13% of cases.² Hair changes such as sparse scalp hair was seen in 7% cases and lustreless hair in 7% cases. Dry lustreless hair may be due to decreased secretion of sebum.² Rare iatrogenic manifestations reported include gynaecomastia and arteriovenous shunt dermatitis in one case each. Udaykumar et al reported gynecomastia in 1% of cases and arteriovenous shunt dermatitis in 8% of patients.²

CONCLUSION

The reported prevalence rates of various cutaneous findings vary in different studies. Our observations necessitate a joint effort between dermatologists and nephrologists for early recognition and management of these comorbidities of ESRD which may significantly improve the quality of life of patients. This is of greater importance in the present scenario where larger numbers of patients with ESRD survive for longer periods on maintenance haemodialysis.

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Efficacy and Safety of Long Pulsed Neodymium-Doped Yttrium Aluminium Garnet Laser for Hair Reduction in Patients of Skin of Colour

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ABSTRACT

Introduction: Many different laser systems are available for permanent reduction of unwanted hairs; however, no single laser has been shown to be superior in providing safe and effective hair removal in all skin types. The objective of the study was to evaluate the efficacy and safety of long-pulsed Neodymium-doped Yttrium Aluminium Garnet (Nd:YAG) 1064-nm laser along with cooling device for hair removal in darker skin types.

Materials and methods: A total of 85 female patients of Fitzpatrick skin types IV and V with terminal facial and/or non-facial hairs were treated with a long pulsed Nd:YAG laser 1064-nm, (6mm spot size, fluence of 60-100J/cm² with pulse width of 40 or 60msec and 10-mm spot size, fluence of 36-45 J/cm² with pulse duration of 15msec. 6 or more consecutive laser treatments were delivered to 160 skin sites at an interval of 6 to 8 weeks. Both the outcome and the adverse events were noted down.

Results: There was a significant hair reduction of 60-80% after 6 treatment sessions. Non facial sites like axillae and chest responded slightly better than facial sites. Amongst the facial hairs, side burn showed more reduction than chin and upper lip. Adverse reactions were minimal and included mild pain, transient erythema, perifollicular edema and rarely post inflammatory hyperpigmentation without scarring.

Conclusion: The long-pulsed 1064-nm Nd:YAG laser is a safe and effective method of hair reduction in patients of dark skin types. It may require more than 6 sittings to have permanent hair reduction. Side effects were limited and transient.

Keywords: Dark skin type, Laser hair reduction, Nd:YAG Laser,

with longer pulse duration and adequate epidermal cooling minimize the epidermal injury in skin of color.² In this study we discuss about outcome of laser hair removal in dark skin patients using long pulsed Nd:YAG 1064-nm laser including procedure details, its safety and efficacy, precautions and contra-indications.

Aim of the study was to assess the outcome of laser hair removal in the different body sites and to look for the most common adverse events.

MATERIAL AND METHODS

This was an observational study conducted at a tertiary care teaching hospital from 2009 to 2013 for a period of five years. Institutional ethical committee clearance as well as informed consent from the patients were obtained before starting the study. All the patients who fulfilled the inclusion criteria were included and only those who had completed 6 sittings were analyzed for the treatment outcome. A total of 85 patients with 160 skin sites having terminal facial or non-facial hairs were included in the study. Initial evaluation was done for growth and density of hairs (Black hairs: Brown hairs: Light brown hairs and coarse/medium/fine). Patients with features suggestive of hirsutism were evaluated clinically and biochemically. A detailed clinical history was taken in each patient especially regarding herpes, photosensitivity, keloidal tendency or any drug intake.

Inclusion Criteria: a) Patients of skin type Fitzpatrick IV and V having terminal facial and non-facial hairs b) Informed Consent signed by patient or guardian.

Exclusion Criteria: a) Waxing, threading or bleaching within one month, b) patients on Isotretinoin in past 3 months, c) patients suffering from photosensitivity disorders, d) history of keloid formation, e) pregnancy and epilepsy.

The patients were advised not to undergo threading, waxing, plucking or bleaching and excessive sun tanning at least 3-4 weeks prior to start of treatment and in between the treatment sessions.

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INTRODUCTION

The laser assisted hair removal has come a long way from its inception. Over the last decade there have been tremendous advances in Laser technology for hair removal. Light based system evolved from the earlier version of IPL (Intense pulsed light) based technology to AFT (Advanced Fluorescent Technology) with contact cooling. Lasers have moved from the days of Ruby laser 694-nm and Alexandrite Laser 755-nm to Long pulsed Nd:YAG laser 1064-nm and Diode laser of 810-nm in-motion technology. Longer wave length laser such as Nd:YAG 1064-nm have been shown to be best for patients with darker skin shades.¹ The advantage of this wavelength is reduced scatter and deeper penetration of the laser. The decreased absorption of the 1064-nm Nd:YAG laser by melanin containing structure is an advantage in terms of epidermal heating and damage, it follows that hair also is less effectively heated. Use of longer wave length laser

After marking the treatment area with white marker, hairs were shaved close to skin and site was cleaned properly. Topical anesthetic cream was not used routinely. All the patients were treated with a long pulsed Nd:YAG laser (Harmony Laser XL from Alma Lasers, Ltd.) 1064-nm with precooling of the skin with Cryo5 Zimmer. For apprehensive patients and with darker shade of skin, a test patch was done with 6mm spot size with fluence of 60 and 70J/cm². The patients were reassessed after 48 hours and further treatment was given.

These patients were treated with 6mm spot size, fluence of 60 to 70J/cm² with pulse width of 40 to 60 msec. Depending upon patient's response fluence was increased by 10J/cm² on subsequent sitting up to 100J/cm² and pulse width reduced from 60 to 40 msec. Usually 1-2 passes were given. Non facial sites like axilla and chest were treated with 10-mm spot size, fluence of 36-45J/cm² with pulse duration of 15msec. For the initial 2-3 sessions, patients were called after 4 to 6 weeks and subsequent intervals were based on regrowth of hairs which was approximately 8 weeks. Global clinical evaluation of hair reduction using photographs of skin sites were obtained at baseline and at the end of 6 treatment sessions. Hair reduction was graded as poor for less than 25% reduction, fair for 25% to 50% reduction, good for 51% to 75% reduction, and excellent for more than 76% reduction. Outcome and adverse events, if any were recorded after each sitting. Each patient underwent at least 6 or more consecutive laser treatments.

Post treatment instructions were given to the patient like not to rub the treatment areas for next 2-3 days and regular use of sunscreens. Patient who developed marked peri-follicular edema and erythema were advised fluticasone and fucidic acid ointment for 3-5 days to prevent post inflammatory pigmentation.

STATISTICAL ANALYSIS

Microsoft excel was used to generate tables. Results of the study are based on Descriptive statistics.

RESULTS

A total of 85 patients with 160 skin sites were included in the study (Table-1). Out of 70 patients undergoing laser treatment for chin, 20 (28.5%) patients showed excellent results, 44 (62.9%) patients showed good results and 6 (8.5%) patients showed fair results. Out of 40 patients who were treated for upper lip area, 10 (25.0%) showed excellent results, 24 (60.0%) showed good results and 6(15.0%) showed less than 50% improvement. Of the 35 patients who were treated for side burn, 17 (48.5%) patients showed excellent results and 18 patients (51.4%) showed good results.

All the patients (n=10) treated for axillae (Figure-1a and Figure-1b) and chest (n=5) showed excellent results.

Adverse reactions included mild pain and burning sensation in almost all patients especially while treating the upper lip area which reduced after extra cooling with the Zimmer chiller. Immediate erythema was noticed in all the treated areas. Perifollicular edema (Figure-2) was noticed especially where coarse hairs were present except over the central area of upper lip and axillae. In 6 cases there was unusual response to cold in the form of urticaria which subsided after

Site	No. of sites	Improvement		
		Excellent > 76%	Good 51%-75%	Fair 25%-50%
Chin	70	20	44	6
Upper lip	40	10	24	6
Side burn	35	17	18	
Axillae	10	10		
Chest	5	5		

Table-1: Table showing overall results after 6 sessions of laser treatment.



Figure-1: (a and b) Before and after treatment photographs of axilla in a patient showing excellent results.



Figure-2: Perifollicular edema

several hours. Mild crusting and post inflammatory hyperpigmentation was noticed in 10 patients which was transient and subsided within a week except in 3 patients for whom prolonged intervention was required in the form of chemical peeling and skin lightening creams.

DISCUSSION

With advances in the laser technology, wide ranges of laser machines are available for laser assisted hair reduction in all the skin types. In spite of all these advances, there is no single laser system which is effective in all skin shades and hair type. This is evident from the change in terminology of earlier claims of permanent hair removal to hair reduction and from the concept of thermal relaxation time (TRT) to thermal damage time (TDT). All hair removal lasers work on the principle of selective photothermolysis with the melanin in the hair follicle as the chromophore. Absorption spectrum of melanin is between 600-nm and 1100-nm. At this range laser is absorbed poorly by competing chromophore like hemoglobin and water and hence penetrate deeply in to the dermis.^{3,4} The use of higher fluence and the larger spot sizes can compensate for the reduced melanin absorption capacity by taking the advantage of reduced scatter of the energy as it passes through the epidermis. Safety and efficacy of laser hair removal is well documented in fairer skin types in several studies.^{5,6} There are few studies which are designed to evaluate laser hair reduction in Fitzpatrick's skin type IV and V.⁷⁻⁹ Study conducted by Alster TS *et al.*, on women with skin type IV through VI showed prolonged hair reduction of 70% - 90% at the end of 12 months. They observed that axillary hairs are substantially more responsive than hairs on face and legs. In our study overall hair reduction was 60% - 80% at the end of 6 sittings. Hair of the axillae and chest responded better than face. In their study, Nanda S and Bansal S reported improvement of 89.69% for chin and 59% for upper lip. In our study good to excellent result was seen in 91.4% for chin and 85.0% for upper lip. It is observed that as the number of sittings progresses hairs become light brown, thinner and much longer than the original. It may require few more sessions with reduced pulse width and higher fluence to counter these changes.

Side effects are minimal and temporary without any permanent damage to the color or texture of skin. This is the observation in most of the studies which concluded that Long pulsed Nd:YAG laser is a safe and effective method of long term hair reduction in patients with dark pigmented skin.^{10,11}

Limitation

As the majority of the patients included in the study were of type V skin and only few were of type IV skin, hence, statistically significant differences in response could not be evaluated between the groups.

CONCLUSION

Hair reduction with long pulsed Nd:YAG laser 1064-nm is safe and effective technique in darker skin types when it is used along with the cooling device. However, to achieve permanent hair reduction it may require more than 6-8 sittings. Side effects are seen only in a few patients and are transient without any permanent sequelae.

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Suicidal Ideation and its Correlates in Patients of Alcohol Dependence Syndrome

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ABSTRACT

Introduction: Risk of suicide among addicts is higher than in the general population and patients of alcohol dependence are not exception. The large population of individuals with alcohol use disorders, the relative higher frequency of suicides and suicide-related behaviours in this population, and the devastating effects of attempted and completed suicides on individuals, families, and society make this a topic of immense importance. This study aims to find out suicidal ideation and different factors associated with it among patients of alcohol dependence who visited Psychiatry OPD.

Material and Methods: The study sample consisted of 50 consecutive male patients of alcohol dependence syndrome who visited Psychiatry OPD and were neither in withdrawal state nor in acute intoxication. A similar number of age, sex and education level matched healthy persons were kept as control. After obtaining informed consent, both study sample and control subjects were assessed for suicidal ideation, depression and anxiety with the help of 'Scale for Suicidal Ideation (SSI)', 'Beck's Depression Inventory-Short Form (BDI-SF)' and 'State-Trait Anxiety Inventory (STAI)' respectively.

Results: In comparison to normal controls, the patients of alcohol dependence syndrome had significantly higher mean scores on the SSI ($t=2.858$, $df=98$, $p<0.01$), BDI-SF ($t=3.082$, $df=98$, $p<0.01$) and the State subscale ($t=3.465$, $df=98$, $p<0.01$) as well as the Trait subscale ($t=3.508$, $df=98$, $p<0.01$) of STAI. In comparison of control subjects, significantly more number of the patients had clinically significant suicidal ideation ($\chi^2=9.470$; $df=1$; $p<0.01$) as well as clinically significant depression ($\chi^2=18.316$; $df=1$; $p<0.001$). A significant positive correlation of suicidal ideation (SSI total score) was found with SADQ total score ($r=0.835$, $p<0.001$), BDI-SF total score ($r=0.934$, $p<0.001$), STAI-State score ($r=0.952$, $p<0.001$), and STAI-Trait score ($r=0.921$, $p<0.001$) in the patients ($N=50$).

Conclusion: Overall, the male patients of alcohol dependence syndrome had significantly higher suicidal ideation, depression and state and trait anxiety scores as compared to normal controls. A statistically significant positive correlation of suicidal ideation was found with levels of depression, anxiety as well as severity of alcohol dependence in the patients. These issues should carefully be enquired for during therapy and follow up of patients with alcohol use disorders.

Key words: Suicidal ideation, Depression, Anxiety, Alcohol Dependence Syndrome, Male

decades and it is now a fact that alcohol use disorders are an important risk factor for suicidal behaviour. According to some researchers, risk of suicide in alcohol-dependent subjects is even higher than in patients with depression.⁶

The risk for suicide among alcohol-dependent subjects varies from 7% to 18%.⁶⁻⁹ Murphy and Wetzel¹⁰ reviewed the epidemiological literature and found that the lifetime risk of suicide among individuals with alcohol dependence treated in out-patient and in-patient settings was 2.2 and 3.4%, respectively.

Several factors have been hypothesized to be associated with increased suicidality among patients of alcohol dependence. For example a recent study suggests that the risk for suicide associated with alcohol dependence increases with age.¹¹ Further, alcoholism and depression are frequently comorbid.¹²⁻¹⁴ and such comorbidity is now claimed to be a major risk factor for suicide.¹⁵ This can happen in two ways- both the patients of alcohol dependence with comorbid depression as well as the patients of depressive disorders with history of alcoholism are at increased risk of suicidality. Several researchers have pointed out that among alcohol-dependent individuals who committed suicide, 45-70% meet the criteria of major depressive episode before a suicide.¹⁶⁻¹⁸ In a recent study, Sher et al¹⁹ found that depressed subjects with a history of alcoholism had higher current suicide ideation scale scores compared with depressed subjects without a history of alcoholism. They also found that being male and older than approximately 50 years of age increases the risk for completed suicide.

In a recent study in India, Kaur et al.²⁰ have found that around 10% of the patients of alcohol dependence syndrome expressed suicidal thoughts or ideas, out of which 7% reported to have attempted suicide. Such suicidal behaviour was evaluated after one to one interview with a psychiatrist. It was further seen that the group which expressed suicidality, either suicidal thoughts/ideas or attempted suicide, was significantly ($p<0.01$) associated with comorbidity of other psychiatric diagnoses like mood disorders. Suicidality among alcoholics is a burning topic of current scenario in view of rising population exposed to alcohol.

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INTRODUCTION

Risk of suicide among addicts is higher than in the general population.¹ Suicidal ideation refers to a myriad of cognition specific to death, self-destructive behaviour, related actions and activities. It has been viewed as an initial stage on a continuum of suicidality and a primary marker for future suicidal behaviour.²⁻⁵ Researchers have been interested in the relationship between alcohol and suicide for many

There may be multiple relationships between alcohol dependence and suicidality. In a recent article by Gossop²¹ it has been emphasized that effect of alcohol use and suicidality is a bidirectional phenomenon as well as alcohol use and suicidality can themselves be affected by any third factor like some underlying disorder. The large population of individuals with alcohol use disorders, the relative frequency of suicides and suicide-related behaviours in this population, and the devastating effects of attempted and completed suicides on individuals, families, and society make this a topic of immense importance. However, the number of publications on the relation between alcoholism and suicidality remains relatively small, and most of these publications discuss only certain aspects of the problem. The exploration of suicidality and its correlates in patients of alcohol use disorders merits future research. This study aims to find out suicidal ideation and different factors associated with it among patients of alcohol dependence who visited Psychiatry OPD of a tertiary care medical institute at Rohilkhand Region of Uttar Pradesh in India.

MATERIAL AND METHODS

Sample consisted of 50 male patients of alcohol dependence syndrome who visited Psychiatry OPD (Out Patient Department) of a tertiary care medical institute at Bareilly in Uttar Pradesh (India). It was a hospital based cross-sectional descriptive study. Study was done after taking informed consent from the patients and obtaining the ethical approval from the Institutional Ethical Board. Purposive sampling technique was used to select sample.

Inclusion Criteria (for both the patients and control subjects)

- Male gender
- Educated at least to primary level
- Giving informed consent to participate in study
- Overtly healthy to complete study protocols

Exclusion criteria

- Patients of alcohol dependence who were either in acute intoxication or in withdrawal state of alcohol
- Patients of alcohol dependence who were dependent on other psychoactive substances
- Normal control subjects who were dependent on any psychoactive substance

All subjects of both groups went through a thorough physical and mental status examination and they were administered following tools of assessment:

Socio-demographic and Clinical Data Sheet (self-prepared): This was especially prepared for this study. In this datasheet, socio-demographic details like age, sex, race, standard (education), living pattern, domicile and socio-economic status etc. as well as clinical details like age of onset and total duration of alcohol intake, duration of alcohol dependence, severity of alcohol dependence syndrome etc. were recorded.

Severity of Alcohol Dependence Questionnaire (SADQ; Stockwell et al)²²: It is a short, easy-to-complete, self-administered, 20-item questionnaire designed to measure severity of dependence on alcohol. Its questions cover the follow-

ing aspects of dependency syndrome: - physical withdrawal symptoms, affective withdrawal symptoms, relief drinking, frequency of alcohol consumption, and speed of onset of withdrawal symptoms. Ratings of each question were done on a four-point scale: almost never-0, sometimes-1, often-2, and nearly always-3. Thus the range of total score is 0-60. The level of dependence is ascertained as Mild (total score <16), Moderated (total score 16-30) and Severe (>30). The questionnaire takes between 2 and 5 minutes to administer. During administration of the questionnaire it is ensured that the patients focus on a recent period of drinking that is typical of their heavy drinking. The SADQ has been applied on inpatient, outpatient, and community-based treatment agencies' attendees in several countries with test-retest reliability of 0.85 and internal consistency of items as well as content, criterion, and construct validity derived. It is probably most useful as an assessment tool for use with problem drinkers rather than a screening instrument.

Scale for Suicide Ideation (SSI; Beck et al, 1979)²²: This is a 19-item clinician rating instrument designed to quantify and assess suicidal ideation. For each item, there are three alternative statements graded in intensity from 0 to 2. The total score is computed by adding the individual item scores. Thus, the possible range of scores is 0-38. It has high internal consistency and moderately high correlations with clinical ratings of suicide risk and self-administered measures of self-harm. Its factor analysis yielded three meaningful factors: active suicidal desire, specific plans for suicide, and passive suicidal desire. A score of 6 or more has been found to be a cutoff threshold for clinically significant suicidal ideation in adults in some previous studies.²⁴ In this scale, the first 5 items show attitudes toward living and dying and they have been used to screen patients about any desire to make an active (item no. 4) or passive (item no. 5) suicide attempt before applying the full scale on them.²⁵

Beck Depression Inventory-Short Form (BDI-SF): The Beck Depression Inventory (BDI)²⁶ is a widely used self-rating scale for measuring depression. The BDI is divided in two subscales: the cognitive-affective (items 1 to 13) and the somatic-performance (items 14 to 21).²⁷ The cognitive-affective subscale (items 1 to 13) is called BDI short-form (BDI-SF) and has been proposed to assess depression in the medically ill subjects with scores higher than 10 associated with moderate and severe depressive syndromes.²⁸

State-Trait Anxiety Inventory (STAI; Spielberger et al.)²⁹: The STAI has been extensively used in research and clinical practice. It comprises separate self-report scales for measuring state and trait anxiety. The S-Anxiety scale (STAI form Y-1) consists of twenty statements that evaluate how respondents feel "right now, at this moment". The T-Anxiety scale (STAI form Y-2) consists of twenty statements that assess how people generally feel. Each STAI item is given a weighted score of 1 to 4. Scores on both the scales can vary from a minimum of 20 to a maximum of 80.

After data collection, it was statistically analysed using IBM Statistical Package for Social Science (SPSS) version 21.00 for Window 8.1 with parametric and nonparametric tests being used as applicable.

RESULTS

Table 1 shows comparison of socio-demographic details of the participants of this study. The mean (\pm SD) age of the patients of alcohol dependence syndrome was 40.06 (\pm 8.39) years while that of the control subjects was 38.5 (\pm 8.18) years. The age range of all the subjects of both groups was 25-62 years. The mean (\pm SD) education-years of the study group and control group was 8.62 (\pm 3.31) and 8.54 (\pm 3.58) respectively and they were at least primarily educated. Majority of the patients were unskilled, married Hindu belonging to middle class nuclear family and semi-urban/urban background of Uttar Pradesh (India). The control subjects were comparable to the study group in these socio-demographic details.

The clinical details of the patients of alcohol dependence syndrome have been shown in table 2. They started intake of alcohol at age range of 16-35 years with a mean (\pm SD) age

of the same being 22.78 (\pm 4.46) years. The mean (\pm SD) duration of alcohol dependence was 11.9 (\pm 5.92) years. Sixty percent of the patients gave history of any withdrawal treatment prior to current OPD consultation. The mean (\pm SD) of total score on SADQ (Severity of Alcohol Dependence Questionnaire) was 22.46 (\pm 8.11) and majority (77%) of the patients had moderate level of severity of alcohol dependence.

Table 3 gives comparative clinical details of male patients of alcohol dependence syndrome and normal control subjects. In comparison to normal controls, the patients had significantly higher ($p < .01$) mean scores on psychiatric assessment tools like the Scale for Suicidal Ideation (SSI), Beck's Depression Inventory-Short Form (BDI-SF) and both the State and Trait subscales of the State-Trait Anxiety Inventory (STAI). Overall 11 (22% of total) patients had clinically significant suicidal ideation in comparison to only a single of normal controls and it was statistically significant ($\chi^2=9.470$;

Socio-demographic Variables		Male patients of ADS (N=50)	Control Subjects (N = 50)	t/ χ^2	df	
		Mean \pm SD	Mean \pm SD			
Age (in years)		40.06 \pm 8.39	38.50 \pm 8.18	.942	98	.349
Education (in years)		8.62 \pm 3.31	8.54 \pm 3.58	.116	98	.908
		n%	n%			
Religion	Hindu	46(92%)	45(90%)	.154	2	.926
	Muslim	3(6%)	4(8%)			
	Sikh	1(2%)	1(2%)			
Marital status	Single	10(20%)	16(32.0%)	5.068	3	.167
	Married	29(58%)	30(60%)			
	Separated	5(10%)	1(2%)			
	Divorced	6(12%)	3(6%)			
Occupation	Unemployed	12(24%)	8(16%)	1.371	2	.504
	Unskilled Employment	26(52%)	26(52%)			
	Skilled Employment	12(24%)	16(32%)			
Residence	Rural	12(24%)	15(30%)	.459	2	.795
	Semi-urban	15(30%)	14(28%)			
	Urban	23(46%)	21(42%)			
State	Uttar Pradesh	45(90%)	43(86%)	.379	1	.538
	Uttarakhand	5(10%)	7(14%)			
Socio-economic status	Low	7(14%)	13(26%)	4.592	2	.101
	Middle	36(72%)	35(70%)			
	High	7(14%)	2(4%)			
Family type	Nuclear	34(68%)	30(60%)	.694	1	.405
	Joint	16(32%)	20(40%)			

Table-1: Comparison of Socio-demographic details of Male Patients of Alcohol Dependence Syndrome (ADS) and Control Subjects

Clinical Variables	Male Patients with ADS (N=50)		
	Minimum	Maximum	
Age of onset of alcohol intake (in years)	16	35	22.78 \pm 4.46
Duration of alcohol dependence (in years)	2	21	11.90 \pm 5.92
Total score on SADQ	7	45	22.46 \pm 8.11
			n%
History of previous withdrawal treatment			30 (60%)
Severity of ADS	Mild (SADQ total score <16)		6(12%)
	Moderate (SADQ total score = 16-30)		39(77%)
	Severe (SADQ total score >30)		5(10%)
SADQ: Severity of Alcohol Dependence Questionnaire			

Table-2: Clinical Details of Male Patients of Alcohol Dependence Syndrome (ADS; N=50)

df=1; $p < 0.01$). On screening the individuals for depression on BDI-SF, overall 46% of the patients and only 8% of normal controls had clinically significant depression and this comparison was statistically significant ($\chi^2=18.316$; df=1; $p < 0.001$).

Further, in comparison to normal controls, significantly more number of the patients gave history of occasional use other substances (like tobacco, cannabis, sedative and hypnotics etc.; $\chi^2=9.004$; df=1; $p < 0.01$). A statistical trend ($\chi^2=4.762$; df=1; $p=.054$) of more number of the patients giving history of significant past medical illnesses (like major injuries, hypertension, seizure disorder, HIV positive status etc.) was found.

Table 4 shows that there was a significant positive correlation of suicidal ideation with SADQ total score ($r=0.835$, $p < .001$), BDI-SF total score ($r=0.934$, $p < .001$), STAI-State score ($r=0.952$, $p < .001$), and STAI-Trait score ($r=0.921$, $p < .001$) in male patients of alcohol dependence syndrome.

No statistically significant correlation of suicidal ideation was observed either with age or with education-years or with age of onset of alcohol intake or with total duration of alcohol dependence in male patients of alcohol dependence syndrome.

DISCUSSION

The major finding of this study was that overall 22% of all male patients of alcohol dependence syndrome had clinically significant suicidal ideation and 46% of all of the patients had clinically significant depression. Also they had significantly higher state and trait anxiety in comparison to normal control subjects.

Presence of significantly more number of patients of alcohol dependence syndrome to have suicidal ideation in this study is in line of a very recent Indian research work by Kaur et

al.²⁰ In comparison to ours, Kaur et al.²⁰ assessed a larger sample size and found that around 10% of the patients of alcohol dependence syndrome expressed suicidal thoughts or ideas, out of which 7% reported to have attempted suicide. Suicidal ideation has been viewed as initial stage on a continuum of suicidality and a primary marker for future suicidal behaviour.²⁻⁵ In this sense timely assessment and intervention of suicidal ideation can prevent suicidal attempt. A lifetime risk of suicide in individuals with alcohol dependence treated in out-patient and in-patient settings has also been mentioned to be 2.2 and 3.4% respectively in a review article by Murphy and Wetzel.¹⁰

Recently many factors closing associated with suicidal behaviour among subjects with alcoholism has been proposed.¹⁸ The predisposing factors linked to increased risk of suicidality among individuals with alcoholism have been grouped as predominantly externalizing constructs like aggression/impulsivity and alcoholism as well as predominantly internalizing constructs like negative affect and hopelessness. Precipitating factors for suicidality among alcoholics have also been conceptualized such as major depressive episodes and stressful life events – particularly interpersonal difficulties. This model of suicidality among these patients is consistent with the stress-diathesis model of suicidal behaviour.³⁰⁻³¹

Biological vulnerability of suicidal behaviour among patients of alcohol dependence has also been suggested. Multiple research works now point out that lower serotonin activity is tied to increased aggression/ impulsivity which in turn are presumed to enhance the probability of suicidal behaviour in patients of alcohol dependence.³² A low level of 5-HIAA in CSF has been found in abstinent individuals with a history of alcohol dependence of both sexes.³³ Moreover, impulsive offenders with alcohol dependence had lower CSF 5-HIAA

Clinical Variables	Male patients of ADS (N=50)	Control Subjects (N=50)	t	df	
	Mean \pm SD				
SSI total score	40.58 \pm 5.88	2.06 \pm 2.64	2.858	98	.005*
BDI-SF total score	8.84 \pm 8.93	4.52 \pm 4.29	3.082	98	.003*
STAI-State score	31.46 \pm 15.08	23.80 \pm 4.13	3.465	98	.001*
STAI-Trait score	29.22 \pm 13.15	22.52 \pm 3.04	3.508	98	.001*
	n%	n%	χ^2		
Significant suicidal ideation (SSI total score= 6 or more)	11(22%)	1(2%)	9.470	1	.004*
Presence of Depression (BDI-SF total score >10)	23(46%)	4(8%)	18.316	1	.000**
Occasional use of other substances	32 (64%)	17(34%)	9.004	1	.005*
Significant past medical history	12(24%)	4(8%)	4.762	1	.054

*Significant at $p < .01$ (2-tailed); **Significant at $p < .001$ (2-tailed); SSI: Scale for Suicidal Ideation; BDI-SF: Beck Depression Inventory-Short Form; STAI: State-Trait Anxiety Inventory

Table-3: Comparison of Clinical Details of Male Patients of Alcohol Dependence Syndrome (ADS; N=50) and Control Subjects (N=50)

Variables	SADQ total score	BDI-SF total score	STAI-State score	STAI-Trait score
	r	R	r	r
Suicidal Ideation (SSI Total Score)	0.835**	0.934**	0.952**	0.921**

**Significant at $p < .001$ (2-tailed); r: Pearson's correlation coefficient

Table-4: Correlation of Suicidal Ideation (SSI Total Score) with SADQ total score, BDI-SF total score, STAI-State score and STAI-Trait score In Male Patients of Alcohol Dependence Syndrome (N=50)

levels than non-impulsive offenders with alcohol dependence.³⁴ A lower CSF 5-HIAA levels have also been found in high-lethality depressed suicide attempters with comorbid alcoholism compared with low lethality depressed suicide attempters with comorbid alcoholism.³⁵

A finding of positive relationship between suicidal ideation and levels of depression and anxiety in patients of alcohol dependence syndrome in this study merits further discussion. Among the various factors associated with a risk of suicidality in patients of alcoholism, mood disorders, especially depression, are of prime importance. Several researchers have pointed out that among alcohol-dependent individuals who committed suicide, 45–70% meet the criteria of major depressive episode before a suicide.¹⁶⁻¹⁸ Unfortunately alcoholism and depression are frequently comorbid.¹²⁻¹⁴ Recently in India, Kaur et al.²⁰ have pointed out that an overall presence of psychiatric comorbidity is significantly associated with suicidal ideation as well as suicide attempt in patients of alcohol dependence syndrome. A highly significant relationship of suicidal ideation with state and trait anxiety was a unique finding of this study and warrants further detailed evaluation. Earlier it has been found that the risk for suicide associated with alcohol dependence increases with age¹¹ but we could not find such relationship. Severity of alcoholism has been proposed as one of many predisposing factors associated with risk of suicide among subjects with alcoholism by many previous researchers.^{1,18,30,31} A finding of positive correlation of severity of alcohol dependence with suicidal ideation among patients of our study further supports this notion.

The finding of significantly higher depression scores in alcohol dependents of this study supports some noted earlier research works from both India,³⁶⁻³⁹ and abroad.^{40,41} It is now clear from research evidences that alcohol is used as self-medication for comorbid depressive disorders as well as alcohol itself may produce clinically significant depression in patients of alcohol dependence syndrome. Without proper address of this significant issue we cannot expect holistic management of this patient group.

Presence of significantly higher trait and state anxiety scores in male patients of alcohol dependence syndrome of this study is in line of findings earlier studies^{42,43} and emphasizes that this can be etiologically significant in alcohol dependence. It has been suggested that anxiety can be an important factor in the initial development and subsequent maintenance of alcohol abuse and dependence. Some patients use alcohol as a medication for the treatment of anxiety while some anxiety symptoms may be secondary to alcohol withdrawal too. Since we excluded those patients of alcohol dependence who were in withdrawal state, a finding of significantly higher state or trait anxiety in the patients of this study gives impression of presence of primary anxiety disorders in such patients. Researchers across the globe have now acknowledged the presence of common comorbid primary anxiety disorders like panic disorder, phobia, social anxiety disorder, generalized anxiety disorder, posttraumatic stress disorder and obsessive compulsive disorder in patients of alcohol dependence syndrome.^{13,36,44,45,37} This is important from long term treatment perspective of such individuals.

CONCLUSION

The present study showed that male patients of alcohol dependence syndrome had significantly higher suicidal ideation, depression and state and trait anxiety scores as compared to normal controls. Overall, clinically significant suicidal ideation was present in 22% of all male patients of alcohol dependence syndrome and 46% of all of the patients had clinically significant depression. A statistically significant positive correlation of suicidal ideation was found with levels of depression, anxiety as well as severity of alcohol dependence in these patients. In view of high levels of depression, anxiety and suicidal ideation as well as a positive relationship of suicidal ideation with levels of depression and anxiety, it is recommended that these should be carefully enquired for during therapy and follow up of patients with alcohol use disorders. This knowledge should be better disseminated among subjects at risk for deterrent purposes. The inclusion of only male patients in this study limits generalization of the findings on individuals of both genders.

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Modified Alvarado Score and its Application in the Diagnosis of Acute Appendicitis

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ABSTRACT

Introduction: Appendicitis in its acute form is a commonest surgical emergency. Many a times, the diagnosis is made by clinical examination only. However, other investigations like USG, CTscan are being used in the diagnosis. Despite this, negative appendectomy rates are high. Hence a better diagnostic tool, a scoring system was explored to accurately diagnose appendicitis, thereby reducing negative appendectomies. There is no definitive diagnosis preoperatively. The treatment being surgical, negative appendectomy rates are high. Present study was conducted to evaluate Modified Alvarado Scoring System for diagnosis of acute appendicitis and its correlation by histopathology.

Material and Methods: A prospective study was conducted on 150 patients hospitalized with lower abdominal pain suggestive of appendicitis and were subsequently operated from Jan 2010 to Jan 2015 over a period of five years at Raja Rajeshwari Medical College and Hospital Bangalore.

Results: Patients of age group from six years to fifty and above years of both sexes were included in the study. Pre-operatively Modified Alvarado Score was assigned to all patients and the results were compared with operative and histopathological diagnosis reports. In our study, Modified Alvarado score of 1-4, 5-7 and 8-10 had the accuracy of 10%, 75% and 100% respectively. Higher the score, higher was the accuracy. Lower score patients should be kept under observation. Score sensitivity was more in males compared to female patients.

Conclusion: This scoring system is reliable and practicable diagnostic modality to increase the accuracy in the diagnosis of appendicitis, thus avoiding unnecessary surgery.

Keywords: Acute Appendicitis, Alvarado Score, Scoring System, Negative Appendicentomy

Alvarado score has six clinical variables and two laboratory quantification with a total of ten points.

The modified Alvarado score is presently in use for establishing diagnosis of acute appendicitis. The scoring includes elements from the patient's history, the physical examination and from laboratory tests.

1. Abdominal pain migrating to right iliac fossa.
2. Anorexia or ketone bodies in urine
3. Nausea or vomiting
4. Tenderness in right iliac fossa
5. Rebound tenderness
6. Fever of 37.3 degree Celsius or more
7. Leukocytosis more than 10,000 cells per micro liter in the serum
8. Neutrophilia in serum white blood cell count.

Tenderness in the right iliac fossa and leukocytosis are the two most important factors and are assigned two points each and six other factors are assigned one point each, for a total score of 10 points.

A score of 1-4 indicates very unlikely appendicitis, 5-7 probable appendicitis and 8-10 highly probable appendicitis.⁸

A popular mnemonic used to remember the Modified Alvarado score factor is MANTRELS - Migration to right iliac fossa, Anorexia, Nausea/Vomiting, Tenderness in right iliac fossa, Rebound tenderness, Elevated temperature (fever), Leukocytosis and Shift of neutrophils to left.

The high diagnostic value of this scoring system has been confirmed in a number of studies. The general consensus of researchers is that the Alvarado score is noninvasive, safe diagnostic method which is simple, reusable and repeatable and can aptly guide the clinician in establishing diagnosis and subsequent management. It carries high significance in the diagnosis of acute appendicitis.⁹⁻¹¹ Present study was conducted to evaluate Modified Alvarado Scoring System for diagnosis of acute appendicitis and its correlation by histopathology.

MATERIAL AND METHODS

This study was carried out in the Department of General Surgery, Raja Rajeshwari Medical College and Hospital, Bangalore, for a period of five years from Jan 2010 to Jan

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INTRODUCTION

Acute appendicitis has customarily been a clinical diagnosis. Around 6% of the general population is believed to have appendicitis in their lifespan.¹ Patients' history and physical examination is very important for proper diagnosis.² It is possible to have an absolute diagnosis of appendicitis only after surgery and histopathological examination of specimen. Thus it is impractical to have a definitive preoperative diagnosis. The only confirmation of diagnosis is by histopathology examination. Diagnosis of appendicitis has an considerable rate of negative appendectomy varying from 20-40%³⁻⁵ and an associated morbidity of around 10%.⁶ Various scoring systems have been developed for assisting the diagnosis of acute appendicitis, and Alvarado scoring system is one of them.⁷

The Alvarado scoring is a clinical system applied in the diagnosis of acute appendicitis. It was introduced in the year 1986; although meant for pregnant females, it has been extensively validated in non-pregnant population.

2015. It was carried out on 150 patients hospitalized with lower abdominal pain suggestive of acute appendicitis. Written informed consent and institutional ethical committee clearance was obtained before the start of study. All patients with suspected preliminary diagnosis of appendicitis were considered for the study. Data included age, sex, symptoms, physical signs and laboratory findings such as white blood cell total and differential count were recorded.

In addition, urine for routine examination was done for all cases. Plain X-Ray KUB region was done in selected cases. Ultra sonogram (USG) of abdomen was performed when the diagnosis was doubtful especially in female patients to exclude gynecological causes. Acute appendicitis diagnosis was made clinically and decision for appendicectomy was taken. Though all patients were scored using the modified Alvarado score, the same had no insinuation on the decision for surgery. Consequently, score of each patient was interrelated with clinical, operative and histopathological findings.

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS software. Results are based on descriptive statistics.

RESULTS

Total number of patients who underwent surgery was 150. Age of the patients ranged from 8 years to 60 years of age. Majority of the patients in the third decade (44%), followed by second decade (29%) (Table 1). In our study, male patients were more than females (Table 2 and Figure 1). Post operatively, all the specimens were sent for histopathological examination. The report confirmed appendicitis in 132 patients (88%), remaining specimens (18) did not confirm any evidence of appendicitis. The scoring system was found 100% sensitive in 8-10 score group (Table 3). Out of 18 patients, per operatively, one patient had evidence of salphingitis, one with ruptured ovarian cyst, two patients showed evidence of mesenteric lymphadenitis, four patients had Pelvic inflammatory disease and in remaining ten patients no abnormal pathology found (Table 4).

DISCUSSION

Acute appendicitis is most often a clinical diagnosis. However now-a-days most of the doctors order CT scan or ultrasonogram prior to evaluation. CT scan reports, 95% accuracy, whereas ultrasonography has sensitivity up to

90% and specificity of 80-90% in the diagnosis of acute appendicitis. Alvarado scoring systems can be safely used by general practitioners and primary health care medical personnel to determine need for referral to a qualified surgeon. Patients are either referred lately or unnecessarily due to lack of competency to make an appropriate diagnosis. Pain in right iliac fossa with guarding, accompanying fever and elevated leucocyte count are found to be more predictive

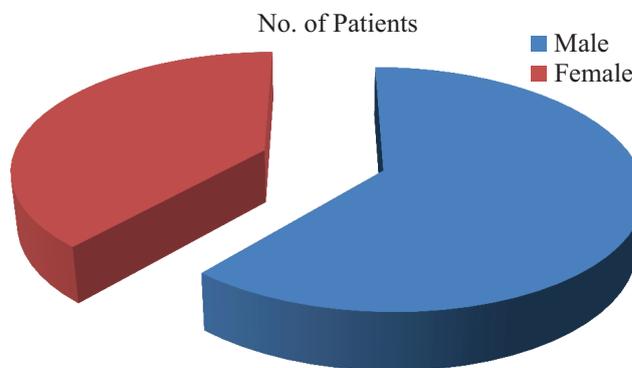


Figure-1: Sex distribution

Sl. No.	Age Group (Years)	No. of Patients	Percentage
1	Upto 10	6	4
2	11 to 20	44	29
3	21 to 30	65	44
4	31 to 40	24	16
5	41 to 50	8	5
6	>51	3	2
Total		150	100

Table-1: Age distribution

Sex	No. of Patients	Percentage	Male:Female
Male	92	60	3:2
Female	58	40	

Table-2: Sex distribution

Score	Patients	Acute Appendicitis	Normal Appendix	Percentage
1 - 4	10	1	9	10%
5 - 7	48	36	12	75%
8 - 10	92	92	0	100%

Table-3: Sensitivity in different score range group

Sl. No.	Appendix Status	Findings	No. of patients	Percentage
1	Acute Appendicitis	Inflammatory	118	78.6
		Suppurative	8	5.3
		Gangerous	4	2.7
		Perforated	2	1.4
		Total	132	88
2	Normal Appendix with other Pathology	Salphingitis and Rupture of ovarian cyst	2	0.65
		PID	4	2.67
		Mesenteric lymphadenitis	2	1.34
		No pathology found	10	6.6
		Total	18	12
Total	-	-	150	100

Table-4: final diagnosis from correlation of preoperative diagnosis with histopathological findings

of appendicitis in most of the cases.

Alvarado recommended surgery for patients with score 7 or more and observe patients with less than 6. In most appendicectomy the naked eye examination of appendix quite often confirms diagnosis, but at times a normal looking may be reported as one with appendicitis. Hence, histological report was taken as the final word in the diagnosis of acute appendicitis.¹²

Results from our study shows that acute appendicitis was common in 21-30 age group (44%) followed by age group 11-20 (29%). Epidemiological studies have recorded that appendicitis is more common in age group of 11-30 years.¹³ Studies indicate males are more prone to infection as compared to females.¹⁴ Our study shows ratio of male and female being 3:2.

In our study, patients with Alvarado score results being 1-4, 5-7 and 8-10 respectively with accuracy percentage 10%, 75% and 100% confirmed appendicitis. The one patient 1-4 group whose appendix was confirmed as appendicitis histopathologically, the score being 4 with migratory pain, right iliac fossa tenderness and vomiting. The leucocyte count was normal. A negative rate of appendicectomy is about 20-40% in surgical literature.¹⁵ In our study, it was 12%.

Use of Alvarado score decreased unusually high false positive appendicectomy rate of 44% to 14%, in a prospective study of 215 patients which included both adults and children. Many surgeons across the world opined that maximum of 15-20% negative appendicectomy are acceptable.¹⁶ Removal of normal appendix seems to be logical to lower the rate of complications of acute appendicitis. But, unnecessary appendicectomy bears long term risks and morbidity to patients.¹⁷

However there are no signs/ symptoms or laboratory tests that are 100% reliable in the diagnosis of acute appendicitis. In our study modified Alvarado score system that the accuracy of diagnosis was very dependable and acceptable with higher score patients. Thus the diagnostic score may be used as a guide to decide whether patient needs surgery or observation. Patients with 8 and above should undergo surgery and patients with 5-7 should be kept under observation and evaluated every 4 hours to note if the score remains same or increases accordingly decision may be taken for surgery. Patients with score 4 or less are very unlikely, but not impossible to have appendicitis and they can be discharged from hospital after conservative treatment, with the advice to come back if the symptoms persist or condition become worse.

CONCLUSION

Alvarado scoring is easy, simple, cheap, non invasive tool in preoperative diagnosis of acute appendicitis and it is more useful at junior level doctors and for primary health care doctors. Moreover it is repeatable at no cost. Thus the application of this scoring system improves diagnostic accuracy and consequently reduces appendicectomy.

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Prevention and Management of Arrhythmias in Acute Myocardial Infarction

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ABSTRACT

Different types of arrhythmia (both brady- and tachyarrhythmia) may occur in myocardial infarction patients which may be silent or symptomatic (incidence around 75%). Many arrhythmias are fatal requiring urgent treatment and increases mortality while others are benign and do not affect prognosis of patients. Pathophysiology of arrhythmias is different in early versus late arrhythmia, also treatment modalities. Various factors contribute to arrhythmogenesis in acute myocardial infarction (AMI) like metabolic changes, electrophysiological changes, increased sympathetic activity, vagal stimulation, left ventricular (LV) ejection fraction and scar formation. Prevention and prompt treatment of these arrhythmias are important in decreasing mortality in AMI both peri-infarct period and follow-up.

Keywords: Prevention, Arrhythmias, Acute Myocardial Infarction

INTRODUCTION

It is known that ischemia and infarction leads to metabolic and electrophysiological changes that may cause silent and symptomatic life-threatening arrhythmia. At least 75% of patients with acute myocardial infarction (AMI) have an arrhythmia during the peri-infarct period.¹ Sudden cardiac death (SCD) is most often attributed to this pathophysiology and around one-half of death occurs before patient reach hospital. Cause of death in AMI before hospitalization is most often ventricular tachycardia/ventricular fibrillation (VT/VF). Both atrial and ventricular arrhythmia may occur in setting of acute coronary syndrome (ACS) including ventricular tachyarrhythmia which may cause circulatory collapse and hence need immediate treatment. Atrial fibrillation (AF) may also warrant urgent treatment when a fast ventricular rate is associated with hemodynamic deterioration. The management of other arrhythmia is also based largely on symptoms. Prophylactic antiarrhythmic management strategies have largely been discouraged. Improvement in medical care, early relief of ischemia, use of beta-blocker, angiotensin-converting enzyme inhibitor (ACE-1) have declined incidence of arrhythmia, still it remain major cause of mortality in these patients. Use of implantable cardioverter-defibrillator (ICD) has promising effect in primary and secondary prevention of ventricular arrhythmia (VA) in ACS patients.

DIFFERENT TYPES OF ARRHYTHMIA AND THEIR INCIDENCE IN AMI

Different types of arrhythmia (both brady and tachy) can occur as shown in Table 1. A higher incidence of bradyarrhythmia is associated with inferior and posterior AMI, compared to anterior and lateral AMI. According to one study, around

3.7% of patients with inferior or posterior AMI developed complete heart block, only 1% of those with anterior or lateral AMI developed complete heart block.² Similarly, diagnosis of first-degree atrioventricular (AV) block (1.1% vs 0.6%), second- degree AV block types I (1.1% vs 0.4%) and II (0.2% vs 0.0%) were more common in the context of inferior or posterior compared to anterior or lateral AMI. There was no difference in the incidence of VT by AMI location (7.3% in inferior or posterior AMI versus 7.9% in anterior or lateral AMI, HR = 0.89, p = 0.064) while VF was marginally more frequent among patients with an anterior or a lateral AMI (9.0% vs 8.1%, HR = 0.65, p = 0.023). Table 2 shows incidence of different types of arrhythmia according to location of AMI. Patients with anterior or lateral AMI were more likely to die prior to hospital discharge than patients with an inferior or posterior AMI (11.3% vs 7.7%).

ETIOPATHOGENESIS OF DIFFERENT ARRHYTHMIA

According to various studies, about 30% of patients experience sinus tachycardia, especially those with anterior location. Mechanism of sinus tachycardia is due to physiologic response to left ventricular (LV) dysfunction or stimulation and overactivity of sympathetic nervous system due to various factors like pain, anxiety, persistent pain, epinephrine, or dopamine; rarely, it occurs in patients with atrial infarction.

Although the reported incidence of atrial tachyarrhythmia, they are uncommon during early phase of myocardial infarction (MI).³ These are often transient. Pathophysiologic mechanisms of development of these arrhythmia are they are augmented sympathetic stimulation of the atria and often occur in patients with LV failure, pulmonary emboli in which the arrhythmia intensifies hemodynamic deterioration, or atrial infarction, pericarditis. In AF, worsening of hemodynamics is due to fast ventricular rate, loss of atrial contribution to cardiac output.

Ventricular arrhythmias are common early after onset of AMI. The mechanism for these arrhythmias is multifactorial and includes ongoing ischemia, hemodynamic and electrolyte abnormalities (hypokalemia, hypomagnesemia),

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metabolic abnormalities (acidosis, hypoxia), re-entry, and enhanced automaticity. Acute myocardial ischemia leads to ATP deficiency, anaerobic glycolysis causing acidosis, elevation of extracellular potassium and lysophosphatidylcholine accumulation. This sequence of events results electrophysiologically in: (1) ionic imbalance, (2) less contractile force by events that culminate in mishandling of intracellular calcium and (3) reduced conduction velocity because of less functional gap junctions.⁴ Ionic imbalance in turn leads to (a) shorter duration of the action potential by activation of the substrate-related potassium current: IK, ATP. Myocardial reperfusion may cause profound electrophysiological alterations, depending on the prior duration of ischemia. I⁺ current and phosphorylation of sarcoplasmic reticulum proteins by CAMKII (calcium and calmodulin-dependent protein kinase II).⁵ The intracellular Ca²⁺ overload (among others caused by reactive oxidative stress) will result in spontaneous Ca²⁺ oscillations (calcium overload) the ischemic/reperfused to the nonischemic (Figure 1),⁶ (intramural) re-entry in ischemia, whereas triggered activity appears to be the dominant mechanism in reperfusion. Arrhythmogenesis early in the course of an ACS, manifested as often polymorphic VT. Ventricular arrhythmia late after ACS is due to scar re-entry and incomplete revascularization.

PREDICTORS OF ARRHYTHMIA IN AMI

One should evaluate the risk of reoccurrence of a rhythm disturbance in AMI especially VT or VF as they are potentially lethal events. Arrhythmia risk evaluation includes, beside the careful reading of standard electrocardiogram (ECG), a series of useful more or less routine investigations (Table 3).⁸ ECG features with significant arrhythmia risk are premature ventricular beats (PVBs) with profoundly altered morphology, polymorphic ventricular premature contraction (VPC), frequent ventricular couplets, triplets, nonsustained ventricular tachycardia (NSVT) episodes, QRS duration greater than 160 ms in patients with complete left bundle branch block (LBBB); alternation of T-wave amplitude (of microvolts); QT dispersion greater than 100 ms.

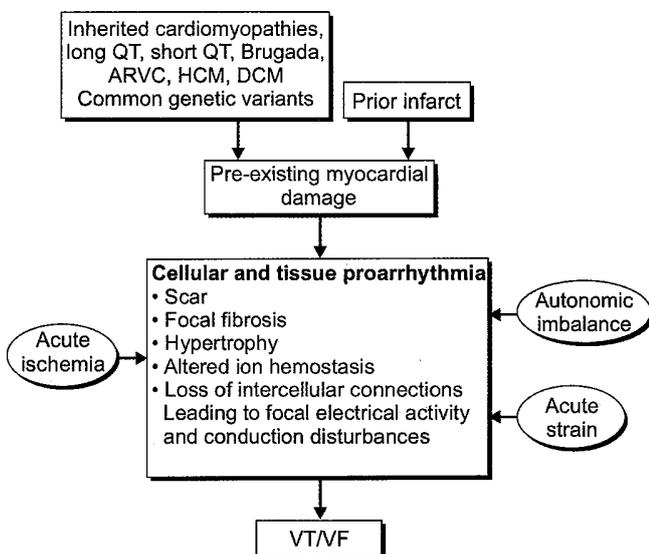


Figure-1: Mechanism of arrhythmia

Heart rate variability (HRV) can be analyzed in time and frequency domain using a 24-hour Holter ECG recording. post:MI and tends to return during the first year. The autonomous Tone and reflexes in acute myocardial infarction (ATRAMI)⁹ study confirmed that HRV and baroreflex sensitivity (BRS) remains a significant predictor of cardiac mortality in patients after AMI (< 28 days). Also according to this study, the combination of low values of HRV and reduced left ventricular ejection fraction (LVEF) is useful for SCD risk stratification in patients after AMI.

Category	Arrhythmia
Ventricular tachy	Ventricular premature beats (VPC) Ventricular tachycardia/ventricular fibrillation (VT/VF), accelerated idioventricular rhythm (AIVR)
SVT	Sinus tachycardia Atrial fibrillation and/or atrial flutter Paroxysmal supraventricular tachycardia
Brady	Sinus bradycardia Junctional escape rhythm Atrioventricular block Intraventricular block

SVT, supraventricular tachycardia; AMI, acute myocardial infarction.

Table-1: Different types of tachy- and bradyarrhythmia in AMI

Conduction abnormalities	Inferior or posterior AMI	Anterior or lateral AMI
First degree AV block	1.10%	0.60%
Mobitz 1	1.10%	0.40%
Mobitz 2	0.20%	0.00%
Complete AV block	3.70%	1.00%
VT	7.30%	7.90%
VF	8.10%	9.00%
Death	7.70%	11.30%

AV, atrioventricular; VT, ventricular tachycardia; VF, ventricular fibrillation; AMI, acute myocardial infarction.

Table-2: Different types of arrhythmia by AMI location

Standard ECG
• Stress ECG, looking for:
- Effort-induced arrhythmias
- Premature beats, QT interval (adaptation to heart rate)
- Heart rate adaptation to effort (maximum value, return to normal rhythm)
• Bedside ECG
• Ambulatory ECG monitoring (Holter), analyzing:
- Eventual sustained or unsustained arrhythmias
- Number of PVB, heart rate variability
- Heart rhythm turbulence, QT variability
• Long-term monitoring with implantable devices
• Signal-averaged electrocardiography (SAECG)
• Evaluation of T-wave alternans (or MTWA—microvolt T-wave alternans)
• Evaluation of the baroreceptor reflex sensitivity
• Electrophysiological exploration (with programmed stimulation)
ECG, electrocardiography; PVB, premature ventricular beat
Table-3: Evaluation for predictors of arrhythmia

Heart rate turbulence (HRT) is represented by variations in sinus rhythm cycle length determined by a VPC.

Signal-averaged electrocardiography (SAECG), allows the highlighting of small amplitude potentials, of the order of microvolts at the end of QRS complex. The presence of these conditions is labelled as late potential present/positive SAECG which are considered predisposing to re-entrant arrhythmias.

Signal-averaged electrocardiography and microvolt T-wave alternans (MTWA) have the negative predictive value of 97-99% is of practical importance.

PROGNOSIS OF ARRHYTHMIA IN AMI

Ventricular premature beats are almost universal on the first day of the acute phase and complex arrhythmias (multiform complexes, shorttrunsotheR-on-Tphenomenon) are common.

An accelerated idioventricular rhythm (AIVR) typically occurs during the first 2 days, with about equal frequency in anterior and inferior infarctions. Most episodes are of short duration. Accelerated idioventricular rhythm is often observed shortly after successful reperfusion has been established with fibrinolytic therapy. However, the frequent occurrence of this rhythm in patients without reperfusion limits its reliability as a marker of the restoration of patency of the infarct-related coronary artery. In contrast to rapid VT, AIVR is thought not to affect prognosis, and routine treatment of AIVR is not indicated.

Ventricular tachycardia/ventricular fibrillation: Among

patients who underwent fibrinolytic therapy in the (GUSTO-I) study, approximately 10% experienced VT/VF. In the Assessment of Pexelizumab in Acute Myocardial Infarction (APEX-AMI) study, which included patients treated with primary percutaneous coronary intervention (PCI), sustained VT/VF developed in 5.7%. Clinical outcomes were worse in patients with VT/VF than in those without VT/VF. Compared with patients without VT/VF, 90-day mortality risk was 2-fold higher for patients with early VT/VF and 5-fold higher in late VT/VF.¹² Result of French Registry of Acute ST-Elevation or Non-ST Elevation Myocardial Infarction (FAST-MI) 2005 registry which was recently published, the overall in-hospital mortality was significantly higher among VF patients (25.0% vs 5.0% for non-VF patients). When considering VF timing, in-hospital mortality was higher in the late VF group as compared to the early VF group (33.3% vs 22.8%; $p < 0.001$). Also the investigators concluded that, while patients who develop VF during their index hospitalization for AMI are at significantly higher risk of in-hospital mortality, they are not at higher long-term mortality risk or SCD mortality.¹³

PREVENTION AND MANAGEMENT OF ARRHYTHMIA IN AMI

Sinus Tachycardia

As it represents physiologic response to LV dysfunction and overactivity of sympathetic system, treatment includes optimizing hemodynamics and oxygenation, correction of anemia, electrolyte and acid-base disorder, pain control,

Recommendations	Class	Level
Direct current cardioversion is indicated for sustained VT and VF	I	C
Sustained monomorphic VT that is recurrent or refractory to direct current cardioversion: should be considered to be treated with IV amiodarone	IIa	C
May be treated with IV lidocaine or sotalol	IIb	C
Transvenous catheter pace termination should be considered if VT is refractory to cardioversion or frequently recurrent despite antiarrhythmic medication	IIa	C
Repetitive symptomatic salvos of nonsustained monomorphic VT should be considered for either conservative management (watchful waiting) or treated with IV beta-blocker, or sotalol, or amiodarone	IIa	C
Polymorphic VT		
Must be treated by IV beta-blocker	I	B
Or IV amiodarone	I	C
Urgent angiography must be performed when myocardial ischemia cannot be excluded	I	C
May be treated with IV lidocaine	IIb	C
Prompt assessment and correction of electrolyte disturbances, consider magnesium	I	C
Should be treated with overdrive pacing using a temporary transvenous right ventricular lead or isoproterenol infusion	IIa	C
Management of ventricular arrhythmias and risk evaluation for sudden death on long-term		
Specialized electrophysiological evaluation of ICD implantation for secondary prevention of sudden cardiac death is indicated in patients with significant LV dysfunction, who suffer from hemodynamically unstable sustained VT or who are resuscitated from VF occurring beyond the initial acute phase	I	A
Secondary preventive ICD therapy is indicated to reduce mortality in patients with significant LV dysfunction, and hemodynamically unstable sustained VT or survived VF, not occurring within the initial acute phase	I	A
Risk evaluation for sudden cardiac death should be performed to assess indication for primary preventive ICD therapy by assessing LVEF (from echocardiography) at least 40 days after the acute event in patients with LVEF < 40%	I	A
VT, ventricular tachycardia; VF, ventricular fibrillation; ICD, implantable cardioverter-defibrillator; LV, left ventricle; LVEF, left ventricular ejection fraction; ESC, European Society of Cardiology; STEMI, ST-elevation myocardial infarction; AMI, acute myocardial infarction.		

Table-4: ESC 2012 STEMI guidelines for management of arrhythmia in AMI

anti-anxiety drugs. Beta-blockers are indicated for patients without evidence of significant LV dysfunction.

Atrial Tachyarrhythmia

Atrial fibrillation has been reported to complicate 2.3-21% of acute AMI patients.¹⁴ Pre-existing AF observed in patients with AMI, and new-onset AF for the remaining two-thirds. ACE-Is and angiotensin II inhibitors has led to a substantial decline in the incidence of post-MI AF. (2.5-5 mg every 2-5 minutes to a total of 15 mg) or atenolol after heart failure and underlying conduction disease have been excluded. When there are absolute contraindications to beta first-line therapy for management of acute AF, but it plays role in patients with heart failure or LV dysfunction. Urgent direct current cardioversion (DCCV) is recommended for patients with severe hemodynamic instability or intractable ischemia. In addition to electrical cardioversion (CV), amiodarone can be used for restoration of sinus rhythm when the hemodynamic situation is stable. drugs (AADs) because of its limited negative inotropic effect. Benefit of triple antithrombotic regimen should be weighed against risk of bleeding and accordingly type of stent [bare-metal stent (BMS) or drug-eluting stent (DES)] should be chosen. In patients with ACS, receiving triple antithrombotic therapy HAS-BLED score was found to have diagnostic value in prediction of bleeding. Necessary¹⁵ which is usually 1 month after BMSs and 3 to 6 month after DES. ("dual" therapy) for up to 12 months, and then by anticoagulant monotherapy lifelong.

VENTRICULAR ARRHYTHMIA

Prophylaxis

Because hypokalemia can increase the risk for development of VT, low serum potassium levels should be identified quickly after admission for ST-elevation myocardial infarction (STEMI) and should be treated promptly.¹⁶ Despite the lack of a consistent relationship between hypomagnesemia and VAs, magnesium deficits may still be linked to risk because patients with STEMI have reduced intracellular magnesium levels not adequately reflected by serum measurements. As noted earlier, magnesium should be repleted to achieve a serum level of 2 mEq/L. Early beta-blocker use has reduced VF and can be instituted in patients without contraindication. Lidocaine prophylaxis to prevent primary VF is no longer advised. Early revascularization reduces incidence of VA. Early and intensive statin therapy reduces incidence of premature ventricular contraction (PVC) and nonsustained VT.

Management

With widespread use of revascularization therapy limiting size of infarction and to increased use of beta-blocker, the incidence of sustained VT/VF has declined. Still it remains a major cause of mortality in ACS patients. Direct current CV/defibrillation is the treatment of choice in VT/VF. If ischemia is suspected to be responsible for arrhythmia, immediate reperfusion is of utmost importance. Early use of beta-blocker is done in absence of contraindication. Correction of any electrolyte abnormalities, if present is encouraged. Acidosis is not corrected by sodium bicarbonate infusion as it may increase hemodynamic burden, rather it is better to

treat acidosis by hyperventilation.

Polymorphic ventricular tachycardia should be treated with DCCV, IV beta-blocker, IV amiodarone, urgent revascularization, and correction of electrolyte abnormality (Table 4).

Recurrent VT/VF should be treated with repeat DCCV/DF. Antiarrhythmic drug treatment should be considered only if episodes of VT/VF are frequent and can no longer be controlled by successive CV/DF. IV amiodarone is antiarrhythmic drug of choice followed by iv lidocaine.¹⁷ In patients with recurrent VT/VF triggered by VPC arising from partially injured Purkinje fibers, catheter ablation has been shown very effective and should be considered. VT/VF not responding to above measures, implantation of percutaneous left ventricular assist device (LVAD) and extracorporeal membrane oxygenation (ECMO) assisted primary PCI has been found promising as a bridge to recovery. ECMO-assisted PCI has been shown to significantly improved recovery and survival in patients with cardiogenic shock and refractory VT/VF. Proper hemodynamic support with inotropes and vasopressor is required and caution must be taken for dopamine use, as it increases risk of arrhythmia in patients with shock. Other inotropes are less arrhythmogenic. Sustained VT/VF developing beyond acute period (provided the arrhythmia is not due to reversible causes, like electrolyte imbalance, transient, ischemia, reinfarction) is liable to recur and is associated with high risk of death. Among survivors of VT/VF, ICD therapy is associated with significant mortality reduction compared to AADs. With exception of beta-blocker, AADs have not shown to be effective and should not be used for prevention of arrhythmia and death. An ICD should be recommended as a part of secondary prevention to reduce mortality before hospital discharge.

Implantable cardioverter-defibrillator implantation for primary prevention has been shown to reduce all-cause mortality in patients with reduced ejection fraction (< 40%) as a result of infarction that occurred at least 40 days earlier. ICD implantation should be deferred until at least 40 days after acute event to allow stunned myocardium to recover of function.

Ventricular Asystole and Electromechanical Dissociation

Asystole and electromechanical dissociation Other resuscitative measures, including chest compressions, atropine, vasopressin. Non-sustained VT are also seen commonly following successful reperfusion.^{6,7} All these arrhythmias should be treated as mentioned previously.

Bradyarrhythmia

Atrioventricular do not affect prognosis. Vagal stimulation, ischemia and opioids often are responsible. It often requires no treatment. If accompanied by severe hypotension, sinus bradycardia should be treated by iv atropine, AV block is usually associated with inferior infarction and seldom causes adverse hemodynamic effects. Permanent pacemaker implantation is considered if bradyarrhythmia do not recover.

CONCLUSION

Recent improvement in treatment strategies, early use of beta-blocker, statins, ACE-I/angiotensin receptor blocker (ARB) has reduced the incidence of arrhythmia in MI, still

its prevalence is very high and it remains the most common cause of mortality in ACS. Early revascularization is helpful in both prevention and treatment of refractory early VA and also it prevents development of LV dysfunction and scar which is a substrate for development of late VT/VF. Use of ICD for both primary and secondary prevention of late VT/VF has revolutionized the management of arrhythmia and substantially decreased mortality in these patients.

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Critical Review on Glass Ionomer Seal under Composite Resin of Obturated Root Canals

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ABSTRACT

Introduction: The root canal treated teeth need an adhesive seal for coronal leakage prevention. Glass ionomer sealant is the usual interface used between the coronal restoration and dental hard tissue however when composite resin material is used as a coronal restoration, some dental clinician prefer not to use it. The aim of this review is to determine the need to seal the orifice of an obturated root canal with glass ionomer under composite resin to prevent microleakage.

Material and methods: Electronic searches were performed in the Pubmed and Scopus databases using relevant keywords. Textbook searching was also applied. Following selection, articles were fully reviewed to ensure that they met inclusion/exclusion criteria.

Results: The intracoronary sealing abilities of a wide variety of restorative materials have been investigated, assessed and compared within the dental literature.

Conclusion: No definitive guidelines were found regarding the use of orifice sealing materials following endodontic treatment. This review was not able to answer the research question, and further investigation is required to achieve this goal.

Keywords: Intra-orifice barriers, Composite resin, Glass ionomer, Micro leakage.

INTRODUCTION

Microbial infection via an inadequate coronal seal is one of the major factors associated with endodontic failure,¹ and the literature suggests that coronal leakage is more likely to determine clinical success or failure than apical leakage.²

Placement of a material over the coronal gutta-percha to act as a barrier to coronal microleakage would be advantageous in reducing leakage and increasing the possibility of treatment success.³ The sealant material is placed into the canal orifice following removal of the coronal portion of gutta-percha and sealer. Many materials have been investigated for use as an intra-coronal seal to prevent microleakage, including Cavit, amalgam, intermediate restorative material (IRM), Super-EBA, composite resin, glass-ionomer cement (GIC), and mineral trioxide aggregate (MTA).¹

Glass ionomer cement has been advocated for use as an intracanal barrier when microleakage or recurrent caries are likely because of its cariostatic and adhesive properties.⁴ Resin-modified glass ionomer material is one of the barrier materials used routinely to close the canal orifice after root canal obturation.⁵ It consists of glass ionomer and composite resin, having properties of both materials. Composite resin has excellent adhesive properties and is used commonly as a core in endodontically treated teeth.⁶

The aim of this review is to determine if there is a need, following endodontic treatment, to seal the root canal orifice

with glass ionomer beneath composite resin to prevent microleakage.

MATERIAL AND METHODS

Electronic searches were performed in the Pubmed and Scopus databases using the keywords: intraorifice barriers, composite resin, glass-ionomer, microleakage. Textbook searching was also applied for relevant information. Articles were first selected according to titles and abstracts, and they were then fully reviewed to ensure that they met the inclusion/exclusion criteria.

Inclusion criteria

Studies with all designs that used different materials and or techniques included. The study should refer to intracoronary orifice and micro leakage significance. Searches were limited to papers written in English and published between 2002 and 2014.

The exclusion criteria

All studies that failed to meet the inclusion criteria. If a study did not refer to the intraorifice barrier or explain its relation with microleakage, it was discarded. Studies that discussed a coronal barrier were also rejected.

RESULTS

Definition of an intraorifice sealing material and their importance

The intra-orifice barrier is an effective treatment used in endodontically treated teeth by introducing an additional material into the canal orifice immediately after removal of the coronal portion of gutta-percha and sealer.⁷

Coronal leakage is a primary cause of endodontic failure.⁸ Sealing of the coronal part of the root canal is therefore indicated to reduce the chance of treatment deterioration.¹ Sealing is of particular importance when the coronal restoration is lost or inadequately placed,⁹ or when there is delay in placing the final restoration.¹⁰ This is important for

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both anterior and posterior teeth.¹¹

Cavit[®], amalgam, intermediate restorative material (IRM[®]), super-EBA, composite resin, glass ionomer cement and mineral trioxide aggregate (MTA) are commonly used materials.^{12,13} The use of colored materials is recommended so they can be easily identified in cases of retreatment or post restoration.¹¹ Examples include the flowable composite resins PermaFlo[®] Pink or Purple (Ultradent), Flow-It[®] dark red (Pentron) or dark blue (DenMat).

The use of a resin-modified glass-ionomer material over the gutta-percha followed by provision of a well-sealed temporary or permanent filling is suggested.¹¹

The sealing abilities of a variety of intraorifice restorative materials and their capacity to prevent coronal micro leakage have been investigated, assessed and compared.

MTA had the lowest rate of microleakage compared with composite resin or light-cured glass ionomer¹ following completion of root canal treatment without coronal restoration. Sealing with Cavit[®] gave better results than Vitremer[®] (glass-ionomer cement), and the flowable composite Flow-It[®].¹⁴ Composite resin used alone or combined with Coltosol[®] showed a significant reduction in microleakage, whereas glass ionomer combined with Coltosol[®] resulted in less microleakage than the glass ionomer used alone.¹⁵

In an evaluation of the necessity to use an intraorifice seal in teeth with post space, a glass ionomer barrier over the gutta-percha could reduce the risk of recontamination of the apical gutta-percha compared to those without glass ionomer but sealed with Vitrabond[®],¹⁶ IRM[®] and Coltosol[®] were significantly better in preventing microleakage than chemically cured glass ionomer and dentinal adhesive.¹⁷ In a recent study the adhesive system CoroSeal[®] reduced coronal leakages more effectively than a flowable composite resin, fissure sealant or polycarboxylate cement¹⁸ Figure 1.

DISCUSSION

Conventional root filling materials such as gutta-percha and sealer do not provide adequate resistance to bacterial microleakage.^{21,22} Therefore, the coronal part of the root canal should be sealed to minimize the endodontic treatment failure rate.³ Previous research support the use of intra-orifice sealants, but there is little agreement on a standardized protocol or material to be used as a coronal barrier.^{23,24} Different studies have shown highly conflicting results regarding the sealing ability of different materials.¹

The following criteria have been proposed by Wolcott et al. for an intracoronary barrier: (a) Easily placed by the specialist, (b) Bonds to tooth structure (retentiveness), (c) Effectively seals against microleakage, (d) Easily distinguishable from natural tooth structure and (e) Does not interfere with the final restoration of the access preparation.

GIC is used commonly as an intraorifice barrier, and according to Mavec et al.,²⁵ the literature supports the use of an intraorifice glass ionomer barrier to protect the root canal filling as a second line of defense for the temporary coronal seal.

In their study, Parekh et al.³ found that microleakage was less beneath a seal of GIC plus composite resin as opposed to

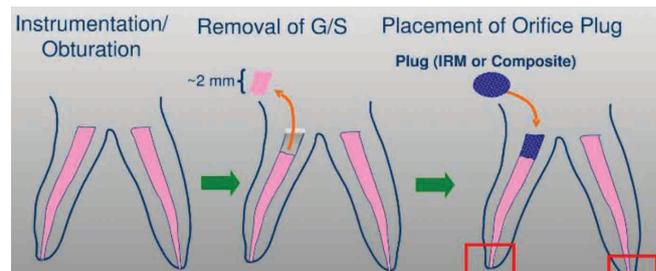


Figure-1: Placement of Sealing Materials.^{19,20}

composite resin alone, and concluded that “LCGIC + Tetric N-Flow was found to be superior over other experimental materials as intraorifice barriers.” They suggested that the enhanced sealing ability of LCGIC may be attributed to:

1. Adhesion of LCGIC by development of an ion-exchange layer adjacent to dentin and
2. Shear bond strength of LCGIC which is higher than conventional GIC.

Divya et al.²⁶ also concluded that a GIC and composite combination can be recommended as coronal sealants, as did Deepali et al.²⁷ who stated they had the “highest probability for achieving a maximal coronal seal.”

Other studies have recommended other sealing agents: Slutzky- Goldberg et al.⁶ found GIC or MTA to be equivalent in their sealing abilities, and the results of Jiang et al.²⁸ suggest that flowable composites can serve as ideal intra-orifice seals.

Mineral trioxide aggregate and flowable composite was found to be preferred over glass ionomer as a coronal barrier by Sagar et al.,⁵ while El-Kady²⁹ concluded that the use of a silorane based composite without the traditional glass ionomer base was best to decrease leakage to the root canal system.

CONCLUSION

The literature does not state clearly whether to use intra orifice sealant materials beneath final and temporary restorations. Although the routine is to place them under final restorations, no study has supported a single protocol. Consequently this review didn't answer the research question, and a well-designed investigation is required to achieve this goal.

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Effect of Armed Conflict on the Mental Health of Youth in Kashmir

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ABSTRACT

Introduction: Conflict of any course and nature has its impact on youth as they are emotionally immature and are more vulnerable to exploitation. The current study aimed at comparing the level of neuroticism, overall anxiety, mental tension, guilt proneness, level of maturity, suspiciousness and level of self-control in youth of Kashmir on the basis of age, gender, residence and witnessing of violent episodes.

Material and Methods: State Trait Anxiety Inventory and Self Reporting Questionnaire was used. A sample of 150 participants was selected. It was conducted on school and college going youth.

Results: The study reported significant difference in the level of neuroticism, anxiety, mental tension, guilt proneness, level of maturity, suspiciousness and self-control in youth from rural areas and in youth who have and haven't witnessed any traumatic episode. There is also significant difference in the level of mental tension and guilt proneness in late adolescence group (16-20years) and early adulthood group (21-25 years). After checking the correlation between the scores of SRQ and STAI and its dimensions, the results indicate that those who scored high on SRQ also scored high on STAI and those who scored less on SRQ scored less on STAI, thus indicating positive correlation between the findings of these two tests.

Conclusion: As very less information exists about the mental health of youth, this research can add up to the existing pool of studies done in this area and it will help in understanding and providing proper mental health care to youth.

Keywords: Conflict, Mental health, Youth, Kashmir, STAI

INTRODUCTION

Armed conflict can be defined as the use of armed violence to resolve local, national and/or international disputes between individuals and groups that have a political, economic, cultural and/or social (as opposed to inter-personal or criminal) origin. In active conflict zones, people have a detrimental impact on their mental health. Disturbed and antisocial behaviour, such as family conflict and aggression towards others are the offshoots of psychological trauma. Mental disorders and psychosocial consequences associated with conflicts include sleeplessness, fear, nervousness, anger, aggressiveness, depression, flashbacks, substance abuse, suicide, and domestic and sexual violence.¹

Kashmir has been a major issue of conflict between government of India and Pakistan since its partition in 1947. Youth are contemplated to be the future of nation, so the constructive development of youth is very important for any nation to develop. Due to incessant exposure to an environment filled with terrorizing events of massacres and distress of conflict, a large number of youth participated in the ongoing struggle. This combat resulted in loss of lives of numerous young ones, loss of their beloved ones and a deteriorated future of many others and overall has led to

serious medical as well as psychological issues. Not only these two aspects but armed conflict has also ruined the social and cultural ethics that youth was supposed to learn. The socio-psycho development of youth gets hampered by conflict and the developmental problems in turn have an enormous devastating impact on the society. Youth are more vulnerable to depression as already they are trying to cope with the changing complexities of adolescence and when they face conflict related problems, their adjustment and coping becomes difficult.²

The aim of the study was to see the "Effect of armed conflict on the mental health of youth in Kashmir".

MATERIAL AND METHODS

Youth was examined on the basis of four categories: age (late adolescence group, 16-20 years and early adulthood group, 21-25 years), gender (males and females), residence (rural and urban) and violence (youth who have and haven't witnessed any violent episode(violent episodes indicate any direct traumatic experience due to armed conflict). Comparisons were made in all these categories on the levels of neuroticism, overall anxiety, mental tension, guilt proneness, maturity, suspiciousness and self-control.

An informed consent was taken from the participants and those who didn't consent were excluded. The study was approved by the departmental and institutional ethical committee and to maintain confidentiality of the study, the names of the participants were not recorded.

Participants: The study was conducted on a sample on 150 participants from Kashmir (Random Sampling). It was conducted on school and college going youth. The minimum age was 16 years and the maximum age was 25 years. The sample consisted of youth from both rural and urban areas, males and females, and youth who have and haven't witnessed any episode of violence. 75 participants in the late adolescence group(16-20 years) and 75 in the early adulthood group (21-25 years), 69 participants were males and 81 participants were females, 74 participants were from rural background and 76 were from urban background and 74 participants had witnessed violent episodes and 76 had

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never witnessed any traumatic episode.

Assessment technique: State Trait Anxiety Inventory: STAI is based upon the MAP series which measures 20 personality dimensions. The test includes 40 items. The test includes 5 domains that are tension, guilt proneness, maturity, suspiciousness and self-control. The STAI was developed as a means of getting clinical anxiety information in a rapid, objective and standard manner. It is appropriate for use in chronological ages of 14 years and above, throughout adulthood.³

Self-Reporting Questionnaire-20 (SRQ-20): SRQ has been developed by WHO. It consists of 20 items which have to be answered by yes or no. it may be used either as a self-administered or as an interviewer administered questionnaire. The SRQ-20 is an instrument which question respondents about symptoms and problems likely to be present in those with neurotic disorder.⁴

STATISTICAL ANALYSIS

Means and standard deviation was calculated of the scores. The Statistical Package for social sciences (SPSS 16.0) was used, in which t-test was calculated by comparing all the four categories i.e. age, gender, residence, violent episodes on the parameters of neuroticism, overall anxiety, mental tension, guilt proneness, maturity, suspiciousness and self-control and correlation was also calculated between self-reporting questionnaire and State Trait Anxiety Test and its dimensions.

RESULTS

The table-1 is depicting the level of neuroticism according to age group, gender, residence and violent episodes. It was observed that level of neuroticism is higher in youth who have faced violent episodes (M=15.959, S.D.=3.928), followed by youth of rural areas (M=14.594, S.D.=4.816). There is also significant difference in the t-values calculated based on

residence and violence group. The t-value of group based on residence is 6.427 which is highly significant and the t-value of group based on violence is 13.040 which is also highly significant whereas the t-values of groups based on age and gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender.

The table-2 is depicting the level of overall anxiety according to age group, gender, residence and violent episodes. It was observed that level of anxiety is higher in youth who have faced violent episodes (M=8.675, S.D.=1.752), followed by youth of rural areas (M=7.756, S.D.=2.563). There is also significant difference in the t-values calculated based on residence and violence group. The t-value of group based on residence is 5.537 which is highly significant and the t-value of group based on violence is 13.084 which is also highly significant whereas the t-values of groups based on age and gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender.

The table-3 is depicting the level of mental tension according to age group, gender, residence and violent episodes. It was observed that level of mental tension is higher in youth who have faced violent episodes (M=7.959, S.D.=1.912), followed by youth of rural areas (M=7.378, S.D.=4.894). There is also significant difference in the t-values calculated based on residence, violence and age. The t-value of group based on age is 1.941 which is significant, the t-value of group based on residence is 6.039 which is highly significant and the t-value of group based on violence is 10.404 which is highly significant whereas the t-value of group based on gender is insignificant. There is not much difference in the means calculated on the basis of gender.

The table-4 is depicting the level of guilt proneness in groups based on age, gender, residence and violent episodes. It was observed that level of guilt proneness is higher in youth who have faced violent episodes (M=7.959, S.D.=1.912), followed by youth of rural areas (M=7.473, S.D.=2.433). There is also significant difference in the t-values calculated

Variables		N	Mean	St. deviation	St. error mean	t-value
Age group	Late adolescence group (16-20)	75	11.853	4.528	.522	-.781.
	Early adulthood group (21-25)	75	12.506	5.657	.653	
Gender	Males	69	11.942	4.658	.560	-.524
	Females	81	12.382	5.499	.611	
Residence	Rural	74	14.594	4.816	.559	6.427**
	Urban	76	9.828	4.253	.487	
Violence	Faced violent episode	74	15.959	3.928	.456	13.040**
	Haven't faced violent episode	76	8.500	3.030	.347	

Table-1: Indicating level of neuroticism

Variables		N	Mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	6.400	2.336	.269	-.684
	Early adulthood group	75	6.720	3.310	.382	
Gender	Males	69	6.956	2.434	.293	1.575
	Females	81	6.222	3.154	.350	
Residence	Rural	74	7.756	2.563	.297	5.537**
	Urban	76	5.394	2.658	.304	
Violent episode	Faced violent episodes	74	8.675	1.752	.203	13.084**
	Haven't faced violent episodes	76	4.500	2.132	.244	

Table-2: Level of anxiety

based on residence, age and violence group. The t-value of group based on residence is 5.003 which is highly significant, the t-value of group based on age is 1.978 which is significant and the t-value of group based on violence is 10.404 which is also highly significant whereas the t-values of group based on gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender. The table-5 is depicting the level of maturity in groups based on age, gender, residence and violent episodes. It was observed that level of maturity is higher in youth who have faced violent episodes (M=7.554, S.D.=1.888), followed by youth of rural areas (M=5.959, S.D.=2.608). There is also significant difference in the t-values calculated based on residence and violence group. The t-value of group based on

residence is 5.262 which is highly significant and the t-value of group based on violence is 12.179 which is also highly significant whereas the t-values of groups based on age and gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender. The table-6 is depicting the level of suspiciousness in groups based on age, gender, residence and violent episodes. It was observed that level of suspiciousness is higher in youth who have faced violent episodes (M=7.135, S.D.=2.002), followed by youth of rural areas (M=6.824, S.D.=2.639). There is also significant difference in the t-values calculated based on residence and violence group. The t-value of group based on residence is 6.077 which is highly significant and the t-value of group based on violence is 11.615 which

Variables		N	Mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	6.560	2.279	.263	1.941*
	Early adulthood group	75	5.680	3.196	.369	
Gender	Males	69	6.434	2.452	.295	1.273
	Females	81	5.851	3.058	.339	
Residence	Rural	74	7.378	2.578	.299	6.039**
	Urban	76	4.894	2.458	.281	
Violent episode	Faced violent episodes	74	7.959	1.912	.222	10.404**
	Haven't faced violent episodes	76	4.328	2.334	.267	

Table-3: Level of mental tension

Variables		N	mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	6.893	1.983	.229	1.978*
	Early adulthood group	75	6.066	3.028	.349	
Gender	Males	69	6.768	2.256	.271	1.263
	Females	81	6.234	2.825	.313	
Residence	Rural	74	7.473	2.433	.282	5.003**
	Urban	76	5.513	2.363	.271	
Violent episode	Faced violent episodes	74	7.959	1.912	.222	10.404**
	Haven't faced violent episodes	76	4.328	2.334	.267	

Table-4: Level of guilt proneness

Variables		N	mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	5.680	2.218	.256	.470
	Early adulthood group	75	5.466	3.243	.374	
Gender	Males	69	5.797	2.535	.305	.912
	Females	81	5.382	2.960	.328	
Residence	Rural	74	5.959	2.608	.303	5.262**
	Urban	76	3.789	2.440	.279	
Violent episode	Faced violent episodes	74	7.554	1.888	.219	12.179**
	Haven't faced violent episodes	76	3.644	2.037	.233	

Table-5: Level of self maturity

Variables		N	mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	4.840	2.260	.261	-.089**
	Early adulthood group	75	4.880	3.166	.365	
Gender	Males	69	5.405	2.463	.296	.886
	Females	81	5.000	3.049	.338	
Residence	Rural	74	6.824	2.639	.306	6.077**
	Urban	76	4.353	2.330	.267	
Violent episode	Faced violent episodes	74	7.135	2.002	.232	11.615**
	Haven't faced violent episodes	76	3.289	2.051	.235	

Table-6: Level of suspiciousness

is also highly significant whereas the t-values of groups based on age and gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender.

The table-7 is depicting the level of self-control in groups based on age, gender, residence and violent episodes. It was observed that level of self-control is higher in youth who have faced violent episodes (M=6.648, S.D.=1.989), followed by youth of rural areas (M=6.378, S.D.=2.733). There is also significant difference in the t-values calculated based on residence and violence group. The t-value of group based on residence is 5.669 which is highly significant and the t-value of group based on violence is 10.292 which is also highly significant whereas the t-values of groups based on age and gender is insignificant. There is not much difference in the means calculated on the basis of age groups and gender.

Results obtained by measuring the correlation between the results of self-reporting questionnaire and state trait anxiety test and its domains. It was observed that there is positive correlation and the correlation is significant at 0.01 level.

DISCUSSION

In our study we observed that level of neuroticism was much higher in youth who have witnessed violent episodes and in youth from rural areas. This indicates that physical problems like headache, lack of appetite, poor digestion, sleeping problems, always feeling tired shaking hands and other stomach problems; emotional problems like getting

frightened, feeling nervous, not thinking clearly, crying spells, loss of interest in life, feeling worthless, suicidal ideations and behavioral problems like not able to enjoy day to day activities, work suffering, unable to take decisions were more in youth from rural areas than youth of urban areas and those who have witnessed any episode of violence rather than those who haven't experienced any violent episode. These findings of our study are similar to the study conducted by Jong et al. (2006) in Kashmir, their study revealed that the most of the Kashmiri population suffered from high level of anxiety, tension and extensive worrying (62.07%), One third of the respondents had some psychological disorder and one third of them wanted to end their lives.⁵ There was no major difference found when youth was compared on the basis of age and gender in our study. The findings are in contrast with Jong et al. (2008) who conducted a survey as a part of routine programme evaluation to assess confrontation with violence and its consequences on mental health, health service usage and socio-economic functioning. A two-stage cluster household survey was held in two districts using questionnaires and women scored significantly higher than males in having symptoms of psychological distress.⁶ Our study also reveals that there is a significant difference in the results incurred by STAT, in youth who have witnessed violent episodes and those who belong to rural background. This reveals that the level of anxiety was higher in youth who have witnessed violent episodes and youth from rural areas, whereas no major difference was found in groups based

Variables		N	mean	St. deviation	St. error mean	t-value
Age (16-25 Years)	Late adolescence group	75	5.093	2.080	.240	-.408
	Early adulthood group	75	5.280	3.371	.389	
Gender	Males	69	5.087	2.553	.307	.935
	Females	81	4.666	2.893	.321	
Residence	Rural	74	6.378	2.733	.317	5.669**
	Urban	76	4.026	2.337	.268	
Violent episode	Faced violent episodes	74	6.648	1.989	.231	10.292**
	Haven't faced violent episodes	76	3.118	2.202	.252	

Table-7: Level of self control

		Self-reporting questionnaire	Overall anxiety	Mental tension	Guilt proneness	Level of maturity	suspiciousness	Self control
Self-reporting questionnaire	Pearson Correlation	1	.848**	.805**	.820**	.856**	.787**	.846**
Overall anxiety level	Pearson Correlation	.848**	1	.905**	.893**	.914**	.877**	.923**
Mental tension	Pearson Correlation	.805**	.905**	1	.900**	.888**	.827**	.870**
Guilt proneness	Pearson Correlation	.820**	.893**	.900**	1	.895**	.796**	.829**
Level of maturity	Pearson Correlation	.856**	.914**	.888**	.895**	1	.820**	.898**
Suspiciousness	Pearson Correlation	.787**	.877**	.827**	.796**	.820**	1	.883**
Self-control	Pearson Correlation	.846**	.923**	.870**	.829**	.898**	.883**	1

**Correlation is significant at the 0.01 level (2-tailed).

Table-8: Correlations

on age and gender. In addition it was observed that mental tension in youth belonging to rural background, youth who have witnessed any kind of violent episodes and youth of late adolescence group is higher (16-20 years), they tend to be more tense, excitable, frustrated, driven, restless, fretful and impatient. They are often fatigued, unable to remain active, they usually take a poor view of the degree of unity, orderliness and leadership. Mental tension was nearly equal in males and females. The level of guilt proneness in youth of rural areas, youth of late adolescence group (16-20 years) and youth who have faced any episode of violence is higher, they tend to be depressed, apprehensive, troubled, moody, worrier, full of foreboding and brooding. They do not feel accepted or free to participate in groups, are ineffective speakers, remain rigidly task oriented in their remarks and have few peers as friends. The level of maturity in youth of rural background and youth who have faced any episode of violence is higher and they are easily affected by feelings and tend to be low in frustration tolerance, changeable and plastic. They usually evade necessary reality demands and are neurotically fatigued. They are fretful, easily emotional and annoyed, active in dissatisfaction and have neurotic symptoms like phobias, sleep disturbances, psychosomatic complaints. The level of suspiciousness in youth of rural areas and youth who have faced any episode of violence is higher and they tend to be more suspicious, mistrusting, doubtful and hard to fool, they are often involved in their own ego, are interested in internal mental life, are usually unconcerned about others and poor team members and the level of self-control is higher in youth of rural areas and those who have witnessed any traumatic episode, they will not be bothered with will control and regard for social demands, they are careless of protocols and follow their own urges, they are overly considerate, careful or painstaking. They may also feel maladjusted and show affective maladjustments. After checking the correlation between the scores of SRQ and STAI and its dimensions, the results indicate that those who scored high on SRQ also scored high on STAI and those who scored less on SRQ scored less on STAI, thus indicating positive correlation between the findings of these two tests. The high level of anxiety shown in youth particularly those who witnessed violent episodes are in agreement with the series of studies of Margoob et al which reported high prevalence of PTSD among those who have faced traumatic events as compared to those who haven't witnessed any episode.⁷⁻⁸

Our study also contribute to extant knowledge that there is high anxiety in youth from rural areas as compared to urban, this could be due the fact that youth from rural areas belong to lower socioeconomic status and are mostly unemployment which leads to increased stress in them. They may worry about the socioeconomic stress in their families or the lack of employment opportunities. Our finding are in agreement with Amin and Khan (2009) who conducted a research to explore the characteristics of depression in Kashmir where a low-intensity conflict is present since past 17 years and found that the prevalence of depression is much higher in rural areas (84.73%) as compared to urban areas (15.26%).⁹ There are other studies which have also documented a

considerable increase in the prevalence of acute stress reaction, depressive disorders, anxiety disorders, and in one of the study the prevalence of post traumatic stress disorder is reported to be 15.9% (Margoob MA and Sheikh, 2006) which is quite alarming for the state when compared to other places.¹⁰

One more similar research was done by Cardozo and others (2004), they conducted a nationally representative survey of Afghans and found that prevalence rates of symptoms of depression and anxiety were high among those who have faced traumatic events as compared to those who haven't witnessed any episode.¹¹

As per the findings of our research no major difference was seen in the mental health of males and females. These findings are in contrast with other researches in relation to difference in anxiety in genders wherein females are more likely to develop anxiety symptoms and disorders Kohli and Showkat (May 2013) explained war brings disastrous changes in the psychological well-being of civilians, war causes serious mental health problems to adults, elderly people and children. It was seen that women face more severe consequences of war than men.¹²

Limitations: There are few limitations to the study. Illiterate youth was excluded from the study, sample size was small, few researches have been done in this field and purposive sampling has been done, if random sampling would have been done the sample would have been a better representative of youth population. The practical implications of the study are: As very less is known about the mental health of youth, this research can add up to the existing pool of studies done in this area and it will help in understanding and providing proper health care to youth.

CONCLUSION

Armed conflict leads to disastrous consequences. The main aim of the present research was to see how mental health of youth has been affected by the prolonged low-intensity conflict in Kashmir. With the passage of time this low-intensity conflict turned into a violent one and escalated when youth resorted to violent means to achieve their objective of sovereignty. The findings of our study, although modest, speak in favour of both anxiety prevention efforts for youth and mental health promotion efforts aimed at this target group. Colleges offer an ideal setting for universal prevention activities such as general and specific prevention education, self-help strategies and resources, and psychosocial support networks and services with potential to reach large numbers of young students.

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E-health Points an Attempt to Reverse the Man Made Disaster in Cancer Belt

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ABSTRACT

The Green Revolution transforming Punjab into a prosperous state also resulted in deleterious impact on the health of the people of Punjab. High Yield variety of seeds led to the immense usage of pesticides. The indiscriminate use of pesticides percolating into the ground water over the years has led to grave consequences like increased incidence of Cancer in the region. As cleaning the ground water is a herculean task; and the continuous increase in Cancer cases along with other ill health effects due to polluted water calls for an immediate solution. Thus generating a need for an alternative remedy. E- Health point model, which is a one stop solution is catering to both the issues, it is providing RO filter water at a nominal price (Rs.75/month for a family of five members) and expert telemedicine consultation to cancer patients, that too at a rural setting without having the patient to travel to cities. E Health points thus obviate the usage of polluted ground water and go a long way in preventing the further deterioration of health. Since its inception many people have taken the advantage of E health Points as the facility is available at their door steps.

Keywords: E-health Points, Cancer Belt

INTRODUCTION

Punjab is one of India's most prosperous states. This prosperity has been largely due to its success in the agricultural green revolution.¹ Unfortunately, over the past five decades health of the people of Punjab has deteriorated as Green Revolution brought changes in their agricultural practices and lifestyle.

Liberal use of pesticides and fertilizers especially the internationally banned chemicals, the improper disposal of hazardous wastes, lack of knowledge on safety precautions for handling chemicals has all led to contamination of the ground water, rendering it unfit for drinking and irrigation purposes.

Cumulative exposure to pesticides may come from food, water, air, dust, soil etc. Total number of pesticides detected in blood samples from Punjab was 15 out of 28 pesticides analyzed.²

As per the U.S. Center for Disease Control and Prevention, the concentration of these pesticides in the blood of Punjabis was 15 to 605 times greater than the concentration of the same compounds found in U.S. farmers.³

MAGNITUDE

The Malwa region of Punjab, India, has been facing an unprecedented crisis of environmental health linked to indiscriminate, excessive, and unsafe use of pesticides and fertilisers for decades resulting in poor groundwater quality. Cancer is so prevalent in the Malwa region that the region

has been called India's Cancer Capital. The data shows a continuous increase in the number of cancer cases in the last 12 years. The highest number of cancer cases among the four districts are in Muktsar, followed in order by the Mansa, Faridkot, and Bathinda districts.⁴

Studies conducted over two years back, of this region have also highlighted a sharp increase in many other pesticide-related diseases, such as mental retardation and reproductive disorders.⁴

The Atlas of Cancer in Punjab State (ICMR, 2012- 13) has also reported a spurt in cancer cases in Punjab, with 1453 total cases in 2012 in Bathinda region increasing to 1646 cases in a matter of one year.⁵

The water quality in the region is indicating towards a potential hazard, since excessive intake of fluoride causes fluorosis which is a pathological condition resulting usually from drinking water. Premature greying of hair and premature ageing have been reported in district Bathinda (Punjab)⁶

CHALLENGES

The cause is local, it is geographical, in this case it is polluted water, and the source of pollution is the increased use of pesticides for decades. So it is the ground water which is the causative.

These reports, coupled with media scrutiny and increasing public awareness have now forced the state government to announce a series of steps to augment health facilities to tackle the scourge of cancer.⁷

The measure which can be taken at this point is cleaning the ground water which by itself is not an easy task and constraint is bio-monitoring.

Many states are not able to adopt it or carry it on regular basis due to the following main constraints: i) Lack of desired level of skill in many State Pollution Control Boards; ii) Lack of manpower; iii). Lack of resources and iv). Lack of awareness.⁸

Thus, the feasible and practicable remedy left is to make easy access of potable water to people from retail outlets like shops and temples. The drawbacks of which seem to be that sick persons and / or their family members may not often

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go to fetch water. Thus, the need arose to look out for an apt place where the sick are more likely to visit for one or the other definite purpose.

INNOVATION / SOLUTION

E Health Point units, started in rural India, intending to provide families in affected villages with, advanced tele-medical services that “bring” a doctor and/or a paramedic and modern evidence-based healthcare to their community where the local available paramedics or doctors can consult the specialist or consultants residing in metros of the country or abroad through telecom conferencing services.

These E Health points have also been equipped with RO filters which provide safe water to the Population at a rate of 20 litres per person per day for drinking and cooking. Taking average of 5 members in a family, every family is being charged a nominal fees of Rs. 75/Month.⁹

Also, providing alongside greater access to high quality health-care and safe drinking water services resulting in better health and well-being, enhanced productivity and improved standard of living, it also provides multiple opportunities for employment generation in the local areas.¹⁰

E Health Points have successfully provided telemedical consultations, diagnostic investigations, alongwith supply of safe drinking water to many beneficiaries from the time of its inception.

E Health Points positively changes the perspective of the public versus private health sector by implementing a technology-based social enterprise for low income groups.¹¹

The gathering of people at a common place can be utilized to raise awareness about health issues and can be used as an opportunity for preventing and promoting health concerns. Clubbing healthcare delivery with a basic amenity of water provision can go a long way in combating social taboos like HIV, TB, and Leprosy.

Cancers due to water contamination pose a serious threat to public health. Government agencies are proactive in tackling the issue but with little success.

CONCLUSION

Many organizations be it public private or a NGO provide different components of healthcare and water services separately. As per our view E health point model brings together all these stand alone services; using telemedicine for a doctor- patient interaction, combining preventive and curative services, providing RO water, bringing urban facilities to rural rather than the usual approach of rural patients having to travel to cities for treatment.

This further decreases their expenses on water borne diseases, healthcare, and reduces sickness absenteeism and lost wages.

E health point serving as an epitome of Universal Health Coverage is first of its kind and a unique contribution to the field of public health.

Thus it is a model which is innovative, effective, acceptable to people, replicable, scalable, sustainable, with a belief that it will decrease health inequities and so will further augment human productivity.

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Prevalence of Peripheral arterial disease (PAD) in Patients of Chronic Obstructive Pulmonary Disease (COPD) attending Tripura Medical College and Dr. BRAM Teaching Hospital

Dulal Chakraborty¹, Avik Chakraborty², Nirmalya Saha³, Sannibesh Das⁴

ABSTRACT

Introduction: Peripheral arterial disease (PAD) in patients of Chronic Obstructive Pulmonary Disease (COPD) is on increase specially in developing countries. So the aim of this study was to determine the prevalence of peripheral arterial disease (PAD) and the associated risk factors for patients with COPD.

Material and Methods: This prospective cross-sectional study enrolled 115 COPD patients (mean age: 68.02 years). Demographic data, lung function and cardiovascular risk factors were recorded. The ankle-brachial index (ABI) was used to detect PAD (ABI<0.90).

Results: Among the enrolled 115 COPD patients, the prevalence of PAD was 29.57%. The prevalence of PAD in younger (<65 years) were 2 (1.74%) and among older (>65 years) were 32 (27.83%). Hypertension was found to be the most common cardiovascular comorbidity (n= 66, 57.39%), followed by diabetes mellitus (n =32, 27.83%), and hyperlipidemia (n= 29, 25.22%). There was no significant difference in lung function (forced vital capacity and forced expiratory volume in one second) between the two groups. Hyperlipidemia was found to be the strongest independent factor for PAD (odds ratio (OR): 19.38), followed by old age (OR: 7.143), and hypertension (OR: 4.15).

Conclusion: The prevalence of PAD among COPD patients in TMC and Dr. BRAM Hospital is 29.57%. In our study the associated cardiovascular risk factors were Hyperlipidemia, increased age, hypertension and smoking. No association was found between COPD GOLD stage and PAD.

Keywords: ABI: Ankle - Brachial index. FEV1: Forced expiratory volume in 1 second. FVC: Forced vital capacity. GOLD: Global initiative for chronic obstructive lung disease. DM: Diabetes mellitus.

INTRODUCTION

Peripheral arterial disease (PAD) also known as peripheral vascular disease (PVD) is narrowing of the arteries other than those that supply the heart and brain. When narrowing occurs in the heart and the brain it is called coronary artery disease and cerebrovascular disease respectively. PAD most commonly affects the lower limbs, but other arteries may get involved. Classical symptom is leg pain on walking which is known as intermittent claudication that resolves with rest,¹ other symptom like skin ulcer, cold skin, bluish skin, poor nail and hair growth may occur in the affected limb. Possible complications are infection or tissue death which may need amputation; stroke, or coronary artery disease. Approximately 50% of cases of PAD are asymptomatic.¹ Cigarette smoking is the main risk factor and other risk factors include hypertension, diabetes, and hyperlipidemia.²

Atherosclerosis and arterial spasm could be the underlying mechanism of PAD which can be diagnosed by duplex ultrasonography and angiography. Angiography is more accurate for diagnostic and therapeutic purposes.³

In 2010 worldwide approximately 202 million people had PAD. It affects about 5.3% of people between 45 - 50 years and 18.6% of 85 - 90 years in developed world. It affects 4.6% of 45 - 50 years and 15% of 85 - 90 years. PAD is equally common among men and women in the developed world while women are more commonly affected in the developing world.²

Chronic obstructive pulmonary disease (COPD) is leading cause of morbidity and mortality worldwide, with prevalence rates between 5% and 13%.⁴⁻⁶ COPD is projected to represent the third leading cause of death in middle-income countries by 2030.⁷ Smoking is the major cause of COPD, as smoking induced inflammation causes vascular endothelial damage via oxidative stress.⁸ Peripheral arterial disease (PAD) and its risk factors are common to other atherosclerotic diseases including cardiovascular diseases.⁹ PAD is an atherosclerotic process that effects non coronary arteries and often refers to occlusion of the arteries of the lower limbs.^{10,11}

Chronic obstructive pulmonary disease (COPD) has been defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a disease state characterized by airflow limitation that is not fully reversible.¹²

Aim and objective of the research were to find out the prevalence of PAD in patients of COPD attending TMC and Dr. BRAM Teaching Hospital, to find out other comorbidities associated in patients of COPD and CAD and to evaluate the association of lung function (FEV1 and FVC) and GOLD staging in patients with PAD.

MATERIAL AND METHODS

This cross sectional study was done over a period of six months at TMC and Dr. B. R. Ambedkar Teaching Hospital. A total of 115 diagnosed and treated patients with COPD were included in the study.

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Inclusion criteria

1. Male/Female subjects aged 40-80 years.
2. Baseline post bronchodilator FEV1 of $\geq 80\%$ predicted and FEV1/FVC of < 0.7 without reversibility of $< 15\%$ according to GOLD criteria.
3. Ability to comply with the requirements of the protocol and be available for study visits.
4. Willing to participate in the study.

Exclusion criteria

1. Subjects aged < 40 and > 80 years.
2. Except COPD other pulmonary diseases such as Bronchial asthma, asthma- COPD overlap, Interstitial lung disease, bronchiectasis, cystic fibrosis, lung tumor, pulmonary TB, Pneumonia, pneumoconiosis etc.
3. Any acute peripheral artery diseases i.e. thromboembolic peripheral artery disease.

Patient aged between 40-80 years attending medicine OPD/IPD with history suggestive of COPD were screened by spirometry for diagnosis of COPD as per GOLD criteria of COPD. Detailed history of risk factors of development of COPD was taken along with the detailed history of risk factors of development of Peripheral artery diseases. Detailed examination with special emphasis on peripheral pulse, respiratory and cardiovascular system was done. Patients fulfilling the inclusion and exclusion criteria were taken up for the study.

Spirometry was done in all patients including pre and post bronchodilator after 200 mcg of salbutamol inhalation by Metered Dose inhaler (MDI). Study population will be categorized according to GOLD criteria of COPD. According to GOLD criteria:¹³

Stage I COPD Patient denotes Mild cases with Spirometry findings FEV1/FVC < 0.7 and FEV1 $\geq 80\%$ predicted.

Stage II COPD Patient denotes Moderate cases with Spirometry findings FEV1/FVC < 0.7 and FEV1 $\geq 50\%$ but $< 80\%$ predicted.

Stage III COPD Patient denotes Severe cases with Spirometry findings FEV1/FVC < 0.7 and FEV1 $\geq 30\%$ but $< 50\%$ predicted.

Stage IV COPD Patient denotes Very severe cases with Spirometry findings FEV1/FVC < 0.7 and FEV1 $< 30\%$ predicted.

Diagnosed cases of COPD shall be subjected to detailed history and physical examination pertaining to PAD. All subjects shall undergo peripheral artery Doppler with hand held vascular Doppler (VD-320) and Ankle brachial index (ABI) will be calculated. Clinically PAD will be classified according to classification introduced by Robert B. Rutherford in 1986 and revised in 1997.¹⁴⁻¹⁵

Grade 0, Category 0 = No symptoms.

Grade I, Category 1 = Mild claudication.

Grade I, Category 2 = Moderate claudication.

Grade I, Category 3 = Severe claudication.

Grade II, Category 4 = Rest pain.

Grade III, Category 5 = Minor tissue loss; Ischemic ulceration not exceeding ulcer of the digits of the foot.

Grade IV, Category 6 = Major tissue loss; severe ischemic

ulcers or frank gangrene.

When the blood pressure readings in the ankles are lower than that in the arms, blockages in the arteries which provide blood from the heart to the ankle are suspected. PAD was confirmed by ABI using hand held vascular Doppler. Normal range of ABI is 1.00 to 1.40. The patient was diagnosed of having PAD when the ABI is ≤ 0.90 . ABI values in between 0.91 to 0.99 were considered "borderline" and values more than 1.40 indicate non compressible arteries. PAD was graded as mild to moderate if the ABI was between 0.41 and 0.90, and an ABI less than 0.40 was suggestive of severe PAD. These relative categories have prognostic value.¹⁶

Calculation of sample size

$$n = 4 p q / L^2$$

Where p = Prevalence = 7 % (Prevalence as per the study, "Prevalence of COPD in India: a systematic review")¹⁷

$$q = (100-p) = 93\%$$

$$L = \text{Allowable error (absolute)} = 5\%$$

$$\text{By the formula } n = 4 p q / L^2$$

Calculated sample size = 104. Extra 10% sample added to compensate any incomplete data

So, final sample size = 115.

STATISTICAL ANALYSIS

All relevant data so collected was entered in the master chart and analyzed using IBM SPSS Statistics 20. Descriptive statistics was used to infer results.

RESULTS

Of the 115 participants, male were 112 (97.39%). Age > 65 years were 88 (76.52%) and < 65 years were 27 (23.48%). Mean age was 68.02. Thirty four (29.57%) were diagnosed to have PAD, among those 28 (24.35%) were asymptomatic PAD and 6 (5.22%) were symptomatic PAD. The prevalence of PAD in younger (< 65 years) were 2 (1.74%) and among older (> 65 years) were 32 (27.83%).

The most common cardiovascular comorbidity was hypertension (n= 66, 57.39%), followed by diabetes mellitus (n = 32, 27.83%), and hyperlipidemia (n= 29, 25.22%). All the patients included in the study had history of smoking (at least 10 pack years), including current (n= 98, 85.22%) and former (n= 17, 14.78%) smokers. The mean pack-years of smoking were 44.324. Sixteen patients (13.91%) had a significant reversibility of short acting bronchodilators. There was no patient with severe respiratory failure in our study. Twenty two patients (19.13%) were overweight, 8 (6.96%) were obese. PAD seen in different stages of COPD stage I –IV were 3%, 35%, 50%, 12% respectively.

DISCUSSION

This was a cross-sectional study to investigate the prevalence of PAD among COPD patients in TMC and Dr. BRAM Teaching Hospital, Tripura. We used an ABI < 0.9 for the diagnosis of PAD.

Among the enrolled 115 COPD patients, the prevalence of PAD was 29.57%. The prevalence of PAD in younger (< 65 years) were 2 (1.74%) and among older (> 65 years) were 32 (27.83%).

Hypertension was found to be the most common

cardiovascular comorbidity (n = 66, 57.39%), followed by diabetes mellitus (n =32, 27.83%), and hyperlipidemia (n= 29, 25.22%). Age, hyperlipidemia, and hypertension were the associated factors in the elderly COPD patients. No significant difference in lung function (FEV1 and FVC % predicted) test and GOLD stage between the COPD patients with and without PAD was found in our study. Hyperlipidemia was found to be the strongest independent risk factor for PAD in the patients with COPD.

Few studies investigated the prevalence of PAD in patients with COPD (Table 3). The first study regarding the prevalence

of PAD in patients with COPD was in France, which enrolled 151 moderate to severe COPD patients and found that the prevalence of low ABI (<0.9) was 81.4%.¹⁸ This is very high compared to studies from Israel and Spain which reported the prevalence of low ABI to be approximately 30% to 40%.^{19,20} As shown in Table 3, the prevalence of hyperlipidemia in two of the studies was about 68%, which is almost 2 times higher than in our study (25.22%). The strongest independent factor for the development of PAD in the current study was hyperlipidemia, and this may explain the prevalence rate. The prevalence rates of hypertension,

	All (n = 115)	PAD (-) n = 81	PAD (+) n= 34
Age (years)	68.02	66.954	70.56
Gender: male	112(97.39%)	78(96.3%)	34(100%)
Height (cm)	157.48	158.55	154.94
BW (kg)	57.42	57.52	57.18
BMI	23	22.66	23.8
Normal	85(73.91%)	58(71.6%)	27(79.41%)
Overweight	22(19.13%)	17(20.99%)	5(14.71%)
Obese	8(6.96%)	6(7.41%)	2(5.88%)
Smoker	115(100%)	81(100%)	34(100%)
Pack-years	44.34	42.47	48.8
Current	98(85.22%)	70(86.42%)	28(82.35%)
Former	17(14.78%)	11(13.58%)	6(17.65%)
DM	32(27.83%)	20(24.69%)	12(35.29%)
Hypertension	66(57.39%)	39(48.15%)	27(79.41%)
Hyperlipidemia	29(25.22%)	7(8.64%)	22(64.70%)
ABI	1.05	1.13	0.86
Lung function			
Pre-bronchodilator			
FEV1 (L)	1.16	1.21	1.04
FVC (L)	1.96	2.02	1.82
FEV1/FVC (%)	56.8	56.9	55.5
Post-bronchodilator			
FEV1 (L)	1.28	1.28	1.16
FEV1 (pred %)	51.2	51.1	51.8
FEV1/FVC (%)	56.9	57.15	56.3
GOLD stage			
I	8(6.96%)	7(8.64%)	1(2.94%)
II	54(46.96%)	42(51.85%)	12(35.29%)
III	38(33.04%)	21(25.93%)	17(50%)
IV	15(13.04%)	11(13.58%)	4(11.76%)

Table-1: Demographic data of the COPD patients with and without PAD.

	GOLD Stage I	GOLD Stage II	GOLD Stage III	GOLD Stage IV
Participants (n)	8	54	38	15
Age (years)	60.6	77.82	69.4	72.03
Pre-bronchodilator				
FEV1 (%predicted)	87.8	62.5	40.5	24.3
FEV1/FVC	67.3	61.9	53.3	43.5
Post-bronchodilator				
FEV1 (L)	2.05	1.54	1.03	0.69
FEV1/FVC	67.0	62.1	53.7	43.4
PAD	1(12.5%)	12(22.22%)	17(44.74%)	4(26.67%)
Diabetes	2(25%)	14(25.93%)	10(26.32%)	6(40%)
Hypertension	3(37.5%)	38(70.37%)	16(42.11%)	9(60%)
Hyperlipidemia	0	15(27.78%)	9(23.68%)	5(33.33%)

Table-2: Lung function, age and co-morbidities between each COPD grade.

Study	Prevalence (%)	Diagnostic method	Enrolled subjects	Lung function	Hyperlipidemia	Diabetes	Hyper tension	Others
Castagna O et al. ¹⁸	81.4	ABI<0.9	151 moderate-to-severe COPD patients, mean age: 67.63.1 years	FEV1: 37 % FEV1/FVC: 47 %	68.1%	25.6%	74.8%	BMI: 22.9
Blum A et al. ¹⁹	31	ABI<0.9	87 COPD patients, mean age: 69.8611.8 years	FEV1: 34%, with PAD FEV1:45 %, without PAD	Unavailable	43 %	72.4%	BMI: 29.3
Pecci R et al. ²⁰	36.8	ABI<0.9	9 246 COPD patients, mean age: 70.2611 years; men: 79%	FEV1: 46 %, with PAD FEV1:52 %, without PAD	68%	27.2%	57.3%	Obesity: 33%
Lin MS et al. ²¹	8	ABI<0.9	427 COPD patients, mean age: 70.069 years; men: 97.7%	FEV1: 51 % FVC: 62 %	13.3%	18.3%	48.5%	BMI: 23
Our study	34	ABI<0.9	115 COPD patients, mean age: 68.02 years; men: 97.39%	FEV1: 51.2 % FEV1/FVC: 56.8 %	25.22%	27.83%	57.39%	BMI: 23

Table-3: Prevalence and risk factors for PAD in the COPD patients by ethnicity.

diabetes and obesity documented in our study were much lower than in previous reports. Previous studies have shown that decreased pulmonary function is independently associated with

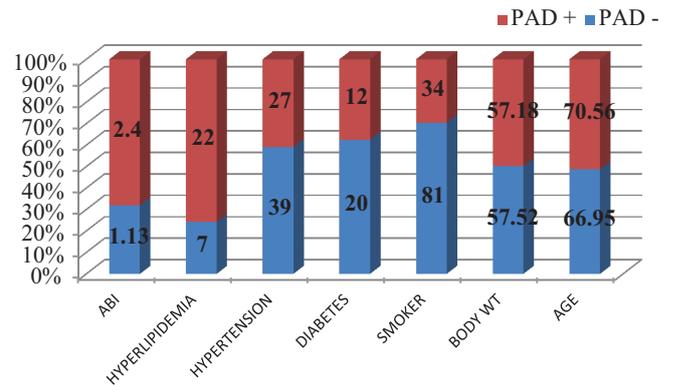


Figure-1: Demographic data and PAD.

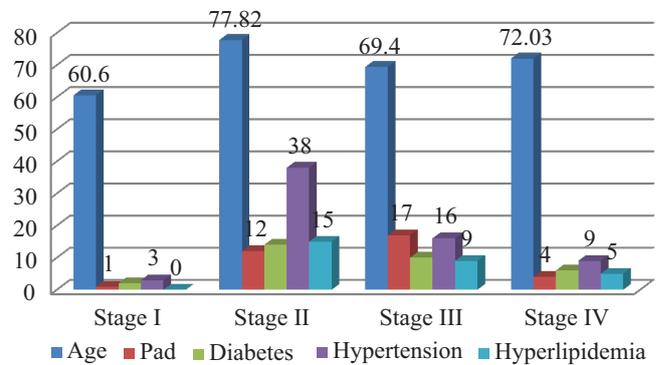


Figure-2: Comorbidities in stages of COPD.

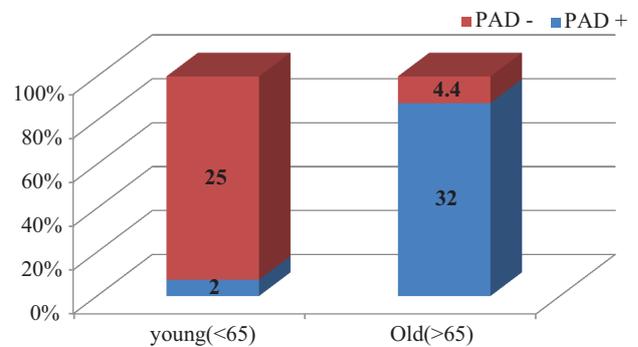


Figure-3: Age distribution of PAD.

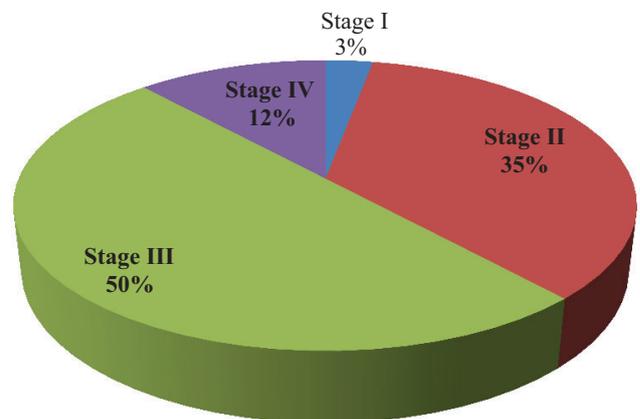


Figure-4: PAD in different stages of COPD.

subclinical atherosclerosis, arterial stiffness and coronary heart diseases.²⁷⁻³¹ Only few studies have investigated the relationship between ABI of less than 0.9 and lung function. Diminished lung function were documented in patients with PAD in two studies.¹⁹⁻²⁰ In the study from Spain, COPD severity was found to be positively associated with ABI<0.9, however, they did not consider cardiovascular factors such as diabetes, hyperlipidemia, and hypertension as co-variables for multivariate regression analysis.¹⁸ No association between lung function and low ABI (<0.9) could be detected in our study, in either the younger or elderly COPD patients. Smoking might be the cause of the higher prevalence rate of PAD among COPD patients than in the general population in our study. Smoking is the most important modifiable risk factor for the development of PAD.²⁷ However, it is very difficult to stop smoking before they become ill, and it could be the reason why the prevalence of current smokers (67% vs. 45%) was higher among younger than elderly patients in our study. High BMI is associated with the development of PAD.²⁸⁻³¹ However, patients with COPD tend to be underweight and cachexic. The mechanism underlying this phenomenon involves systemic inflammation and impaired muscle oxidation.³²⁻³⁴ In our study, only 6.96% of all enrolled COPD patients were obese, which is much lower than our previous data for the general population (overweight: 31.9% and obese: 11.2%).³⁵ Hence, COPD related cachexia might be a protective effect against the development of PAD. Limitation to this study is that the most of the enrolled patients were male (97.39%), thus, it is unknown whether the results can be applied to women.

CONCLUSION

The prevalence of PAD was 29.57% in COPD patients (1.74% in the younger patients and 27.83% in the elderly patients). Hyperlipidemia was the strongest independent factor associated with PAD, followed by old age and hypertension. Lung function was not associated with PAD in the patients with COPD.

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An Atypical Case of Non-Syndromic Multiple Impacted Supernumerary Teeth – A Case Report

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ABSTRACT

Introduction: Multiple supernumerary teeth are often detected on radiographs. These can be asymptomatic or can result in fascial space infection, resorption of root of the adjacent tooth, malocclusions, delayed or non-eruption of teeth, temporomandibular joint disorder, cyst formation. A great challenge is management of such cases to the clinicians. Hence, correct diagnosis and treatment with the use of appropriate imaging techniques and multidisciplinary intervention are highly important.

Case report: A case in mandibular premolar region of an adolescent female patient is presented having multiple supernumerary teeth with non-syndromic association, which were diagnosed accidentally during routine radiographic evaluation.

Conclusion: Radiographic assessment has an important part to play as early diagnosis and intervention. It can help avoid orthodontic problems and dental pathology associated with supernumerary teeth.

Keywords: supernumerary teeth; hyperdontia; impacted teeth; radiographic images; surgical treatment

radiographic evaluation, a suitable treatment is essential.

CASE REPORT

A chief complaint of 19-year-old female patient was pain in right lower back tooth since past few days. Familial, medical and dental history was non-significant. Extraoral examination did not reveal any abnormality. On intraoral examination, it was noted that #73, #74, #75 and #83, #84, #85 hadn't exfoliated and were still retained in the mouth well beyond their age of exfoliation. A carious lesion was present in relation to #46 which was tender on vertical percussion. To assess the extent of carious involvement, a routine intraoral periapical radiograph of the tooth was advised. The radiograph revealed the carious lesion involving dentin, close to the pulp, with an associated finding of a calcified structure that resembled the crown of a developing premolar close to the root of left mandibular first premolar. A radiolucent halo of the dental sac surrounded the calcified structure. A follow-up orthopantomograph [Fig-1] along with Cone Beam Computed Tomography (CBCT) [Fig-2] was then advised to rule out presence of other supernumeraries elsewhere in the jaws. Two premolars with developed roots along with two crowns of developing premolars lying in their respective dental sacs [Fig-3] and two canines with fully developed and dilacerated roots were observed in both left and right mandibular quadrants [Fig-4]. The patient and her mother were educated about the radiographic finding and adequately counseled. The offending first permanent molar was root canal treated. Treatment plan required interdisciplinary management involving extraction of deciduous molars and canines. It was planned to enucleate the crowns of supernumerary premolars and surgically remove the impacted canines lying beneath the roots of lower incisors as their roots were dilacerated and they were unlikely to erupt and corrected by orthodontic intervention, followed by surgical exposure of premolar crowns and orthodontic extrusion & alignment. At present, patient is under regular clinical and radiological examination.

INTRODUCTION

Supernumerary teeth or hyperdontia are defined as existence of an excessive number of teeth in relation to the normal dental formula (20 in the deciduous dentition and 32 in the permanent dentition).¹ The prevalence varies for permanent and primary dentition in various populations respectively, is 0.5- 5.3% and 0.2-0.8%.² It has been reported in permanent dentition, the prevalence of the supernumerary premolars is between 0.075-0.26% and that account for only 10% of all the supernumerary cases³; also they occur more commonly in the mandible.⁴ Single supernumeraries occur in 76-86% of cases, double supernumeraries occur in 12-23% of the cases and multiple supernumerary teeth in less than 1% of cases.⁵ Multiple hyperdontia can be associated with labial palatal cleft or cleidocranial dysostosis, Gardner's syndrome, Fabry-Anderson syndrome, Ehlers-Danlos syndrome. Multiple supernumerary teeth not associated with syndromes are rare, and the premolar area of the mandible is the most frequent location.⁴ The etiology is not yet completely clear. There are several theories about occurrence of supernumerary teeth; one states that hyperactivity of the dental lamina can result from new germs splitting off the lamina and continued extension of dental lamina. Another is the dichotomy theory, hyperdontia can result from accumulations of remaining epithelium.⁶ Other factors such as atavism and genetic association have also been cited. Their occurrence can create a variety of clinical problems, such as diastema, rotations, crowding, delayed eruption, cystic lesions, and resorption of the adjacent teeth. Hence after proper clinical and

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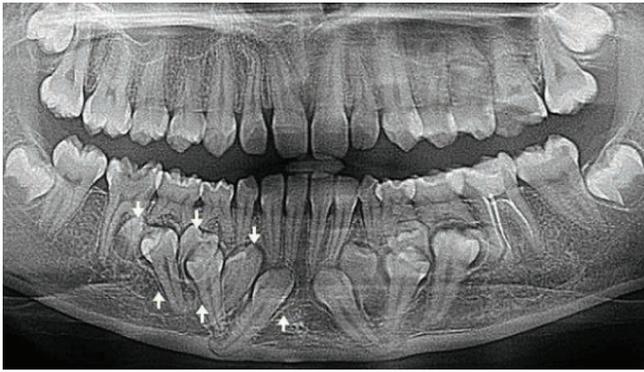


Figure-1: Orthopantomograph showing retained deciduous and impacted permanent and supernumerary teeth.



Figure-2: Cone Beam Computed Tomography CBCT, lingual view.



Figure-3: CBCT lingual view showing two premolars with developed roots along with two crowns of developing premolars.



Figure-4: CBCT labial view showing two canines with fully developed and dilacerated roots

DISCUSSION

Different studies have reported a prevalence of supernumerary teeth in the permanent dentition of between 0.15% and 3.8%.⁷ Yusof in 1990⁴ reported that the premolar region in the lower arch is the most common place for supernumerary teeth. In a study by Rubenstein et al⁸ the number of orthodontic patients were 1100, and the prevalence of supernumerary

premolars was 0.64%.

In the permanent dentition the male female ratio is 2:1. A male female ratio of 9:2 among 11 patients who had non-syndromic multiple supernumerary teeth was shown by Yusof.⁴

The best way to determine Supernumerary teeth is by clinical and radiographic examination. Generally, if there are no symptoms, these can be identified during radiographic examination by coincidence. The diagnosis is usually made as a result of a causal finding during routine panoramic X-ray studies. CBCT was used as one of the diagnostic measures as this is a recent technology which has revolutionized maxillofacial imaging. It provides high contrast 3D image as well advantage of image reconstruction for better treatment planning.

Multiple complications occur with the development of supernumerary teeth such as functional impairment, malalignment of teeth, and an unaesthetic appearance. Failure of teeth to erupt, delayed eruption and ectopic eruption, displacement, diastema, concrescence, dilacerations, pathological fractures, loss of pulp vitality, cyst formation and root resorption may also occur. Bodin et al⁹ have reported that only 2% of the supernumerary premolars are likely to undergo pathological changes.

The position and clinical manifestations of the supernumerary tooth may determine treatment. Thus, an early diagnosis is crucial for deciding among extraction, extraction followed by orthodontic treatment, or simply monitoring of the supernumerary teeth, to minimize the risk of complications. If these teeth are linked with any pathological formation or when they disturb the eruption, or result in malpositioning of the permanent teeth, they should be removed as soon as possible. However regular clinical and radiographic monitoring should be made if the risks of surgery outweigh the benefits of removal. Asymptomatic supernumerary premolar teeth should be left *in situ* until development of the adjacent anatomic structures and root development of the adjacent teeth.¹⁰

An incidental finding in this case was the presence of the supernumerary teeth and the patient was completely asymptomatic. As the impacted supernumeraries were not associated with any cyst formation or resorption of the adjacent teeth, it was decided to extract deciduous teeth observe the permanent teeth and to erupt spontaneously, else go for orthodontic treatment and radiographically review the patient.

CONCLUSION

Hyperdontia or multiple supernumerary teeth without association with complex syndroms is infrequent and is normally asymptomatic, usually diagnosed as a casual finding during routine panoramic X-ray studies. Management of such a condition requires a multidisciplinary approach involving surgical and orthodontic intervention. Presence of four supernumerary premolars and two canines makes this case unusual and rare.

ABBREVIATIONS

Cone beam computed tomography(CBCT)

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Cefixime Induced Stevens-Johnson Syndrome: A case report and Review of literature

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ABSTRACT

Introduction: Stevens–Johnson syndrome (SJS) is one of the manifestations of severe form of cutaneous adverse drug reactions (CADRs). It is an acute, self-limited disease, presenting as severe mucosal erosions with widespread erythematous, cutaneous macules or atypical targets. Majority of the SJS cases are drug-induced despite its varied etiology.

Case report: We report here a case of 55 years old woman who reported us with the chief complaints of rash with erythema of conjunctiva and crusting of the eyelids, fever, and dysphagia. The rashes appeared after four days of consumption of tablet cefixime hydrochloride (200 mg) twice daily for LRTI with fever. She was treated conservatively and tablet cefixime was stopped, oral and eye lesions were taken care of. Causality assessment using the WHO UMC criteria and Naranjo's algorithm revealed that the adverse drug reaction (ADR) was 'probable'. With ALDENS algorithm, the causality was 'very probable', and Preventibility score as determined using Schumocks and Thorntons criteria revealed the ADR to be 'preventable'.

Conclusion: Although there are ample cases of SJS due to beta-lactam antibiotics in the literature, few reports of cefixime-induced SJS are in record till date. Hence, motivation of the healthcare professionals is of utmost importance in order to avoid such adverse drug reactions, which in turn may result in strengthening of the pharmacovigilance program in India as well as enrichment of rational drug prescribing.

Keywords: Cefixime, CADR, Stevens-Johnson syndrome, rational drug therapy

INTRODUCTION

Modern day drug therapy has made great strides in the recent past and adverse drug reaction (ADR) remains to be major threat in the management of patients. Stevens-Johnson Syndrome (SJS) is one such serious ADR, which was described as a severe variant of erythema multiforme as "A new eruptive fever with stomatitis and ophthalmia" and termed as SJS by Albert Mason Stevens and Frank Chambliss Johnson in 1922.¹ SJS is a severe hypersensitivity reaction that can be precipitated by infection such as herpes simplex virus or mycoplasma, vaccination, systemic diseases, physical agents, food and drugs.^{2,3} Such severe idiosyncratic adverse drug reactions are characterized by a low incidence but high mortality. SJS is generally diagnosed by a dermatologist using Bastuji Garin classification.⁴ The incidence of SJS is approximately six cases per million persons per year, and that of TEN is approximately two cases per million persons per year.⁵ Previously mortality could be decreased by improving the supportive care only due to lack of specific therapy. But, recently intravenous immunoglobulin (IVIg) has emerged as a promising therapeutic option.⁶ The drugs that cause SJS commonly are antimicrobials, anticonvulsants, NSAIDs, and oxide inhibitors.⁷ Among the antimicrobials as causative agent of SJS, antiretrovirals are the most common group, followed by the anti-tubercular drugs, sulphonamides, fluoroquinolones, and

penicillins.⁵

CASE REPORT

A woman aged 55 years attended the medicine outpatient door (OPD) of a tertiary care hospital with the chief complaints of rash over face, neck, upper part of chest and both the hands for three days. She also complained of dysphagia, fever, and erosive stomatitis with drooling. On examination, the rashes were tender, pruritic, maculopapular and erythematous in nature with multiple excoriations of both the upper and lower lips and upper lids of the eyes. Ophthalmological examination revealed bilateral upper lid crusting and excoriation, conjunctival congestion and superficial keratitis. She had normal visual acuity, and findings of direct ophthalmoscopy and slit-lamp examination were within normal limits. General examination revealed pulse=86/minute, BP= 130/80 mm of Hg, raised body temperature (102 degree fahrenheit) with absence of oedema, pallor, jaundice, cyanosis and clubbing. No visceral tenderness or organomegaly was found on systemic examination. Laboratory investigations including complete haemogram, liver function test, and renal function test was normal. History taking revealed, oral intake of tablet cefixime hydrochloride (200mg) twice daily for four days for lower respiratory tract infection (LRTI) with fever after which the rashes started appearing on the fifth day, firstly over the forehead followed by progression over the entire face, lips and both the eyes. The rashes then gradually spread to the neck, upper part of chest and both the hands with lesser involvement of the back of chest, abdomen and lower limbs. She also had ulcers over the oral mucosa. The patient came to the OPD on seventh day of the suspected drug intake. She had no previous history of any drug hypersensitivity reactions. She was being co-prescribed tablet paracetamol (650 mg) every 6 hours for the control of fever and an expectorant syrup 10 ml (2 teaspoons) 3 times a day for her cough symptoms along with the tablet cefixime hydrochloride. She was then admitted to the hospital, Tablet cefixime was stopped and the patient was treated conservatively without discontinuation of the other two medications. Her eye lesions were treated with eyedrops moxifloxacin, homatropine, carboxymethylcellulose, and tobramycin ointment. Further progression of the rashes was halted and the patient started recovering within the two days of withdrawal of tablet Cefixime. Tablet Cefixime was not rechallenged or reinstated as the patient refused to give informed consent for the sake of her own health. Causality assessment using the WHO UMC

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Figure-1: Multiple excoriations of upper and lower lips; **Figures-2 and 3:** Upper lid crusting and excoriation, conjunctival congestion and superficial keratitis in both the eyes

criteria⁸ and Naranjo's algorithm⁹ revealed that the adverse drug reaction (ADR) was probable. The causality was not certain as there was no rechallenge and the drug level was also unknown as required for Naranjo's algorithm. With ALDENS algorithm,¹⁰ the causality was very probable, and Preventibility score as determined using Schumocks and Thorntons criteria¹¹ revealed the ADR to be preventable. The patient was then prescribed tablet levofloxacin (750 mg) once daily for 5 days, for her LRTI by the consultant physician as the rashes gradually resolved over a week.

DISCUSSION

Recent data of drug induced SJS have shown the antimicrobials to be the most commonly suspected drugs (45%) as has also been reported in Australia.¹² It is postulated that in some individuals, due to a genetic defect, the drug metabolites may bind to the proteins and trigger an immune response may bind to the proteins and trigger an immune response that leads to the cutaneous reactions of SJS.¹³ Literature search could not reveal cefixime induced SJS so commonly in adults as compared to children. Our case did not reveal similar occurrence in the past with the history of intake of other medications and specifically with any other antimicrobials specially belonging to the beta lactam class or any other class. Hence, FDE can be ruled out clearly in our case. Other differential diagnosis such as DRESS, EM, TEN, exanthematous drug eruption, and lichenoid drug eruption were ruled out in this case. Causality assessment revealed that the ADR was probable according to WHO UMC scale and Naranjo's algorithm. ALDENS algorithm showed causality was very probable, and Preventibility score as determined using Schumocks and Thorntons criteria revealed the ADR to be preventable in nature. Skin detachment <10% of body surface area (BSA) with widespread erythematous or purpuric macules and involvement of the mucous membrane confirms the diagnosis of SJS in our case.

CONCLUSION

This case is probable and clinically confirmed case of SJS that is a serious and life threatening adverse drug reaction especially when caused by unknown drugs, those drugs used for self-medication as well as over the counter (OTC) drugs. This may in turn pose a greater challenge in the diagnosis and management of such cases. A dynamic and robust ADR monitoring system with a scope of feedback to and from the prescribers, and education of the prescribers may be helpful in the prevention, identification and management of drug induced SJS much more effectively.

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Renal Status (BU, UO) in Birth Asphyxia

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ABSTRACT

Introduction: Perinatal asphyxia is one of the common causes of neonatal mortality and morbidity and it affects various organs depending upon severity of asphyxia. This study was undertaken to evaluate and monitor the renal functions (urinary output and blood urea) in birth asphyxia and to correlate renal function with severity of birth asphyxia.

Material and methods: A prospective cross sectional study conducted on newborns delivered in Obstetrics and Gynaecology and admitted to neonatology section of Department of Pediatrics, Govt Medical College, Rajindra Hospital, Patiala. 100 asphyxiated newborns were taken as cases and 35 non-asphyxiated newborns were taken as control group.

Results: Among the 100 asphyxiated newborns, 40% were having mild birth asphyxia, 36 % moderate and 24% were having severe birth asphyxia. Out of 100 newborns 45 were preterms and 55 were term newborns with weight of <1000gms in 6 babies, 60 babies with weight of 1000-2500 and > 2500 gms were 34 babies. In present study, mean BUN level of severely asphyxiated babies on day 1 and 3 was significantly higher than that of mildly and moderately asphyxiated babies ($p < 0.01$). Mean urinary output in severely asphyxiated babies on day 1 was significantly lower as compared to mean UOP in mildly and moderately asphyxiated babies ($p < 0.01$).

Conclusion: Perinatal asphyxia is important cause of affecting renal functions. BUN on day 1st and 3rd and UOP day 1, day 2 and day 3 were significantly different among mildly, moderately and severely asphyxiated babies, concluding that mean levels of BUN and UOP are related to grade of asphyxia.

Keywords: perinatal asphyxia, renal failure, Blood urea nitrogen, hypoxic ischemic encephalopathy, neonate.

INTRODUCTION

World Health Organization (WHO) has defined Birth asphyxia as "Failure to initiate and sustain breathing at Birth."

Perinatal asphyxia is about 1 to 1.5% of live births in most centres and is inversely related to gestational age and birth weight. It occurs in 0.5% of live born infants more than 36 weeks gestational age and accounts for 20 % of perinatal deaths.¹

Asphyxia occurs when the organ of gas exchange fails. When this occurs, arterial carbon dioxide partial pressure (PaCO_2) rises, and arterial oxygen partial pressure (PaO_2) and pH falls.²

In the presence of a hypoxic –ischemic challenge, reflexes are initiated, causing shunting of blood to the brain, heart and adrenals, and away from the lungs, gut, liver, kidneys, spleen, bones, skeletal muscle and skin ("diving reflex). In a study of asphyxiated newborn, 34% had no evidence of organ injury, 23% had an abnormality confined to one organ, 34% involved two organs and 9% had three

affected organs. The most frequent abnormalities involved the kidneys (50%), followed by CNS (28%) cardiovascular system 25%, and pulmonary (23%) system.²

Whenever a neonate develops severe hypoxia or hypotension kidney damage may result. The presentation and course of renal damage depend on the severity and duration of the insult. Mild ischemia results in transient loss of renal concentrating capacity, owing to extreme sensitivity of the medullary thick ascending limb to tissue hypoxia. More prolonged injury produces widespread tubular dysfunction, with significant impairment in sodium and water reabsorption and decreases in GFR.³

Seeing the gravity of involvement of kidneys in birth asphyxia, this study was designed. Renal status was evaluated on the basis of estimation and monitoring of urinary output and blood urea nitrogen.

MATERIAL AND METHODS

The study group comprised of 100 newborns delivered in Department of Obstetrics and Gynaecology, admitted to Neonatology section of Department of Pediatrics, Govt Medical College, Rajindra Hospital, and Patiala.

100 asphyxiated newborns served as cases and 35 normal neonates served as control group. Newborns with congenital anomalies of kidneys and urinary tract, respiratory distress syndrome, DIC, septicemia were excluded. The study was approved by the Institutional Ethical Committee, and informed consent was obtained from the parents of each subject. In this study, 100 asphyxiated neonates (Apgar score at one minute 7 or less) were taken as cases of study. 35 normal neonates (Apgar score at 1 minute more than 7) were taken as control. The renal functions were evaluated in the form of urinary output and blood urea. Blood urea was estimated at 24 hours because the renal damage due to birth asphyxia occurs within 24 hours. The second estimation of blood urea was done at 72 hours to monitor the renal functions. Likewise the urinary output was measured till 72 hours.

Value of blood urea was converted into BUN by using the following:

Blood urea $\times 0.467 = \text{BUN}$ (Newman and Price, 2001)⁴

Urine was collected by using urinary bags, both in male and female neonates. Urine output was monitored daily till 72

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hours. Blood urea was estimated by diacetyl monooxime method using commercially available kit (J. Mitra and co. Ltd). Urea reacts with diacetyl monooxime in acidic medium at 95^o-100^o to give pink coloured complex. Ferric ions are used to oxidise hydroxylamine formed in the reaction. Absorbance of pink coloured end product is measured at 520 nm. ARF will be considered in a newborn when urine output is < 0.5 ml/kg/hr and BUN > 20 mg/dl.

STATISTICAL ANALYSIS

Statistical comparison of measured values between two groups was performed by the unpaired test of the means and chi square test.

RESULTS

In this study, 100 asphyxiated neonates (Apgar score at 1 minute less than 7) were taken as study group and 35 normal neonates (Apgar score at one minute more than 7) were taken as control. Blood urea levels were determined at 24 hours and at 72 hours of life in all neonates. Blood urea nitrogen values were calculated from blood urea levels. Urinary output was measured in all neonates for first three days of life. Statistical comparison of measured values between two groups were performed by the unpaired test of the means and chi square test. 40 cases were mild birth asphyxia, 36 cases were moderate birth asphyxia and 24 were severe birth asphyxia. Blood urea nitrogen and urinary output in study group according to grades of birth asphyxia and control group is shown in table -1. In present study, mean BUN level of severely asphyxiated babies on day 1 and 3 was significantly higher than that of moderately and mildly asphyxiated babies ($p < 0.01$) (Table-2) The mean BUN levels of moderately asphyxiated babies were also significantly higher than that of mildly asphyxiated babies at day 3 of life, whereas at day 1 the difference between them was nonsignificant. The mean urinary output in severely asphyxiated babies on day 1, 2 and of life was significantly lower as compared to mean UOP in mildly and moderately asphyxiated babies ($p < 0.01$) (Table-3)

In terms of UOP, difference between study and control group was statistically highly significant on day 2 and day 3 but was not significant on day 1 and for BUN levels difference between study and control group was statistically highly significant on day 1 and day 3 as shown in Table 2 and 3.

On day 3, 43% of asphyxiated babies developed renal failure (BUN level > 20 mg/dl). 41.86% (18/43) developed oliguric renal failure (UOP < 0.5 ml/kg/hr) and 58.14% developed non-oliguric renal failure (UOP > 0.5 ml/kg/hr) as shown in Table-4. In severely asphyxiated babies, on day 2 and day 3, percentage of oliguria increased to 33.3% and 50 % respectively. Corresponding values in moderately asphyxiated babies were 5.56% and 16.6% on day 2 and day 3 of life respectively. The difference between moderately and severely asphyxiated babies were also significant statistically significant ($p < 0.01$) on day 2 and 3 as shown in Table-5

DISCUSSION

Perinatal asphyxia is a common neonatal problem and contributes significantly to neonatal mortality and morbidity. During Hypoxic ischemia, blood flow is redistributed in

order to preserve circulation to most vital organs- brain, heart and adrenals. This is at the expense of the kidneys, liver and gastrointestinal tract, which are therefore vulnerable to hypoxic-ischemic damage.⁵

Out of 100 cases, 40 babies had mild asphyxia, 36 had moderate birth asphyxia and 24 had severe birth asphyxia, 55 were males and 45 were females. Babies with Apgar score less than or equal to 7 were defined as asphyxiated and babies with Apgar score more than 7 constituted the control group. Blood urea was determined and BUN values calculated of the entire neonate (both study group and control group) on 1st and 3rd day of life. In the present study, mean BUN level of severely asphyxiated babies on day 1 and day 3 was significantly higher than that of moderately and mildly asphyxiated babies ($p < 0.01$) table-1. The mean BUN levels of moderately asphyxiated babies were significantly higher than that of mildly asphyxiated babies on day 3 of life whereas on day 1 the difference between them was non-significant. This shows that mean BUN are related to severity of asphyxia. This is in accordance with the study of Gupta BD et al that high values of blood urea were seen with lower apgar scores.⁶⁻⁸

In present study, mean urinary output in severely asphyxiated babies on day 1 of life was significantly lower as compared to mean UOP in mildly and moderately asphyxiated babies ($p < 0.01$) table-1. Similarly mean UOP in severely asphyxiated babies was significantly lower than in mildly and moderately asphyxiated babies on day 2 and day 3 of life. The mean UOP of moderately asphyxiated babies were also significantly lower as compared to mildly asphyxiated babies on day 2 and 3 of life ($p < 0.01$) table-1. This shows that UOP was inversely related to severity of asphyxia which in accordance with the study of Pejovic B et al (2002), who concluded that there is a good prediction of severity of oliguric renal failure according to the degree of perinatal asphyxia determined by Apgar score at one minute.^{9,10}

In present study, 4.17% of severely asphyxiated babies on day 1 was having decreased UOP (< 0.05 ml/kg/hr) as against 2.78% in moderately asphyxiated babies and 0% of control babies. Difference between severely asphyxiated babies and moderately asphyxiated babies were not significant statistically ($p < 0.01$) as shown in table-2.

In severely asphyxiated babies, on day 2 and day 3, percentage of oliguria increased to 33.3% and 50% respectively. Corresponding values in moderately asphyxiated babies were 5.56% and 16.6% on day 2 and day 3 of life respectively. The difference between moderately and severely asphyxiated babies was also statistically significant on day 2 and 3. This shows that UOP is inversely related to degree of asphyxia which is co-relating well with the study of Pejovic B et al (2002), who found highly positive linear correlations between Apgar score and urinary output in their study on acute oliguric renal failure in hypoxic neonates born at full term. The difference between UOP on day 1 and day 3 was also significantly different in moderately and severely asphyxiated babies

Out of 43 asphyxiated babies who developed renal failure (i.e. BUN > 20 mg/dl), 18 (41.86%) had oliguria and rest 25 (58.14%) were having normal urinary output. None of the

babies had anuria in the present study. Incidence of non-oliguric renal failure in the present study was similar with study done by Karlowicz MG and Adelman RD (1996), who had observed non-oliguric renal failure in 60% of asphyxiated term neonates. However in their study number of oliguric cases was 25%, and of anuric cases was 15%. This in contrast to the present study where number of oliguric cases were 41.86%. This difference could be due to the fact that they included the babies in their study with higher degree of asphyxia (5 min. Apgar Score \leq 6) as compared to the present study.¹¹⁻¹³

CONCLUSION

Perinatal asphyxia is important cause of affecting renal functions. BUN on day 1 and 3 and UOP day 1, day 2 and day 3 were significantly different among mildly, moderately and severely asphyxiated babies, concluding that mean levels of BUN and UOP are related with grade of asphyxia.

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Relative Positions of Motor Neuron Somata of Median Nerve in Spinal Cord of Rabbit

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ABSTRACT

Introduction: Median nerve is the main nerve supplying muscles of flexor compartment of forearm. The study was conducted with an aim to see the relative positions of motor neuron somata of median nerve in different segments of rabbit spinal cord.

Material and methods: This study is conducted by using New Zealand white rabbits. Median nerve of left side was cut 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 perfusion 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. Then they were projected over reconstructed columns of spinal cord by Elliot's method. Position of motor neuron somata with retrograde changes was noted.

Results: It was observed that motor neuron somata with retrograde changes were present in the medial part of dorsolateral (DL) column of fifth (C-5) and sixth (C-6) cervical segments, in the medial part of dorsolateral (DL) column and whole of the retrodorsolateral (RDL) column of seventh (C-7) and eighth (C-8) cervical segments and in the retrodorsolateral (RDL) column of first thoracic (T-1) segment.

Conclusion: In fifth (C-5) and sixth (C-6) cervical segments motor neuron somata were located in dorsolateral (DL) column, in seventh (C-7) and eighth (C-8) cervical segments they were located in dorsolateral (DL) and retrodorsolateral (RDL) column and in retrodorsolateral (RDL) column of first thoracic (T-1) segment.

Keywords: Motor neuron somata, spinal cord segment, median nerve, chromatolysis

granules or Nissl bodies.¹

The typical morphological changes in the cell body after axotomy were first recognized by Nissl.¹ It includes swelling of the cell and disappearance of basophilic material or Nissl's granules from the cytoplasm. The prominence of the latter phenomenon led to the general application of the term "chromatolysis" for the response to axotomy.² Basically chromatolysis is the dissolution of the Nissl bodies in the cell body of a neuron. It is an induced response of the cell usually triggered by axotomy, ischemia, toxicity of the cell, cell exhaustion, and virus infections. The event of chromatolysis is characterized by a prominent 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.³ 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.⁴⁻⁶ 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 in dog, rabbit, rat, monkey etc., by electrophysiological method in cat, and by retrograde axonal transport of horseradish peroxidase (HRP) in cat, monkey, dog and in albino rats.^{3,7-18} 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 localize the positions of the motor neuron somata of median nerve in the ventral grey horn of the spinal cord of rabbit.

MATERIAL AND METHODS

This study is conducted by using New Zealand white rabbits in the Department of Anatomy, Jawaharlal Nehru medical college, Aligarh muslim university, Aligarh, Uttar Pradesh, India. Ethical clearance was taken from Central Animal house, JNMC, AMU, Aligarh. Total six rabbits were used in this study, three of them were females and three of them were males.

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INTRODUCTION

Nervous system is the most complex system of the body. It controls and co-ordinates other systems of the body. It consists of highly specialized cells neuron. 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, called as axon, is usually much longer than the others and conducts information away from the cell body. The other processes are termed as dendrites and information travels towards the cell body through these dendrites.

There is plenty of rough endoplasmic reticulum associated with ribosomal RNA present in the neuron cell body. When these are stained with basophilic dyes such as thionine, cresyl violet, toluidine blue etc., they appear as numerous microscopic clumps. These clumps are called as Nissl's

The operation to cut the median nerve was performed under general anaesthesia and aseptic conditions. Ether was used for general anaesthesia and inhalation route was used. The median nerve of left side was exposed in axilla and cut. A small segment of the trunk of nerve was also removed to prevent reunion. The right side was used as control. Then the animals were kept alive for 1-4 weeks. After that they were sacrificed with an overdose of chloroform. 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 to second thoracic segments of spinal cord were separated and kept in numbered containers filled with formalin solution. For identification of side a vertical nick was given on right side of the spinal cord. Tissue blocks of each segment were prepared after paraffin embedding. Sections were cut from tissue blocks with the help of a rotary microtome. Sections were cut at the thickness of 40 micrometers. The sections were stained with thionine stain and examined under light microscope. Nerve cell body with cell body response and typical chromatolysis were identified and marked. (Figure-1). Reconstruction of the longitudinal cell columns (cell groups) of the ventral grey horn of the spinal cord was done by the method of Elliot (1942).¹⁹

RESULTS

It was observed that motor neuron somata with retrograde changes were present in the medial part of dorsolateral (DL) column of fifth (C-5) and sixth (C-6) cervical segments, in the medial part of dorsolateral (DL) column and whole of the retrodorsolateral (RDL) column of seventh (C-7) and eighth (C-8) cervical segments and in the retrodorsolateral (RDL) column of first thoracic (T-1) segment (Figure-2,3,4).

DISCUSSION

The findings of the present study are in close agreement with the study on buffalo where, in the ventral grey horn of the cervical region, ventromedial and dorsomedial columns (on the medial side) and ventrolateral, dorsolateral and retrodorsolateral columns (on the lateral side) were present.²⁰ Crosby et al. studied the longitudinal cell columns in cervical enlargement of human spinal cord.²¹ In his study he described the presence of ventromedial and dorsomedial cell columns on the medial side and ventrolateral, dorsolateral and retrodorsolateral columns on the lateral side of the ventral grey horn in the cervical enlargement of human spinal cord. The same findings were observed in our study as far as the presence of longitudinal cell columns is concerned.

The findings of the present investigation are in near agreement with Thomas and Wilson in cat both in respect of location of median nerve motor neuron somata and their longitudinal extent in the ventral grey horn of the spinal cord.²²

The findings of the present investigation do not agree with

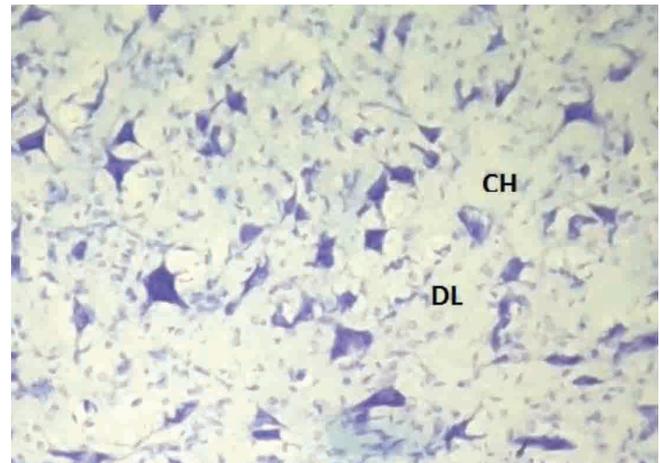


Figure-1: Photomicrograph of transverse section of spinal cord showing chromatolysed neuron soma (CH). Thionine stain X100

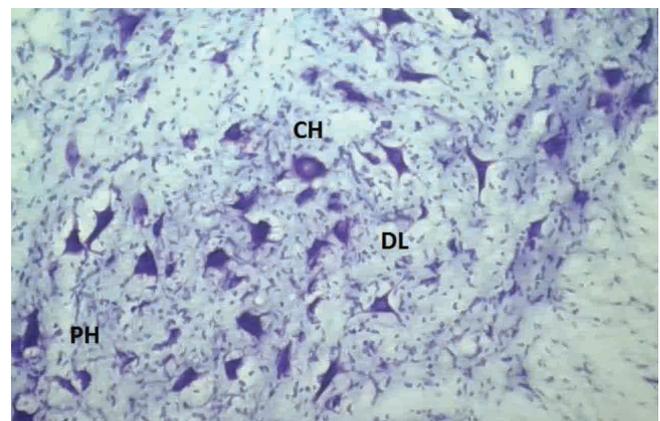


Figure-2: Photomicrograph of a part of transverse section of spinal cord passing through caudal part of fifth cervical (C-5) segment showing a chromatolysed neuron soma (CH) in dorsolateral column (DL) of ventral grey horn. Thionine stain X100. DL = Dorsolateral column

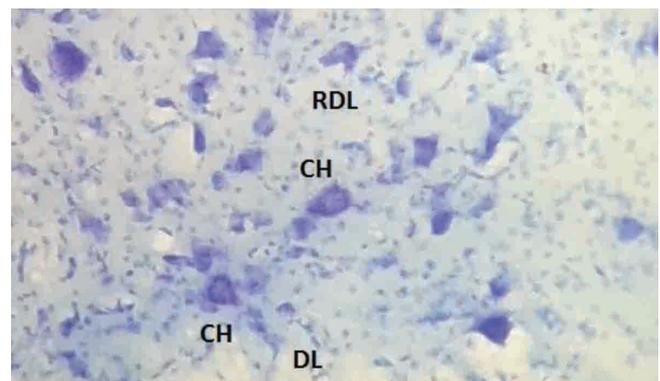
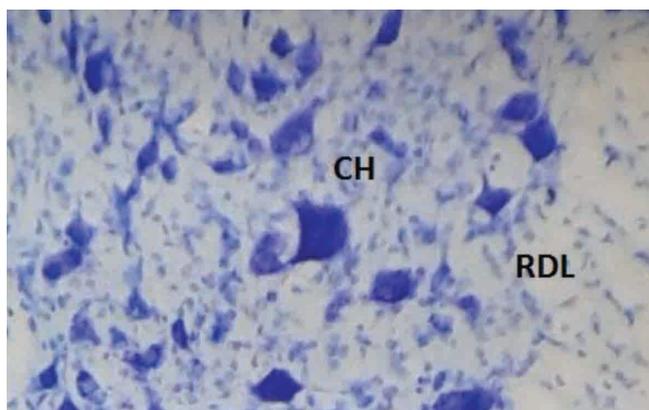


Figure-3: Photomicrograph of a part of transverse section of spinal cord passing through eighth cervical (C-8) segment showing a chromatolysed cells (CH) in dorsolateral (DL) and Retrodorsolateral (RDL) column of ventral grey horn. Thionine stain X100. DL = Dorsolateral column, RDL = Retrodorsolateral column

Fritz et al. in cat who found that the median nerve motor neurones occupied a single representation area in seventh cervical segment whereas in present study we find the two representation area in seventh cervical segment.²³ In eighth cervical and first thoracic segments two median nerve



Figure–4: Photomicrograph of a part of transverse section of spinal cord passing through first thoracic (T-1) segment showing a typical chromatolysed cell (CH) in Retrodorsolateral (RDL) column of ventral grey horn. Thionine stain X100. RDL = Retrodorsolateral column

representation area were found by the Fritz et al. whereas in present study we find two representation area in eighth cervical segment and one representation area in first thoracic segment.

Jenny and Inukai in monkey found that the motor neuron somata of median nerve were located in dorsolateral column of eighth cervical and first thoracic segments, whereas in our study we found that the motor neuron somata of median nerve were located in the dorsolateral and retrodorsolateral columns of the eighth cervical and first thoracic segments.²⁴

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. Positions of motor neuron somata of median nerve in different segments of spinal cord of rabbit were as, in dorsolateral (DL) column of fifth (C-5) and sixth (C-6) cervical segments, in dorsolateral (DL) and retrodorsolateral (RDL) column of seventh (C-7) and eighth (C-8) cervical segments and in retrodorsolateral (RDL) column of first thoracic (T-1) segment.

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Is Histopathologic Evaluation of the Dental Follicle a Need of Time???

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ABSTRACT

Introduction: Previous studies have reported that dental follicle associated with third molar may undergo cystic degeneration or neoplastic transformation leading to formation of odontogenic cysts and tumors. The presence of pericoronal pathosis is generally accepted reason for their extraction. "Radiographic pathology" is define as a Pericoronal radiolucency measuring about 2.5 mm or larger in any dimension. The aim of the study was to evaluate Histopathological changes in Dental Follicle associated with Impacted Mandibular Third Molar.

Material and Methods: This study was conducted in Department of Oral and Maxillofacial Surgery between February 2014 and May 2014, total 50 patients were included in this study aged between 17 to 50 yrs age, out of which 29 males and 21 females who were undergone surgical removal of impacted mandibular third molar showing pericoronal radiolucency less than 2.4 mm. The dental follicle were detached from teeth carefully and sent for histopathological evaluation to the Department of Oral Pathology. The types of pathological changes were recorded based on histopathological report.

Results: Out of 50 patients studied, the results obtained from histopathological reports showed that incidence of chronic nonspecific inflammation (58%), incidence of normal dental follicle (28%) while incidence of cystic changes showed (14%)

Conclusion: Considering the significant incidence of pathological changes in dental follicular tissue, histopathological evaluation of dental follicle is routinely required to prevent any pathological changes in future.

Keyword: Tooth Germ; Dental Follicle; Follicular space; Tooth Extraction; Oral Surgical Procedures; Third molar.

in oral cavity. Removal of impacted mandibular third molar is common procedure performed in oral surgery. Indications for removal of third molar have generated much discussion in dentistry. Some clinicians advocate prophylactic removal before pathologic changes develop while others propose observation and periodic monitoring.

Third molar impaction is a major problem in dentistry. Figures ranging from 9.5% to 39% have been quoted in different populations worldwide. In the Asian Indian population the most common position of impacted third molar is vertical (42%) followed by mesioangular (31%), distoangular (27%) and rarely horizontal.¹³ The development of impacted third molars normally spans several years and, problems often develop gradually. Nevertheless, these gradual changes can cause sudden and severe pain, discomfort, pericoronitis, headache and swelling. Some type of pathologic changes like dentigerous cyst, internal resorption, caries, periodontal ligament damage, bone loss distal to second molar and pressure resorption of second molar can be expected eventually in approximately 12% of impacted third molar population and 1.82% of the general population over sustained period of time.¹⁴ The pathologic changes are common in mandibular third molar (8%) compared to maxillary third molars (5.2%). While not every impacted third molar actually causes clinically significant problem, each has a potential.¹⁵

This research includes histopathological evaluation of the dental follicle after mandibular third molar surgery; we have included 50 patients with unilateral impacted or partially erupted mandibular third molar in age group 17 to 50 years showing pericoronal radiolucency less than 2.4mm. After surgical removal of mandibular third molar, dental follicle was carefully detached from teeth and kept in 10% formalin solution and sent to Department of Oral pathology and microbiology for histopathological evaluation.

Numerous justification for and against prophylactic extraction of asymptomatic impacted third molar had been offered in the past leading to confusion in the mind of practitioners. Numerous studies with conflicting results were conducted on potential of follicular tissues to undergo

INTRODUCTION

Dental follicle originates from odontogenic ectomesenchyme, is part of the tooth germ and is physiologically involved in the formation of cementum, the periodontal ligament, and alveolar bone. Once the tooth has fully developed inside the jaw, the coronal part of the follicle is termed dental/pericoronal sac or follicle and occasionally persists adjacent to the crown of unerupted or impacted teeth.¹ It is composed of fibrous connective tissue and frequently contains epithelial residues of odontogenesis, which could be the starting point of pathology.²⁻⁴ Radiographically, it appears as a thin pericoronal radiolucency considered normal by some authors when it is less than 3mm thick^{5,6} and by others when it is no thicker than 2.5mm.⁷ Apart from its important role in eruption physiology, previous studies have reported that the dental follicle may undergo cystic degeneration and/or neoplastic transformation.² Recent studies have reported pathological changes in dental follicle of up to 2.5mm.^{2,8-12} Mandibular third molar are most commonly impacted teeth

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pathological alteration.¹⁶ Hence, this study aimed to evaluate the histopathologic changes in dental follicle associated with impacted mandibular third molars.

MATERIAL AND METHODS

50 patients who met the inclusion and exclusion criteria were randomly selected from the OPD in Department of Oral and Maxillofacial Surgery between February 2014 and May 2014. The Ethical clearance was obtained from ethical committee in January 2015. Out of the total 50 patients included (based on inclusion and exclusion criteria), 29 were males and 21 were females who underwent surgical removal of impacted mandibular. A written informed consent was taken from the patient before performing Surgical procedure.

Inclusion criteria

Healthy patient in age group 17 to 50 years.
Pericoronal radiolucency should be less than 2.4 mm.

Exclusion criteria

Medically compromised patient.
Pericoronal radiolucency > 2.4 mm.
The dental follicles were detached from teeth carefully and were kept in 10% formalin solution and sent for histopathological evaluation to the Department of Oral Pathology. The types of pathological changes were recorded based on histopathological report.

RESULT

A total of 50 dental follicles were histopathologically evaluated. The age of these patients ranged from 17 to 50 years, 29 of them being male patients and 21 female. The results obtained from histopathological reports showed that incidence of chronic nonspecific inflammation (58%), incidence of normal dental follicle (28%) while incidence of cystic changes showed (14%).

On comparison of age group affected by impacted teeth between male and female $t = 4.771$ and $p < 0.0001$ (extremely significant). Thus female with younger age have greater incidence of impacted mandibular third molar (Table-1).

Out of 50 cases 32 cases were of impacted 38 out of which 16 were male and 16 were female and 18 cases of impacted 48 out of which 13 were male and 5 were female patients. $p = 0.2188$ (not significant) chi square value = 1.512 Thus both sides are equally affected.

To determine the mean follicular size ranging from 1 to 2.4 mm following test were done to find any significant radiographic follicular size. For 38 male to female comparison $t = 0.5842$, $p = 0.5634$ (not significant). For 48 male to female comparison $t = 0.5842$, $p = 0.0932$ (not significant) Male comparison $t = 0.6496$, $p = 0.5215$ (not significant). Female comparison $t = 2.029$ $p = 0.0568$ (not significant). For all male to female comparison $t = 1.06$ $p = 0.2942$ (not significant). Overall comparison between 38 and 48 $t = 1.410$ $p = 0.1650$ (not significant). Thus there was no significantly comparable radiographic follicular size (Table-2).

$p = 0.4137$ (not significant) chi square = 1.765
The results obtained from histo-pathological reports showed that incidence of chronic nonspecific inflammation in 29 cases (58%), incidence of normal dental follicle in 14 cases (28%) while incidence of cystic changes in 7 cases (14%). p

= 0.4137 (not significant) chi square = 1.765. thus there was no significant cystic changes (Table-3) (Figure-1)

DISCUSSION

The presence of pericoronal pathosis is generally the common reason for the removal of third molars. Pericoronal space surrounding the impacted third molar may represent either a normal or an enlarged dental follicle but alternatively may represent a pathologic entity most commonly a dentigerous cyst.¹⁷

Several studies have suggested that the follicular tissue associated with these teeth may have the potential for transforming into cystic and/or neoplastic lesions. Various pathological changes like odontogenic keratocyst, dentigerous cyst, calcifying epithelial odontogenic cyst, odontogenic myxoma etc have been reported.¹⁶ However many of these changes are not detectable during clinical or

Age	Male	Female
Minimum	24	19
Maximum	49	47
Mean	35.79	28.09
Standard Deviation	73.50	7.236
$t = 4.771$ $p < 0.0001$ (extremely significant)		

Table-1: comparison of age between male and female

Impacted Tooth No.	Mean±Standard Deviation of Radiographic Follicular Size		Total
	Male	Female	
38	1.268+0.020	1.231+0.518	1.25+0.1796
48	1.223+0.169	1.08+0.083	1.177+0.162
All	1.274+0.188	1.195+0.516	1.224+0.1756

Table-2: Mean radiographic follicular size ranging between 1mm to 2.4mm

Histopathological Diagnosis	Impacted Tooth No.		Total
	38	48	
Chronic nonspecific inflammation	18	11	29
Normal Dental follicle	8	6	14
Cyst	6	1	7

Table-3: Histopathological diagnosis

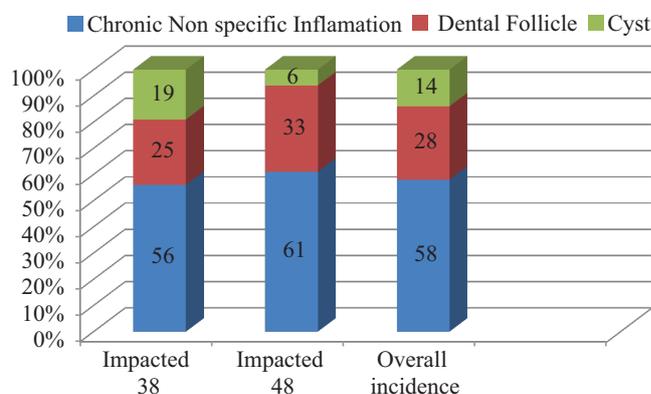


Figure-1: Incidence of chronic nonspecific inflammation, dental follicle and cyst associated with impacted 38, impacted 48 and overall incidence

radiographic examination while they may be found through microscopic analysis. Hence, histopathological evaluation of dental follicle is mostly recommended to evaluate the various cystic changes associated with impacted third molars.

In this study histopathological evaluation was carried out of 50 dental follicles from impacted mandibular third molar, which were having radiographic radiolucency less than 2.4mm.

In the present study we analyzed the pathologic changes in both asymptomatic as well as symptomatic cases (showing pericoronitis/chronic irritation).

21 follicles showed odontogenic tissue out of which 14 follicles showed presence of reduced enamel epithelium and underlying connective tissue displayed Odontogenic islands and few areas of ossification, without evidence of cystic lining. These follicles were histopathologically diagnosed as normal dental follicle. While 4 follicles showed presence of 2-3 cell layers of flattened cells, with connective tissue showing odontogenic islands in fibro cellular stroma, diagnosed as dentigerous cyst. The remaining 3 specimens showed presence of epithelial lining of stratified squamous type arranged in arcading pattern, underlying connective tissue showed presence of chronic inflammatory cell infiltration in fibro cellular stroma, diagnosed as radicular cyst.

In this study we found 7 cases of cystic changes out of which 4 cases were reported as dentigerous cyst while 3 cases seen as radicular cyst. Out of 50 cases studied, 29 cases showed chronic nonspecific inflammation suggestive of presence of inflammation in pericoronal region. 14 cases were showing normal routine dental follicle.

Previous similar studies conducted showed variable values ranging from the high rate of cystic changes in Rakprasitkul et al (2001)⁸ (58.65% (dentigerous cyst, 50.96%; chronic nonspecific inflammatory tissue, 4.81 %; odontogenickeratocyst, 1.92%; ameloblastoma, 0.96%).) to low as in Monica Yadav et al¹⁶ (2001) study (4.44%).

Comparing the present study with past studies conducted we have intermediate results (14%).

After extraction of impacted tooth, the follicles are normally discarded and not sent for histopathological examination. In view of results in our study we recommend all tissue extracted with impacted teeth should be sent for its histopathological evaluation.

CONCLUSION

Considering the significant incidence of pathological changes in dental follicular tissue, histopathological evaluation of dental follicle is routinely required to prevent any pathological changes in future. We propose more such studies with greater sample size and coupled with immunohistochemical investigations of the same are the need of the hour.

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Herpes Zoster Infection of Maxillary and Mandibular Branch: A Case Report and Current Trends in Management

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ABSTRACT

Introduction: Herpes zoster (HZ), also known as shingles, is a painful vesicular rash resulting from reactivation of the virus that also causes chickenpox. Although shingles is generally regarded as a self-limited condition, it can take several weeks to resolve and has the potential for development of complications such as post herpetic neuralgia (PHN) which presents a great challenge to clinicians. The pain, however, may persist for months, even years. Post herpetic neuralgia often described as an intense burning, itching sensation.

Case report: Here we have described a case of herpes zoster of maxillary and mandibular division of trigeminal nerve involving left side of hard and soft palate, oropharynx, buccal mucosa, left dorsal and ventral surface of the tongue, floor of the mouth, alveolus, buccal vestibule and labial vestibule. We also have described the most effective conventional treatment options currently available.

Conclusion: Many treatment options are available, but all of them offering variable levels of efficacy. Conventional therapies include prescribing antivirals, corticosteroids and analgesics, anti-inflammatory agents, physiotherapy and nerve block injections.

Keywords: Herpes Zoster, Trigeminal nerve, Neuralgia induced cavitation osteonecrosis.

INTRODUCTION

Herpes zoster (HZ) is a painful vesicular rash resulting from reactivation of Varicella Zoster virus (VZV) which causes chicken pox. Oral and facial lesions result from Herpes Zoster of the trigeminal nerve. Shingles is regarded as a self limiting condition. However, in patients of Herpes zoster, sometimes unnecessary tooth extraction and endodontic treatment is carried out due to the incorrect diagnosis. Development of complications such as post herpetic neuralgia, corneal scarring and blindness due to involvement of ophthalmic branch are the challenges to physician. A thorough knowledge of herpes zoster will prevent unnecessary and delayed treatment of the patients.

HZ is more commonly known as shingles, from the Latin *cingulum*, for “girdle.” This is because a common presentation of HZ involves a unilateral rash that can wrap around the waist or torso like a girdle. Elder and those with compromised immune response – such as those who have undergone organ transplantation or recent chemotherapy for cancer, or individuals with HIV/AIDS – are at greater risk for developing HZ. VZV is one of eight known herpes viruses that infect humans (Table 1).¹ Primary infections are clinically identified as Varicella or chickenpox. VZV is ubiquitous and highly contagious, with initial exposure typically occurring during childhood. The virus enters the host via the respiratory system, replicates at an undefined site (presumably the

nasopharynx), infiltrates the reticuloendothelial system, and eventually makes its way into the bloodstream.²

CASE REPORT

A 43 year old patient reported with a chief complaint of pain in the lower left side of the face since 3 days. Pain was severe and continuous in nature which was aggravated on eating or speaking with no relieving factors. It was radiating till the left ear and lip region. Patient visited doctor for the same and took medicine but got no relief. Patient also gave history off ever since 4-5 days. Patient gave previous history of malignancy in rectum 2 years back and had undergone treatment for the same. On extraoral examination, unilateral diffuse multiple vesicular lesions were present on the left side of the face extending from left temporal region up to lower border of the mandible, but not crossing the midline. Lesions were also present on the left ear and crustations were present on temple region, left ear and left side of the chin. Edema with crustations was present on the left side of lower and upper lip which was tender on palpation.

On intraoral examination, diffuse multiple unilateral ulcerations of varying size were present on left side of hard and soft palate, oropharynx, buccal mucosa, left dorsal and ventral surface of the tongue, floor of the mouth, alveolus, buccal vestibule and labial vestibule. The overlying surface of ulcers were covered with slough (Fig-1).

Prodromal symptoms, ulcers and vesicles not crossing the midline, segmental distribution, absence of any dental pathology led to a diagnosis of herpes zoster of maxillary and mandibular division of trigeminal nerve. Patient was given Acyclovir (800mg 5 times daily for 7 days) which showed excellent response (Fig-2).

DISCUSSION

Herpes zoster is a sporadic disease with an estimated life time incidence of 10-20%. The incidence of herpes zoster is up to 15 times high in patients with HIV than in non-

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HIV patients and as many as 25% of Hodgkin's lymphoma patients develop HZ. Herpes zoster is the reactivated form of Varicella Zoster virus, the same virus which is responsible for chicken pox.

Varicella zoster virus is responsible for two common infectious diseases: chicken pox and shingles. Chicken pox is the primary infection and after the initial infection the virus remains dormant until there is reactivation that may occur several decades later. The subsequent reactivation is Herpes Zoster Infection.²

Typically Herpes Zoster begins with a prodrome of headache, photophobia, malaise, shooting pain, paresthesia, burning and tenderness along the course of affected nerve. Unilateral vesicles on an erythematous base appear in clusters, chiefly along the course of affected nerve giving the characteristic clinical picture of single dermatome involvement.

HZ presenting with pain and unilateral vesicles and the diagnosis is straight forward. It is a diagnostic dilemma during the prodromal period when there is absence of lesions. Occasionally HZ may occur with pain along the course of the nerve but without the appearance of dermatome lesions, a condition known as *Zoster Sine Herpete*, which again is a diagnostic problem.³

Herpes zoster can spread via direct contact with an infected person. Virus infects the cells of the respiratory tract or conjunctival epithelium and is carried through the body via the blood stream and lymphatic system. It is then spread from the capillary epithelium to the epidermis where the viral replication destroys the basal cells.⁴

The prodromal stage where there is absence or no signs of vesicles or ulcers, may lead to incorrect diagnosis of pulpitis which again can lead to unnecessary endodontic treatment. HSV infections appear in a similar fashion and if localized and mild, it may be mistaken for HZ infection. Culture can be done to differentiate between herpes zoster and herpes simplex infection. Other blistering or ulcerative disease like pemphigus or pemphigoid are chronic and do not present unilaterally.⁵

Oral and facial lesions result from HZ of trigeminal nerve (V). Involvement of the first division of trigeminal nerve V1 (ophthalmic) lead to lesions on the upper eyelid, forehead and scalp; lesions on the midface and upper lip with second division V2 (maxillary); lesions on the lower face and lower lip with third division V3 (mandibular) involvement. V1 involvement may occasionally lead to acute retinal necrosis and should be managed by an ophthalmologist.⁶ With involvement of V2, patient experience a prodrome of pain, burning and tenderness on the palate or gingiva on one

side followed by appearance of painful, clustered 1 to 5mm ulcers. Involvement of V3 results in ulcers of tongue and mandibular gingiva. Oral soft tissue vesicular eruptions are more persistent and lesions extend more frequently into the underlying bone causing osteonecrosis and tooth exfoliation especially in immunocompromised patients.⁴

20% of the cases of herpes zoster infect the trigeminal nerve; therefore oral physicians should have a thorough knowledge about the presentation of this condition, its treatment and the possible complications. The most common oral complications associated with this condition are post herpetic neuralgia, facial scarring, and osteonecrosis of the underlying jaw bone (NICO-neuralgia induced cavitation osteonecrosis) and exfoliation of teeth and in cases with ophthalmic involvement may lead to blindness.

Direct microscopy-stained smears from the base of the early vesicles show multinucleated giant cells and type A intranuclear inclusion bodies. Diagnosis of HZ can be confirmed by viral culture, direct immunofluorescence assay and PCR technique.

Viral culture is possible but VZ virus is labile and difficult to recover from swabs of cutaneous lesions. A direct immunofluorescence assay is more sensitive. PCR is useful for detecting VZ virus DNA in fluid tissues.⁷

The objective of conventional therapy is to accelerate healing of the lesions, reduce the accompanying pain and prevent complications. Medications include antiviral agents, corticosteroids, analgesics NSAIDs and tricyclic antidepressants.

Antiviral agents: Although multiple clinical investigations have demonstrated efficacy in reducing both duration of the rash and severity of the associated pain, benefit has been demonstrated in patients receiving treatment within 72 hours after onset of the rash. Efficacy in preventing post herpetic neuralgia is not as definitive as studies showed only moderate benefit in reducing its development. Three most common antiviral agents used are Acyclovir, Valacyclovir and Famciclovir. These medications are generally well tolerated with some common side effects like nausea, abdominal pain, headache and vomiting. The recommended dosages of antiviral agents used in the management of herpes zoster infection are given in table 2.

Corticosteroids: They are commonly been used for pain management in HZ, although clinical trials have showed inconsistent results for reducing the development of post herpetic neuralgia.

Analgesics and NSAIDs: Individuals with mild to moderate

Human Herpes Virus	Commonly Associated Diseases
Herpes Simplex, type 1 (HSV -1)	Herpetic oral lesions
Herpes Simplex, type 2 (HSV- 2)	Herpetic genital lesions
Varicella Zoster Virus (VZV)	Chickenpox, Herpes Zoster
Epstein - Barr Virus (EBV)	Infectious Mononucleosis
Human Herpes Virus -6 (HHV - 6)	Roseola, Mononucleosis syndrome
Cytomegalovirus (CMV)	CMV Mononucleosis
Human Herpes Virus - 7 (HHV - 7)	Currently not known
Human Herpes Virus - 8 (HHV - 8)	Kaposi's Sarcoma

Table-1: Types of Human herpes virus with associated diseases:



Figure-1: (A) Edema with crustations on the left side of lower lip and upper lip, (B) Unilateral ulcers on the ventrolateral surface of the tongue and on the soft palate, (C) Unilateral ulcers on the dorsal surface of the tongue, (D) Unilateral ulcers on the left side of the hard palate.



Figure-2: (A,B,C,D): Healed lesion on all areas

Medication	Dosage
Acyclovir	800 mg orally five times daily for 7 to 10 days, 10 mg per kg IV every 8 hours for 7 to 10 days
Famciclovir	500 mg orally three times daily for 7 days
Valacyclovir	1,000 mg orally three times daily for 7 days

Table-2: Dosages of Antiviral agents:

pain find satisfactory relief with the use of topical or oral analgesics such as aspirin, acetaminophen or ibuprofen. Several studies have showed that topical aspirin preparations can provide effective temporary relief in case of acute herpetic neuralgia and post herpetic neuralgia. In patients with severe pain, use of narcotics may be indicated. Use of nerve block injections is another option. Local Anesthetic may be injected around the affected nerves provides the pain relief typically lasting 12-24 hours. However the effectiveness of nerve block for reducing or preventing post herpetic neuralgia is questionable.

Tricyclic antidepressants (TCA): Low doses TCAs have been used for post herpetic neuralgia but they require at least 3 months for positive results.

Other Natural options

An underlying goal for employing natural therapies is to strengthen cell mediated immunity thereby allowing the body’s natural defense mechanism to control the virus and prevent recurrence. They effectively manage herpes virus, prevent and treat complication and minimize the risk of developing viral resistance.

Dietary /multiple nutrient effects: When consumed collectively in the form of fruits and vegetables intake showed dose related reduction in the HZ risk.

Vitamin A: An observational trial by High et al demonstrated an association between an increased incidence of hyporetinolemia and increased risk of HZ infection.⁸ Vitamin A functions both as a fat-soluble vitamin and a hormone, contributing to the visual pigment rhodopsin and controlling gene transcription that allows for normal proliferation and differentiation of epithelial cells. Vitamin C, Vitamin E, lysine and zinc have demonstrated potential in the treatment of HZ.

Enzyme therapy: studies have concluded that use of trypsin, chymotrypsin and papain are as effective as acyclovir in reducing pain. No data is available with regard to its effect on post herpetic neuralgia prevention.

Nutritional consideration

Botanicals with specific efficacy for HZ

Capsaicin is of important in the treatment of post herpetic neuralgia because of its effect on C fiber sensory neurons. These neurons release inflammatory neuropeptide such as substance P that mediates neurogenic inflammation and chemical initiated pain.

Licorice is one of the most widely used herbs in traditional medicine. It has an anti inflammatory, mucoprotectant and antiviral activity. One constituent glycyrrhizin inhibits viral growth but when taken orally converted into glycyrrhetic acid with loss of systemic antiviral effect. It can be applied topically and is beneficial in treatment of HZ.

Other treatment options

TENS: (Transcutaneous electrical nerve stimulation)

Use of combination therapy consisting amitryptilline, topical capsaicin and TENS was recommended for the treatment of post herpetic neuralgia over antiviral therapy.⁹

Vaccine

Improved prevention and treatment strategies, including

better vaccines are needed to reduce the disease burden of zoster. ZOSTAVAX or other active or inactive formulations of zoster vaccine can be used. A better understanding of immunologic correlates of protection against zoster would help facilitate the development and evaluation of such new zoster prevention strategies.³

CONCLUSION

Herpes zoster infection leads to various complications in the affected region if left untreated, oral physicians should have a thorough knowledge about this condition, the treatment and prevention of the complications. It can be safely stated that early diagnosis and prompt management of herpes zoster infections can go a long way in reducing the discomfort of the patient and a long term follow up of the patient should also be done to avoid further complications.

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Spontaneous Absorption of Lens

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ABSTRACT

Introduction: Spontaneous absorption of natural lens is rare, although it has been infrequently reported in literature, as far back as two centuries.

Case report: Thirty five year old lady presented with sudden diminution of vision in left eye. Anterior segment OCT revealed absent lens matter with intact capsular bag. Surgery with IOL implantation was done through 2.8 mm incision. Phacoemulsification was not required. So the diagnosis both preoperative and intraoperative was complete absorption of lens.

Conclusion: Absorption of lens is a rare entity, and complete spontaneous absorption of lens with no change in capsular bag is rarest of all. We could arrive at diagnosis confidently with OCT.

Keywords: Spontaneous, absorption, lens, Optical Coherence Tomography (OCT)

INTRODUCTION

Natural crystalline lens is the part of eye which is important for focusing of light rays. It may become opaque, when it is known as cataract. Sometimes the cataractous and very rarely the crystalline lens become absorbed. Absorption can be spontaneous; or it may be associated with conditions like, maternal rubella, leptospirosis, uveitis, PHPV, Hallerman-Streif- Francois syndrome, Down syndrome, morgagnian cataract etc.

Ever since J.C.Saunders (1811)¹ mentioned his possibility of spontaneous absorption of congenital cataract, various authors have presented their own cases or case series. The debate still continues about mechanism of absorption in cases where no cause is found, as in this case. However, completely absorbed lens matter with well preserved capsular bag makes this case unique, as discussed below.

CASE REPORT

A thirty five year old female presented to M.D. Eye Hospital, Allahabad with complain of poor vision left eye for two years. She also had diminution of vision in right eye for last five years for which she underwent cataract surgery elsewhere in right eye two years back. Been informed by the previous surgeon that she is suffering from cataract in left eye as well, she presented to us for cataract surgery in her left eye. No history of trauma, long term medication was present. Birth history and obstetric history were normal.

On examination, eyes were orthophoric with full extraocular motility. Uncorrected vision was 6/12P in right eye and FC in left eye. Best Corrected Visual Acuity was 6/6 in right eye (-1.0DC@170 degree) and 6/6P in left eye (+11D/-0.75 DC@180 degree) respectively. This was quite surprising to us. Intraocular pressures were 14.1 and 17.3 mm Hg in right and left eye respectively.

Slit lamp examination of right eye revealed pseudophakia with SICS surgery. In left eye lens was not visible, only two membranes in apposition were seen. No signs of trauma, surgery or uveitis were seen. Fundus examination was unremarkable both eye.

Clinical diagnosis which seemed probable was spontaneous absorption of lens. Full blood count, blood sugar, ESR, serum electrolyte and creatinine were normal. TORCH titre was significantly positive. Anterior segment OCT (Fig.1) revealed anterior and posterior capsules of lens were well in apposition with no signs of lens in between. Rest of the anterior segment OCT was normal.

IOL power calculation was done in aphakic mode. Surgery was planned. Initial steps were the same. Rhexis (Fig.2) was completed. There was no need for hydrodissection. We performed irrigation aspiration which revealed few cortical fibers superiorly (Fig.3). Implantation of foldable IOL was done with a well centered lens at the end of surgery (Fig.4). She was followed up on day 1, 7, 15 and 30. Uncorrected vision at 1 month was 6/9. Refraction at 1 month revealed +0.5DS/-1.0DC@180 degrees with 6/6 vision. Thereafter we followed her at month two. But then we lost to follow up.

DISCUSSION

J.C. Saunders in 1811 first mentioned the possibility of spontaneous absorption of congenital cataract.¹ But it hardly gained any recognition till the first case report was made by Warnatz (1835).¹ Ruess (1900)¹ presented review of literature. Pyle (1902)¹ reviewed the literature and proposed a classification. Though a century old, we would like to mention it here.

1. Cases in which there was absorption after spontaneous rupture of anterior or posterior capsules.
2. Cases in which there was spontaneous dislocation of cataractous lens.
3. Cases in which there was intracapsular resorption of the opaque cortex and sinking of the nucleus below the axis of vision, after degenerative changes of morgagnian cataract without rupture of capsule or dislocation of lens.
4. Cases in which there was complete spontaneous resorption of both nucleus and cortex without reported history of rupture of capsule, dislocation or degenerative changes of the morgagnian type.
5. Cases of spontaneous disappearance of incipient cataract without degenerative changes or marked difference in

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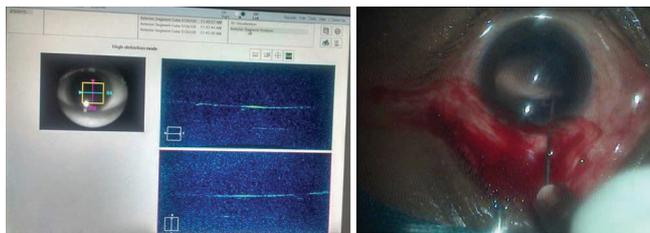


Figure-1: Anterior segment OCT showing anterior and posterior lens capsules adjacent to each other. Nucleus absent; **Figure-2:** Capsulorrhexis



Figure-3: Aspiration of cortical fibers at 12 O'clock; **Figure-4:** Well centered IOL

refraction.

Individual case reports of spontaneous lens/ cataract absorption were made by several authors in various scenarios e.g. Trousseau (1901) in acute glaucoma, Vancea (1932) in persistent pupillary membrane and Geiser in PHPV.¹ Congenital rubella cases showing same were reported by Ehrlich, Black, Delthil and Delthil, Weiss and Boger et al.¹ Blaise et al reported it in phacolytic glaucoma,² whereas Rathinam et al widely studied it in leptospiral uveitis.³ Certain syndromes have also been associated with spontaneous absorption of lens, Down syndrome⁴ and Hallermann – Strief – Francois syndrome.^{5,6} Mechanism of spontaneous absorption of lens is believed to be different in different cases. Vancea¹ considered the absorption secondary to various complications, injury to lens capsule being one of them. Duke Elder proposed that an unrecognizable tear of capsule is probable in many cases.¹ Osmotic changes due to chemical changes on either side of lens capsule are undoubtedly of great importance. No mechanisms have been proposed for post-uveitis cases^{7,8} or those associated with syndromes.⁴⁻⁶

Hence the literature has plethora of cases being termed spontaneous. But Webster's dictionary defines it as," Proceeding from or acting by internal impulse, energy, or natural law, without external forces; self acting."⁸ As is seen in our case, with no preceding history of trauma, ocular or systemic disease, or long term medication.

History of diminution of vision is of five years only (patient being thirty five years old). Nystagmus was absent. Postoperative vision with refractive correction was 6/6. This indicates that the problem was not of congenital origin. Anterior and posterior capsules were intact, and no breaks were seen either in OCT or during surgery. Nucleus was totally absent and fine traces of cortical matter were present. To the best of our knowledge, this is the first case of its type. Hence worth reporting.

CONCLUSION

The world is full of God given surprises. Anything which does not look like a routine case should be thoroughly investigated. Like OCT in this case was very helpful in making the diagnosis and the intraoperative findings matched it. A patient who develops sudden diminution of vision with aphakia could be due to dislocation of lens, or very rarely due to spontaneous absorption of lens.

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Clinical vs Bacteriological and Mycological Evaluation in Chronic Suppurative Otitis Media

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ABSTRACT

Introduction: Chronic suppurative otitis media is defined as an infection of the middle ear that lasts more than 3 months and is accompanied by tympanic membrane perforation. The disease is more common in children belonging to lower socioeconomic group. Most common microorganisms found in chronic suppurative otitis media are *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Escherichia coli*, *Aspergillus* species and *Candida* species. The aim of our study is to evaluate the prevalence of CSOM, to evaluate the different type of bacteria and their relative percentage, to evaluate different fungal element and relative percentage, to evaluate the clinical manifestations and correlate them with causative organism.

Material and methods: 90 cases with ear complaints taken and from them clinically diagnosed cases separated which includes safe and unsafe type. All patients undergone for pus culture and sensitivity testing, fungal identification and associated pathology of nose and throat.

Result: On the basis of study of 90 patients we concluded that maximum age of incidence between age group of 20-29 years 34.4%. Male patients were found to be more than female patients. Cases of safe CSOM are more than unsafe CSOM. Commonest organism to be isolated was found to be staph aureus in both safe and unsafe organism. *Aeromonas* was isolated from unsafe CSOM. There was only a single isolate. Commonest fungus to be isolated was *Aspergillus niger*.

Conclusion: Mixed flora organism are associated with chronic suppurative otitis media and they were closely related to the diseases of nose and nasopharynx.

Keywords: bacteria, fungus, safe and unsafe CSOM

INTRODUCTION

Chronic suppurative otitis media is defined as chronic or persistent inflammation of middle ear mucosa (>3 month in duration). On otoscopic examination there may be persistent fluid behind perforated tympanic membrane. Incidence of chronic suppurative otitis media (CSOM) is more common in Eskimos, American Indians and Indigenous population of Alaska, poor living conditions, overcrowding and poor hygiene and nutrition. The infection of middle ear mucosa is caused by different bacteria and fungi. In pre-antibiotic era conditions were associated with fatal complications. More understanding pathophysiology proved role of immunity and eustachian tube dysfunction in CSOM. In immunocompromised individuals problems with more atypical organism is common.

It is often mentioned that a culture of the discharge from an infected ear reveals usually a mixed infection. Culture from CSOM rarely gives a single organism. One fluid may contain so many organisms that it is often difficult to pick out the original offender (Fowler 1948)¹ Ersner and Alexander²

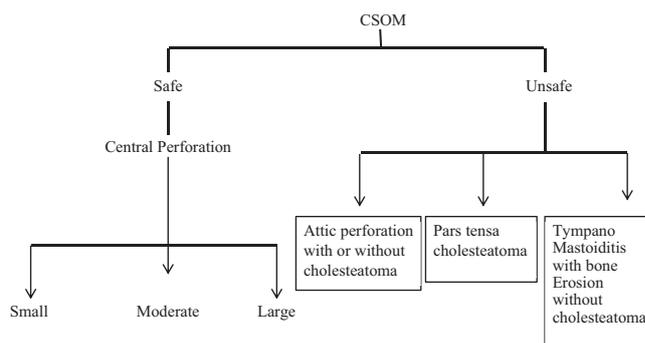
also subscribe to the view of the effect. In (Lakshampati et al³) large variety of organism could be cultured from the suppurating ears. But 46.2% yielded a single organism, 53.8% showed multiple organisms. Fowler (1948 stated that culture from CSOM rarely gives a single organism. One finds so many organisms that it is often difficult to pick out the original offender.¹

Interestingly the incidence of otomycosis was found significantly higher in females in a study in North Iraq. The common factor among these house wives was mainly attributable to fungal spores being present in house dust (Yehia et al 1950⁴)

MATERIAL AND METHODS

Study population: From the total patient attending ENT OPD of MLB Medical College, Jhansi between February 2014 to December 2015, all cases with ear complaints were taken and from them clinically diagnosed cases of CSOM were separated, which includes both safe and unsafe type. From total CSOM cases 90 patients were randomly selected for study. After taking detail informed consent and ethical approval by ethical committee, detailed history regarding patient's name, age, sex and nature of discharge was taken. All the patients were taken with discharging ears of more than 3 months of duration. After collection of ear swab a local examination was done regarding the type of ear pathology and associated pathology in nose and throat. Examination of ear, nose and throat by otoscopy, otomicroscopy, diagnostic nasal endoscopy, laryngoscopy.

All cases of CSOM were divided into safe and unsafe.



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Criteria for adenoid hypertrophy

- + Midline in nasopharynx
- ++ Midline+Extend to fossa of rosenmuller
- +++ Midline+extend to fossa of rosenmuller +50% obstruction of posterior nasal airway
- ++++ Midline+extend of fossa of rosenmuller+>50% obstruction of posterior nasal airway + Eustachian tube block

Criteria for tonsillar hypertrophy (Brotsky, Moore⁵)

tonsil do not impinge an airway

- 1+ <25% of airway obstruction
- 2+ 25% to 50% airway obstruction
- 3+ 50% to 75% airway obstruction
- 4+ >75% of airway obstruction

Criteria for amount of ear discharge- Scanty (mild)

-When swab is introduced close to tympanic membrane and becomes wet, Moderate - Pus can be seen in deep ear canal, Severe (profuse) -When pus is coming out of ear canal, soiling of pillow or running down on the neck.

Criteria for hearing loss (Quantitative)

- 0-25dB - Normal hearing for all practical purposes
- 26-40dB - Mild deafness
- 41-55dB - Moderate deafness
- 56-70dB - Moderate severe deafness
- 71-90dB - Very severe deafness
- >90dB - Profound

Processing of samples: The swab so collected were immediately inoculated into sturats transport medium and were transfered to the department of microbiology (MLB Medical College, Jhansi) for further processing. In the laboratory subcultures were made from the sturats medium into blood agar, MacConkey's medium and glucose both. All these were inoculated over night at 37°C in atmosphere of 5-10% CO₂ for 24-28 hours. The plates were observed for type and extent of growth (scanty, moderate and heavy). The bacteria were identified by colonial morphology, grams staining, catalase test, oxidase test and other biochemical reactions. The tests were done only for aerobic bacteria.

For the fungal isolate aseptic precaution were to collect debris and scraping sample from out ear, either by sterile swab, by sterile forceps, or by syringing with sterile saline. Direct microscopic 10% KOH examination of specimen was preformed to determine the presence or absence of fungal element (hyphae, spores and blastospores). Specimens were also cultures on Saborisaud's dextrose agar (SDA) plain and SDA with chloramphenicol (0.05mg/ml) and incubated at 25°C and 37°C. The media was checked as long as 4 weeks before no growth was declared.

RESULTS

The study consists of total CSOM cases seen in ENT OPD of MLB Medical College, Jhansi between February 2014 to December 2015. Total no of patients with ear complaint was 44% and out of them prevalence of CSOM case are 11.2%. Out of them 90 cases were randomly taken for further study as described under materials and methods.

In the present study no of males affected were found to be more than the females. Over all male to female ratio was

found to be 1.4:1. Total no of cases with safe CSOM were 1484 (80%) and total no unsafe CSOM were 364 (20%) (Table-1)

In our study maximum no of patients were in age group of 20-29 and 30 to 39 years.(Table-2)

In present study out of 90 patients taken 52 males and 38 females with clinical difference of 60 safe CSOM 30 unsafe CSOM. This show that cases of safe CSOM were found to be more than cases of unsafe CSOM. The overall male and female ratio of the patient under study was 1.42:1 (table-3 and 4).

Commonest organism identified in this study was staph aureus followed by Proteus mirabilis. (Table-5)

Commonest fungi found in the study were A. niger 44% followed by A. fumigatus 28%. 8% case of Rhizopus, candida and in about 4% cases A. flavus, Cladosporium and Mucor were isolated.(Table-6).

Most of the cases showed pure culture that is single bacterium. In the case of no growth cases containments were also included (Table-7).

Out of 90 cases 54 case of CSOM were associated with DNS, sinusitis, tonsillar hypertrophy and adenoid hypertrophy which were 60% of total cases taken for study (Table-8).

Hearing loss is associated with 79 patients i.e. 87% cases and 11 cases did not have any hearing loss. In our study hearing loss were mostly associated with Staph aureus infection (Table-9).

No specific bacteria seen with type of perforation, polyp, granulation tissue and ossicular chain disruption in our study.

Sex	Safe		Unsafe		Total	
	No.	%	No.	%	No.	%
No. of Male	878	47.5	201	10.8	1079	58.38
No. of Female	606	32.8	163	8.8	769	41.6

Table-1: Sex incidence with clinical difference

Age range (In years)	Total No. of patients
1-9	7
11-19	11
20-29	31
30-39	25
40-49	11
50-59	3
60-69	2
70-79	-

Table-2: Age distribution of cases under study

Sex	No of cases	Percentage
Males	52	57.7%
Females	38	42.2%
Total	90	100%

Table -3: sex distribution of cases under study

Type of CSOM	No	Percentage
Safe CSOM	60	66.6%
Unsafe CSOM	30	33.3%
Total no. of patients	90%	100%

Table-4: Differentiation of CSOM patient

Bacteria isolate	No. of safe CSOM	%	No. of unsafe CSOM	%
Staph aureus	21	35%	8	26.6%
Proteus mirabilis	16	23%	4	13.3%
Pseudomonas aeruginosa	11	18%	4	13.3%
Pseudomonas putida	7	12%	2	6.6%
Klebsiella	2	3%	1	3.3%
beta Haemolytic streptococci	4	6.6%	-	0%
Alkaligenefaecalis	1	1%	2	6.6%
E. coli	2	3%	1	3.3%
Aeromonas	-	0%	1	3.3%

Table-5: Different bacteria in CSOM patient

Fungi	Number	Percentage
Aspergillus niger	11	44%
Aspergillus fumigatus	7	28%
Aspergillus flavus	1	4%
Rhizopus	2	8%
Mucor	1	4%
Cladosporium	1	4%
Candida	2	8%
Total	25	100

Table-6: Fungal isolates from CSOM patients under study

No of bacterial and fungal isolate	No of patients
1 bacterium	72
more than 1 bacterium	8
without any bacterium	10
only fungus	6
fungus and single bacterium	18
fungus and more than 1 bacterium	1

Table-7: No of bacterial and fungal isolates per patient

DISCUSSION

Mawson (1963) described that *B. proteus* and *Pseudomonas pyocyanous* do not normally inhabit the upper respiratory tract and their emergence in chronic infection of middle ear can't be ascribed to a primary derivation from Eustachian route.⁶ It seems certain that they are predominantly secondary invaders from external auditory meatus gaining access to middle ear via a defect in tympanic membrane resulting from an acute episode of otitis media. Interestingly the incidence of otomycosis was found significantly higher in females in a study in North Iraq. The common factor among these house wives was mainly attributable to fungal spores being present in house dust (yehia et al 1990).⁴ Factor present in external auditory canal such as moisture, warmth and some protein and carbohydrates fulfill the requirement of many fungi and bacteria to grown and flourish (Conley 1948).⁷

Sengupta et al in their study of 125 cases of otomycosis found a significant increased due to the use of antibiotics ear drops. Poor living conditions, overcrowding and poor hygiene and nutrition's have been suggested for widespread of prevalence of CSOM in developing countries. In our study maximum no of patients were in age group of 20-29 and 30-39 years. In study conducted by Indudharan et al⁸, 69.3% of patients were less than 20 years and patient's age ranged from from 6 month to 78 years (table-2). Okafar et al⁹ studied 386 patients in which 33.2% patients were age group 11-20 years a sharp fall in incidence was observed after the age of 20. Gulati et al¹¹ showed that incidence of CSOM was maximum in age group of 0-10 years.

In the present study no of males affected were found to be more than the females. Over all male to female ratio was found to be 1.4:1. In India male and female ratio is more in favour of male gender discrimination at early age prevent from medical attention. This could be due to reason that male are more outgoing and travels more than females and may

that repeated URTI and so on CSOM. Gulati et al¹⁰ showed that 96.3% had central perforation and rest of patient had unsafe variety.

In the present study out of 90 cases a total no of 87 bacterial isolates found from 80 (88.8%) cases and 10 (11.1%) cases did not show any growth and 68 (75.5%) had pure culture in which single bacterium seen, 12 (13.3%) cases had mixed culture (table-7). Obeck we et al (1999) studied 111 isolates 49 were pure culture (44%), 34 were mixed (33.3%) and 19 (18.6%) no growth was recorded. Aslam et al 2004 studied 142 samples out of which 108 (76%) were pure cultures and 34 were mixed, the high rate of pure culture in our study may be due to anaerobic culture not done.

In the present study the commonest bacterials isolated was staph aureus 36% followed by proteus mirabilis 25%, *Pseudomas aeruginosa* 15% *Pseudomonas putida* 11%, *Klebseilla* 4%, alfa Hemolytic streptococci 5 %, Alkaline faecalis 4% and *Aeromonas* 1 %. Commonest fungi found in the study were *A. niger* 44% followed by *A. fumigatus* 28%. 8% case of *Rhizopus*, candida and in about 4% cases *A. flavus*, *Cladosporium* and *Mucor* were isolated (Table-6). Table 8 shows that 54 (60%) patients were associated with DNS, 28.8% with chronic sinusitis, 20% with adenotonsillar hypertrophy and 4.4% with chronic tonsillitis. Most common organism associated with this pathology was Staph aureus followed by *Pseudomonas aeruginosa*, proteus, alfa haemolytic streptococcus, *Klebsiella*, *E. coli* in decreasing order.

Table 9 shows that 87.7% patients have conductive hearing loss irrespective of bacterial isolates. Khan et al suggest hearing loss is not associated with any bacteria but with duration of disease and its complications. Table 10 in our study shows that patients also presents with other symptoms like otalgia 22%, vertigo 10%, tinnitus 9%, headache 10% and facial palsy in 1% cases there are no specific bacteria significantly related. These symptoms were generally seen patients with discharge of longer duration or associated with the fungal infection or cholesteatoma. Facial palsy seen in

Bacterias	DNS	Sinusitis	Chronic tonsillitis	Adeno tonsillar hypertrophy	Total	%
Staph aureus	8	6	2	3	19	21.1%
Proteus mirabilis	4	3	—	1	8	8.8%
Pseudomonas aeruginosa	6	3	1	1	11	12.2%
Pseudomonas putida	3	2	—	—	5	5.5%
Alfa haemolytic streptococci	2	2	1	1	6	6.6%
Klebseilla	1	1	—	—	2	2.2%
E. coli	2	1	—	—	3	3.3%
Total	26	18	4	6	54	

Table-8: Relation of bacterial isolates from CSOM with associated pathology of nose, nasopharynx, sinuses and oropharynx

Bacteria	Hearing loss				
	Mild	Moderate	Severe	V severe	Profound
Staph aureus	7	16	2	2	-
Proteus mirabilis	3	8	3	1	1
Pseudomonas aeruginosa	4	6	1	2	1
Pseudomonas putida	2	4	2	1	2
Klebseilla	-	1	1	-	-
Alfa haemolytic streptococci	1	1	1	-	-
Alkaline facalis	-	1	-	-	-
E. coli	1	2	-	-	-
Aeromonas	-	1	-	-	-

Table-9: Degree hearing loss vs different bacterial isolate.

Bacteria	Clinical symptoms					
	Otalgia	Vertigo	Tinnitus	Headache	Facial palsy	Itching
Staph aureus	3	4	2	3	-	3
Proteus mirabilis	-	1	-	2	-	-
Pseudomonas aeruginosa	1	2	-	2	-	2
Pseudomonas putida	-	-	2	1	-	-
Klebseilla	1	-	-	-	-	1
Alfa haemolytic streptococci	1	-	1	-	-	-
Alkaline facalis	-	-	-	-	-	-
E. coli	-	-	-	-	-	-
Aeromonas	-	1	-	-	-	-
Aspergillus niger	7	-	2	-	-	10
Aspergillus fumigatus	6	-	-	-	-	6
Candida	1	-	-	-	-	1
Sterile	-	1	1	1	1	-
Total	20	9	8	9	1	23
Percentage (%)	22	10	9	10	1.1	25.5

Table-10: Different bacteria and fungus with rest of clinical symptoms

Author	Year	No. of isolates	Staphylococcus (%)	Proteus Sp (%)	Pseudomonas Aeruginosa	Escherichia Coli (%)	Klebsiella
Palva and Hallstorm ¹¹	1965	100	13	8	24	4	ND
Jokippi et al ¹²	1977	70	19	8	4	7	ND
Ojala et al ¹³	1981	806	22	12.9	19	6.8	3.7
Ibekwa and okafar ¹⁴	1983	62	29	12.9	45.2	ND	ND
Sugita et al	1981	62	6.3	21.1	7.8	ND	1.6
Fliss et al ¹⁵	1992	170	20	ND	84	ND	ND
Zain et al sharreef et al	1997	102	20.7	3.6	22.5	ND	2.7
Mustafa et al ¹⁶	1994	259	16.6	8.4	26.3	5	15
Indudharam et al	1999	497	23.7	7.4	27.8	0.6	3.2
Juen et al	2002	177	43.5	2	28.8	3.4	
Sharma et al ¹⁷	2004	324	30	ND	36.4	ND	ND
Present study	2015	97	36	25	18	4	4

Table-11: Types of aerobic isolate from various studies compared with present study.

1 case and culture was found sterile Fungal infection mostly presents with itching. Bacterial isolates in our study as compared to other study were given in table 11.

CONCLUSION

The current study shows that maximum incidence of CSOM occurs between age group of 20-29 years (34.4%). Male patients were found to be more than female patients with male: female ratio 1.4:1. Cases of safe CSOM are more than unsafe CSOM. Commonest organism to be isolated was found to be staph aureus in both safe and unsafe organism. Aeromonas was associated with unsafe CSOM. No specificity of any clinical presentation can be associated with specific bacteria. Commonest fungus associated with csom was aspergillus niger.

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A Study of Variation of Circle of Willis, in the Adult Population of South India

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ABSTRACT

Introduction: There is insufficient data on the variations of circle of Willis and cerebral circulation in the south Indian population. The aim of the study is to describe the most common variations found in the circle of Willis.

Material and methods: 50 embalmed cadaver brains were studied. The brains were dissected during the routine teaching of MBBS and BDS students. Detailed drawings of the circle of Willis were drawn and the photographs obtained using digital camera. Vernier caliper was used for measuring the length and external diameter of the vessels where they formed part of the circle of Willis.

Results: In 60% of brains, the circle of Willis is complete. The most common anomaly, is the occurrence of abnormal diameter of the arteries, and is found to be most frequent in the PCoA. The second most common anomaly is the absence of the component vessels; the PCoA is again most frequent. An uncommon anomaly observed is, in a brain specimen the right PCA is very thin and is dividing into slender branches after some distance. One of its branches is joining the hyperplastic anterior choroidal artery and the PCoA are absent on both sides.

Conclusion: In the south Indian population variations are in accordance with the literature and there appears to be no difference between races.

Keywords: abnormal arteries and absent arteries, non-classical morphology, hyperplastic anterior choroidal artery

INTRODUCTION

The circle of Willis is formed in the base of the brain, by the branches of both the internal carotids and the vertebral arteries. The arterial circle maintains continuous blood supply to the brain at all times. However, there exist many anatomic variations including different populations, resulting in the variation in the blood supply to the brain.

The normal circle of Willis or the circle of Willis with the classical morphology is the one, whose components include internal carotid arteries of both sides, its anterior cerebral arteries joined by the anterior communicating artery anteriorly and its posterior communicating arteries joining the posterior cerebral arteries.

The most common anatomic anomalies observed in the study are, the abnormal diameter of the vessels and the absence of the component vessels resulting in an incomplete circle or non-classical morphology of circle of Willis. Different studies put the occurrence of normal circle of Willis in the range between 28 to 52% in the different populations.^{1,2}

The anatomic variations could be due to different races of populations is a question raised by Eflekar, Dadmehr, Ansari et al., 2006³ and Nordon DG and Rodrigues Junior OF.⁴ The existing data on the anatomic variation in respect of the south Indian population is insufficient; and this study will

contribute to our current knowledge in anatomical variations between different populations.

MATERIAL AND METHODS

The brains were obtained for the study from the Government Siddhartha Medical College, Vijayawada, south India and other nearby colleges. The study was done during 2004 to 2007 and in 2016 after obtaining ethical approval from the institutional ethical board.

The length and external diameter of the vessels were measured where they formed part of the circle of Willis i.e. the internal carotid between its posterior communicating and anterior cerebral branches, the anterior and posterior cerebrals from their points of origin to the point where they were joined by the communicating artery and the communicating arteries in their entirety.⁵

A caliper, graduated to measure up to 0.02mm was used. The arteries less than 1 mm in diameter were considered abnormal, barring communicating arteries, where less than 0.5 mm diameter was considered abnormal.⁵

The most important anatomic anomalies and variations are studied in detail. The basic criterion for considering the circle as anomalous was being unable to maintain an adequate blood flow, what is defined by Alpers, Berry and Paddison (1959) one in which, blood can circulate from any entrance point and return the same point.⁴

The abnormal arteries and the absent arteries are considered as anomalies as they give rise to incomplete circle of Willis. Other morphological differences which do not result in an incomplete circle of Willis are considered as anatomic variations.

STATISTICAL ANALYSIS

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

RESULTS

Among the brains studied 60% had no abnormal or absent arteries and the circle of Willis is complete. The main anatomic anomalies and variations observed are represented

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Artery	Anatomic variation/ anomaly		Number	%
ACoA	Double	Variation	2	4
ACoA	Abnormal diameter	Anomaly	4	8
ACA	Triple ACA in A2 segment / Accessory ACA generation	Variation	2	4
ACA	Anastomosis with the other ACA	Variation	4	8
Right ACA	Abnormal diameter	Anomaly	1	2
Right PCA	Abnormal diameter	Anomaly	1	2
Right PCA	Thin and dividing into slender branches / Uncommon origin from ICA	Anomaly	1	2
Left PCA	Abnormal diameter	Anomaly	1	2
Right PCoA	Abnormal diameter	Anomaly	4	8
Left PCoA	Abnormal diameter	Anomaly	2	4
Right PCoA	Absent	Anomaly	2	4
Left PCoA	Absent	Anomaly	2	4
Both PCoA	Absent	Anomaly	2	4

Table-1: Showing anatomic anomalies and variations.

in the Table 1.

The most common anomaly in the study is the occurrence of abnormal diameter of the arteries. It is most frequently seen in the PCoA. Out of the six observed (12%), four are present on the right side (8%) and two on the left side (4%). The ACoA is of abnormal diameter in (8%), the PCA has two abnormal arteries one on each side (4%) and ACA has one present on the right side (2%).

The second most common anomaly observed is the absence of component vessels; the PCoA is absent in 12%; both sides absent in 4%, left side absent in 4%, right side absent in 4%. An uncommon anomaly observed in the study is, in a brain specimen the right PCA is very thin and is dividing into slender branches after some distance. One of its branches is joining hyperplastic anterior choroidal artery and PCoA are absent on both sides (Figure-1).

The variations which did not affect the circle and observed in the study include: the ACA has anastomoses between them in 8% (Fig. 2), a third ACA or an accessory ACA generation in A2 segment in 4%, and the ACoA is double in two specimens (4%).

The Table 2 shows the distribution of non-classical morphology observed in the study, which is 40% (100%), and it is found that most of the non-classical morphology existed in the posterior circulation with 75 %; on the right side of brain 50%; in the anterior circulation 25% out of which the median is 20 %.

DISCUSSION

The number of brains with non-classic morphology is 40%. The non- classic morphology according to the literature ranged between 48% -71.7%.^{1,2}

In the anterior circulation, the ACoA is of abnormal diameter in (8%). This is quite significant because according to literature rarely (1%) of the ACoA is aplastic.^{3,6} The ACA has anastomoses between them in 8% with a short fused A2 trunk and one among the ACA is found to be dominant in the A2 segment. A fused short A2 trunk is more commonly found.⁴ In the A2 segment of the ACA, one ACA is found to be dominant and provides blood supply to both hemispheres in its distal aspect of the cerebral hemispheres.⁶ The third ACA or an accessory ACA generation in A2 segment in the study is found in two brain specimens (4%) and is found

Side	Anterior	Posterior	Total
Left	0(0%)	6(30%)	6(30%)
Right	1(5%)	9(45%)	10(50%)
Median	4 (20%)	0(0%)	4(20%)
Total	5(25%)	15(75%)	20 (100%)

Table-2: Showing number of alterations per location. N%.

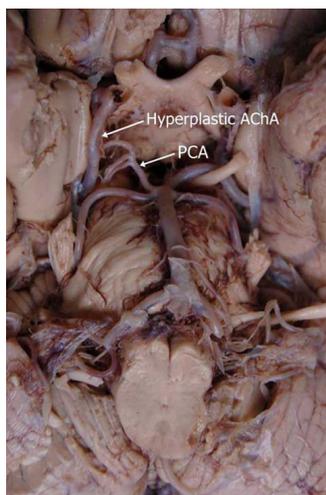


Figure-1: Showing the right PCA dividing into branches and a branch joining the hyperplastic AChA and absence of PCoA on both sides.

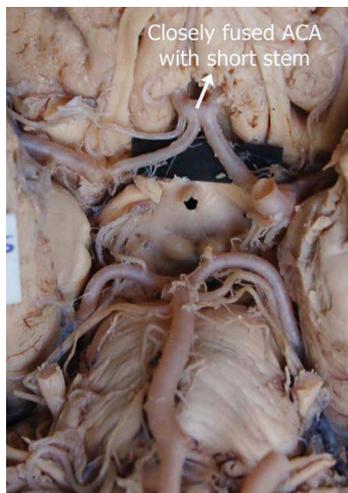


Figure-2: Showing fused ACA with a short stem.

to be originating from the ACoA. This represents our most common finding in the anterior circulation; with 3 cases of “extra ACA”, they were all originated directly from the ACoA.⁴ The ACoA is double in (4%). The ACoA, may be duplicated or differently fenestrated.⁶ Duplications or triplications are most common in the anterior circulation (19%).¹

In the posterior circulation, the abnormal diameter of the arteries is found to be the most frequent in PCoA with (12%). The PCoA are hypoplastic with external diameter smaller than 1mm in 12% to 60% of the cases.³ The absence of PCoA in the study is 12%. The PCoA variations are regarded as the most common variations in brain circulation; they are missing in 10% to 46% of the cases.³

An uncommon anomaly found in the study is in a brain specimen the right PCA is very thin compared to the contralateral side and is dividing into slender branches after some distance. One of its branches is joining the hyperplastic anterior choroidal artery. The normal AChA has potential anastomoses with its neighbouring arteries, especially with the PCoA and PCA.⁷⁻¹⁰ Hyperplasia of the AChA seems to represent a situation in which one of those anastomoses remains and enlarges as a main pathway of the artery, while a segment of the PCA just proximal to the anastomosis eventually attenuates.¹¹ The specimen is illustrated in the Figure-1.

Differences between races

In the study no major differences in the anatomic variations in the south Indian population are found. According to the literature there are no differences between races in the anatomic variations.^{2,3,6} The differences that are reported may have arisen due to differences in the embryonic development of brain and other variable factors which includes the genetic, environment and hemodynamic etc. The origin of variations needs further study by radiology and other noninvasive methods.

CONCLUSION

In the south Indian population, variations in the posterior circulation of the brain are 30% and in the anterior circulation 10%. These result in an incomplete circle of Willis, which has important clinical impact. The variations are more on the right than on the left side of the brain. There seems to be no difference between races.

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Role of Ultrasonography in Thyroid Nodules with Pathological Correlation

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ABSTRACT

Introduction: Thyroid nodules are commonly detected pathology. Ultrasound has emerged as the most useful imaging modality for evaluation of these lesions. The purpose of this study was to identify the accuracy of various imaging features in thyroid nodules that are associated with benignity and malignancy and the overall accuracy of ultrasound in determining malignant nodules.

Material and methods: Fifty seven patients who were referred to our department for ultrasound assessment of thyroid nodules and their pathological findings were available were included in the study.

Results: Out of the 57 seven patients, 25 patients had malignant nodules and 32 patients had benign nodules. Nodules were assessed on the basis of echogenicity, central vascularity, calcification, cystic areas, background thyroid changes and lymphadenopathy.

Conclusion: Ultrasound is a sensitive and specific modality in assessment of thyroid nodules with good overall accuracy. The most sensitive parameter in suspecting malignancy is hypo echogenicity of the nodule, the most specific features are lymphadenopathy and micro calcification.

Keywords: Ultrasound, thyroid, accuracy, micro calcification, sensitivity, specificity.

INTRODUCTION

Thyroid nodules are commonly detected pathology. It is found in 4-8% of patients by palpation and 10-41%¹ by ultrasound. Ultrasound has emerged as the most useful imaging modality for evaluation of these lesions² as it is easily available, has superior resolution, helps classify lesions, detects non palpable nodules and guides for fine needle aspiration of suspicious nodules.

The purpose of this study was to identify the accuracy of various imaging features in thyroid nodules that are associated with benignity and malignancy and the overall accuracy of ultrasound in determining malignant nodules.

MATERIAL AND METHODS

The retrospective study was done for a period of one year in a tertiary cancer referral hospital. We analyzed 57 patients who had thyroid nodules on imaging.

Inclusion and exclusion criteria: Patients who were referred to our department for assessment of thyroid nodules and their pathological work up was done. The nodules that were not evaluated were excluded from the study. Ethical clearance was obtained from the institution and informed consent was obtained from the patient.

The high resolution ultrasound findings were correlated with fine needle aspiration cytology (FNAC) report and the histopathological report (HPE) whenever available.

The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of various ultrasound parameters were assessed in detecting malignant thyroid nodules.

The nodules were assessed on the basis of echogenicity, calcification, internal vascularity, cystic areas, lymphadenopathy and background thyroid changes.

The nodules were classified as hypoechoic when they were of lower echogenicity when compared to the thyroid gland, hyperechoic when nodule was more echogenic when compared to background thyroid parenchyma.

The calcification was classified into microcalcification (for tiny calcification without shadowing and measuring about 1mm) and macrocalcification (calcification with shadowing measuring more than 1mm, including coarse and curvilinear calcification). Presence of internal vascularity on Doppler, and cystic areas was documented. Lymphadenopathy was diagnosed when nodes were enlarged by more than 1 cm in their short axis or had microcalcification or cystic areas (irrespective of size) and architectural distortion. The architecture of rest of the thyroid was assessed for presence of adenomatous hyperplasia, colloid nodules and Hashimoto's thyroiditis.

The final ultrasound diagnosis based on these findings was correlated with FNAC and histologic assessment on post thyroidectomy specimen when available.

STATISTICAL ANALYSIS

Descriptive statistics was used to infer results. Microsoft excel was used to generate tables.

RESULTS

In our study ten male patients presented with nodules out of which 40% were malignant and 47 female patients had nodules out of which malignancy was reported in 44.6% of patients. The nodules assessed in our study ranged from 5mm to 5 cms.

In our study 51% (29) nodules were hypoechoic, 49% (28) nodules were hyper echoic. Central vascularity was present in 68.4% (39) patients and no significant central vascularity was seen in 31.5% (18) patients. No calcification was iden-

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tified in 54.3% (31) patients, macro calcification was seen in 26.3% (15) patients, micro calcification was seen in 17.5% (10) patients and one patient had mixed macro calcification and micro calcification(1.7%). Cystic areas were identified in 23% patients, two patients had honeycombing and 56.1% (32) patients had no cystic areas. Four patients had significant nodes two of these patients had micro calcification in the nodes and other two had no calcification. Normal thyroid background was present in 67% (38)patients; colloid/adenomatous hyperplasia changes were seen in background thyroid in 29.8% (17) patients, Hashimoto's thyroiditis was seen in 2 patients.

The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of each feature were calculated and are given in table 1. The sensitivity of hypoechogenicity, central vascularity, calcification, microcalcification, lymphadenopathy was 84%, 74%, 64%, 29% and 16% respectively. The specificity of hypoechogenicity, central vascularity, calcification, microcalcification, lymphadenopathy was 75%, 48%, 65%, 94%, and 100% respectively in diagnosing malignant nodules.

DISCUSSION

In our study an average of 42.2% malignant nodules were reported. The higher incidence of malignancy reported in our study is due to the fact that our center is a tertiary referral center.

The sensitivity of hypoechogenicity in predicting malignancy was 84%, the specificity was 75% and the accuracy was 78.9%. According to a study by Papini et al, the sensitivity

of hypoechoic nodules in predicting malignancy was 87%, which is similar to our study. Benign nodules were hypoechoic in 55% of cases.³

Central vascularity had a sensitivity of 74.1%, specificity of 48% and accuracy of 78.9% in predicting malignancy in our study. Intrinsic hyper vascularity is a feature of malignant nodules and is defined as flow that is higher in the central part of nodule than in the surrounding thyroid parenchyma. It occurs in 69 to 74% of thyroid malignancies according to a study by Hoang et al.² Benign nodules showed central vascularity in 50% of patients according to a study by Frates et al.⁴ The sensitivity of any type of calcification to predict malignancy was 64%, the specificity was 65.6 % and the accuracy was 64.9% according to our study. In our study malignancy was associated with 70% of patients with micro calcifications and 60% of patients with macro calcifications. The sensitivity of microcalcifications in detecting malignancy was 29.1%, specificity was 93.9%, and accuracy was 66.6%. Micro calcification is a feature in papillary carcinoma and is seen due to the psammoma bodies. Coarse calcification is seen in medullary carcinoma and in adenomatous nodules. Micro calcification was seen in 43% of patients, macrocalcifications was seen in 17% of patients with papillary carcinoma and in a study by Chan et al.⁵

The two patients who had honey combing (spongiform configuration) in our study had colloid nodules. In a study by Ginat et al honey combing was associated with nodular hyperplasia with specificity of 100%⁶ similar finding were observed by Bonavita et al.⁷ There were 12.2% (7) patients who had cystic areas with echogenic debris and comet tail arti-

Feature	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)	Accuracy (%)
Hypoechogenicity	84	75	72	85	78.9
Central vascularity	74	48	58.9	72.4	78.9
Calcification	64	65.6	59.2	70	64.9
Microcalcification	29.1	93.9	77.7	64.5	66.6
Lymphadenopathy	16	100	100	59	61.4
Overall ultrasound	88.4	73.3	74	88	80.3

Table-1: The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of each ultrasound feature in predicting malignancy.

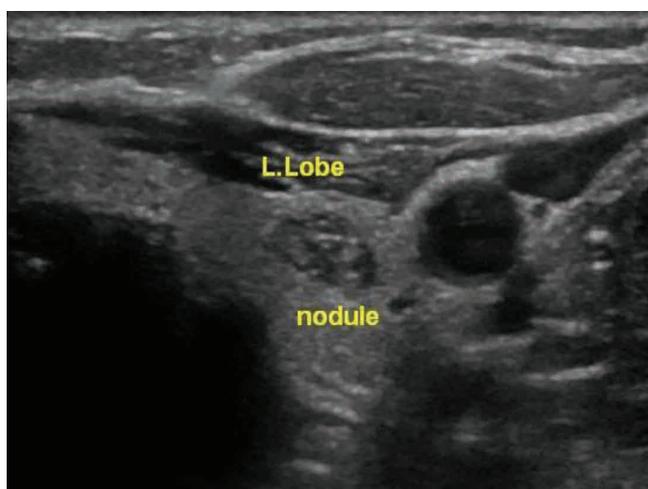


Figure-1: Hypo echoic lesion in left lobe of thyroid with microcalcification

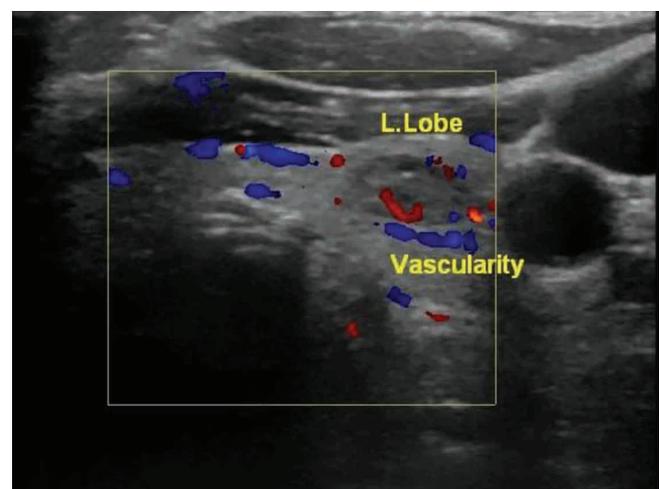


Figure-2: Significant internal vascularity is seen in the nodule. Pathologically proven to be Papillary carcinoma.

fact, out of which 6 patients had adenomatous hyperplasia (85%). One patient had papillary carcinoma. At ultrasound colloid nodules may depict internal echogenic foci due to presence of inspissated calcifications they are identified by presence of comet tail artifact.⁸

Out of other 16 patients who had cystic areas without debris 25% (4) nodules were malignant but all these nodules had micro or macro calcification. The other 75% (12) nodules were benign and had no calcification. Cystic changes are seen in 13 to 26% of papillary carcinomas according to a study by Hatabu et al. The presence of internal solid components with vascularity, solid excrescences protruding into the lumen and micro calcifications help to identify malignant nodules.⁹

Presence of lymphadenopathy had a sensitivity of 16% and a specificity of 100% in predicting malignancy in our study. Lymphadenopathy is a highly specific feature of malignancy.¹⁰ Metastatic regional lymphadenopathy is reported in 19.7% of thyroid malignancies in a study by Papiniet al.³

Nineteen patients had malignant nodules in a background of normal thyroid parenchyma (approximately half of nodules in a background of normal thyroid parenchyma were malignant), in a background of adenomatous hyperplasia 13 patients had benign nodules and 6 patients had malignant nodules (approximately one third of nodules in a background of adenomatous hyperplasia were malignant). Two benign nodules were seen in background of Hashimoto's thyroiditis. In another study malignancy was identified in 9.2% of patients with solitary thyroid nodule and 6.3% of patients in a background of adenomatous hyperplasia.³ Hence just presence of multiple nodules must not be dismissed as due to benign etiology and a suspicious nodule must be further evaluated. In a case of multiple thyroid nodules FNAC may be performed in upto four nodules, which have suspicious features.¹¹

The sensitivity of ultrasound in detecting malignant nodules was 88.4%, specificity was 73.3% and the overall accuracy was 80.3% in our study. In a study by Koike et al the sensitivity of ultrasound in diagnosis of nonfollicular neoplasms was 86.5% and for follicular neoplasms was 18.2%, the specificity was 92.3% and 88.7% respectively.¹⁰ Some of our cases had undergone ultrasound, FNAC and HPE in them it was seen that ultrasound diagnosed nodules as malignant when FNAC was negative in four cases, similarly FNAC had rightly diagnosed 8 cases of malignancy which was not detected on ultrasound, both ultrasound and FNAC had missed three cases of malignancy detected on HPE. Thus the ultrasound features suggesting malignant nodules are hypoechoogenicity, internal vascularity, microcalcification and solid composition.¹²

CONCLUSION

Ultrasound is a sensitive and specific modality in assessment of thyroid nodules with good overall accuracy. The most sensitive parameter in suspecting malignancy is hypo echogenicity of the nodule; the most specific features are lymphadenopathy followed by microcalcification. Significant number of the cases with background adenomatous multinodular changes in thyroid had a malignant nodule, hence FNAC is warranted in suspicious thyroid nodules and they cannot be ignored as adenomatous changes.

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Multimodality Treatment of Arteriovenous Malformation of Head and Neck

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ABSTRACT

Introduction: Peripheral AVM is a locally aggressive disease with a high tendency to recur, its treatment is complex, especially in the anatomically delicate head and neck region. Here we report result of different modalities combining together and in some case individualization done to treat the patient, eg. Sclerotherapy + excision, or feeding vessel ligation+excision or primary ligation.

Material and Methods: We retrospectively assessed degree of AVM eradication, complications and clinical or imaging signs of recurrence for 20 patients treated with S+E, FVL+E and primary excision of head and neck.

Result: Of the 20 patients, 18 had complete eradication of AVM of head and neck with 1 recurrence (discolouration) and 1 patient left the treatment after 2 sclerotherapy session, 2 patient experienced 3 complications (small ulcer in 2 and alopecia in 1).

Conclusion: Sclerotherapy+surgical excision, Feeding vessel ligation+Surgical excision and Primary excision has potential for complete eradication of head and neck AVM with low recurrence after completion of treatment. Complete eradication may require several treatment sessions during which complication should be minimized with careful techniques.

Keywords: AVM, Sclerotherapy, Surgical excision, Feeding vessel ligation

INTRODUCTION

Direct communication between arteries and vein with the absence of capillary system in the area is called “Nidus” and if this is congenital it is called AV Malformation.¹ The behaviour of peripheral (extracranial) AVM is locally aggressive. Typically during puberty or adolescence, the initially quiescent lesion progresses to a expansive mass with cosmetic and functional disturbances, with later progression the AVM destroys normal tissues and eventually leads to complications, such as severe disfigurement uncontrollable bleeding, ulcerations, pain and cardiac volume overload.² Complete surgical excision of the nidus of AVM is the only treatment, but complete removal of the AVM may cause anatomical and physiological disturbances, particularly in the head and neck region, because of its penetration in different tissue planes.³ In a recent series of 272 head and neck AVM patients reported an 81% recurrence rate after surgical resection and 98% after embolization. Suggested recurrence mechanism includes a proangiogenic environment involving hypoxia, trauma and inflammation and canalization of the nidus vasculature. If any nidus remnant remains, these factors will lead to a recurrence, often with complex architecture and extensive vascular recruitment.^{4,5} Embolization can be done with many agents like gelatin

pledgets, ethanol hot water and many other embolic materials.⁶ NaTS being a toxic substance that induces extra-vascular inflammatory reactions and causes vascular fibrosis and occlusion. Baumash and Mandel reported allergic and anaphylactic reaction. NaTS sclerotherapy of head and neck AVM is challenging due to the delicate anatomy and descriptions of its results are infrequent. Our aim is to report treatment results, complications, and currently available follow up information for 20 patients with head and neck AVMs treated with NaTS+excision, FVL+excision and Primary ligation of feeding vessels and discuss potential use of these procedures for peripheral AVMs.

MATERIAL AND METHODS

For an overview of the literature, we conducted a detail search with the following keywords combinations: “Arteriovenous malformation” and “Sodium tetradeceyl sulphate and Sclerotherapy” we limited our searches to articles in English language only.(1988-2014)Patients: For the prospective study, we used clinical methods, radiological information to identify all the 20 patients with AVM located at head and neck region who visited our unit at RIMS, Ranchi until the number of patient reached 20 between 01/01/2007 to 12/02/2016.^{18,19} We recorded AVM location in head and neck region, clinical symptoms, clinical stage according to the Schobinger Staging System (Table 1), 3% NaTS sclerotherapy sessions, surgical excision and feeding vessel ligation, complications resulting out of these procedures.²⁰⁻²²

NaTS Sclerotherapy and Surgical excision: After proper cleaning and draping of the part in operation theatre we injected 0.5 ml-2 ml per session of NaTS into the nidus of the AVMs and tried to stop or occlude the flow out of the nidus with some compression around the AVMs, thou it is difficult

Stage	Clinical symptoms
I (Quiescence)	Skin warmth, discolouration
II (Expansion)	Enlargement, pulsation, bruit
III (Destruction)	Pain, ulcerating, bleeding
IV (Decompensation)	Cardiac failure due to volume overload

Table-1: Schobinger classification of arteriovenous malformation

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Patient	Age /M/F	AVM Location	Symptoms	Schobinger staging	Date of last treatment D/M/Y	Treatment received S and SE or FVL and SE or SE	Eradication /Recurrence (E/R)	Follow up period in years and month
1	11Y/M	Rt. cheek	Ulcer	3	1/1/7	S3 and SE	E	9Y1M
2	14Y/M	upper lip lt. side	Swelling and deformity	2	24/4/7	S2 and SE	E	8Y10M
3	38Y/M	Scalp	Big bleeding ulcer	3	6/6/7	FVL and SE	E Ulcer and alopecia	8Y8M
4	10Y/M	Upper 1/3 of neck rt. side	Swelling	2	30/9/10	S3 and SE	E	5Y5M
5	18Y/F	Tip of nose	Swelling and deformity	2	30/4/11	S2 and SE	E	4Y10M
6	52Y/M	From lt. side scalp upto lower border of mandible	Huge swelling and deformity	3	6/8/11	FVL and SE	E Ulcer	4Y6M
7	48Y/F	Lower lip and tongue	Swelling and deformity	3	20/8/11	S2*	Left after 2 nd session of Scl. (R)	4Y6M
8	10Y/M	Upper lip	Swelling	2	25/8/11	S3 and SE	E	4Y6M
9	10Y/M	Rt. side of nose	Swelling	2	21/10/11	S2 and SE	E	4Y4M
10	22Y/F	Lt. cheek	Swelling	2	17/9/12	S4 and SE	E	3Y5M
11	12Y/M	lt. side of neck middle 1/3	Swelling	2	4/7/11	S2 and SE	E	2Y7M
12	19Y/F	Lt. cheek	Swelling	2	8/8/14	S3 and SE	E	1Y6M
13	37Y/F	Lt. side upper 1/3 of neck	Swelling	2	20/2/15	S3 and SE	E	1Y0M
14	8Y/M	Rt. cheek	Swelling	2	26/3/15	S3 and SE	E	11M
15	24Y/F	Lt. side of nose	Swelling	2	11/5/15	S2 and SE	E	9M
16	28Y/M	Lt. side front of ear and below eyebrow	Swelling	2	16/6/15	S2 and SE	E	8M
17	25Y/M	Lt. malar prominence and lt. side of nose	Discolouration	1	17/7/15	S3 and SE	Still discoloured	7M
18	3Y/F	Scalp and forehead	Swelling	2	21/7/15	SE	E	7M
19	30Y/M	Lt. side upper lip	Swelling and deformity	2	8/1/16	S3 and SE	E	1M
20	2Y/F	Scalp	Swelling	2	12/2/16	S3 and SE	E	1M

S-Sclerotherapy, SE-Surgical excision, AVM-Arteriovenous malformation, FVL-Feeding vessel ligation, Na TS-Sodium tetracycle sulphate.

Table-2: Patient's master record

in head and neck region because of complex anatomy. We typically discharged the patient on the same day or the following day, post treatment swelling lasts for 1 to several days, it is rarely painful and if so they were given NSAIDs for 3-5 days. Sclerotherapy sessions repeated every 3 weeks. Surgical excision done 3 weeks after the last sclerotherapy session.

Feeding vessel ligation and Surgical excision: In two case we performed feeding vessel ligation in one case of scalp AVM which was bleeding and there was an ulcer, we ligated the preauricular vessels and in same sitting we excised the scalp AVM. In second case (which had a huge AVM extending from scalp left side up to the lower border of mandible) we ligated external carotid of the same side and after 2 weeks we excised the AVM which was reduced in size.

Primary surgical excision: In one case of scalp AVM which was very circumscribed was excised primarily and closure done with standard surgical techniques.

RESULTS

Entire result of eradication/recurrence is elicited in Table-2; column 8. Of the 20 patients, 18 had complete eradication of AVMs with mean follow up period (Table-2, Column 9) of 2.94 years (ranging from 1 month-9 years 1 month), and all the patients are still in our follow up programme. 1 patient left the treatment after 2 sessions of NaTS sclerotherapy Table 2, patient No. 7, 48 yrs, female, she had AVM of lower lip and tongue (huge) still in our follow up with no regression in size.

Complication: After 45 sessions of sclerotherapy 19 surgical excision 2 patients had ulcer and 1 patient among the 2 patients with ulcer left with alopecia of the scalp.

DISCUSSION

Head and neck AVM is a locally aggressive lesion in a delicate anatomic region and tends to recur after interventions. Our result suggests that NaTS sclerotherapy may have potential as a treatment technique for head and neck AVM, but should be implemented very carefully due to risk of complications. The most important factor in assessing the usability of any treatment method for peripheral AVMs are its success in complete nidus eradication, complication rate and long term recurrence rate. Reports on ethanol sclerotherapy of trunk and extremity AVMs have shown potential for total nidus ablation. For the head and neck area. 2 studies on auricular AVNs report success rate of 18% and 75%, Interpreting these percentage is difficult^{6,7} In the head and neck ethanol sclerotherapy Jeong and co-authors had a success rate of 50%, but they changed their treatment to surgical excision, if the AVM did not reduced more than 50% after 3 sessions of sclerotherapy.^{8-11,17} In our series of the 20 patients with head and neck AVMs at Schobinger stage I, II and III, 17 had complete eradication. For 2 there were small ulcer left and even if we call it failure as 1 patient left midway after 2 sessions of sclerotherapy with progression of the disease.¹² Acknowledging the potential of AVM stimulation by partial treatments, this has to be considered seriously, with NaTS several successive treatments are often the rule and every

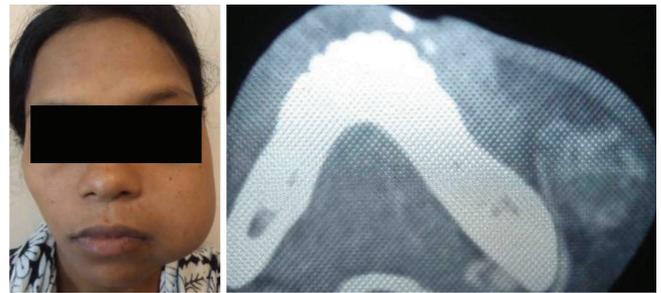


Figure-1: AVM of left cheek; **Figure-2:** CT scan showing AVM of patient No. 10



Figure-3: AVM of scalp with ulcer of Patient No. 3; **Figure-4:** Healed ulcer with alopecia of Patient No. 3



Figure-5: AVM of patient No. 6 from scalp upto mandible (Pre-op); **Figure-6:** Post-op photograph of Patient No. 6 (Feeding vessel ligation)



Figure-7: CT angio showing AVM of the Patient No. 6; **Figure-8:** AVM of lower lip and tongue

treatment carries a complication risk. Adding surgical excision with NaTS sclerotherapy has increased the eradication percentage to a great extent in our series i.e. 85%.¹³ Feeding vessel ligation and subsequent surgical excision also gave very good result in 2 cases with total eradication of AVMs.

Thus it is important to carefully assess any residual AVM after FVL or sclerotherapy and combining it with surgery gives good result. The most common complication of NaTS is local skin or mucosal surface necrosis, these should be minimized with careful technique, but completely avoiding them is impossible if the AVM itself affects the skin or mucosal surfaces. Our complication rate was in line with rates in other studies. All permanently visible complications include scarring after ulcer (n=2) and loss of hair (alopacia n=1) and discolouration resulted in one (n=1).¹⁴ Most AVM recurrences manifest within the first year after intervention, but a minimum of 5 years of follow up is necessary to assess long term control. The follow up periods in sclerotherapy case series vary, most reports a follow up of 1-2 years for mark the completely eradicated lesion with no recurrences. Our data document immediate, short and long term efficacy of NaTS sclerotherapy + excision, FVL+excision and primary excision of the AVMs, with mean follow up period of 2.94 years ranging from 1 month to 9 years 1 month, and all the patient are still in our follow up in a reasonable sized cohort of head and neck AVMs.^{15,16}

CONCLUSION

The message of this study is that NaTS, FVL and primary excision are very good modalities of treatment for AVMs of head and neck region, combining all these modalities with surgical excision makes these modalities a good tool. Meticulous techniques are necessary to avoid complications and long term follow up is vital for assessing permanence of the result.¹⁷

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A Study of Correlation between Carotid Intima – Media Thickness and Diastolic Dysfunction in Asymptomatic Type 2 Diabetes Mellitus

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ABSTRACT

Introduction: Subclinical diastolic dysfunction and ongoing atherosclerosis is a common occurrence in diabetics. Carotid Intimal-Medial Thickness (CIMT) is being used as a marker to assess subclinical atherosclerosis. Study was aimed to find out prevalence of subclinical atherosclerosis and diastolic dysfunction in asymptomatic diabetics and correlate CIMT with left ventricular diastolic dysfunction (LVDD).

Material and methods: A prospective, cross sectional study was conducted over 12 months in asymptomatic diabetics attending OPD/IPD of a tertiary care teaching hospital in north India. Patients were screened to rule out cardiovascular involvement and any other complication related to diabetes. After noting Weight and Height, BMI was calculated. CIMT was measured by B mode high resolution ultra sound. Echocardiography was done and E/A ratio calculated. Patients were divided into those with and without diastolic dysfunction; Also they were divided in two groups taking CIMT into consideration and patient parameters were studied in both the settings and statistical significance tested in between these subgroups using SPSS.

Results: The present study population included 100 asymptomatic diabetics (age range 30-75). Sixty percent were females, twenty two percent smokers and eighteen were alcoholics. The CIMT was less than 1 in 28 subjects, were considered to have less CV risk. CIMT and E/A ratio were significantly different between high risk and low risk groups ($P < 0.0001$). LV Diastolic dysfunction was found in 30% patients. The mean E/A ratio in this group was 0.76 ± 0.04 msec. Female preponderance was observed in the group with diastolic dysfunction and two third of these ladies were post menopausal.

Conclusion: A positive correlation exists between CIMT and low E/A ratio. CIMT increases with age and value more than 1 in young adults is associated with high CV risk. Females have higher CIMT value and post menopausal ladies are more prone to diastolic dysfunction.

Keywords: Carotid Intima, Media Thickness, Diastolic Dysfunction

INTRODUCTION

Atherosclerosis is a chronic disease of vascular endothelium which develop gradually with varying velocity, depending on the presence of risk factors like age, male gender, post menopausal ladies, smoking, abdominal obesity, dyslipidemia, hypertension, insulin resistance and Type2 diabetes mellitus.¹ The process is 2-4 times more in diabetics leading to complications like stroke, heart attack and peripheral vascular disease.¹ These macro vascular complications account for 75–80% of mortality in patients with diabetes.²

Carotid Intimal Medial Thickness (CIMT) is the area of tissue starting at the luminal edge of the artery and ending

at the boundary between the media and the adventitia. Its measurement by high resolution ultrasound B scan is an effective, noninvasive tool which can assist in identifying people with who are at higher risk of developing sub clinical atherosclerosis and subsequent macro vascular complications. It may also help to evaluate the effectiveness of various treatment strategies used to treat people with diabetes.³ CIMT is age dependant. In healthy middle-aged adults it measures 0.6 to 0.7 mm and greater than 1.20 mm is considered abnormal. CIMT is age-dependent and increases at a rate of 0.005 to 0.010 mm/year.⁴ Increase in CIMT can predict future events of silent brain infarction and coronary heart disease.⁴⁻⁷

Diabetes is an important risk factor for atherosclerosis also it can affect cardiac structure and function even in the absence of changes in blood pressure or coronary artery disease, a condition called diabetic cardiomyopathy.^{5,8,9} Left ventricular diastolic dysfunction (LVDD) is considered the earliest manifestation of diabetic cardiomyopathy, preceding the development of systolic dysfunction. The pathogenesis of diabetic cardiomyopathy is multifactorial.⁵ Here not only atherosclerosis accelerated by insulin resistance but also sustained hyperglycemia increases deposition of advanced non enzymatic glycation end products (AGE) in the extracellular matrix, resulting in a further increase in myocardial stiffness. Hence LVDD may be useful markers of progressive arteriosclerosis in type 2 diabetic patients.¹⁰ The present study was conducted on asymptomatic diabetics without any complications with an aim to assess subclinical atherosclerosis and diastolic dysfunction in this group. CIMT was used as early marker of atherosclerosis. An attempt is made to correlate CIMT with LVDD.

MATERIAL AND METHODS

This was a prospective study conducted in a tertiary care teaching hospital in north India. All the patient attending diabetic clinic/IPD during June 2014 - May 2015 who were diagnosed as diabetes mellitus using WHO criteria (1999); were first subjected to a detailed history and examination including calculation of body mass index (BMI). And those

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patients who had no cardiovascular complaints, ECG, TMT, X-ray chest PA view were included in the study after informed consent. The clearance was taken from Institutional ethical committee (vide -IEC/03/2013).

Inclusion criteria- 1) Asymptomatic Patients who had normal BP, ECG, TMT. 2) patients without any complications related to diabetes.

M mode and 2D echo was performed to assess subclinical LVDD. The ratio of early-diastolic peak flow velocity (E) and late-diastolic peak flow velocity (A), was noted and LVDD E/A <0.78 for men and <0.79 for women was taken as normal.

High resolution ultrasound B mode was done in supine patient with head turned 45° opposite to the side being tested. Measurements were taken from both far wall and near wall in both the carotid

Assessment for glycaemic control was done by FBS (10 hr fasting) / PPBS estimation which was estimated by glucose oxidase- peroxidase method (GOD-POD).¹¹

HbA1C was determined directly (without measurement of

total hemoglobin) by immunoturbidimetric method.¹² Serum total cholesterol was measured by cholesterol oxidase-phenol aminoantipyrine (CHOD-PAP) method.¹³ Serum triglycerides were measured by GPO-PAP method.¹⁴

High density lipoprotein (HDL) and LDL cholesterol estimations were done by assay based on Poly vinyl sulphonic acid and polyethylene glycol methyl ether coupled classic precipitation method with improvement in using optimized quantities of PVS-PEGME and selected detergent.¹⁵

The patients were sub divided in two group –one with low CV risk and High CV risk based on CIMT values (Table-2) and mean of the entire patient variables were compared in these subgroup using t test. The patients were also divided into two more groups depending on presence /absences of LVDD (Table-3) and patient characteristics were studied using SPSS software. Comparison of mean values of patient variables was done in these groups using unpaired students t test.

RESULTS

The present study population included 100 diabetics age (range 30-75) attending diabetic clinic at a teaching hospital in north India; who had no cardiovascular symptoms and signs, normal BP and ECG/TMT. Sixty percent were females; twenty two percent smokers and eighteen were alcoholics. Table-1 shows patient characteristics. The CIMT was less than 1 in 28 subjects, were considered to have less CV risk.⁶ Table-2 shows comparison of mean of various risk factors amongst the group with low probability and those with high probability of CV risk. CIMT and E/A ratio were significantly different between these groups ($P<0.0001$) LV Diastolic dysfunction was found in 30% patients. The mean E/A ratio in this group was 0.85 ± 0.19 ms prevalsvalva and 0.77 ± 0.16 msec post valsvalva. For convenience the group was sub divided into those with E/A >1(no diastolic

Patient variables (n=100; without complications of DM)	Mean value
Age (years)	53.05±10.72; F: M=3:2
BMI (kg/m ²)	25.46±4.29
Duration of DM (years)	4.26±4.04
AverageHbA1c(%)	7.1±0.21
Average Triglyceride(mg%)	190±73.96
Average LDL(mg%)	102.9±21.8
Average HDL(mg%)	35. 7±.23
Average total cholesterol(mg%)	195 ±38.43
Mean CIMT (mm)	1.41±0.65
Mean E/A	1.10±0.28.

Table-1: Patient characteristics of the study group.

	CIMT (<1) n=28	CIMT (>1) n=72	F value	Overall n=100
CIMT(mm)	0.82 ^a ± 0.02	1.62 ^b ± 0.07	54.90**	1.41 ± 0.06
EA ratio	2.61 ^a ± 1.38	1.05 ^b ± 0.03	9.66**	1.49 ± 0.39
Age(years)	51.64 ± 1.84	53.59 ± 1.30	1.18	53.05 ± 1.07
Sex	1.53 ± 0.09	1.62 ± 0.05	1.49	1.60 ± 0.04
Duration DM(years)	3.89 ± 0.43	4.15 ± 0.52	1.63	4.08 ± 0.39
BMI(kg/m ²)	26.49 ± 0.78	25.33 ± 0.60	0.01	25.65 ± 0.48
LDL(mg%)	113.60 ± 8.92	101.54 ± 2.48	1.96	104.92± 3.09
TG(mg%)	148.22 ± 14.09	199.36 ± 8.35	0.17	185.04 ± 7.52
HBA1C(%)	6.99 ± 0.17	7.07 ± 0.11	0.22	7.05 ± 0.09

Table-2: Comparison of means of patient variables in group with low(CIMT <1) and high(CIMT>1) probability of CV risk

	E:A ratio (<1) n=27	E:A ratio (>1) n=73	F value
EA ratio	0.76 ± 0.04	1.76 ± 0.53	1.03*
CIMT	1.69 ± 0.13	1.30 ± 0.07	5.20*
Age(years)	54.33 ± 2.06	52.57 ± 1.25	0.12
Sex	1.74 ± 0.08	1.54 ± 0.05	17.49**
Duration DM (years)	3.27 ± 0.50	4.38 ± 0.50	0.50
BMI(kg/m ²)	25.35 ± 0.76	25.77 ± 0.60	0.58
LDL(mg%)	102.44 ± 3.56	105.83 ± 4.03	1.53
TG(mg%)	168.55 ± 11.99	191.14 ± 9.24	2.45
HBA1C(%)	7.24 ± 0.16	6.97 ± 0.11	0.14

Table-3: comparison of mean value of the patient variables amongst the group with and without LVDD.

dysfunction) and E/A <1(diastolic dysfunction). Table-3 shows comparison of mean of various variables in between these subgroups. (Table-3) It is evident that the two groups were significantly different with respect to gender ($P<0.001$). Female preponderance was observed in the group with diastolic dysfunction and two third of these ladies were postmenopausal. A significant difference in CIMT was also noted in these groups ($p<0.05$).

DISCUSSION

The study was conducted with the aim to verify role of CIMT in assessment of subclinical atherosclerosis and study the association with LVDD –earliest marker of cardiovascular involvement. So the study group constituted of randomly selected diabetic patients without cardiovascular symptoms, who had no evidence of any complication related to diabetes. Amongst 100 patients ranging 35-75 years; 23% were above 60 years and 60% were females. 22% patients were smokers and 18% were alcoholic. Increasing age, male gender, smoking, alcohol consumption, obesity, dyslipidemia, diabetes are responsible for augmenting CV risk factors in atherosclerosis.^{16,17} CIMT is a surrogate marker of cardiovascular risk. It is considered in clinical trials evaluating the efficacy of cardiovascular risk factor modification.^{1,3,4,16,17}

It is value increase with age, in young adults (age <45 year) value <1 should be considered abnormal.^{3,6,16} In present 28% had CIMT <1 where mean age was 51.64 years.

Subclinical LVDD was found in 30% asymptomatic diabetic patients in our study as noted by E/A ratio. The prevalence of subclinical/preclinical diastolic dysfunction was noted to be 54.33% in a similar case control study conducted over 5 years in 127 asymptomatic diabetics.¹⁷ The of 11% control had LVDD in the same study. LVDD was found to increase with duration of diabetes, Hb A1C and obesity indices. Boyer et al. observed LVDD in 75% asymptomatic, normotensive patients with type 2 diabetes. They also found that, TDI detected diastolic dysfunction more often than any other echocardiography parameter.¹⁸

Table-2 demonstrates highly significant difference amongst the values of CIMT and EA ratio in low probability and high probability of CV Risk group ($p<0.001$). There exist and inverse correlation between E/A ratio and CIMT values. Our finding were comparable with those of a large Chinese population based study on healthy subjects; where a positive correlation of CIMT significantly associated with lower E/A ratio; more so in women.¹⁹ Female preponderance was also noted in the diastolic dysfunction group of the present study (Table-3, gender $p<0.001$). Two third of these women were post menopausal; which is another risk factor of atherosclerosis.

Study limitations: It is a cross sectional study on 100 diabetics and there is no control group to compare the age related atherosclerosis occurring in healthy Individual. As atherosclerosis and diabetes are chronic continuous processes the longitudinal study (long term follow up study) is needed to study about risk factors and development of macro vascular complications.

CONCLUSION

A positive correlation exists between CIMT and low E/A

ratio. Hence CIMT can be used as simple non invasive tool for screening of subclinical atherosclerosis and diastolic dysfunction. CIMT increases with age and value more than 1 in young adults is associated with high CV risk. Females have higher CIMT value and post menopausal ladies are more prone to diastolic dysfunction. As atherosclerosis is a chronic continuous process, monitoring of CIMT is recommended to assess its progress over time. Further study of longer duration with age and sex matched controls is needed to exactly assess the diabetic control/obesity indices /CIMT as risk factor for cardiovascular and cerebrovascular events.

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Efficacy of Intravenous Clonidine to Attenuate Cardiovascular Stress Response to Laryngoscopy and Tracheal Intubation – A Prospective Randomized Double Blind Study

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ABSTRACT

Introduction: Hemodynamic stress response to laryngoscopy and intubation although transient, can lead to life threatening complications in susceptible patients. The objective of the present study was to evaluate efficacy of 3mcg/kg intravenous clonidine infusion to attenuate hemodynamic stress response to laryngoscopy and tracheal intubation and its effect on the requirement of thiopentone sodium for induction of anaesthesia.

Material and methods: 60 ASA Physical Status 1 patients undergoing elective surgery under general anaesthesia with endotracheal tube were randomised into 2 groups to receive either a premedication infusion of 3 mcg/kg intravenous clonidine (Group A) or normal saline (NS) (Group B). Sedation score, dose of thiopentone sodium required for anaesthetic induction, Heart rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP), and Rate pressure product (RPP) were recorded at specific time intervals before, during and after tracheal intubation.

Results: Patients in Group A were significantly more sedated at the end of infusion ($p < 0.05$). The dose of Thiopentone sodium required for induction of anaesthesia was significantly low in Group A ($p < 0.05$). The increase in HR, SBP, DBP, MAP and RPP from their baseline values after laryngoscopy and tracheal intubation was significantly lower ($p < 0.05$) and short lived in Group A.

Conclusion: Intravenous clonidine (3 micrograms/kg) given as an infusion over 10 minutes prior to induction of anaesthesia provided adequate sedation and blunted the stress response to laryngoscopy and tracheal intubation. It also reduced the dose of thiopentone sodium required for induction of anaesthesia.

Keywords: Intravenous clonidine, Sedation, Laryngoscopy, Tracheal intubation, Hemodynamic stress response.

INTRODUCTION

Laryngoscopy and tracheal intubation can produce major changes in hemodynamics of a patient.¹ Hemodynamic stress response to laryngoscopy and tracheal intubation occurs due to reflex sympathetic discharge caused by mechanical stimulation of pharynx and larynx resulting in tachycardia, hypertension and arrhythmias.²⁻⁴ This short-lived hyper adrenergic state is of little consequence in healthy individuals, but it may lead to detrimental effects in patients with primary or secondary hypertension, ischaemic heart disease, poor cardiovascular reserve²⁻⁴ and cerebrovascular diseases.⁵ Various anaesthetic techniques and drugs are used to blunt this hemodynamic response to laryngoscopy and tracheal intubation. The technique or drug of choice depends on the urgency and duration of

surgery, choice of anesthetic technique, medical condition of the patient, individual preference and availability of equipments. Alpha-2 adrenoceptor agonists are frequently used as an adjunct to anesthesia as these drugs reduce anesthetic requirements, attenuate adrenergic, hormonal, and hemodynamic stress responses to surgery, reduce anxiety, and lead to sedation.^{3,5-7} clonidine, an imidazoline derivative is centrally acting α_2 adrenoceptor agonist.⁶⁻⁸ It decreases the central sympathetic outflow by increasing the reuptake of nor-adrenaline by stimulation of pre-synaptic α_2 adrenoceptors.^{7,8} Thus, it results in less nor-adrenaline to act on post synaptic membrane, in Nucleus Tractus Soliterius (NTS) and vasomotor centre of brain stem.^{6,7} The current study was undertaken to evaluate the efficacy of intravenous Clonidine 3mcg/kg as a premedication for attenuation of hemodynamic stress response to laryngoscopy and intubation and on Thiopentone sodium requirement for induction of anaesthesia.

MATERIAL AND METHODS

This prospective, randomized placebo controlled study was carried out in 60 ASA I patients of either sex between the age group of 18 to 60 years, posted for elective surgery lasting for 4-5 hours under general anaesthesia requiring endotracheal intubation after obtaining approval from Institutional Ethics Committee. Patients diagnosed with hypertension, A-V blocks, cardiac arrhythmias, congestive cardiac failure, coronary artery disease, cerebrovascular disease, COPD, acute or chronic hepatic or renal failure, BMI > 30 Kg/m² and anticipated difficult intubation were excluded from the study. Any patient requiring a second attempt of laryngoscopy and intubation and with duration of laryngoscopy more than 30 seconds were also excluded from the study. A thorough preanaesthetic evaluation was carried out as per institutional protocol. Selected patients were randomised into 2 groups using computer generated randomised chart. Written informed consent was obtained from all patients. Group A

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patients received Clonidine 3mcg/kg intravenously in 100ml of NS and Group B patients received only 100ml of NS. On the day of surgery, after confirming adequate starvation, IV access was secured and Ringer lactate was started at 2ml/kg/hr. In the operating room, baseline parameters like Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), oxygen saturation (SpO₂) and respiratory rate (RR) were recorded and mean arterial pressure (MAP) and rate pressure product (RPP) were calculated from the above parameters.

Then, patients in Group A received Clonidine 3mcg/kg intravenously diluted in 100 ml of NS over 10 minutes with the help of infusion pump. Patients in Group B received only NS 100 ml over a period of 10 minutes with the help of infusion pump. HR, SBP, DBP, SpO₂, RR, MAP, RPP and sedation score were recorded before starting infusion (BEFa), and then at 5 minutes (@5a) and 10 minutes (@10a) after infusion. The degree of sedation was graded as follows: Sedation Score 0: Patient awake and talkative.

Sedation score 1: Patient sedated but easily arousable.

Sedation score 2: Patient asleep but immediately responding to verbal commands.

Sedation score 3: Patient asleep reacting to verbal commands with delay.

Sedation score 4: Patient asleep, not reacting to verbal commands.

Any other complaints like nausea, vomiting, headache, restlessness, pruritus bradycardia (pulse rate < 60 per minute), hypotension (decrease in SBP by >20% baseline), and allergic reaction were noted.

All patients received Injection Glycopyrrolate 0.004 mg/kg, Injection Ondansetron 0.08 mg/kg, Injection Midazolam 0.02 mg/kg and Injection Ranitidine 1 mg/kg at the end of drug infusion. Patient was then induced with injection Thiopentone sodium in graded doses till loss of eye lash reflex. The dose of Thiopentone sodium required for induction was noted. After confirming the ability to ventilate, injection Vecuronium 0.1 mg/kg was given and patient was ventilated with 40% O₂ and 60% N₂O for 2 minutes 30 seconds and with 100% O₂ for 30 seconds. Patient's trachea was then intubated with appropriate-sized endotracheal tube by a senior anaesthesiologist having at least 1 year experience in endotracheal intubation. The entire procedure of intubation was completed in 30 seconds and in single attempt. Study parameters were recorded at different time intervals as follows: after induction with thiopentone sodium(AT), 3 minutes after giving injection Vecuronium (@MV), at the time of performing laryngoscopy (AL) and tracheal intubation(ATI) followed by 1 minute (@1b), 2 minutes (@2b), 3 minutes (@3b), 4 minutes (@4b), 5 minutes (@5b), 7 minutes (@7b) and 10 minutes (@10b) after tracheal intubation. Any surgical interventions like catheterization, nasogastric tube insertion and incision were allowed 10 minutes after intubation to avoid disturbances in data recording. Anaesthesia was maintained with O₂ 40% and N₂O 60% and intermittent boluses of injection Vecuronium with addition of Propofol infusion started 10 minutes after intubation, on controlled ventilation with circle absorber system. Injection Fentanyl 2mcg/kg was

given 10 minutes after endotracheal intubation only in Group B. Any evidence of tachycardia i.e. > 20 % increase in HR from baseline or hypertension i.e. > 20 % increase in SBP from baseline was treated by deepening the plane of anaesthesia, by increasing Propofol infusion rate and by supplementing injection Diclofenac sodium 1.5 mg/kg IV as a rescue analgesic. Patients in Group B received injection Fentanyl 1 mcg/kg/hour in repeated doses till 1 hour prior to end of surgery. After completion of surgery, neuromuscular blockade was antagonized with Injection Neostigmine 0.06 mg/kg and Injection Glycopyrrolate 0.008 mg/kg. Patients were extubated and shifted to Post anaesthesia care unit for observation and shifted to the ward when they fulfilled the shifting criteria.

STATISTICAL ANALYSIS

Data analysis was done by using SPSS version 16.0. Qualitative data was represented in the form of frequency and percentage and was compared by using Pearson Chi-Square test. Quantitative data was represented in the form of Mean±SD. Paired and unpaired t-tests were used for within and between group comparisons respectively. P value <0.05 was considered statistically significant. P value < 0.001 was considered statistically highly significant.

RESULTS

Both groups were comparable with respect to demographic characteristics (p>0.05) and duration of surgery (Table-1). The mean sedation score at the end of infusion in Group A was 1.87 ± 0.587 as compared to 0 in Group-B (p<0.001). At the end of infusion, 23.33% of patients had sedation score 1, 66.66% of patients had sedation score 2 and 10% of patients had sedation score 3 in Group A. None of the patients in Group A had respiratory depression. There was no statistically significant difference between the two groups with respect to RR (12.93± 0.9 per minute in Group A vs. 12.93±0.9 per minute in Group B) and SpO₂ at the end of infusion (P>0.05). The mean induction dose of thiopentone sodium in Group A was 3.8830 ± 0.3395 mg/kg compared to 5.8000 ± 0.5816 mg/kg in Group B (P< 0.05). The baseline HR, SBP, DBP, MAP and RPP were comparable in both the groups (p>0.05). There was statistically significant decrease in HR, SBP, DBP, MAP and RPP as compared to baseline in Group A at the end of infusion (p<0.001). Both groups showed significant reduction in arterial pressure after anaesthetic induction (p<0.05) (Tables 2 and 3).

Heart Rate (HR): The maximum increase in HR in Group A was 11.30 % (96.47±8.53) from baseline (86.67±4.96) at 1 minute after intubation as compared to 46.53% (124.80± 3.77) from baseline (85.17±4.11) in Group B (p<0.001). HR

	Group A	Group B	P Value	
Age	28.77 ± 9.402	27.07 ± 9.727	>0.05	
Weight	57.10 ± 3.595	56.67 ± 2.426	>0.05	
Sex	Male	19 (63.3%)	22 (73.3%)	>0.05
	Female	11 (36.7%)	8 (26.7%)	>0.05
Duration of surgery (hrs)	5.7 ± 0.907	5.87 ± 0.819	>0.05	

Table-1: Demographic Data and Duration of surgery

Time	Heart rate HR			Systolic blood pressure SBP			Diastolic blood pressure DBP		
	Group A	Group B	P value	Group A	Group B	P value	Group A	Group B	P value
baseline	86.67 ± 4.96	85.17 ± 4.11	>0.05	123.67 ± 4.85	121.73 ± 2.56	>0.05	83.46 ± 2.62	83.40 ± 1.67	>0.05
5 minutes after infusion	79.20** ± 4.32	84.30 ± 3.42	<0.05	118.00** ± 4.58	121.07 ± 2.91	<0.05	79.13** ± 4.32	84.30 ± 2.91	<0.05
10 minutes after infusion	75.13** ± 4.10	84.67 ± 3.83	<0.05	113.87** ± 5.06	119.60* ± 4.25	<0.05	76.33** ± 4.00	79.87 ± 2.28	<0.05
At the time of induction with thiopentone sodium	85.13 ± 5.67	94.53** ± 5.67	<0.05	98.27** ± 6.68	113.00** ± 4.69	<0.05	69.80** ± 3.98	75.80** ± 2.94	<0.05
3 minutes after giving Vecuronium	81.93** ± 4.99	100.47** ± 5.03	<0.05	104.33** ± 7.54	115.80** ± 3.94	<0.05	72.87** ± 3.88	76.80** ± 2.44	<0.05
At the time of laryngoscopy	88.27 ± 5.89	110.53** ± 3.93	<0.05	114.87** ± 7.42	135.20** ± 3.51	<0.05	78.87** ± 4.94	88.53** ± 2.87	<0.05
at the time of tracheal intubation	95.93** ± 7.05	124.53** ± 3.59	<0.05	125.87 ± 6.66	147.67** ± 2.41	<0.05	84.73 ± 4.12	94.40** ± 2.54	<0.05
1 minute after tracheal intubation	96.47** ± 8.53	124.80** ± 3.77	<0.05	129.60** ± 7.34	146.27** ± 2.01	<0.05	86.87* ± 5.79	94.40** ± 2.54	<0.05
2 minutes after tracheal intubation	92.67** ± 7.69	124.80** ± 3.77	<0.05	126.73* ± 5.74	143.13** ± 2.01	<0.05	84.67 ± 4.31	91.40** ± 2.68	<0.05
3 minutes after tracheal intubation	87.93 ± 7.08	122.00** ± 3.64	<0.05	121.27* ± 4.85	139.47** ± 2.40	<0.05	80.73** ± 3.50	87.73** ± 2.33	<0.05
4 minutes after tracheal intubation	83.90* ± 5.91	117.73** ± 3.39	<0.05	118.33** ± 5.20	134.73** ± 2.60	<0.05	80.00** ± 3.10	83.73 ± 2.33	<0.05
5 minutes after tracheal intubation	79.63** ± 4.76	112.87** ± 2.76	<0.05	115.13** ± 4.16	131.07** ± 2.61	<0.05	76.60** ± 3.78	81.47** ± 1.65	<0.05
7 minutes after tracheal intubation	77.00** ± 4.57	108.27** ± 2.13	<0.05	112.20** ± 4.18	123.87* ± 3.10	<0.05	74.40** ± 3.54	81.27** ± 2.13	<0.05
10 minutes after tracheal intubation	74.07** ± 3.99	99.67** ± 4.64	<0.05	110.73** ± 3.26	119.47* ± 3.01	<0.05	73.07** ± 3.70	79.00** ± 1.55	<0.05

Table-2: Hemodynamic Parameters at various time intervals (HR, SBP, DBP)

Time	Mean arterial pressure MAP			Rate pressure product RPP		
	Group A	Group B	P value	Group A	Group B	P value
baseline	96.86 ± 3.17	96.18 ± 1.76	>0.05	10719.87 ± 779.01	10369.87 ± 591.16	>0.05
5 minutes after infusion	92.10* ± 4.24	92.62* ± 1.94	>0.05	9355.60** ± 742.24	10207.60 ± 516.00	<0.05
10 minutes after infusion	88.84** ± 4.05	93.11* ± 2.73	<0.05	8567.20** ± 749.68	10129.53* ± 642.76	<0.05
At the time of induction with thiopentone sodium	79.29** ± 4.12	88.20** ± 3.13	<0.05	8375.46** ± 894.32	10686.80* ± 784.82	<0.05
3 minutes after giving Vecuronium	83.35** ± 4.76	89.80** ± 2.71	<0.05	8560.93** ± 930.70	11638.80** ± 779.33	<0.05
At the time of laryngoscopy	90.86** ± 5.39	104.10 ± 2.13	<0.05	10156.00** ± 1109.02	14942.93** ± 626.35	<0.05
at the time of tracheal intubation	98.44 ± 4.76	112.15** ± 1.87	<0.05	12098.93** ± 1354.98	18388.13** ± 567.94	<0.05
1 minute after tracheal intubation	101.11** ± 6.17	111.69** ± 2.08	<0.05	12544.67** ± 1685.06	18256.00** ± 663.32	<0.05
2 minute after tracheal intubation	98.69* ± 4.61	108.64** ± 1.93	<0.05	11770.8** ± 1365.90	17865.47** ± 664.66	<0.05
3 minute after tracheal intubation	94.24** ± 3.73	104.98** ± 2.10	<0.05	10674.93 ± 1076.52	17016.27** ± 622.30	<0.05
4 minute after tracheal intubation	92.77** ± 3.62	100.73** ± 1.92	<0.05	9937.20** ± 925.28	15862.40** ± 544.88	<0.05
5 minute after tracheal intubation	89.44** ± 3.70	98.00** ± 1.51	<0.05	9166.93** ± 623.69	14792.27** ± 440.11	<0.05
7 minute after tracheal intubation	87.00** ± 3.56	95.47 ± 2.28	<0.05	8639.06** ± 597.77	13410.53** ± 463.13	<0.05
10 minute after tracheal intubation	85.62** ± 3.38	92.50** ± 1.90	<0.05	8205.73** ± 568.20	11902.53** ± 541.61	<0.05

Table-3: Hemodynamic Parameters at various time intervals (MAP, RPP)

reached near baseline values 3 minutes after intubation in Group A after which it remained significantly lower than baseline ($p < 0.05$) throughout the assessment period. The lowest HR in Group A was 74.07 ± 3.99 per minute ($p < 0.001$). HR in Group B remained significantly higher than baseline after tracheal intubation ($p < 0.05$) and did not return to baseline throughout the observation period (Tables 2 and 3, Figure 1).

Systolic Blood Pressure (SBP): The maximum increase in SBP in Group A was 4.80% (129.60 ± 7.34 mmHg) from baseline (123.67 ± 4.85 mmHg) at 1 minute after intubation as compared to 21.35% (147.73 ± 2.41 mmHg) from baseline (121.73 ± 2.56 mmHg) in Group B which occurred at the time of intubation ($p < 0.05$). SBP reached near baseline values 3 minutes after intubation in Group A after which it remained significantly lower than baseline throughout the observation period ($p < 0.05$). In Group B, SBP remained significantly high till 7 minutes after intubation ($p < 0.05$) and reached near baseline values towards the end of observation period. The maximum fall in systolic BP in Group A was 98.27 ± 6.68 mmHg i.e. 20.54%, which occurred after thiopentone sodium induction. ($p < 0.001$) (Tables 2 and 3, Figure 2).

Diastolic Blood Pressure (DBP): The maximum increase in DBP in Group A was 4.08% (86.87 ± 5.79 mmHg) from baseline (83.46 ± 2.62 mmHg) at 1 minute after intubation as compared to 13.18% (94.40 ± 2.54 mmHg) from baseline (83.40 ± 1.67 mmHg) in Group B which occurred at the time of intubation ($p < 0.05$). In Group A, DBP reached near baseline values within 2 minutes after intubation whereas in Group B it took 4 minutes to reach near baseline value. Following this, DBP was significantly low as compared to baseline in both the groups ($p < 0.05$). (Tables 2 and 3, Figure 3).

Mean arterial pressure (MAP): The peak rise in MAP was 4.39% (101.11 ± 6.17 mmHg) from baseline (96.86 ± 3.17 mmHg) at 1 minute after intubation in Group A as compared to 16.60% (112.15 ± 1.87 mmHg) from baseline (96.18 ± 1.76 mmHg) in Group B which was seen at the time of intubation ($p < 0.05$). MAP reached near baseline values within 3 minutes after intubation in Group A as opposed to 7 minutes in Group B. Following this, MAP was significantly low as compared to baseline in both the groups ($p < 0.05$) (Tables 2 and 3, Figure 4).

Rate-pressure-product (RPP): Maximum rise in RPP was 17.02% (12544.67 ± 1685.06) from baseline (10719.87 ± 779.01) at 1 minute after intubation in Group A as compared to 77.32% (18388.13 ± 567.94) from baseline (10369.87 ± 591.16) in Group B which occurred at the time of intubation ($p < 0.05$). RPP reached baseline values within 3 minutes of intubation in Group A after which it remained significantly low compared to baseline throughout the observation period ($p < 0.05$). In Group B, RPP remained significantly higher compared to baseline throughout the observation period ($p < 0.05$) (Tables-2 and 3, Figure-5).

DISCUSSION

In 1951, King BD et al described the hemodynamic changes associated with laryngoscopy and tracheal intubation in the form of tachycardia, and hypertension, with or

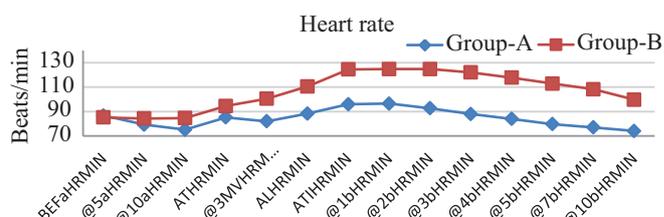


Figure-1: Comparison of Heart Rate (HR)

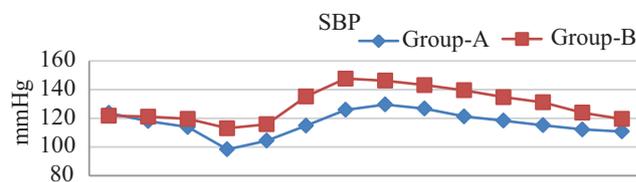


Figure-2: Comparison of Systolic Blood Pressure (SBP)

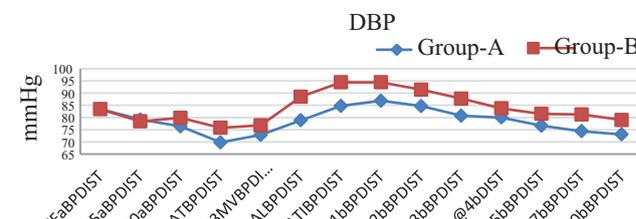


Figure-3: Comparison of Diastolic Blood Pressure (DBP)

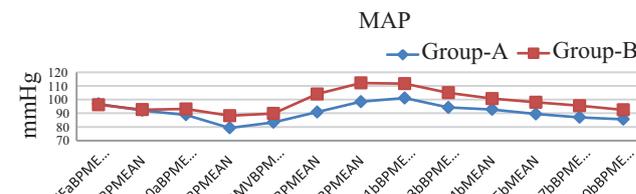


Figure-4: Comparison of Mean Arterial Pressure (MAP)

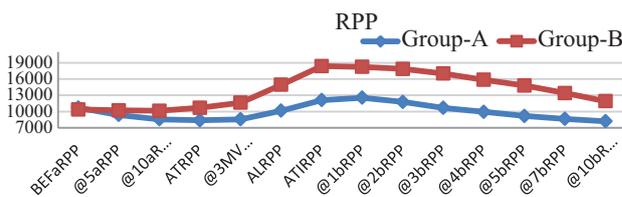


Figure-5: Comparison of Rate Pressure Product (RPP)

without arrhythmias. It was interpreted to be due to reflex sympathoadrenal response. These nerves activate the supra segmental and hypothalamic sympathetic centers releasing catecholamines causing rise in arterial blood pressure and tachycardia.⁹ These changes are short-lived. But even this transient change in hemodynamics may lead to myocardial ischemia and subsequent myocardial infarction in susceptible individuals.^{10,11} This stress response can also lead to rise in intracranial and intraocular pressure, which can be hazardous in patients with open eye injuries, intracranial lesions and cerebro-vascular disease.¹⁰ Clonidine is an alpha-2 adrenoreceptor agonist, which reduces the release of nor-epinephrine from nerve endings both centrally and peripherally and thus causes reduction in arterial pressure,^{7,8}

intraocular pressure,¹² and intracranial pressure⁵ and protects myocardium from cardiovascular stress response.¹³

In the present study, we chose intravenous route of administration to relate pharmacodynamic effects more precisely to a certain dose. After intravenous route, the onset of action is immediate, distribution $t_{1/2}$ is 9 to 11 minutes and elimination $t_{1/2}$ is 9 hours. Analgesia, sedation and antihypertensive effects last for 8-9 hours.^{13,14} The infusion was preferred in place of bolus dose to avoid reflex hypertension and tachycardia due to peripheral α -2 adrenoreceptor stimulation.¹³ Kulka Peter J et al demonstrated that attenuation of pressor response to laryngoscopy and intubation by intravenous clonidine was dose-related till 4mcg/kg and, increasing the dose further was not found to be beneficial.¹¹ In most human studies, 4mcg/kg clonidine was applied without relevant signs of peripheral α -2 stimulation,¹¹ hence we chose 3mcg/kg dose of clonidine. We selected the optimal age range of 18 to 60 years. This is because, the variability of the heart rate change decreases with increasing age and younger patients show more extreme changes.¹⁵

In the present study, the mean sedation score at the end of infusion in Group A was 1.87 as compared to 0 in Group B ($p < 0.001$). None of the patients in Group A had respiratory depression and SpO₂ was maintained in all the patients. The hypnotic or sedative effect of α 2 adrenoreceptor activation has been attributed to locus coeruleus, which is the predominant noradrenergic nucleus in the brain with higher density of α 2 adrenoreceptors and is an important modulator of vigilance.^{11,16} Our finding is in accordance with studies done by Kulka Peter J et al,¹¹ Marinangeli F et al¹⁷ and Kate Leslie et al¹⁸ who demonstrated that clonidine-treated patients were significantly more sedated compared to placebo-treated patients. Aantaa R et al,¹⁹ and Ooi R et al²⁰ showed that intravenous clonidine in doses of 3 mcg/kg and 3.5 mcg/kg respectively was not associated with respiratory depression. The induction dose of Injection Thiopentone Sodium was significantly lower in Group A compared to the Group B (3.8830 ± 0.3395 vs. 5.8000 ± 0.5816 mg/kg) ($P < 0.05$). The sedative and analgesic properties of clonidine could explain the induction agent's sparing effect. Kate Leslie et al¹⁸ and Marinangeli F et al¹⁷ also found significant reduction in the induction dose of thiopentone sodium after using intravenous clonidine in doses of 2.5 mcg/kg and 3 mcg/kg respectively.

Hemodynamic variables: The baseline HR, SBP, DBP, MAP and RPP were comparable in both groups ($p > 0.05$). There was statistically significant decrease in HR, SBP, DBP, MAP and RPP in Group A compared to baseline at the end of infusion ($p < 0.001$). This fall can be attributed to the centrally mediated sympatholytic effect of this drug.¹¹ Similar findings were also seen in the study by Sakshi Arora et al,¹ Kulka Peter J et al¹¹ and Anish Sharma N G et al.²¹ Both groups showed significant reduction in arterial pressure after anaesthetic induction, indicating anaesthetised state and no surgical stimulation. This did not warrant any treatment. The cause of hypotension can be attributed to hypovolemia unmasked by the reduction of sympathetic tone by thiopentone induction.²² In the study by Youhua Zhang et al, some patients in the clonidine group had SBP below 100 mmHg after induction

with Thiopentone sodium. This hypotension was transient and only 3 out of 30 patients required administration of 100 ml bolus of NS.²³ The maximum fall in systolic BP in Group A in our study occurred after thiopentone induction ($p < 0.001$). Though the fall was by 20% from the baseline SBP, it was short lived and did not warrant any inotropic support. HR, SBP, DBP, MAP and RPP were significantly decreased in Group A as compared to Group B from the end of infusion till 10 minutes after intubation ($p < 0.05$).

The maximum increase in HR, SBP, DBP, MAP and RPP in Group A occurred at 1 minute after tracheal intubation and that in Group B at the time of intubation after which there was gradual decrease in all the parameters in both groups. However, the decline was more rapid in Group A. This finding was in accordance with other studies,^{24,25} which concluded that plasma catecholamine concentration increased to the maximum at 1 minute after the laryngoscopy and came down by 3 minutes to 5 minutes after the laryngoscopy.

The maximum increase in heart rate in Group A was 11.30% while it was 46.53% in Group B ($P < 0.001$). HR reached near baseline values 3 minutes after intubation in Group A and at the end of 10 minutes in Group B. This finding was in agreement with studies done by Kulka Peter J et al¹¹ and Zalunardo MP, Zollinger A et al^{26,27} who concluded that during laryngoscopy and intubation, mean HR in clonidine pre-treated groups was significantly lower compared to placebo, and hemodynamic response to laryngoscopy and intubation was significantly attenuated by clonidine. Similar results were reported by Anish Sharma N G et al.²¹ The maximum rise in SBP, DBP, MAP and RPP (4.80%, 4.08%, 4.39%, 17.02%) in Group A was significantly lower as compared to Group B (21.35%, 13.38%, 16.60%, 77.32%) ($P < 0.05$). The rise in SBP, DBP, MAP and RPP was sustained for 3 minutes, 2 minutes, 3 minutes, and 3 minutes respectively in Group A as opposed to 10 minutes, 4 minutes, 7 minutes and 10 minutes respectively in Group B. Similar attenuation of hemodynamic response was also seen by Manjula Sarkar et al²⁸ and Manjushree Ray et al.²⁹

For healthy volunteers and patients with Ischemic heart disease, the critical limit of RPP was found to be 22,000 and 12,000 respectively.³⁰ In our study, clonidine did not allow the RPP to rise above 12544.67 ± 1685.06 , providing protection against angina or unwanted cardiac event in perioperative period. Similar findings were also seen in the study by Youhua Zhang et al.²³

Limitations of our study

1. Our study was carried out in normotensive patients.
2. We did not measure the plasma catecholamine levels which is an objective means of measuring hemodynamic stress response.
3. We conducted the study only for initial 10 minutes after intubation. The intra operative requirement of anaesthetic agents, extubation response and postoperative sedation were not monitored.

CONCLUSION

Intravenous clonidine (3 mcg/kg) given as an infusion over 10 minutes prior to induction of anaesthesia provided adequate sedation without respiratory depression and

blunted the stress response to laryngoscopy and tracheal intubation without causing clinically significant bradycardia or hypotension. It also reduced the dose of Thiopentone sodium required for induction of anaesthesia.

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A Study of Microalbuminuria in Patients with Essential Hypertension

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ABSTRACT

Introduction: Hypertension is one of the commonest chronic disease in our country. The prevalence of hypertension is increasing day by day in our country. Improved mechanisation, increased sedentary life style coupled with increased work stress, obesity and abnormal eating habits all contribute to increasing incidence of hypertension. Our study aims at finding out the percentage of microalbuminuria in patients with hypertension and it's relationship with the duration of hypertension and target organ dysfunction.

Material and Methods: Our study was conducted in a tertiary care hospital. We studied 50 hypertensive patients who satisfied the inclusion criteria were included in the study. All patients underwent detailed clinical examination, ECG, 2D ECHO, fasting lipid profile and urine for microalbuminuria.

Results: In this study 50 patients with hypertension were observed for percentage of microalbuminuria positive patients and also as a marker for target organ dysfunction. The age group ranged from 36 years to 78 years. Majority of them were male patients. The prevalence of microalbuminuria among hypertensives increased steadily with the advancing age and the duration of hypertension. The prevalence of microalbuminuria was high as the lipid levels increased in both male and female patients.

Conclusion: In this study it was observed that the percentage of patients with microalbuminuria is more in patients with essential hypertension. Patients with advanced age and longer duration of hypertension develop microalbuminuria more commonly. Prevalence of microalbuminuria is more in patients with unfavourable lipid profile and there is high risk of development of target organ damage in patients with microalbuminuria.

Keywords: Microalbuminuria, Hypertension

INTRODUCTION

As India is progressing towards industrialisation and improved mechanisation, which has led to decreased work load and increased sedentary lifestyle of individuals, there is a rising trend of chronic life style diseases like Hypertension (HTN), Diabetes Mellitus, Obesity etc. Hypertension is an international problem with 13.5% of all deaths attributed to hypertension related deaths. It is also suggested that the prevalence of hypertension is rapidly increasing in developing countries and is one of the leading causes of death and disability in them.¹ The incidence of hypertension is increasing year after year and the prevalence of hypertension is increasing day by day due to increased life expectancy and aging population. The Jaipur heart watch study² and the Chennai Urban Rural Epidemiology study (CURES) reported the prevalence of hypertension to be 37% and 20% using the JNC- VII guidelines. The incidence of hypertension in India is 5 –15% in the adult population against 10–12% in the West. Unfortunately by the time most of the individuals are diagnosed with hypertension they have

already progressed into severe stage and many of them have already developed target organ damage like fatal stroke or myocardial infarction or irreversible renal failure.

Even in developed countries like United States 30% of hypertensives are unaware of it's presence, only 59% of hypertensives are on treatment and only 34% have good control of their blood pressure. Essential hypertension produces clinical proteinuria and a significant reduction in renal function in 5 –15% of patients. Several epidemiological studies have shown that proteinuria as well as microalbuminuria are independent predictors of cardiovascular morbidity and mortality in patients with essential hypertension. Moreover, 25% of patients with end stage renal disease have hypertension as the primary diagnosis.

Microalbuminuria is described as moderate increase in the urine albumin levels. Microalbuminuria is said to occur when there is leakage of small amounts of albumin into the urine and is said to be due to high permeability of the renal glomerulus for albumin. Microalbuminuria can be diagnosed from a 24-hour urine collection (between 30–300 mg/24 hours) or, more commonly, from elevated concentrations in a spot sample (30 to 300 mg/L). Microalbuminuria is predicted as an independent risk factor of cardiovascular mortality irrespective of its association with other cardiovascular risk factors. The risk of developing renal failure, ischemic and hemorrhagic stroke and peripheral arterial disease is doubled in the presence of microalbuminuria. This may be due to increased renal endothelial permeability and diffuse endothelial dysfunction. Hence diagnosis of microalbuminuria at an early stage helps to take proper precaution and to initiate appropriate management in hypertensive subjects. Trials have shown that lowering of albuminuria by either an angiotensin-converting enzyme (ACE) inhibitor or angiotensin II receptor blockers (ARB) was associated with a better renal and cardiovascular outcome. Moreover, it has been shown that the reno protective and cardio protective effects were related to the extent to which albuminuria was lowered.

In patients with primary hypertension, increased urine albumin ratio is associated with increased cardiovascular morbidity. In a large population based study of non diabetic hypertensives, the presence of microalbuminuria is associated

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with significantly higher prevalence of LVH, CAD, MI, Hyperlipidemia and peripheral vascular disease.³ In a study conducted by Dick de zeeuw et al in 2006,⁴ the prevalence of microalbuminuria in patients with hypertension was 8 to 23% in different cohorts. In a study conducted by S Jalal et al; it was found that microalbuminuria has a positive correlation with the severity of hypertension and thus may be an early marker for end-organ damage susceptibility.⁵ In a study conducted by Rodilla, Enrique et al;⁶ an association between serum uric acid, metabolic syndrome and microalbuminuria in previously untreated essential hypertensive patients was found. General population studies such as Prevention of Renal and Vascular End Stage Disease (PREVEND) showed an 8 to 11.5% prevalence of microalbuminuria in individuals with hypertension.

Aims and objectives of the research were to find out the percentage of patients with microalbuminuria in patients with essential hypertension and to assess the relationship of microalbuminuria with Target organ dysfunction in patients with essential hypertension like LVH, Stroke and Retinopathy.

MATERIAL AND METHODS

Adults aged more than 18 years attending Medical OPD, and patients admitted to the medical wards diagnosed to have essential hypertension in Raja Rajeswari Medical College and Hospital. The study was conducted over a period of 1 year and 50 patients meeting the inclusion criteria were taken. Ethical clearance was obtained from the ethical committee and informed consent was taken for all the patients included in the study.

Exclusion criteria

1. Proven cases of secondary hypertension
2. Diabetes mellitus
3. UTI
4. Pregnant women
5. Established cases of kidney diseases
6. Macroproteinuria
7. Strenuous exercise
8. CCF
9. Acute febrile illness
10. History of NSAID intake

The BP of each patient was measured according to JNC VII guidelines with a standardized calibrated measuring column type sphygmomanometer. BP above 140/90mm of Hg was regarded as Hypertension (JNC VII).

Each patient underwent detailed history taking and physical examination was performed on each patient. It was specifically emphasized on the assessment of the neurological status, cardiovascular status and funduscopy. All patients underwent special investigations like fasting Lipid profile, ECG for LVH, Chest radiography and Microalbuminuria. Microalbuminuria was assessed by Latex turbidimetry. 5ml of random/first morning urine sample was used. In women examinations were done during non-menstrual phase of their cycles.

STATISTICAL ANALYSIS

Descriptive and inferential statistical analysis has been

carried out in the present study. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

In this study 50 patients with hypertension were observed for percentage of microalbuminuria positive patients and also as a marker for target organ dysfunction. There were 29(58%) male and 21 (42%) female patients (Table-1). The age group ranged from 36 years to 78 years. Maximum number of patients were in the age group 51-60yrs both in male and female patient groups (Table-1). Among the patients with hypertension as seen on 2D ECHO, LVH was noted in 21(42%) patients and microalbuminuria was noted in 12 (57.14%) of these patients which was statistically significant (Table-2). The prevalence of microalbuminuria among hypertensives increased steadily with the advancing age and the duration of hypertension. The prevalence of microalbuminuria was high as the lipid levels increased in both male and female patients (Table-3). Hypertensive retinopathy was noted in 15(30%) cases among which microalbuminuria was noted in 10 (66.7%) patients which was also statistically significant (Table-4).

DISCUSSION

In our study, there were 50 patients. The age group of study population ranged from 36 years to 78 years. Among 50 patients 29(58%) were male and 21(42%) were female patients.

A study conducted by Sharan badiger et al. in 2012⁷ showed the prevalence of microalbuminuria to be 63%. A study by Bohm et al. in 2007,⁸ prevalence of microalbuminuria was found to be 58.4%, in which male were affected more than female patients. A study by Hiitha et al. in the year 2008,⁹ in South India showed prevalence of microalbuminuria to be 26.6%. In our study the percentage of patients with microalbuminuria was found to be 32% in line with the other studies.

Prevalence of microalbuminuria in patients with unfavourable

Age in years	Gender		Total
	Female	Male	
31-40	4(19%)	4(13.8%)	8(16%)
41-50	7(33.3%)	6(20.7%)	13(26%)
51-60	8(38.1%)	13(44.8%)	21(42%)
61-70	2(9.5%)	5(17.2%)	7(14%)
>70	0(0%)	1(3.4%)	1(2%)
Total	21(100%)	29(100%)	50(100%)

Table-1: Age distribution of patients studied

Echo	Gender		Total
	Female	Male	
Negative	17(81%)	12(41.4%)	29(58%)
Positive	4(19%)	17(58.6%)	21(42%)
Total	21(100%)	29(100%)	50(100%)

Table-2: Echo findings

Variables	Microalbuminuria		Total	P value
	Absent	Present		
Age in years	49.56±9.32	58.56±7.79	52.44±9.75	0.002**
Duration Hypertension	3.76±3.88	7.56±5.55	4.98±4.77	0.007**
Total Cholesterol (mg/dl)	207.71±29.92	231.19±41.66	215.22±35.45	0.027*
TGL (mg/dl)	135.50±31.72	161.25±36.17	143.74±35.00	0.014*
HDL (mg/dl)	47.41±6.23	45.81±5.47	46.90±5.99	0.384

Table-3: Comparison of study variables in relation to Microalbuminuria

Findings	Microalbuminuria		Total (n=50)	P value
	Absent (n=34)	Present (n=16)		
ECG	7(13.3%)	14(66.7%)	21(42%)	<0.001**
Echo	9(42.9%)	12(57.1%)	21(42%)	0.001**
Retinopathy	5(13.3%)	10(66.7%)	15(30%)	0.002**
CVA	0(0%)	3(18.8%)	3(6%)	0.029*

Chi-Square test/Fisher Exact test

Table-4: Findings of ECG/ECHO/Retinopathy/CVA in relation to Microalbuminuria

lipid profile is more when compared to patients with favourable lipid profile. A study by Wachtell et al.,2002,¹⁰ showed an association with raised microalbuminuria and increased risk of heart attacks and stroke. Among the patients with hypertension, 21(42%) patients had LVH as noted on 2D ECHO and microalbuminuria was noted in 12 (57.14%) of these patients which was statistically significant. Monfared et al.2013,¹¹ study showed increased microalbuminuria is a risk factor for LVH which in turn an indicator of cardiovascular risk. A study by Bohm et al. 2007,⁸ showed microalbuminuria is an independent risk factor for cardiovascular risk.

The prevalence of microalbuminuria was also higher among those with hypertensive retinopathy in our study and it was statistically significant. Microalbuminuria is more prevalent in essential hypertensives with target organ dysfunction.¹² The shortcomings of this study is small study sample and also lack of controls. Large case control studies have to be done to confirm the above findings.

CONCLUSION

In our study it was observed that the percentage of patients with microalbuminuria is more in patients with essential hypertension. Patients with advanced age and longer duration of hypertension develop microalbuminuria more commonly. There is no statistically significant differences among both sex. Prevalence of microalbuminuria is more in patients with unfavourable lipid profile and there is high risk of development of target organ damage in patients with microalbuminuria in patients with essential hypertension. The shortcomings of this study is small study sample and also lack of controls. Large case control studies have to be done to confirm the above findings.

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Modified Lip Split Incision To Approach The Posterolateral Tongue: A Case Report

Nitin Bhagat¹, Harsh Jain², S Dandagi³, Aviral Verma⁴

ABSTRACT

Introduction: The lower lip-split incision was first described by Roux in the mid 19th century and was later modified by Trotter and Konig. This incision has been widely used in the field of head and neck oncology surgeries for accessing intraoral tumours along with its extension in neck dissection when combined with mandibulectomy or mandibulotomy. Over the years, this incision has been modified to improve the aesthetic outcomes especially focussing on the chin pad contouring and postoperative scarring.

Case Report: We report a case of moderately differentiated squamous cell carcinoma of the right lateral side of tongue in a 60year old female patient who underwent hemiglossectomy, the surgical approach being the mainstay to deliver the tumour in toto with sufficient clear margins. We have also discussed the lip split incision technique for adequate exposure of the posterolateral tongue to ease in delivering the tumour. Patient recovered uneventfully and was discharged after 6 days following the surgery.

Conclusion: In our experience modified lip splitting incision used here is ideal to approach the posterolateral tongue carcinomas and also help in rapid recovery from this type of mutilating surgeries.

Keywords: Lower lip split incision, Squamous Cell Carcinoma, Posterolateral Tongue

INTRODUCTION

Squamous Cell Carcinomas comprises of 90% of all Oral Cancers.¹ The primary importance is the adequate margins in a composite resection of oral carcinomas. Further considerations include the cosmetic result of the patient after the operation. Most intraoral tumors may be accessed and excised through an intraoral approach. However, in cases where access is poor and a wide exposure is needed, a splitting of the lower lip can be done.²

Roux in mid-19th century first described lower lip splitting procedure which was later modified by Trotter and Konig. A total number of 60 patients were treated with various lip splitting incisions between 1992 and 1998 and were assessed for the functional and aesthetic results of the lower lip split. The use of lower lip splitting incision has been widely used in head and neck oncologic surgery for access to the intraoral, pharyngeal, and parapharyngeal tumors and allow access to the cervical part of the spinal column, can be combined with a mandibulotomy or mandibulectomy and allowing a neck dissection to be performed as it can be extended as a neck dissection incision. Good exposure to the site of operation is essential for an adequate three-dimensional resection of the tumour. The access to posterolateral tongue can be achieved through a variety of means with a difficulty in adequate exposure and a risk potential of the adverse aesthetic and

functional outcomes postoperatively. Aesthetic lip splitting procedure can greatly enhance exposure during excision of a bulky lesion and facilitate subsequent wound closure.³

The incision used in our case offered optimal exposure and visualization without disfigurement and loss of function with low morbidity.

CASE REPORT

A 60 year-old female reported to the oral and maxillofacial clinic with a chief complaint of slowly enlarging ulcer on the right side tongue with difficulty in swallowing since 6 months. Intraoral examination revealed an ulceroproliferative lesion measuring 3.5 cm*2 cm in diameter on the right lateral border of the tongue was present and was tender on palpation (Figure 1).

MRI scan showed an altered signal intensity lesion of size 3 cm (CC)*2 cm (AP)*1.5 cm (Tr) involving right lateral border of the tongue with enlarged right jugulodigastric lymph node measuring 2cm in short axis.

A clinical diagnosis of Squamous Cell carcinoma was made. A hemiglossectomy with Modified Radical Neck Dissection II was planned and using the modified lower lip split incision to approach the posterolateral tongue. Nasal endotracheal intubation was done for general anaesthesia. Vital signs were maintained within the normal limits. Painting with 5% povidone-iodine and draping was done. Local Anaesthesia (1:80,000) was injected at the site of the incision. A separate lip split incision was made to expose the posterolateral tongue following neck dissection (Figure 2).

Layer by layer dissection was done. Facial vessels were identified, clamped, cut and ligated. Tumour on the posterolateral tongue was exposed. Hemiglossectomy was done and the specimen with 1cm margins was delivered (Figure 3).

Intraoral tongue defect was sutured in a continuous manner using 3-0 vicryl sutures. Layer by layer closure was done with vicryl 3-0 and skin was closed with 3-0 silk suture. The post operative healing was uneventful. Patient recovered un

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eventfully and was fed on ryles tube for 7 days, and was discharged after 6 days.

The specimen was x-rayed to know radiographic clear margins followed by histopathological examination. Microscopically, hematoxylin and eosin-stained section showed the presence of islands and sheets of dysplastic epithelial cells in the connective tissue stroma along with presence of keratin pearls. Few areas also showed cords and islands of atypical squamous cells infiltrating into muscle fibers. Submandibular lymph nodes and Juguloomohyoid group of lymph nodes showed metastasis with areas of atypical squamous cells, presence of keratin pearls and areas of keratinisation. Hence, the final diagnosis of Moderately Differentiated Squamous Cell Carcinoma with metastasis in Level I and Level III group of lymph nodes was made.

Patient is under regular follow-up since then and there are no signs of recurrence or any fistula formation and infection (Figure 4).

DISCUSSION

The most challenging surgical aspects include difficulty in obtaining adequate access to lesions of floor of the mouth or those situated on the medial aspect of posterior mandible often. The preservation of important anatomic structures in the adjacent regions comes to an edge when the need for free access and ample exposure of those lesions is required. The desire for preservation of vital structures is heightened when the lesion is benign, however, is situated in an inaccessible location. In dealing with a malignant lesions, the bone, nerves and other structures have to be sacrificed in order to achieve an adequate ablation. Surgeries at the, pterygomandibular, floor of the mouth and posterolateral tongue region may be difficult unless adequate access is achieved.

A straight line vertical split of the lower lip to the midline of mandibular symphysis was described by Diefenbach in 1834, Burow in 1855 and Bernard in 1853. This technique is simple and reliable but has cosmetic and functional disadvantages. The scar contraction leaving a notched vermilion and the distended chin,⁴

A modification of the lower lip split was described Konig in 1922 where a vertical incision is made starting at 1.5 cm medially to the oral commissure and descending vertically to the lower mandibular border. This incision can be elongated

into a collar incision as well.⁵

The mandibular midline split as part of the anterior translingual pharyngotomy was used by Wilfred Trotter in 1929 for the removal of the lesions of epiglottis, base of the tongue and associated glossoepiglottic fold.⁶

The lip-splitting approach can include a mandibular osteotomy to gain additional exposure of the oral cavity and pharynx even when segment of the mandible is not be resected. The lip incision can be extended below the jaw, creating a cheek flap that is reflected posteriorly at the cornmissure of the mouth. The eventual cosmetic outcome depends upon the placement of the incision lines in natural facial creases and recesses along with the careful reapproximation of the lip muscle, subcutaneous tissue, skin, and mucous membrane. The placement of two or three mattress sutures well into the depth of the orbicularis oris muscle during repair should be

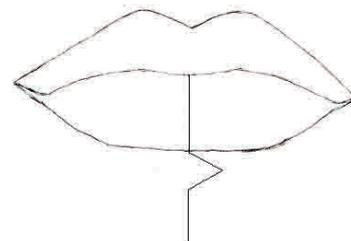


Figure-2: Schematic diagram of modified lip splitting incision



Figure-3: Exposure following modified lip splitting incision



Figure-1: Incision markings on patient



Figure-4: 2 weeks, post operative photograph of the patient.

considered of particular attention to prevent late notching of the lower lip. Similarly, the most important external landmark to realign is the vermillion border.²

To achieve the postoperative functional and aesthetic results after lip splitting approach, adherence to basic surgical principles and correct closure of incision are critical. This includes suturing in layers and careful approximation of previously determined skin points. Special attention should also be paid to proper alignment of vermillion border, which is especially prominent aesthetic unit. Various authors have proposed modifications, by breaking the incision line to better conform to the anatomic contour of region.⁷

Vertical splitting of the lower lip has proved to be an unreliable procedure due to the presence of a long straight scar and result in a notched vermilion. A vertical depression is formed in cases of transection of the chin, disturbing its smoothness and roundness, which gets even more accentuated on facial movement.³

The modified splitting technique, therefore, used in our case seems to be an immense improvement in allowing accurate repair of the vermilion and the orbicularis oris muscle, following the anatomic contour of the lower lip and chin, staying close to the midline to avoid nerve injury, safe extension with the neck incisions avoiding injury to the marginal mandibular nerve, giving the most satisfactory aesthetic and functional results and the likelihood of scar contraction being very less. In our experience modified lip splitting incision used here is ideal to approach the posterolateral tongue carcinomas and also help in rapid recovery from this type of mutilating surgeries.

CONCLUSION

A number of modifications of lip split incisions have been used to approach various regions of the oral cavity. The modified lip split incision used in our case has offered good aesthetic outcomes with no scar appearance, minimal scar contracture, optimum functional results, adequate access and exposure and has proved to be a safe extension with the neck dissection incision.

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Seroprevalence of *Helicobacter Pylori* in COPD Patients in Kashmir, India

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ABSTRACT

Introduction: Worldwide *Helicobacter pylori* infection is the most common chronic bacterial infection of humans. The aim of the study was to evaluate the seroprevalence of *helicobacter pylori* in COPD patients in Kashmir, India

Material and methods: 50 patients with symptoms of COPD were included in the study and compared with 50 healthy controls. Blood samples (4-5 ml) were collected from patients and controls. Serum was separated and stored at -20 °C till tested. *H. pylori* specific IgG antibodies were detected. The test procedure was carried out as per manufacturer's instructions.

Results: Mean concentration IgG ELISA anti *H. pylori* was (57.8±5.4 U/ml) in COPD patients and (37.6±4.3U/ml) in controls. There was a significant difference in concentration of anti *H.pylori* IgG ELISA between COPD patients and controls (p=0.004). There was also a significant difference in seroprevalence of *Helicobacter pylori* between COPD patients and controls (p=0.014). There was also a significant difference in High +ve IgG ELISA anti *H.pylori* seroprevalence between COPD patients with that of controls (p=0.027)

Conclusion: We concluded that the Seroprevalence of *H.pylori* is higher in COPD patients as compared to healthy controls. Also the mean concentration of anti *H.pylori* IgG is higher in COPD patients as compared to healthy controls. And the occurrence of High positive anti *H.pylori* IgG levels is higher in COPD patients as compared to healthy controls.

Keywords: Seroprevalence, *Helicobacter Pylori*, COPD

through an immune mediated release of substances associated with vasospasm or platelet aggregation.

Detection of serum anti *H.pylori* Cag A is currently the most practical investigation for predicting bacterial virulence and disease development in *H.pylori* infection.⁵ Various studies has shown that these cytokines may be expressed in chronic bronchitis or its acute exacerbation.⁶⁻⁹ Moreover a cross mimicry between bacterial and host antigens exists in *H.pylori* infected patients.¹⁰ In Chronic bronchitis^{8,9} and bronchiectasis¹¹ and other respiratory diseases the symptoms are actually an interplay of chronic inflammation and exaggerated immune response. Recently *H.pylori* has been identified in tracheobronchial aspirates in mechanically ventilated patients and possibility that it might cause ventilator associated pneumonia has been raised,¹² it appears that *H.pylori* has a close relationship with respiratory diseases.¹³

Study aimed to determine the seroprevalence of *helicobacter pylori* in COPD patients and to find out the association of *helicobacter pylori* with COPD.

MATERIAL AND METHODS

Study group: This study was conducted at the Sher- I- Kashmir institute of medical sciences, Srinagar, Jammu and Kashmir. The following groups of patients/subjects were included in the study after taking written informed consent and ethical clearance.

Group I (n=50) – Patients with COPD.

Inclusion Criteria

Chronic obstructive pulmonary disease (COPD) is a chronic disorder characterized by not fully reversible and usually progressive airflow limitation. This limitation is thought to be associated with an abnormal inflammatory response of the lungs to noxious particles and/or gases.¹⁴

- The airflow limitation that is not fully reversible is confirmed by spirometry (post bronchodilator FEV1 <80%) of the predicted value, in combination with an FEV1/FVC<70%.

INTRODUCTION

Helicobacter pylori is a slow growing, microaerophilic spiral shaped gram negative bacteria, whose most striking biochemical characteristic is abundant production of urease. It was successfully cultured from gastric biopsy specimen from patients with histological gastritis in Perth, Australia, in 1982 and was soon named *Campylobacter pylori* (a name latter changed to *Helicobacter pylori*).¹

The prevalence of chronic obstructive pulmonary disease in patients with peptic ulcer is 2-3 times greater than in ulcer free controls.^{2,3} Based on these facts, many recent studies have focused on the potential association between *H.pylori* infection and various respiratory disorders.

Epidemiologically, *H.pylori* infection is associated with myriad extra gastrointestinal pathologies including cardiovascular, skin, rheumatic and liver disease as suggested by various studies.^{4,5}

H.pylori infection often triggers a marked local inflammatory response and a chronic systemic immune response. One hypothesis is that the persistent inflammatory response related to *H.pylori* infection could induce vascular disorders

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Exclusion Criteria

Following patients were excluded:

- Previous month exacerbation of COPD (the exacerbation was defined as “increased dyspnea associated with change in quality or quantity of sputum, which led the patient to seek medical attention).¹⁵
- Prior *H.pylori* eradication therapy.
- Anti-acid drugs or antibiotics consumption in the preceding 6 months.
- A known history of gastro intestinal tract pathology.
- A known history of vagotomy or operation on the upper gastro intestinal tract.

Group II (n=50) – consisted of Healthy Controls. Healthy controls with following criteria’s were also included.

Exclusion Criteria

- A known history of chronic bronchitis
- A known history of gastro intestinal tract pathology.
- Detailed history was recorded and physical examination was performed on the patients. Routine investigations like TLC, DLC were done.

Antibody Detection

Blood samples (4-5 ml) were collected from patients and controls. Serum was separated and stored at -20 °C till tested. *H. pylori* specific IgG antibodies were detected by using kit obtained from Adaltis Italy. The test procedure was carried out as per manufacturer’s instructions.

Calculation of results

The results were calculated by subtracting the blank OD from all the reading to have the net OD values. This was followed by derivation of mean and S.D (standard deviation) of the observed OD values. The obtained value of SD was doubled to which the already obtained value of mean was added which was our cut off value. The ratio between the average net O.D value of sample and that of cut off was calculated. This ratio is the cut off index (COI). The sample is considered positive if ratio is > 1.2, negative if the ratio is <0.8, border line if between 0.8 to 1.2 (cut off±20%). If the result was doubtful the test was repeated.

STATISTICAL ANALYSIS

Statistical analysis was performed by using statistical

package for social sciences (SPSS software version 13, Chicago IL). A p-value of < 0.05 was taken significant

RESULTS

A total of 100 subjects were selected which comprised of 50 COPD patients and 50 controls. Maximum number of COPD patients were in age group 51-60 years (40%) and controls in age group of 41-50 years (42%). For COPD patients male to female ratio and the rural to urban ratio were [(1.17:1) and (1.38:1)] and for controls the ratio’s were [(1.38:1) and (2.125:1)] respectively. There was significant difference in rural to urban ratio between COPD patients and controls (p=0.052). Majority of COPD patients (76%) and controls (62%) were current smokers. There was a significant difference in smoking status (current smokers versus non-smokers plus ex-smokers) between COPD patients and controls (p=<0.001)

Clinically patients presented with cough with expectoration or cough with expectoration and breathlessness while controls were asymptomatic. PFT of the COPD subjects showed that 32 COPD patients (64%) were in GOLD Stage I and 18 COPD patients (36%) were in GOLD Stage II with a ratio of (1.77:1), while general investigation profile of the studied subjects showed that 5 COPD patients presented with anemia (10%) and none among the controls.

Mean concentration IgG ELISA anti *H. pylori* was (57.8±5.4 U/ml) in COPD patients and (37.6±4.3U/ml) in controls. There was a significant difference in concentration of anti *H.pylori* IgG ELISA between COPD patients and controls (p=0.004) (Table-1).

There was a significant difference in seroprevalence of *Helicobacter pylori* between COPD patients and controls (p=0.014). There was also a significant difference in High +ve IgG ELISA anti *H.pylori* seroprevalence between COPD patients with that of controls (p=0.027) (Table-2).

DISCUSSION

Recent studies suggest an epidemiological association between *helicobacter pylori* infection and several extra gastro duodenal pathologies, including cardiovascular, rheumatic, skin and liver diseases.^{4,5,10} In Chronic bronchitis^{8,9} and bronchiectasis^{10,11} and other respiratory

IgG ELISA for Anti H Pylori	min	max	Mean	SE	Inter group Comparison	p value
COPD	1	100	57.8	5.4		
Control	1	100	37.6	4.3	G1 and G2	0.004

Table-1: IgG ELISA concentration for anti H Pylori in the studied subjects

Sero-prevalence		COPD		Control		Total		p value	
		n	%	N	%	n	%		
Sero-prevalence for H-Pylori	Positive	39	78.0	25	50.0	99	67.3	a: p=0.684, b: p=0.014, c: p=0.004, d: p=0.005	
	Negative	11	22.0	25	50.0	48	32.7		
Result	+Ve	16	32.0	18	36.0	56	38.1		a: p=0.085, b: p=0.994, c: p=0.027, d: p=0.071
	-Ve	11	22.0	25	50.0	48	32.7		
	High +Ve	18	36.0	6	12.0	33	22.4		
	Boder line	5	10.0	1	2.0	10	6.8		

Table-2: Sero-prevalence of H Pylori as per IgG ELISA of the studied subjects

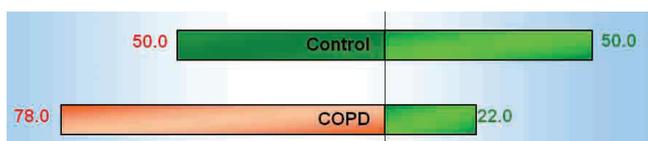


Figure-1: Seroprevalence of H Pylori as per IgG ELISA in studied subjects

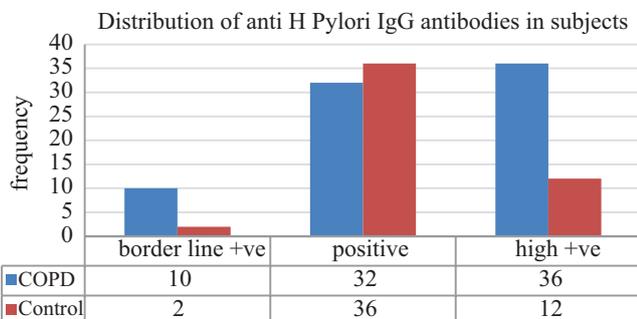


Figure-2: H Pylori as per IgG levels in studied subjects

diseases the symptoms are actually an interplay of chronic inflammation and exaggerated immune response with evidence of *H.pylori* infection evidence by seropositivity.¹⁶ However, such association has not been seen in bronchial asthma suggesting that *H.pylori* may have a role in COPD especially when smoking history is lacking. At present, there is no definite proof of a causal relationship between H pylori and respiratory diseases, since most studies are case- control studies, with small sample size.

The pathogenesis or the association between the two can be due to inflammatory mediator activation. So measuring the concentration of these mediators, virulence factors based on various strains and genetic predisposability of the infected host in *H.pylori*-infected patients with respiratory diseases need further evaluation.

In the present study, a high seroprevalence in patients with COPD as compared to control subjects was observed ($p=0.005$). The difference in seroprevalence also exists when COPD patients are compared with control subjects as different groups (p value: 0.004 and 0.035 respectively). The inference being simple that possibly in *H.pylori* infection there is triggering of a cascade of inflammation to produce the disease. These observations are also recorded by many studies conducted even with larger sample sizes than our.¹⁶⁻¹⁹ Our results are consistent with study conducted by Kanbay Mehmet²⁰ in which 66% chronic bronchitis patients versus 57.7% controls tested positive for *H.pylori* ($p=0.008$). In study conducted by Roussas- et-al in Greece¹⁷ 83.3% chronic bronchitis where anti *H.pylori* IgG positive ($p=0.007$) as compared to 60% healthy controls. However the sample size of study was large as compared to our study. In Dr Anastasios Roussa's study¹⁹ the prevalence of *H.pylori* in patients and controls was 77.8% and 54.7% respectively ($p<0.001$). A Chinese study¹⁸ showed that there was no significant difference between chronic bronchitis and peptic ulcer group for anti *H.pylori* IgG (p is more than 0.05). However these serological parameters were significantly higher in patients with chronic bronchitis or peptic ulcer than in control groups ($p<0.01$)

When we compared seroprevalence as number of high

positive, positive, borderline and negative in different groups a statistically significant high positive results were observed in COPD group compared to control group ($p=0.001$). This stronger association between COPD and *H.pylori* needs to be confirmed as unfortunately none of the studies conducted studied this parameter. One can postulate that a higher burden of infection to produce substantial amounts of pro-inflammatory markers is possibly needed to produce COPD. However, it is too early to conclude as our sample size and others too, is not large enough to draw conclusions. However, the main outcome of the study prevailed as we found a significant difference in antibodies against *H.pylori* amongst COPD patients as compare to control group ($p=0.011$). nearly similar study results were found by Dr. Anastasios Roussas from SOTRIA Chest Diseases Hospital in Athen.¹⁷ However, the absolute values don't match between our study and his, due to difference in ELISA kit standardizations as per manufacturers protocol.

The reported association between chronic bronchitis and development of ulcerogenesis was attributed to cigarette smoking in previous studies²¹ where smoking was regarded as independent factor, however the relationship between cigarette smoking and *H.pylori* is controversial. The prevalence of *H.pylori* infection in smokers has been reported as low,²² normal,²³ or high.²⁴

The influence of smoking on the prevalence of chronic bronchitis has also been little understood.²⁵ Therefore we tried to compare the current smoking status of COPD patients and controls (also smokers and never smokers) and found no statistical difference. Hence an inference can be made that smoking does not predispose to *H.pylori* infection as seroprevalence significantly differed between COPD and control groups. Similar observations have been made by the chinese study.¹⁸

Hence we postulate that chronic activation of inflammatory mediators induced by *H.pylori* infection might lead to development of COPD. It is well known that *H.pylori* stimulate the release of a variety of pro-inflammatory cytokines, including IL-1, IL-8 and TNF- α .^{26,27} Moreover, eradication of *H.pylori* leads to normalization of serum cytokines level.²⁸ These cytokines are also thought to be involved in the pathogenesis of chronic bronchitis.^{7,8,11} Therefore, *H.pylori* function in general and Cag A positive strains in particular might play a pro-inflammatory role in co-triggering chronic bronchitis with other more specific environmental genetic and some unknown factors.

CONCLUSION

We concluded that the Seroprevalence of *H.pylori* is higher in COPD patients as compared to healthy controls. Also the mean concentration of anti *H.pylori* IgG is higher in COPD patients as compared to healthy controls. And the occurrence of High positive anti *H.pylori* IgG levels is higher in COPD patients as compared to healthy controls.

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Comparative Evaluation of Spinal and Epidural Anaesthesia Techniques For Caesarean Section

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ABSTRACT

Introduction: Regional anaesthesia techniques for a caesarean section usually include either epidural or spinal anaesthesia. To determine the most efficient approach among the two mentioned previously, a group of patients who underwent caesarean section were retrospectively analysed to corroborate and contrast the effectiveness of spinal and epidural anaesthesia techniques employed during the procedure.

Material and Methods: Patients selected for the study included only those who met the American Society of Anesthesiologists physical status classification system (ASA) I or II and underwent caesarean sections. This study involved one hundred fifty patients each who received either spinal or epidural anaesthesia. These patients were examined retrospectively. The time from anaesthesia to surgical incision (T_A to T_S), total anaesthesia period, and the requirements of vasopressor and midazolam were evaluated among the two approaches.

Results: The T_A to T_S time and the total anaesthesia period of the group that undertook spinal anaesthesia were found to be significantly shorter when compared to the times recorded for the epidural anaesthesia group. The use of vasopressor was found to be more recurrent in the spinal anaesthesia group as their declines in blood pressure were found to be greater.

Conclusion: The T_A to T_S time and the total anaesthetic period were greater for the epidural anaesthesia group than spinal anaesthesia. On the other hand, the hemodynamic changes were significantly lesser and requirement for vasopressor hardly arised in the former group. Hence, the preference of the technique must involve a careful assessment of the anaesthetic, obstetric and other clinical situation.

Keywords: Anaesthesia, Caesarean section, Epidural, Spinal.

INTRODUCTION

Most patients undergoing caesarean sections are usually taken up under spinal or epidural anaesthesia.¹ In contrast to general anaesthesia, regional anaesthesia has been found to lessen the airway problems and risk of pulmonary aspiration that can occur due to failure of intubation.² The advantages of epidural anaesthesia include the ability to induce anaesthesia without provoking an abrupt change in the cardiovascular characteristics as in cases of haemodynamic volatility.³ Spinal anaesthesia, on the other hand, is simple and quicker, and allows a diminution of time required for anaesthesia to induction.³

However, to assess the comparative efficiency and frequency of side-effects of either of the regional anaesthesia techniques in women undergoing caesarean section is imperative, because anaesthesia in such cases is still far away from what is ideal. The selection of anaesthesia technique depends on maternal and foetal circumstances, expectant women's

and anaesthesiologists' predilection, and the surgical circumstances.²

Thus, this study was taken up to evaluate the effectiveness spinal vs. epidural anaesthesia with the help of a patient survey, so as to make out the most proficient method.

MATERIAL AND METHODS

The study methodology was approved by the Institutional Review Board (IRB). Only those mothers who met the criteria set by the American Society of Anesthesiologists physical status classification system (ASA) I or II and had undergone caesarean sections were included. However, both routine and emergency operations were included in the study. The target population included one hundred fifty patients each who undertook either spinal or epidural anaesthesia; the pertinent data were analysed retrospectively, and therefore no power calculation was performed. The patients who fell under ASA III-V classification, or who underwent general anaesthesia were excluded.

No premedication was used for any of the patients who were included. ECG, pulse oximetry and non-invasive blood pressure measurements were included for intra operative assessment. Oxygen was applied through a mask at the rate of 5 L/min. Preoperatively, 400-500 mL of lactated Ringer's solution was administered.

The technique for epidural anaesthesia involved the addition of fentanyl (100 mcg) to 0.75% levobupivacaine (15–25 mL), via the loss-of-resistance-to-air technique. The anaesthetic solution was administered using an 18-gauge Tuohy needle and a 20-gauge catheter between lumbar vertebrae 3 and 4, with the patient in the sitting position.

The procedure for spinal anaesthesia involved adding 0.5% bupivacaine (10–12 mg) and fentanyl (10–20 mcg) and was performed using a 26-gauge spinal needle to the same interspace.

The age, height, weight, gestational age and the ASA physical health status of all the selected patients were recorded. Continuous monitoring of systolic blood pressure was carried out and a decline more than 20% (in comparison to the baseline) was recorded. After the administration of the regional anaesthesia was completed, the skin sensory

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block degree was recorded and the time from anaesthesia to surgical incision (T_A to T_S) time; entire anaesthesia period; midazolam usage; and usage of phenylephrine or ephedrine were compared among the two anaesthesia techniques used. Apgar score of the newborn at one minute and five minutes; the state of the postdural puncture headache (PDPH); and the visual analogue scale (VAS) pain score at one day after surgery were also examined.

STATISTICAL ANALYSIS

Mean \pm standard deviation values were used to evaluate (T_A to T_S) time, total anaesthesia period, requirement for vasopressors and midazolam, Apgar score, and VAS pain score. To compare the two groups, the unpaired t-test was used. Chi square test was utilized for frequency evaluation. $P < 0.05$ was considered to be statistically significant. SPSS version 18.0 was used for statistical analysis.

RESULTS

No significant differences were found in the age, height, and weight, sensory block level and ASA status. It was seen that a statistically significant difference existed in the T_A to T_S time, the entire anaesthesia period, and the extent of use of vasopressors between the two groups. Both T_A to T_S time and total anaesthesia periods were shorter for the spinal anaesthesia group as compared to the epidural anaesthesia group.

The decline in systolic blood pressure, however, was seen to be more frequent in the spinal than in the epidural anaesthesia group, and hence the extent of usage of phenylephrine and ephedrine was also more (Table 1).

The differences in the one minute and five-minute Apgar score of the newborn; the VAS pain score at 1 day after surgery; and the PDPH degree were not found to be statistically significant between the two groups (Table 2).

DISCUSSION

During caesarean section operations, anaesthesia has been found to eliminate pain and hence show fewer side effects in both the mother and infant. The ideology of anaesthetists in obstetrics is that anaesthesia time must be as little as possible and also the hemodynamic changes be minimized to consistently maintain the blood flow through the uterus. Studies have shown that maternal mortality rate is 16 times as high for general anaesthesia as that for regional anaesthesia.⁴

Thus, regional anaesthesia is the more commonly employed technique over general anaesthesia for such patients.⁵ Spinal anaesthesia usually allows a faster induction and thus, enhances the rate of turnover in the operation theatre when compared to epidural anaesthesia.⁶

Obstetric surgeons are usually inclined to the belief that it is better for the infant to be taken out as soon as possible and thus; quite a lot of hospitals administer spinal anaesthesia, even with an epidural catheter inserted with to assist for a painless vaginal delivery.⁷

The time from beginning anaesthesia to the commencing of surgery (T to T_S) and the entire anaesthesia period were found to be significantly lesser for spinal anaesthesia and that is the biggest advantage of this procedure. However, the decline in systolic blood pressure $> 20\%$ as compared to baseline was also found to be more after spinal anaesthesia. Thus, the incidence of use and the amount of ephedrine or phenylephrine used were also found to be greater with spinal anaesthesia. Also in a previous study, it was seen that the level of anaesthesia increased so quickly for spinal, which resulted in a respiratory insufficiency. Eventually it was seen that unconsciousness occurred leading to a conversion into general anaesthesia with intubation.⁸

The benefits and issues related to spinal and epidural anaesthesia stand in an obvious disparity. Also the use of a combination of spinal and epidural anaesthesia has become more common in recent times.

Since the combined spinal epidural anaesthesia shares the advantages of inducing spinal anaesthesia quickly and reinforcing intermediate blockage; the associated complications, such as high-level blockage or hypotension, can be significantly reduced by diminishing the amount of the spinal anaesthetic used.⁹ However, the anaesthesia time is longer with spinal anaesthesia itself and the level of the anaesthesia also increases fast as in spinal anaesthesia; so the drawback of abrupt hemodynamic changes still remains. A recent study has suggested the possibility of failure was higher with the use of combined anaesthesia than seen for spinal anaesthesia alone.¹⁰

The present study clearly showed that there was no difference among the groups in terms of the status of the newborn baby (as revealed by the Apgar Scores) and the pain experience by the mother after surgery. Thus, it can be proposed that, while general anaesthesia should only be used if the status of

	Spinal anaesthesia	Epidural anaesthesia	p- value
A-to-S time (min)	19.81 \pm 4.23	28.46 \pm 6.34	0.034
Total anaesthetic period (min)	86.34 \pm 13.84	93.13 \pm 12.68	0.016
SBP decrease $> 20\%$	46.4%	22.8%	0.038
Ephedrine/phenylephrine use	76.4%	32.5%	0.042
Ephedrine (mg)	7.8 \pm 2.4	2.7 \pm 1.8	0.029

Table-1: Intraoperative characteristics for the different anaesthesia techniques.

	Spinal anaesthesia	Epidural anaesthesia	p- value
Apgar score (at 1 min)	8.54 \pm 0.23	8.78 \pm 0.45	0.083
Apgar score (at 5 min)	9.34 \pm 0.46	9.56 \pm 0.31	0.143
VAS pain scores on postoperative day 1	3.12 \pm 1.13	3.43 \pm 1.26	0.282

Table-2: Apgar scores and maternal pain scores after caesarean section.

foetus worsens rapidly; spinal anaesthesia must be preferred for use in cases of relative urgency. The use of epidural anaesthesia should be minimized with careful monitoring of haemodynamic changes in those cases and preferred only where the patient's and foetus's state is stable.

CONCLUSION

The time from anaesthesia to the commencement of surgery (T_A to T_S) and the entire anaesthetic period were found to be longer with epidural anaesthesia. However, the haemodynamic changes were small and vasopressor use was also minimal. Also, the Apgar score was similar in both groups, thus the type of anaesthesia used was found to have no different effects on the newborn. Hence, the selection of the anaesthetic technique used must depend upon the anaesthetic, obstetric and clinical situation in each and every case.

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The Role of Empirical Antibiotic Therapy in Treating Necrotizing Fasciitis: A Retrospective Record Analysis

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ABSTRACT

Introduction: Necrotising fasciitis is a fulminant polymicrobial soft tissue infection with high mortality rate. The four treatment principles are; fluid resuscitation and correction of electrolyte and acid-base imbalance, early initiation of antibiotics, surgical debridement of the affected area and supportive measures for organ failure. But to initiate antibiotics based on culture sensitivity reports one has to wait for atleast three days. The patient condition worsens by then and mortality rate is high. So it is beneficial to start combination empirical antibiotic therapy rather than waiting for culture reports².

Material and Methods: Fifty patients with necrotizing fasciitis were retrospectively analysed where early empirical antibiotics were initiated along with other treatment modalities. The clinical and laboratory parameters and the duration of stay in hospital were taken into consideration. The comorbidities of the patients were noted. The primary end point was clinical symptomatic improvement of the patients and the secondary end point was wound healing.

Results: The incidence was more in males (64%) when compared to females (36%). Elderly between 60-80 years of age were affected more (40%). Patients with comorbidities (74%) especially diabetes mellitus (40%) were affected more. The extremities (96%), face (2%) and upperlip (2%) were involved. Almost all the patients presented with local tenderness (100%), oedema (100%), erythema (100%) and swelling (98%). Most of the patients had low haemoglobin (66%) and raised serum procalcitonin(50%). Blood culture was positive in 4% and pus culture was positive in 34% of the patients. Most of patients (50%) improved between 3-14 days. Majority of the patients (88%) improved with empirical antibiotic therapy.

Conclusion: The study concludes that the empirical antibiotic therapy in early management of patients with necrotising fasciitis who were started on triple drug regimen improved irrespective of culture growth.

Keywords: Necrotizing fasciitis, Clinical presentation, empirical antibiotics, outcome

INTRODUCTION

Necrotising fasciitis (NF) is a dangerous and potentially life threatening soft tissue infection. It causes rapidly spreading necrosis of fascia and subcutaneous tissues. It also involves muscles and skin. Previously known as hospital gangrene, gas gangrene and fourmiers gangrene. It is most frequently due to group A β -haemolytic streptococcus. A number of other organisms have also been isolated and mortality rate is 25-73%.¹

Patients with necrotising fasciitis requires specialists from medicine, surgery, plastic surgery, critical care and rehabilitation.² At present the treatment options available

are-

1. Fluid replacement, electrolyte disturbances and acid-base imbalance correction.
2. Early initiation of antibiotics.
3. Surgical debridement of the affected area.
4. Supportive measures for organ failure.³

In addition to antimicrobial therapy, complete debridement of infected tissue is key to successful treatment.⁴

The treatment modalities of NF in different patient groups are different, but the most important factor of mortality is the time of operative intervention and antibiotic therapy. The number of co-morbidities also determine the mortality. The commonest comorbidities are DM, IV drug users and haematological malignancies.⁵

The success in managing a patient with NF involves early and prompt initiation of suitable antibiotics. This becomes even more important as blood and tissue cultures are not immediately available. It will take around three days. This interval is very critical. The selection of appropriate antibiotics must also take into consideration the increasing global prevalence of MRSA and local antimicrobial susceptibility patterns.⁶ MRSA is responsible for 3.6% to 39% of NF disease, causing a destructive and deep seated infection, the amputation rates being 18.4%. The prevalence of NF due to MRSA may vary worldwide due to local epidemiological patterns. With this the mortality can be reduced as low as 10-12%. For the broad coverage of regional MRSA strains an empirical antibiotic therapy regimen, including clindamycin, metrogl and amikacin were started.

Therefore there is a need for early initiation of combination empirical antibiotic therapy and improve the outcome. Evidence regarding the same is lacking in medical literature. The main objective of this retrospective record analysis was to prove the early initiation of empirical antibiotic therapy was beneficial than waiting to initiate culture oriented antibiotics.⁷

MATERIAL AND METHODS

This was a retrospective record analysis from 2010 to 2014 done at a tertiary referral unit in Bengaluru. The inclusion criteria were all patients with a clinical diagnosis of

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necrotizing fasciitis based on the infectious diseases society of America.⁸ Exclusion criteria were prior antibiotic therapy and past history of necrotizing fasciitis. Ethical clearance was taken. As this was a record analysis informed consent was not necessary.

Total number of patients were 50. For broad coverage of regional MRSA strains an empirical antibiotic therapy regimen; including clindamycin, metrogyl and amikacin were started. The clinical and laboratory parameters, gender, age and the duration of stay in the hospital were taken into consideration. The comorbidities and the outcome were noted.⁹

Sample size estimation: Based on the previous study conducted by Childers BJ, et al. a total of 163 cases for 14 years were retrospectively analysed and found out that mortality rate was high in patients with culture positivity, comorbidities, delay in starting the antibiotics and inadequate debridement.¹⁰ In the present study the sample size was calculated to be 50 considering relative precision of 10% and desired confidence level of 95%.

STATISTICAL ANALYSIS

All the quantitative variables in this study like age,

Age in years	No. of patients	%
<10	1	2.0
10-20	5	10.0
21-30	2	4.0
31-40	2	4.0
41-50	9	18.0
51-60	7	14.0
61-70	10	20.0
71-80	10	20.0
>80	4	8.0
Total	50	100.0
Mean \pm SD: 55.70 \pm 22.04		

Table-1: Age distribution of patients studied

biochemical and haematological measurements were summarised and presented using descriptive statistics such as mean, standard deviation, median and range.

All the qualitative parameters like gender were presented using frequency and percentage.

It was an observational clinical study. Analysis was done in two phases; descriptive and inference. The mean, median and the biochemical values were compared and p value was calculated using Fisher Exact test. The primary end point was clinical symptomatic improvement of the patients and secondary end point was wound healing.¹¹

RESULTS

There were 50 patients. Incidence was more in males (64%) when compared to females (36%). The age of the patients was ranging from 10 years to 80 years (median 55 years). Elderly between 60-80 years of age were affected more (40%) as shown in Table-1.

The site of necrotizing fasciitis observed in this study are as follows: The extremities (96%), face (2%) and upper lip (2%) were involved. In 78% of the patients lower limbs were involved, making it the commonest site of infection.

The clinical features were common in all the patients. They presented with pain, oedema, erythema and swelling.

Almost all the 50 patients presented with pain (100%), 50 with oedema (100%), 50 with erythema (100%) and 49 with swelling (98%). Hemoglobin (g/dl) distribution of patients studied showed that it was low in 66% of the patients. Serum procalcitonin distribution of patients studied showed that it was raised in 50% of the patients.

Blood culture was positive in 4% of the patients. Pus culture was positive in 34% of the patients.

74% of the patients had underlying comorbidities. The commonest was diabetes mellitus (40%) followed by hypertension (16%) as shown in Table-3. Half of the patients (50%) improved between 3-14 days. 28% stayed beyond 14 days. Mortality was noted in patients who stayed for more

Blood Culture	Gender		Total
	Female	Male	
No growth	16(88.9%)	32(100%)	48(96%)
Acinetobacter sensitive to Amikacin/cefepime/piperacilin&tazobactum/Aztreonam/	1(5.6%)	0(0%)	1(2%)
K pneumoniae sensitive to Amikacin, meropenam, levofloxox	1(5.6%)	0(0%)	1(2%)
Total	18(100%)	32(100%)	50(100%)
Pus/Tissue c/s	Gender		Total
	Female	Male	
No growth	14(77.8%)	19(59.4%)	33(66%)
S aureus sensitive to cefoperazone	1(5.6%)	2(6.3%)	3(6%)
Coagulase positive staph sensitive to amikacin	0(0%)	2(6.3%)	2(4%)
Enterococcus sensitive to erythromycin	1(5.6%)	1(3.1%)	2(4%)
ESBL sensitive to Amikacin/imepenam/Gentamycin	0(0%)	2(6.3%)	2(4%)
Klebsiella sensitive to Amikacin	1(5.6%)	1(3.1%)	2(4%)
MSSA sensitive to cephalixin/clindamycin/vancomycin	1(5.6%)	1(3.1%)	2(4%)
Pseudomonas sensitive to amikacin	0(0%)	2(6.3%)	2(4%)
E coli and S aureus sensitiveto amikacin	0(0%)	1(3.1%)	1(2%)
GNB sen to ampicilin	0(0%)	1(3.1%)	1(2%)
Total	18(100%)	32(100%)	50(100%)
P=0.691			

Table-2: Blood culture, pus and tissue culture of patients studied

than 22 days.

Majority of the patients (88%) improved with empirical antibiotic therapy; clindamycin, metrogyl and amikacin. 8% were discharged against advice or at request. 2% of the patients did not have any improvement and 2% of the patients died as shown in Table-4. P value was significant.

DISCUSSION

Necrotising fasciitis is a serious infection of the soft tissues with high mortality rates. It is very important to understand principles of treatment and pathophysiology to improve the outcome.

In our study almost all patients presented with local tenderness (100%), oedema (100%), erythema (100%) and swelling (98%); Similar to the findings of G Singh et al. in 2003.¹²

In 78% of the patients lower limbs were involved, making it the commonest site of infection, These findings were similar to those of a study done by C P Garg et al in 2009.¹³ Elderly males (64%) with low haemoglobin (66%) and raised serum procalcitonin (50%) were affected more. This was similar to study done by Childers BJ et al.¹⁰ Patients with underlying comorbidities (74%) were affected more. Diabetes mellitus was the commonest (40%). This was similar to study done by V K, Hiremath BV et al.⁵

4% had Blood culture positive and 34% had pus culture positive for poly microorganisms. The hospital stay for culture positive patients prolonged. More than 50% of the patients improved between 3-21 days.¹⁴

Comorbidities	Gender		Total (n=50)
	Female (n=18)	Male (n=32)	
Nil	5(27.8%)	8(25%)	13(26%)
Yes	13(72.2%)	24(75%)	37(74%)
DM	6(33.3%)	14(43.8%)	20(40%)
HTN	5(27.8%)	3(9.4%)	8(16%)
ARF	0(0%)	2(6.3%)	2(4%)
Acute on CKD	0(0%)	1(3.1%)	1(2%)
Chronic liver disease	0(0%)	1(3.1%)	1(2%)
IHD post CABG	0(0%)	1(3.1%)	1(2%)
Membranous nephropathy	1(5.6%)	0(0%)	1(2%)
Nephrotic syndrome	0(0%)	1(3.1%)	1(2%)
Varicose veins	0(0%)	1(3.1%)	1(2%)
Viral parotitis and delayed development of milestones	1(5.6%)	0(0%)	1(2%)
P=0.830			

Table-3: Comorbidities

Outcome	Gender		Total
	Female	Male	
Improved	13(72.2%)	31(96.9%)	44(88%)
DAMA	1(5.6%)	1(3.1%)	2(4%)
Discharge at request	2(11.1%)	0(0%)	2(4%)
Same	1(5.6%)	0(0%)	1(2%)
Died	1(5.6%)	0(0%)	1(2%)
Total	18(100%)	32(100%)	50(100%)
P=0.018*			

Table-4: Outcome of patients studied

It was noted that 88% of the patients improved with early initiation empirical antibiotic therapy in our study. This antibiotic regimen was continued irrespective of culture growth leading to a successful improvement. 2% of the patients did not improve and their antibiotics were changed based on culture report. 2% of the patients died.¹⁵

It ranges from 25- 30% in both the genders. If not treated properly it is a challenging problem with high mortality rate. 30- 40 years back the mortality rate was 45- 50%. A decade ago the mortality rate was 34%.¹⁶ Currently the mortality rate in National surgical quality improvement program is 12%. In our study the mortality rate is 2% (p value was significant). This reduction in mortality is due to early initiation of antibiotics and other timely interventional measures.¹⁷

The selection of appropriate antibiotics keeping in perspective the critical period during which the blood and tissue cultures are not available, our study highlights the importance of early empirical combination antibiotic therapy for patients of necrotizing fasciitis.

The timely initiation of fluid and electrolyte management, antimicrobial therapy, and surgical debridement with wound care and support for organ failure has markedly reduced the mortality in necrotizing soft tissue infections.¹⁸

CONCLUSION

Proper clinical recognition, early initiation of empirical antibiotics and aggressive surgical debridement are the key to successful management. The study concludes that the early initiation of empirical antibiotic therapy in the management of patients with necrotizing fasciitis who were started on triple drug regimen improved irrespective of culture growth.

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Anatomical Variations of Practical Importance in the Medial Cord of Brachial Plexus

Sabah Yaseen¹, Ashfaq ul Hassan², Rohul Afza¹, Nitya Waghray³

ABSTRACT

Introduction: Brachial Plexus is an Important Anatomic Entity. It is a plexus of nerves and variations in Origin of Nerves around this plexus is of utmost importance due to the practical implications of this plexus for modern interventional procedures done in this region. Aim of the present research was to study the variations in the branching pattern of medial cord of brachial plexus.

Material and methods: The present study was conducted at SKIMS Medical College, Department of Anatomy, Shadan Institute of medical sciences and Dr. V.R.K Women medical college, Hyderabad from 2012 to 2015 on properly embalmed and formalin fixed adult human cadavers during routine dissection practice for undergraduate students.

Result: The variations noted were significant. Variations were in the found in the formation of trunks, divisions, cords and terminal branches. All the variations are tabulated and presented.

Conclusion: The study found a definite variation in Number of branches arising from each cord as well as variations in the terminal branches of medial cord of brachial plexus like median, ulnar, musculocutaneous nerves.

Keywords: Medial, Median nerve, Plexus, Radial, Musculocutaneous, cord, Brachial, Variation.

INTRODUCTION

The article specifically deals with variations in the region of Medial Cord as the the brachial plexus may get injured due to trauma, compression or malignancy of the breast.¹ The traumatic cause of the brachial plexus injury are forceps delivery, gunshot or stab injuries, fall from height or automobile accidents. Compression of the plexus is usually due to aneurysm of the axillary artery. The brachial plexus may be injured due to the radiations of the axilla for breast cancer or by direct infiltration of malignant cells.^{2,3}

The brachial plexus is a complex network of nerves arising from nerve roots in the neck and continues by dividing into peripheral nerves in axilla. Brachial plexus has a complex structure and is in close relationship with the important anatomical structures. Anatomical variations in different parts of brachial plexus may attribute to unusual formation during the development of trunks, divisions or cords and these variations usually occur at the junction or separation of individual parts. The knowledge of detailed anatomy of brachial plexus along with its variations is of interest to anatomists, radiologists, neurosurgeons, neurologists, vascular surgeons, orthopedicians and anesthesiologists.³⁻⁵ The study aimed to record the variations in the branching pattern of medial cord of brachial plexus and to observe intercommunications between nerves of brachial plexus.

MATERIAL AND METHODS

The present study was conducted at SKIMS Medical College, Department of Anatomy, Shadan Institute of medical sciences and Dr. V.R.K Women medical college, Hyderabad from 2012 to 2015

A study was done on properly embalmed and formalin fixed adult human cadavers during routine dissection practice for undergraduate students at SKIMS Department of Anatomy, Shadan institute of Medical Sciences and Dr. V.R.K Women Medical college, Hyderabad during the period of 2012 to 2015.

The study was carried out on eighty brachial plexuses in axilla in forty adult human cadavers. Out of forty cadavers thirty were males and ten females and age group 30-70 years.

Instruments used

1. Scalpel – 6 inches in length with detachable pointed blades
2. Forceps – 4 inches in length: blunt forceps, fine forceps, toothed forceps.
3. Scissors – 10 inches long and straight with blunt tip
4. Gloves – 6 1/2 size
5. Cotton

Method

The dissection of axilla and arm was done according to the methods described by Romanes in Cunningham's Manual of Practical Anatomy. The skin, superficial and deep fascia of the pectoral and axillary region were incised and reflected. The pectoralis major muscle was cut across the clavicular head reflected laterally to its insertion. Pectoralis minor was removed at its origin and reflected superiorly. Loose connective tissue, fat and lymph nodes from the axilla were removed to expose its contents. The brachial plexus and axillary vessels were exposed. The various components of brachial plexus in this region were delineated by careful fine dissection. Adequate care was taken to preserve its relations to important surrounding structures. Brachial plexus was studied systematically, noting its pattern of branching and relationship to axillary artery. Inter communications between

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nerves of plexus were also noted.

Inclusion criteria

Adult formalin fixed cadavers irrespective of gender.
Age group varied in between 30 - 70 years.

Exclusion criteria

Cadavers of newborn, infants and children.
Cadavers in which axilla and upper limb is traumatised or with burns

RESULT

The observations recorded in the present study pertained to the meticulous dissection and naked eye examination of eighty human brachial plexus in axilla. It focused on variations of the medial cord of the brachial plexus.

Out of forty cadavers dissected, variations in one or more forms was found in nine cadavers. In five cadavers variation was bilateral and in four cadavers it was found to be unilateral.

All the variations were carefully observed and were recorded and tabulated under the following headings:

Number of cords

In seventy-nine out of eighty cases the number of cords observed, were three. Only in one case, two cords were found. The number of cords on right side were three in all forty cases whereas on left side normal number of cords were found in thirty-nine cases and in one case (2.5%) only two cords were found. Also the relation of cords with second part of axillary artery, on right side was normal in all forty cases and on left side it was normal in thirty-nine cases and variation was found in one case (2.5%). In this case instead of the lateral, medial and posterior cords, only two cords were present lateral and posterior to the second part of axillary artery. Lateral and medial cords fused to form a common cord which was lateral to second part of axillary artery. This common cord gave all the branches of medial and lateral cord. Posterior cord was present normally, posterior to second part of axillary artery and gave its branches in normal pattern.

Medial cord

Medial cord was found in seventy-nine cases and in one case it was united with lateral cord to form common cord. So medial cord was present in all forty cases on right side and in thirty-nine cases on left side. In all forty cases on right side, medial cord was found to have normal five branches, that are, medial pectoral, medial cutaneous nerve of forearm, medial cutaneous nerve of arm, medial root of median nerve and ulnar nerve (table-1). On left side thirty-nine cases had normal number of branches and in one case (2.5%), Medial cord was having only four branches and in this case medial root of median nerve was absent (figure-2) Medial cord was

lying medial to the second part of axillary artery in seventy-nine cases and lateral to the artery only in one case where it represented the common cord.

DISCUSSION

Anatomical variations of the peripheral nerves constitute a potentially important clinical and surgical issue (figure-2,3). Anomalies of brachial plexus and its terminal branches are not uncommon. They have been invariably studied and widely documented. Variations may occur in the formation of trunks, divisions, cords and terminal branches.

In 1877 Walsh¹ described the variations in the formation of brachial plexus and also in its branches. He reported that 325 plexuses out of 350 he dissected, an additional head of ulnar nerve coming from lateral cord. This additional head was named as lateral head of ulnar nerve. He also observed

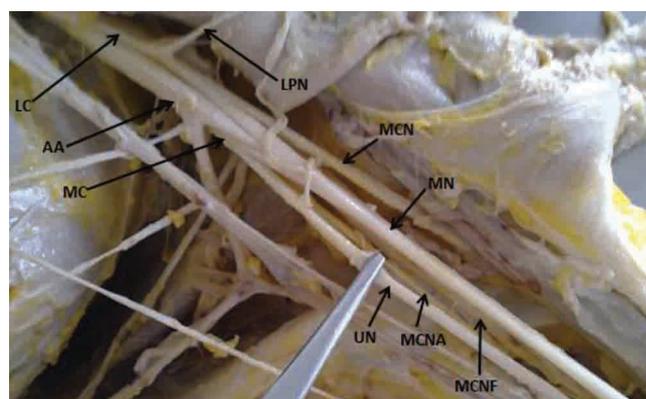


Figure-1 (cadaver 1, Left side): Showing normal anatomy and branches of medial and lateral cord. (LC-Lateral cord; MC-Medial cord; LPN-Lateral pectoral nerve; MCN-Musculocutaneous nerve; MN- Median nerve; UN-Ulnar nerve; MCNA-Medial cutaneous nerve of arm; MCNF-Medial cutaneous nerve of forearm; AA-Axillary artery)

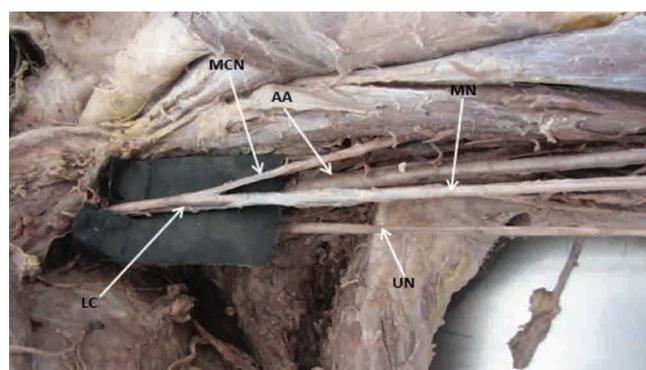


Figure-2 (Cadaver 6, Left side): Showing single lateral root of Median nerve with absent medial root. (LC-Lateral cord; MN- Median nerve; MCN- Musculocutaneous nerve; UN-Ulnar nerve; AA-Axillary artery)

Medial cord	Normal				Variation			
	Right		Left		Right		Left	
	No.	%	No.	%	No.	%	No.	%
Existence	40	100	39	97.5	Nil	0	1	2.5
No. of Branches	40	100	39	97.5	Nil	0	1	2.5
Relation to second part of Axillary artery (AA)	40	100	39	97.5	Nil	0	1	2.5

Table-1: Depicting normal pattern and variations of medial cord (MC)

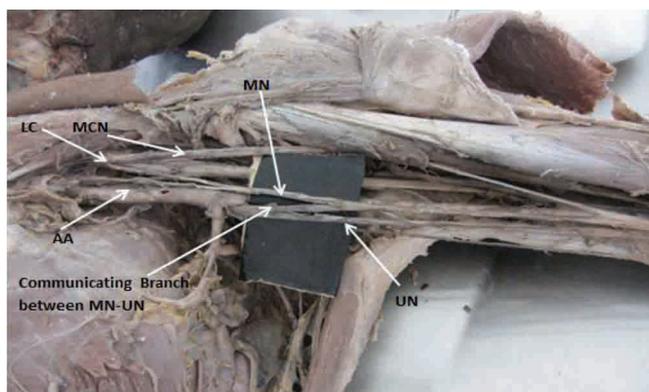


Figure-3 (Cadaver 22, Left side): Showing communication between Ulnar nerve and Median nerve. Two roots of Median nerve joining lateral to third part of Axillary artery. (LC-Lateral cord; MN- Median nerve; UN-Ulnar nerve; MCN-Musculocutaneous nerve; AA-Axillary artery)

a communicating branch between medial head of median nerve and lateral cord in 10 cases.

Herringham WP,² in 1887 conducted a study on 175 brachial plexuses and observed that in 36 plexuses there was no real posterior cord formed.

In 1904, G.E.Smith³ noted on dissection of adult male cadaver that on both sides, radial nerve gave a large branch immediately below the tendon of teres major, this split into two rami, one of which entered the upper part of the medial head of triceps and the other joined the ulnar nerve.

W. Harris⁴ in 1904 reported that in his study on 4 foetal and 26 adult cadavers he found a fine branch from ulnar nerve communicating with the medial cord in 36% of brachial plexuses. He also stated that he traced a branch which arises from medial cord and runs across the front of axillary artery, passes behind the lateral root of median nerve to join the nerve to coracobrachialis.

In 1939, Miller RA.⁵ reported in his study on arrangement of axillary artery and brachial plexus done on 480 upper extremities, that 8% cases had aberrant relationship.

In 1955 Buch-hansen K.⁶ reported a case in which the medial and lateral roots of the median nerve did not unite in the axillary fossa. Instead they united in the arm, 5 cms distal to the lower border of latissimus dorsi muscle.

In 1985, Watanabe M et al⁷ studied 140 upper limbs and found fusion of the musculocutaneous and the median nerve in two cases.

S.K. Pandey et al⁸ in 2004 studied the anomalies in the formation of the brachial plexus cords and median nerve on axillary region in 172 cadavers. The total incidence of anomaly was 12.8%. All the cords merged to form a common cord in 2.3% cadavers. Absence of the posterior cord was observed in 3.5% cadavers. Anomaly in the formation and course of the median nerve was observed in 7% cadavers.

In 2005, Gupta M et al⁹ reported a case of left upper limb of 35 year old male cadaver in which formation of Lateral cord was distal than usual, in relation to the second part of axillary artery behind the pectoralis minor muscle. Anterior division of middle trunk gave rise to the nerve to coracobrachialis and an additional lateral root of the median nerve. Communications were also found between additional

lateral root of the median nerve and medial root of the median nerve, medial root of median and ulnar nerve, ulnar and radial nerve.

Goyal N et al¹⁰ in 2005 reported a case of bilateral formation of median nerve by union of three roots. The additional root was lateral, on both sides. On left side it was arising from the anterior division of middle trunk and on right side it was contributed from the lateral cord.

In 2005, Srijit Das et al¹¹ reported a case of 55 year old male cadaver in which on right side lateral cord gave two roots to the median nerve. The upper branch united with the medial root of median nerve anterior to axillary artery. The median nerve thus formed was related medially to axillary artery.

Avinash Abhaya et al¹² in 2006 reported a case of 33 year old male cadaver in which the musculocutaneous nerve was having a dual origin. Variation of its origin, course and distribution was symmetrical bilaterally. The higher origin was reduced to a thin nerve and supplied only coracobrachialis muscle while the lower origin was of normal thickness, supplying other muscles.

Saeed M.A.M et al¹³ in 2007 reported a case of 65 year old male cadaver with two communicating branches from lateral cord to the medial root of the median nerve. The lateral cord, after receiving communication, bifurcated into two branches. The first division gave muscular branches while the second division formed lateral root of the median nerve.

In 2010, Jamuna M et al¹⁴ reported a variation in brachial plexus. Instead of lateral, medial and posterior cords only two cords, anterior and posterior were present lateral to the axillary artery. Anterior cord was represented by fusion of lateral and medial cords. musculocutaneous, median, ulnar, medial cutaneous nerve of arm and forearm originated from the anterior cord. Radial nerve and axillary nerve originated from posterior cord.

Ajay.R.Nene¹⁵ in 2010 reported a case of 65 year old male cadaver in which median nerve was formed by union of two roots posterior to the third part of axillary artery. The fork of the median nerve thus formed was hooked down by another fork formed by third part of axillary artery and one of its branch.

Flora M.F Taylor and associates¹⁶ in 2010 reported a case of a 45 year old male cadaver. In this case the musculocutaneous nerve was absent. Ulnar nerve was formed by lateral and posterior cords. The whole medial cord continued down as medial root of median nerve, which received a lateral root from the lateral cord. After giving lateral root of median nerve, the lateral cord gave off an additional branch that joined the posterior cord to form a short common trunk. This common trunk divided into two – one additional root for median nerve and second continued down as the ulnar nerve. Sinha R.S et al¹⁷ in 2012 studied forty upper limbs from twenty adult cadavers and observed 5% cases showed variant branching pattern of brachial plexus. In two cases axillary nerve arose from posterior division of upper trunk instead from the posterior cord. In three cases median nerve had an extra root. Communication between median and musculocutaneous nerve was seen in three cases.

Patil S.T et al¹⁸ in 2012 reported a case of adult male cadaver in which, on left side median nerve was formed from lateral

cord only. On right side a communicating branch from median nerve to musculocutaneous nerve was present.

Neelanjit K et al¹⁹ in 2013 reported that out of sixty upper limbs dissected by them, different types of communications between musculocutaneous and median nerve were observed in seven limbs. In two limbs median nerve was formed by three roots, two lateral and one medial. In one limb musculocutaneous nerve was absent and in another one limb musculocutaneous nerve was fused with median nerve.

In 2014 Priti Chaudhary et al²⁰ studied 60 upper limbs and reported only two branches from lateral cord in 10% cases, musculocutaneous nerve being absent. In 3% cases the medial cord had only four branches. In 1 case medial root of median nerve was not originating from medial cord and in another case medial cutaneous nerve of arm was not given by medial cord. In 3% cases posterior cord had only three branches where upper subscapular nerve and thoracodorsal nerve were not arising from posterior cord. In 10% cases four branches were present out of which in 5% cases upper subscapular nerve was absent, in 2% cases axillary nerve as absent and in 3% cases lower subscapular nerve was absent. Results of all the observations were observed in present study also but with percentage of variations varied. In present study two branches from lateral cord were observed in 1.25% case and four branches in 2.5% cases. Whereas three branches in 96.25% cases. In 98.75% cases branches from medial cord were normal, i.e, five and only in 1.25% cases four branches were observed. In posterior cord normal pattern of branching was observed in 97.5% cases where as two and four branches were seen in 1.25% cases each.

CONCLUSION

The anatomical variations in any region are important. Especially those in this region should be taken seriously into consideration by a clinician. The knowledge of detailed anatomy of brachial plexus along with its variations is of interest to anatomists, radiologists, neurosurgeons, neurologists, vascular surgeons, orthopedicians and anesthesiologists. The study found a definite variation in Number of branches arising from each cord as well as variations in the terminal branches of medial cord of brachial plexus like median, ulnar, musculocutaneous nerves.

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Arnold-Chiari Malformation: Anatomical Variations and Latest Embryological Perspective. Review of Literature

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ABSTRACT

One of the most common anomaly of craniovertebral junction is Chiari malformation. These malformations involve both skeletal and neural structures. Earlier it was estimated that the occurrence of Chiari malformation is 1 in 1000 births but with the increased use of imaging techniques such as CT scans and MR imaging it is suggested that this condition is much more common. However it is very difficult to estimate the exact rate of occurrence as some of cases as asymptomatic or do not develop symptoms till adulthood. Chiari malformations are more common in women than in men and type II Chiari malformation is more prevalent in certain ethnic groups like the people of Celtic descent. In the present case report a new born was presented with myelomeningocele and MR imaging revealed the herniation of cerebellar tonsils and vermis along with Brain Stem through foramen magnum hence confirming it to be a case of type II Chiari malformation.

Keywords: Hind brain, Pons, Meningomyelocele, Malformation, Chiari malformation, Arnold-Chiari malformation, Myelomeningocele.

INTRODUCTION

Chiari malformations include a large spectrum of anomalies of hindbrain formation which appear at different stages of development of the central nervous system. In 1883, John Cleland described a case of hindbrain malformation found during autopsy. Hans Chiari, an Austrian pathologist, performed post-mortem examination of forty cases in 1891 and 1896 and gave a detailed description of hindbrain malformations.¹ Chiari described these malformations as congenital anomalies of the hindbrain characterised by downward elongation of the brain stem and cerebellum into the cervical portion of spinal cord.² In his initial description, Chiari classified the hindbrain malformations into type I, II and III and then later added type IV malformation.³ The exact embryological period of the occurrence of Chiari malformation is unclear. The anatomical variations attributing to the Chiari malformation is due to the failure of pontine flexure to form normally from 28-29th day of gestation which leads to elongation of brainstem. Normally growth of the cerebellum during the third month of intra uterine life causes the caudal vermis and choroid plexus to come under the tonsils. However if there is failure of this process, the vermis and choroid plexus remain in extraventricular position. These structural deformities lead to blockage in the flow of cerebrospinal fluid, producing an embryological hydrocephalus. The secondary hydrocephalus causes further herniation of cerebellar tonsils into spinal canal and drags tentorium along with it, thus reducing the dimensions of posterior cranial fossa.⁴ A theory was given by Daniel and Strich, which stated the developmental arrest, especially in

the progression of pontine flexure during 28th and 29th day of gestation as a cause of Chiari malformation.⁵

The theory of overgrowth suggest that the overgrowth of neural plate before neurulation prevents fusion of neural folds. Barry et al reported two cases of human fetuses of 17 and 18 weeks of development with increased volume of cerebellum and brain stem having Chiari malformation.⁶ Contradictory to this it has been observed that cerebellum weighs less in patients with Chiari malformation than in normal people, at all ages.^{7,8}

According to hydrodynamic theory, imbalance between pulsating choroid plexus of forth and lateral ventricles result in Chiari malformation.⁶ According to Jennings et al, Chiari malformation occurs because the normal zone of fusion at third and fourth somites is displaced caudally below the third to fifth somite pairs thus causing the displacement of the area of formation of cervicomedullary junction.⁹

Chiari malformation is not as rare as would be expected from the small number of reported cases but with the increased use of CT Scans and M.R.I's it is suggested to be much more common. The defect is almost always, but not invariably, associated with meningomyelocele or spina bifida occulta in lumbosacral region. Hydrocephalus is present in most cases. Other associated defects of development include creniolacunia, hydromyelia, sryngomelia, double cord, basillar impression.²

CLASSIFICATION OF CHIARI MALFORMATION

Chiari malformations were described to be of four types:

Type I

It is the most commonly observed Chiari malformation. In this type, there is tonsillar herniation through foramen magnum. It is often associated with syringomyelia but not hydrocephalus. This type of Chiari malformation is congenital as well as acquired. Radiologically, Type I is described as tonsillar decent of 5 mm below foramen magnum. Patients with Type I Chiari malformation may be asymptomatic or present with mixture of cerebellar and pyramidal tract signs associated with dysfunctioning of lower cranial nerves.¹⁰

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Type II

It is also called as classic Chiari malformation or Arnold-Chiari malformation. It is less common. In type II Chiari malformation there is caudal descent of cerebellar tonsils and the vermis into the spinal canal along with brain stem and fourth ventricle. Type II Chiari malformation is usually accompanied by myelomeningocele. Hydrocephalus is seen in 90% of cases. Symptoms arise from dysfunctioning of brain cells and lower cranial nerves. Myelomeningocele results in the partial or complete paralysis of area below the spinal opening. Due to the severity, Type II patients become symptomatic in infancy or early childhood.¹⁰

Type III

It is the most serious form of Chiari malformation. There is occipital or cervical encephalocele along with intra cranial abnormalities seen in type II Chiari malformation and a wide foramen magnum. This defect is readily visible and palpable. Plain radiographs help to identify the skull or cranial defects while MR imaging identifies the herniated brain tissue.¹⁰

Type IV

It is a very rare type. It is characterised by cerebellar hypoplasia or aplasia and tentorial hypoplasia. There is no hind brain herniation in this type.

Other types of Chiari malformation includes chiari 0 and chiari 1.5 types. Chiari 0 includes minimal or no hind brain herniation but the headache and other symptoms of Chiari malformation are present. Chiari 1.5 includes patients with tonsillar herniation without brain stem elongation or fourth ventricle deformation.

DISCUSSION

Number of studies have been carried out on Chiari malformation. It has been noted that the prevalence of Chiari I malformation is one per thousand in general population. With the improvement in the imaging modalities, the diagnostic abilities have also improved.

According to Stevenson KL, approximately 1/3rd of the patients with Chiari II malformation develop signs and symptoms of brain stem compression.¹¹ Curnese JT carried out a study on 33 patients with Chiari II malformation and found out that 36% of patients were symptomatic while 64% were asymptomatic.¹² Niels Geerdinll et al carried out MR imaging study on 79 children and concluded that the reliable morphological features leading to diagnosis of Chiari II malformation on MR imaging are downward herniation of the cerebellum, downward displacement of the medulla, pons and fourth ventricle, medullary kinking, abnormally shaped fourth ventricle, hypoplastic tentorium and breaking mesencephalic tectum.¹³ Most of these morphological features are seen on the MR imaging of the present case (figure-1,2,3).

Gammal T et al stated that myelomeningocele is present with Chiari II malformation almost in all cases. However, the reverse is not true all the time.¹⁴ According to Rauzzino M et al, Hydrocephalus is seen in 90% of the cases and ventricles are seen asymmetrically.¹⁵ These observations are in correlation with the present case.

Emery JK et al stated that approximately 6% of cases show spinal bifida.¹⁶ Mclendon RE et al in their study found out

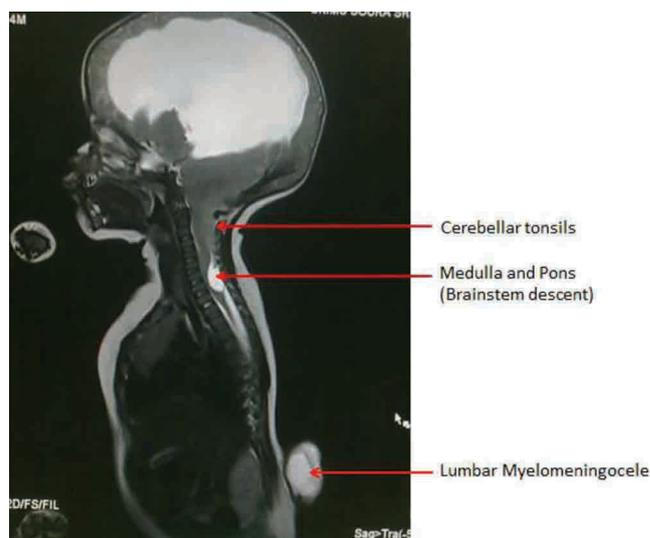


Figure-1: Demonstrating Arnold Chiari Malformation with Lumbar Myelomeningocele

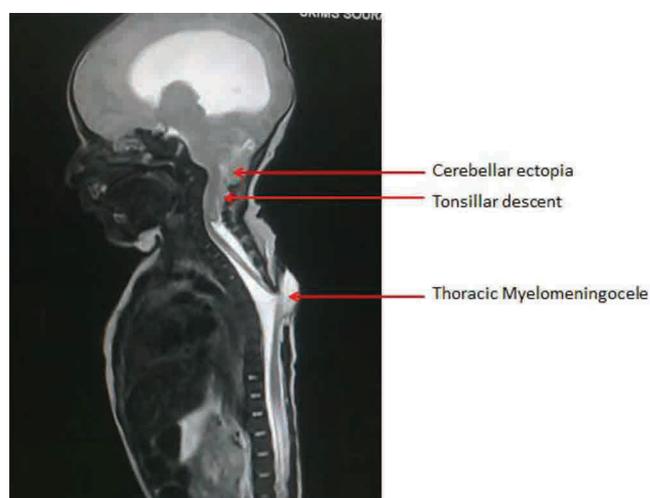


Figure-2: Demonstrating Arnold Chiari Malformation with Thoracic Meningomyelocele

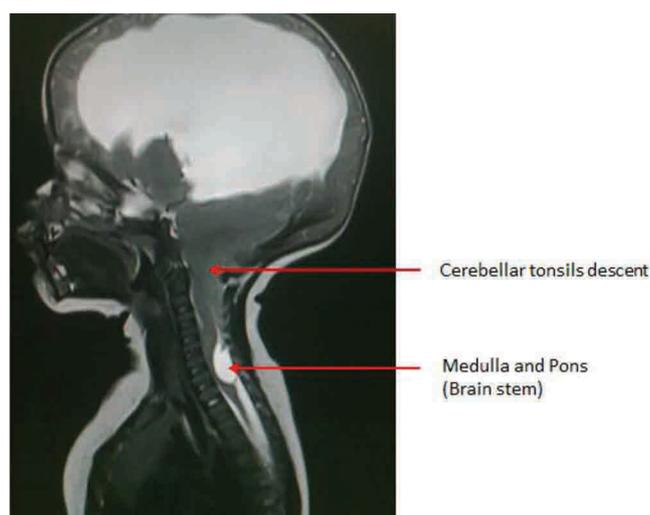


Figure-3: Demonstrating Arnold Chiari Malformation with Prominent Tonsillar Descent

that partial or complete agenesis of corpus Callosum with absence of septum pellucidum, polygyria, prominent anterior commissure, obliterated longitudinal fissure between parietal

and occipital lobes and absent cingulate gyrus are frequently seen to be associated with Chiari II malformation.¹⁷ According to Cunnes JT et al in symptomatic children, the typical kinking of medulla is often seen. It was also reported that the upper cervical spine shows Klippel–Fiel anomaly with hypoplastic posterior arch of first cervical vertebra and scalloped dense.¹³

Tsai T et al did a biometric analysis of 25 patients with myelomeningocele and Chiari II malformation and concluded that degree of vermian herniation and cervicomedullary junction herniation are independent variables in Chiari II malformation while the size of posterior cranial fossa is an important factor in explaining the variability of vermian herniation.¹⁸ Wolpert SM et al carried out a study to see the relation between the amount of brain stem herniation and neurological status of the children with Chiari II malformation and found out that the neurological status was not effected by either the amount of herniation of the characteristics of cervicomedullary and hence concluded that the breathing and swallowing difficulties experienced by children with Chiari II malformation is due to other factors like disorganization of brain stem nuclei.¹⁹

CONCLUSION

To conclude it appears that the phenomenon of cervicomedullary junction is independent although different theories have been suggested resulting in it. The most common embryological cause is found to be due to the failure of pontine flexure to form normally from 28th -29th day of gestation which leads to elongation of brainstem. Recognition of the vermis, medullary kink, cervical cord, C1 arch, fourth ventricle, and myelomeningocele are important radiological features to confirm the diagnosis of Chiari II malformation.

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Infected Non-Unions of Long Bones → Is Low Cost Antibiotic Nail A Viable Option in Indian Scenario

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ABSTRACT

Introduction: The advent of broad spectrum antibiotics and maintenance of strict asepsis in operation theatres combined with laminar airflow systems has decreased the number of orthopaedic implant associated infections. Most of the non-unions associated with infected implants usually found resistant to conventional methods of management. Aims: To evaluate effectiveness of antibiotic impregnated nails in management of infected non unions of tibia and femur with bone loss less than 4 cm.

Material and methods: This was a prospective study of 20 cases with infected non-unions of femur and tibia which were enrolled for the study. All cases who met the inclusion criteria were managed using antibiotic impregnated nail and were followed up for an average period of 1.2 years with encouraging results. Under suitable anesthesia the infected fracture site was exposed and thorough debridement done. Implant was replaced by Antibiotic impregnated cement K-nail/ V-nail/ Interlocking Nail following adequate reaming. Culture sensitivity was done at weekly intervals, to identify pathogen and the sensitive antimicrobial agent.

Results: At follow-up only one patient had a positive culture. In all patients except the one with positive culture, there was no discharge at six weeks follow-up. Implant removal was after interval of 6-12 weeks depending on status of infection and callus.

Conclusion: Management of Infected non unions using Antibiotic impregnated K-nail is simple and very effective method which allows infection control, promotes bone union. This simple procedure is encouraging, cost effective and less cumbersome.

Keywords: Infected non-unions, Antibiotic cement nails.

INTRODUCTION

Operative environment underwent revolutionary changes in 21st century with the advent of antisepsis and clean operating room protocol which lead to drastic decrease in infection rates. However with the increasing number of road traffic accidents and increasing use of orthopaedic devices in open fractures primarily, on an average 5% of implants get infected with added consequences¹. Infected non-unions of long bones are a pain in the neck both for the surgeon and patient and its management is a challenging task. In earlier days infected implants associated non-union's were treated by a staged protocol, first stage being implant removal with measures for infection control and the second stage for achieving bony union. Use of stable external fixation devices like ring fixators and LRS (Limb reconstruction system) were used to achieve bony union^{2,3}. These procedures require increased in patient stay and also great socioeconomic burden. Hence we present a improved method of treatment of these long bone infected non-union, which aim to control infection by providing high

doses of local antibiotics and stabilise fracture at single setting with minimal complications⁴. Aim of our study is to evaluate effectiveness of antibiotic nails locally made in the operation theatre in management of infected non-unions of long bones in terms of infection control and bony union.

MATERIAL AND METHODS

This prospective study conducted from January 2012 to July 2014. Inclusion criteria were infected non-unions of tibia and femur with no evidence of union by 6-8 months and with bone loss of less than 4 cm. Patients with radiologically visible or intra-operative finding of gap non-union of more than 4 cm, patients with multiple medical co-morbidities and those with hypersensitivity to antibiotics were excluded from study. Out of twenty five patients who presented to our outdoor with infected non-unions of tibia and femur, fourteen cases met all the criteria and were enrolled for the study. All patients were thoroughly investigated and evaluated by clinical and radiological means. Out of twenty cases there were 18 male and two female patients. Age group of patients ranged from 18 to 65 years with mean age of 42 years. Six cases had sustained closed fractures, three each of grade-2 and 3 A fractures and rest two had sustained Grade-3B fractures. Mean duration from injury to presentation was 7 months (6 – 10 months). Out of twenty cases seven had femoral non- unions and rest had tibia non-unions. Out of seven femur cases three had intramedullary interlocking nail and four had K-Nails. And out of thirteen tibia non-unions eleven had intramedullary nail and two had initial AO fixators (3 months) followed by plaster cast treatment. Staphylococcus aureus was isolated in fifteen cases, one each of Proteus species and Pseudomonas aeruginosa was isolated. Rest three cases showed polymicrobial picture.

Procedure: After thorough pre operative evaluation, patients were posted for surgery in a elective setting. Under regional or general anaesthesia, adequate exposure of the non-union site was done using the older scars. Implant removal was done first. The removed implant along with per operative samples was sent for culture and sensitivity. Non-union site was thoroughly debrided excising all the dead and devitalised bone and soft tissues till freshly bleeding bone

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edges visualised (Papkira sign) (Figure-1). After initial and meticulous debridement, the gap site was measured and ascertained. Those with loss greater than 4 cm underwent stable external fixation in form of ring fixator and LRS. Those with loss less than 4 cm underwent intramedullary reaming followed by antibiotic coated nail

Antibiotic cement nail preparation: Performed manually on a separate trolley taking all the aseptic measures. Before nail preparation done the surgeon and assistant for nail preparation changed the gown and gloves for performing clean portion of the surgery. K-Nail (cases with Femur Non-union) or V-Nail (for Tibia Nonunions) of appropriate diameter 2-3mm thinner than last reamer width was chosen. Nail of 7-8mm diameter were chosen in most cases. The polymethylmethacrylate bone cement of 40 Grams was mixed with appropriate weight of antibiotic powder. Monomer solution added to this powder and mixing done till the material acquired viscous consistency. Manual application of the cement was done in a uniform smooth layer excluding the eye. After adequate setting and hardening, the nail was inserted into the medullary canal. Haemostasis was secured and wound closure done in layers over a romovac drain.

Post-operative protocol: Postoperatively the patients were started on intravenous antibiotics as per the sensitivity profile. Weekly wound cultures and inflammatory markers were done to assess need for long term antimicrobial therapy.

Active and Passive range of motion exercises and non weight bearing mobilisation was encouraged.

Follow-up: Patients were asked to visit OPD once in a month for first three months followed by once in 2-3 months later on. During each follow-up visit patient underwent clinical and radiological evaluation by standard AP, Lateral and Oblique X rays to assess status of non-union. Status of infection was assessed by clinical history and haematological investigations (ESR, CRP, Differential count, Total count). Every patient was clinically and radiologically assessed at end of 6 weeks to find out regarding infection status and signs of union. Cases which showed evidence of union and infection control were continued with nail till fracture union. Patients with infection control without any signs of union underwent nail removal and exchange intramedullary nailing. Assessment regarding rate of fracture union and infection control and need of any secondary procedures was done during followup.

RESULTS

Outcome of the study analysed in terms of success and failure. Success cases are those where complete clinical and radiological union occurred. Failure cases are those where non-union failed to achieve union with or without control of infection. Average duration of follow-up was 12 months, ranging from 6 months to 24 months. Most common micro-

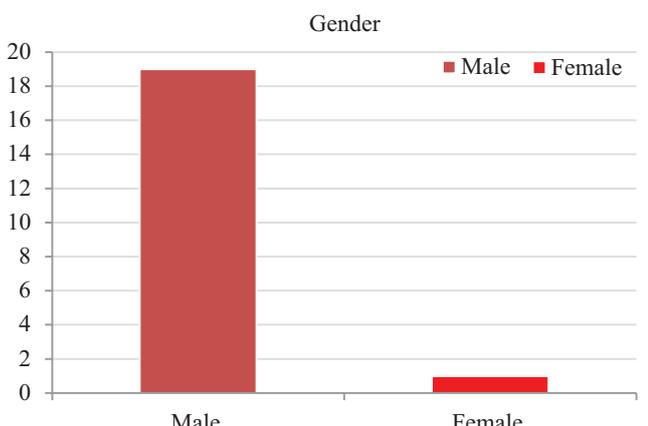


Figure-1: Male Female Case Distribution

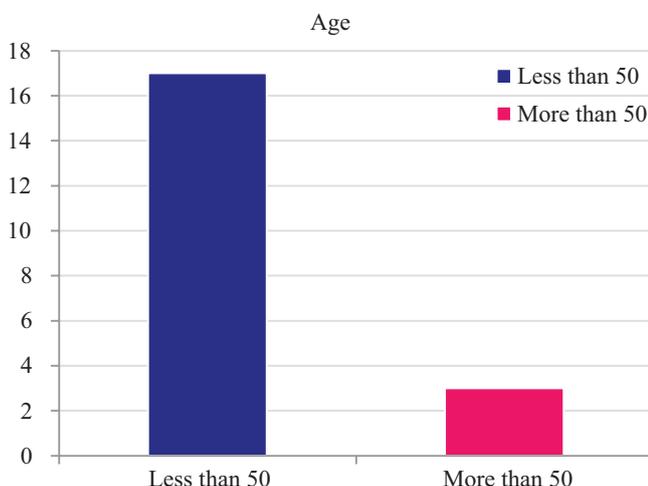


Figure-2: Age Distribution of Cases

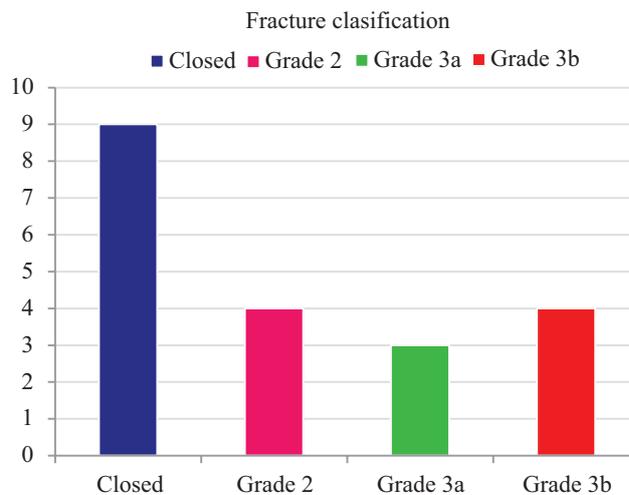


Figure-3: Open Injury Grade based Distribution

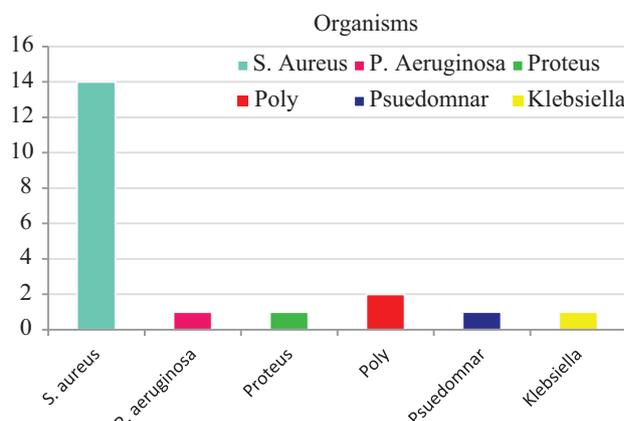


Figure-4: Pathogenic organism based case distribution

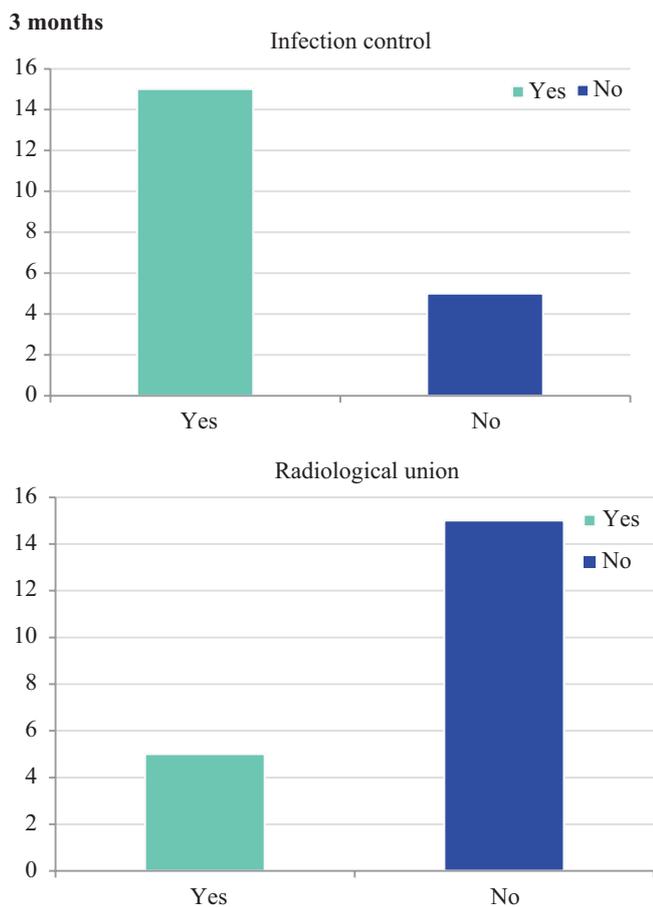


Figure-5: Infection Control and Radiological union at 3 months

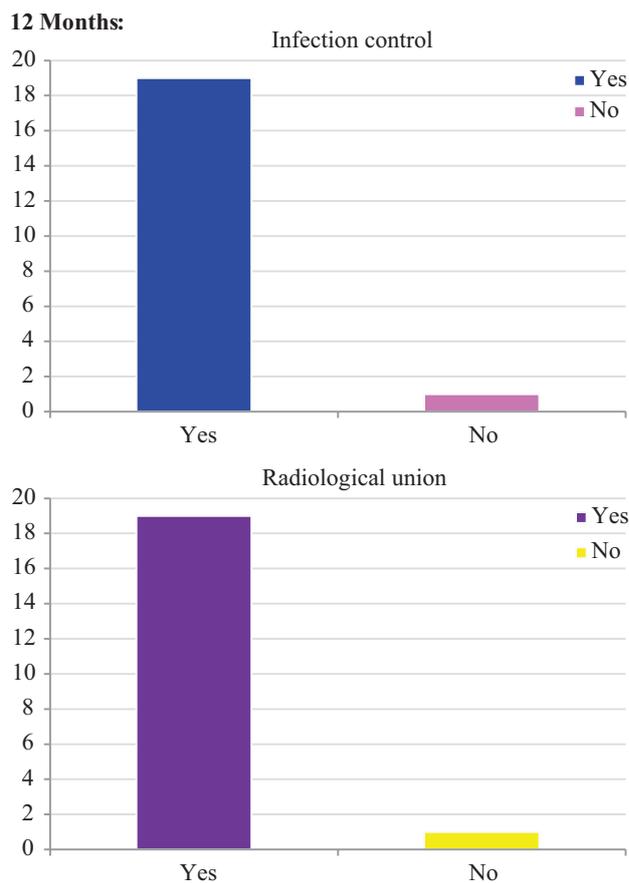


Figure-7: Infection Control and Radiological union at 12 months

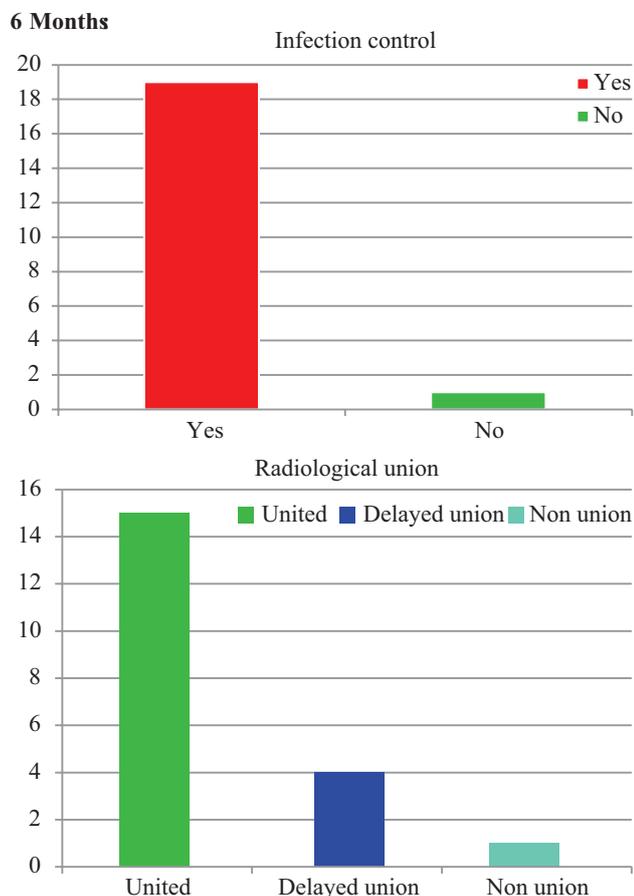


Figure-6: Infection Control and Radiological union at 6 months

organism isolated in our study was Staphylococcus aureus. Out of the 20 patients who underwent antibiotic coated cement nail, 15 patients had excellent infection control at 6 weeks follow-up. Among these 15 patients, 5 had signs of radiological fracture callus, and were continued with the nail in situ till complete bony union. Rest of the 10 patients who had no evidence of radiological callus at 12 weeks post surgery were treated with antibiotic nail removal and definitive fixation using exchange nail with iliac crest bone grafts. Out of these 10 cases 8 patients achieved bony union by six months post revision nailing. One case required additional surgical procedure like dynamisation and one case ended up in non union.

Overall, 15 cases achieved infection control and bony union at the last follow-up.

Failure – One case (7%) of femur non-union where infection was not controlled by 6 weeks failed to achieve infection control at 12 weeks follow-up. Patient underwent cement nail removal and was managed by papineau method of open dressing and bone grafting. Patient achieved union at 6 months post papineau procedure. Four cases went for delayed union and revision nailing or bone grafting had to be done.

Complications: Most common complication in our series was stiffness of knee joint (5 cases), cement debonding occurred in 3 cases where cement nail retained till fracture union. Cement debonding was managed copius saline irrigation and over reaming the medulla and creation of

channel distally for complete removal.⁵

DISCUSSION

Management of infected non-union is a challenging task for orthopaedic surgeon. The increasing trend of high velocity road traffic accidents and consequent open fractures and increased use of foreign bodies for fracture fixation are some of the causes for incidence of infected non-unions. Pathophysiology of infected non-unions of long bones after intramedullary nailing includes spread of infection along the intramedullary canal⁶. Presence of a foreign metal implant in vivo and also biofilm formation makes control of infection very difficult by routine intravenous antibiotics. Also due to long standing infection and repeated surgeries, there is excessive fibrosis and granulation tissue which further decrease antibiotic penetration into the non union site.⁷ The traditional treatment protocols for infected non-union which included debridements, stable external fixation and long term systemic antimicrobial therapy are associated with high rate of complications including stiffness, contractures, pin tract infections and great socioeconomic burden.

Antibiotic cement nails technique first described by Paley and Herzenberg⁸ later by Thonse and Conway. Antibiotic cement nails prepared using PMMA bone cement and heat stable broad spectrum antibiotics. Most commonly heat stable antibiotics like vancomycin, Tobramycin and Gentamycin are used.⁹ Use of intramedullary, non interlocked implants like Enders nail and K nail have been described in multiple studies.¹⁰ Antibiotic Cement coated nails being in a intramedullary location have close proximity to the non union site and provide high local concentration of greater than 200 times the minimal inhibitory level. Also they avoid any systemic effects and easy operative technique. Thonse and Conway in their study where infected non-unions were managed by antibiotic nails they achieved infection control in 85 % of cases and union was seen in 84% cases. Around 27% patients required additional procedures for infection control and union. Most common complication in their series was cement debonding. Our study differs from their study where in antibiotic cement interlocking nails were used. Infection control of our study (92%) is comparable to their study (85%).

Shyam AK, Sancheti PK et al in their study where infected non-union with different gap width were managed by antibiotic nail achieved infection control in in all cases where bone loss was > 6cm, they also achieved union with antibiotic nail in 3 cases where bone loss was < 3.2cm rest requiring revision nailing and bone grafting. Rate of infection control and union rate of our study are comparable to the results of this study.

Only one case in our series which remained ununited even after revision procedure had Pseudomonas Infection. Most common complication encountered was joint stiffness. This may be explained by the fact that cases with k nail and V nail could not be mobilised early due to unstable fixation. Next most common complication encountered was cement debonding. The important limitations of this study was small sample size and narrow inclusion criteria. Larger sample size and long term followup is required to draw conclusions

regarding predictors of outcome.

CONCLUSION

Antibiotic impregnated intramedullary nailing is a simple, very effective method of management of infected non-unions with bone loss < 4cm where it offers best results in terms of infection control (92%). The method by itself achieved bony union in only 33% cases, rest of patients require revision nailing along with bone grafting to achieve union. 25% cases required additional procedures, to achieve union after revision nailing. So, we recommend use of antibiotic cement nails for control of intramedullary infection and this should be followed by revision nailing, there by complications (cement debonding, stiffness) reduced and high success rate achieved with the procedure.

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Study on the Impact of Early Hysterectomies on Women Less than 36 Years and Presenting Symptoms

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ABSTRACT

Introduction: Hysterectomy is surgical procedure performed to remove the uterus and cervix. Depending on the pathology sometimes ovaries and fallopian tubes may also be removed during hysterectomy. Study aimed to know the impact of early hysterectomies on women less than 36 years and presenting symptoms.

Material and Methods: It was an observational study. A total of 100 cases with early hysterectomies done in and around Tirupati, Andhra Pradesh outside our Sri Padmavathi Hospital, Renigunta by different practitioners for varied indications and presenting to our Gynecology op between Feb 2013 to April 2014 were taken into study.

Results: Most common presenting symptom is low back ache, joint pains and body pains. Generalized weakness and inability to attend their routine work are second most common presenting symptoms.

Conclusion: Hysterectomies done at an early age has its own affect on the life of women, if done for benign lesions and medically manageable complaints. Complaints can be prevented, if hysterectomies are planned selectively for indicated reasons.

Keywords: Early hysterectomies, Benign conditions, Impact on health, Pelvic inflammatory disease, Dysfunctional uterine bleeding.

INTRODUCTION

Hysterectomy dates very early in 18th century. First abdominal hysterectomy was performed by Charles Clay in Manchester, England in 1843.¹ First successful abdominal hysterectomy was done by Ellis Burnham from Lowell, Massachusetts in 1853.

Whereas vaginal hysterectomy dates back to ancient times. According to few references vaginal hysterectomy was performed by Themison of Athens in 50 BC.² Vaginal hysterectomy for prolapse of uterus was done 120years AD by Sorrasnus of Ephesus.³

First total abdominal hysterectomy that is removal of entire uterus and cervix was performed by Richardson in 1929.⁴ Idea of removal cervix along with uterus helped in avoiding post hysterectomy serosanguinous discharge from cervical remnant and also possibility of cervical carcinoma from the cervical stump.

Minimally invasive surgical procedure to remove the uterus is laparoscopic hysterectomy. Laparoscopic assisted vaginal hysterectomy technique was described by Kurt Semm, whereas total laparoscopic hysterectomy which was first performed by Harry Reich in Kingston Pennsylvania in 1988.³

In earlier days women used to have operative and postoperative complications due to hysterectomy, but

advances in medical field like introduction of anesthesia, antibiotics and antiseptics, blood transfusion and intravenous therapy etc made hysterectomy a safe procedure.

Common reasons of choosing elective hysterectomy are pelvic inflammatory disease, fibroid uterus, abnormal uterine bleeding, adenomyosis etc.

Long-term complications of hysterectomy include decreasing bone density leading to body pains, generalized weakness, hot flushes, psychological problems, dyspareunia etc.⁵

In our study we mentioned regarding the causes of hysterectomies of patients attending to our Sri Padmavathi Hospital, Renigunta and discussed regarding the long-term complications of early hysterectomies.

MATERIAL AND METHODS

This was retrospective observational study which included 100 women of age less than 36 years who underwent hysterectomies done in and around Tirupati outside our Sri Padmavathi Hospital, Renigunta by different practitioners for varied indications and presenting to our Hospital Gynecology OPD with various symptoms in the period between Feb 2013 to April 2014, and studying their presenting symptoms. We studied the medical charts of all these subjects after taking ethical clearance from institutional ethical committee.

As it was a retrospective observational study which doesn't need any additional tests or procedures on the involved study group. We have worked only on already existing details, so we felt written consents are not applicable to this study.

Inclusion criteria

Women who underwent hysterectomies before 36 years of age.

Exclusion criteria

Cesarean hysterectomies

Women undergone hysterectomies after 36 years of age.

STATISTICAL ANALYSIS

Statistical analysis was done by expressing and comparing the results in percentages.

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RESULTS

Between Feb 2013 to April 2014, hundred cases of early hysterectomies done in and around Tirupati outside our Sri Padmavathi Hospital, Renigunta by different practitioners for varied indications and presenting to our Hospital Gynecology OPD were observed and analyzed for various presenting symptoms.

On observation of out of 100 patients evaluated 74 women were undergone hysterectomy at an age ≤ 35 years and 36 members were operated above the age of 35 years (Table 1). Of these patients 96 had their ovaries retained and three of them had ovaries removed and one woman underwent left ovarian cystectomy due to hydrosol pinx. Patients presenting with symptoms at a period ≤ 5 years from the date of surgery were 32, after 5 years were 68 (Table-2,3).

As women were not taking early and proper treatment for Pelvic inflammatory disease (PID), as the prevalence of sexually transmitted diseases is more in this area and as few surgeons are taking early decision regarding hysterectomy, the most common indication for hysterectomy in our study was PID (44%) followed by fibroids (17%) and Dysfunctional uterine bleeding (DUB) (16%). The rest of them were relatively less in number like unhealthy cervix (7%), ovarian cyst (4%), secondary dysmenorrhea (3%), pain abdomen (3%), adenomyosis (2%), uterovaginal prolapsed (2%), fibroid polyp (1%). And one patient who had PID with appendicitis underwent hysterectomy along with appendicectomy.

Off the study group 32% of them presented with symptoms of body pains, joint pains, low backache followed by 24% with generalized weakness (Table-4). And 12% of them with night sweats, hot flushes and Cardio vascular disorders. Around 6% with pain abdomen and 4% with mood swings and depression. The rest of the presenting symptoms vary from 1 to 4% like white discharge per vaginum in 4% of women, Urinary tract infection in 4%, acid peptic disease and chronic constipation in 3%, burning of extremities in 3%, ovarian cysts in 3%, itching of vulva in 2%, vault prolapse in 1%, bleeding per vaginum in 1% and pain at the site of hysterectomy incision scar in 1% of women.

DISCUSSION

In our study we have taken 30 years as cutoff age to observe the side effects of hysterectomies, as most of the population who underwent hysterectomies for benign conditions were under the age of 30 years.

This cut off value varied in different studies like study by Elizabeth A et al⁶ taken 50 years as cutoff age to observe the side effects of hysterectomies.

In our study, in around 96% of cases ovaries are retained. Study by Elizabeth et al⁶ suggested that retention of ovaries secondary to hysterectomy will produce androgens even after atrophy.

Which will undergo peripheral conversion to estrogen thereby maintaining the endocrinal milieu. In our study we have taken 5 years post hysterectomy as a mark of separation between two groups.

And article by Linda Parkinson Hardman⁷ also mentioned that symptoms of post hysterectomy can develop 5 years

later. From our study we noted that 90% of hysterectomies are done for benign indications comparable with work done by Catharina Forsgen and Daniel Altman.⁸ Whose study also reviewed 90% of the indications for hysterectomies are benign. Studies by Elizabeth A et al⁶, Pearson et al⁹ also stated that majority of indications for hysterectomies were benign.

According to our study most common indications for hysterectomies were PID (44%) followed by fibroids (17%) and DUB (16%). The rest of them were small in percentage. This is in correlation with the study done by above authors, who stated fibroids as most common benign condition taken up for total abdominal hysterectomy. Whereas in the study by Marit Lieng et al¹⁰ most common indications for

Age at hysterectomy	No of patients
≤ 30 years	74
> 30 years	26

Table-1: Selection criteria - Age

Duration between hysterectomy and presenting symptoms	No of women
≤ 5 years	32
> 5 years	68

Table-2: Duration between the date of hysterectomy and presenting symptoms.

Indication for hysterectomy	No of women
Pelvic inflammatory disease	44
Fibroid	17
Dysfunctional uterine bleeding	16
Unhealthy cervix	07
Ovarian cyst	04
Secondary dysmenorrhea	03
Pain abdomen	03
Adenomyosis	02
Utero vaginal prolapse	02
Fibroid polyp	01
Pelvic infection associated with appendicectomy	01

Table-3: Indications of hysterectomy

Presenting symptoms	No of patients
Body pains, joint pains, Low back ache	32
Generalized weakness	24
Night sweats, hot flushes, Cardiovascular disorders	12
Pain abdomen	06
Depression, mood swings	04
White discharge per vaginum	04
Urinary tract infection	04
Acid peptic disease and Chronic constipation	03
Burning of extremities	03
Ovarian cyst	03
Itching of vulva	02
Vault prolapse	01
Bleeding per vaginum	01
Pain at the site of scar	01

Table-4: Post hysterectomy presenting symptoms

hysterectomy were fibroids followed by abnormal uterine bleeding, pelvic inflammatory disease and endometriosis.

In our study post hysterectomy presenting symptoms were generalized like body pains, joint pains, low back ache (Indicating osteopenia and calcium deficiency) in around 56 women, amounting to half of the population studied. Followed by cardiovascular symptoms in 12 (due to hormonal deficiency). The rest of them were minor ranging from 1 to 6. Which tallied with the work done by Poushali Ganguly,¹¹ Sumiya Khan,¹² Howard BV et al,¹³ Cartharina et al,⁸ hysterectomy fact sheet by K.Braun.¹⁴

CONCLUSION

It is observed that most of the hysterectomies at younger age done in and around Tirupati outside our Sri Padmavathi Hospital, Renigunta by different practitioners for varied indications were done for benign medically treatable conditions, causing long term disability of women.

Most of the women were unable to attend their routine duties, abstain from work due to body pains, generalized weakness and orthopedic complaints due to hormonal deficiencies.

All the above problems which most of the women were facing can be avoided by restricting hysterectomies and by performing them for valid indications. Most of the hysterectomies can be avoided by treating benign conditions medically and by conservative methods.

If hysterectomy is mandatory at younger age, ovaries can be retained if healthy to maintain the hormonal status.

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Post Percutaneous Nephrolithotomy Massive Hematuria: Our Experience

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ABSTRACT

Introduction: Percutaneous nephrolithotomy (PCNL) is an integral component of the management of large-volume renal calculus disease with advantages of better stone clearance rates, cost effectiveness, and early convalescence. This study includes identifying risk factors and review of management of post PCNL massive hematuria in our institute.

Material and methods: Medical charts of all subjects who underwent PCNL from 2013 July to 2015 July were reviewed retrospectively and patients were divided in to massive hematuria and non massive hematuria groups after applying inclusion and exclusion criteria. Various patient related factors which include age, sex, presence of co-morbidities like diabetes, hypertension, presence of UTI, renal insufficiency, history of previous renal surgery, indication of PCNL, left vs right sided were compared between the two groups for their association with post PCNL massive hematuria and its management.

Results: Among the 242 patients included in study, 13 patients required renal angiography for management of post PCNL hematuria.

Conclusion: Nowadays PCNL is the procedure of choice for removal of large renal calculi. It needs good surgical skills and an occasional vascular injury is probably unavoidable. Identification of risk factors influencing the incidence of severe vascular injuries is of the utmost importance for decreasing the rate of this serious and sometimes fatal complication.

Keywords: percutaneous nephrolithotomy, angiography, hematuria

INTRODUCTION

Percutaneous nephrolithotomy (PCNL) is an integral component of the management of large-volume renal calculus disease. It has the possible advantages of better stone clearance rates, cost effectiveness, and early convalescence compared with other modalities such as SWL and open stone surgery.¹ A high-flow arteriovenous network constituting 20% of the total cardiac output closely surrounds the collecting system. Access to the pelvicaliceal system and intrarenal manipulations may traumatize these vessels, resulting in significant bleeding.²

Renal hemorrhage is one of the most dangerous complications of PCNL.³ Fortunately conservative measures are adequate to control bleeding in most cases. Angioembolization and further procedures are required in 1% of patients to control intractable bleeding.

Although the diagnosis of and treatment for post-PCNL renal bleeding was attempted by many³⁻⁶ only a few groups have investigated risk factors and one of these studies failed to identify any risk factors.³ Identification of the risk factors of post-PCNL severe hemorrhage is of paramount importance for their avoidance.⁷ So we conducted this retrospective

study to identify risk factors and to review management of post PCNL massive hematuria in our institute.

MATERIAL AND METHODS

Medical charts of all subjects who underwent PCNL from 2013 July to 2015 July in Sri Venkateshwara Institute of Medical Sciences were reviewed retrospectively after getting ethical clearance from institutional ethics committee.

Inclusion Criteria

- All patients who underwent PCNL between July 2013 to July 2015.

Exclusion Criteria

- Patients who underwent PCNL along with URSL on same side at same setting were excluded.
- Patients who were referred with post PCNL massive hematuria from elsewhere from excluded from study.
- Patients who underwent PCN placement for other indications.

After applying above inclusion and exclusion criteria, 242 patients undergoing PCNL patients undergoing PCNL between 2013 July to 2015 July were included in study.

Among the 242 patients, 13 patients had massive hematuria⁸ (drop in Hb by 2gm/dl with 4 or more transfusions), and these patients constituted group A in our study. All patients in group A underwent renal angiography. Remaining 229 patients constituted group B and none of them underwent angiography.

Various patient related factors which include age, sex, presence of co-morbidities like diabetes, hypertension, presence of UTI, renal insufficiency, history of previous renal surgery, indication of PCNL, left vs right sided were compared between the two groups for their association with post PCNL massive hematuria.

Postoperatively, the time of presentation of hematuria, mode of management, mortality and morbidity (in terms of complications-if any, average hospital stay) were reviewed for all group A patients and compared with group B patients.

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STATISTICAL ANALYSIS

These patients data was coded into a Microsoft Excel (Redmond, WA) spreadsheet. Chi Square test is applied to test significance of association (p value < 0.05 – significant association) between various risk factors and massive hematuria.

RESULTS

Among the 242 patients who underwent PCNL in our institute between 2013 July to 2015 July, 13 patients had massive post PCNL hematuria and required renal angiography for management of post PCNL hematuria while none of 229 patients had massive hematuria that needed renal angiography.

The age distribution showed 46% of patients in group A falling in age group of 40 – 60 years while 68 % of patients in group B were in age group of 30 – 50 years. Increasing age did not have significant correlation with post PCNL massive

hematuria (p value – 0.2601).

The M:F ratio in group A was 1.6: 1 and in group B was 0.8:1 and did not have significant association with post PCNL massive hematuria (p value – 0.2567).

Nine (69.2%) out of 13 patients in group had preoperative positive urine culture while 70 (30.56%) of 229 in group had preoperative positive urine culture. Presence of preoperative UTI showed significant association with post PCNL hematuria (p value – 0.0038).

Diabetes and hypertension were more prevalent in group A than group B (61.54% vs 26.63%, 69.23% vs 42.79%) while renal failure was more prevalent in group B (15.38% vs 20.08%). Of the three only diabetes showed significant association with Post PCNL massive hematuria (p value < 0.05).

Around 53.8% of patients did not have previous renal surgery in group A while 77.3% of patients group did not have a previous renal surgery. Previous renal surgery was not a significant risk factor in our study (p value - > 0.05).

Increased stone burden was a significant in our study with 46% of patients with staghorn calculi in group A compared to 11% in group B and 31% patients with multiple renal calculi compared to 26% in group B. (p value – 0.00425).

Side of puncture was comparable in both groups with about 46% of punctures being on left side while 53% on right side in both groups.

Of all the above preoperative factors compared only 3 factors showed a significant association with massive post PCNL hematuria viz. preoperative positive urine culture, presence of diabetes, and stone burden. (Table 1)

Among the 13 patients in Group A except for one presented with hematuria after 48 hours of procedure, 6 patients presented between 2 to 14 days while another 6 patients presented 14 days of procedure with hematuria.

There was no mortality in either groups. Morbidity of group A was more than group B in terms of mean drop of hemoglobin (4.5 vs 1.7 gm/dl), mean number of blood transfusions (4.6 vs 1.8), hospital stay (13.7 days vs 4.5 days) and with greater incidence of postoperative complications (30% vs 11%) (Table 2).

Of the 13 patients in whom renal angiography was done, AV fistula was seen in 7 cases, pseudoaneurysm in 4 cases while both were seen in 2 patients.(Table 3). Angioembolization was successful in 10 of 13 patients (success rate of 77%) while 3 patients required flank exploration out of which partial nephrectomy was done in one patient while

Factors	Group A (n=13)	Group B (n=229)	p value
Mean age	47±15	44±12	0.2601
Sex ratio(M:F)	1.6:1	0.8:1	0.2567
Diabetes	8	61	0.0067
Hypertension	9	98	0.0619
UTI	9	70	0.0038
Renal insufficiency	2	46	0.6791
Previous surgery	6	52	0.0541
ESWL	2	30	0.8130
PCNL	3	16	0.6589
Open surgery	1	06	0.2884
Indications of PCNL*			0.00425
Staghorn calculi	5	25	0.00337
Multiple renal	5	60	0.33194
Ureteric	3	144	0.14255
Right vs Left	6/7	102/127	0.90942
*percutaneous nephrolithotomy			

Table-1: Preoperative variables

Morbidity	Group A	Group B
Mean drop in hemoglobin	4.5	1.7
Mean number of blood transfusions	4.6	1.8
Hospital stay	13.7 days	4.5 days
Post op complications	4(30%)	25(11%)
Mortality	---	---

Table-2: Postoperative morbidity and mortality

Study	AV fistula	Pseudo aneurysm	AVF*+PA**	Vessel laceration
Haung et al	50 %(6)	25%(3)	17%(2)	8%(1)
Richstone et al ¹⁷	25%(14)	53% (30)	17% (10)	5%(3)
Zeng G et al ¹⁸	21%(25)	54%(63)	21%(25)	4%(4)
Kessarar et al ³	46.7%(7)	26.7%(4)	13.3%(2)	13.3%(2)
Martin et al ⁵	37.5%(3)	50%(4)	12.5%(1)	----
Srivastava et al ⁶	36.4%(8)	59.1%(13)	18.2%(4)	4.5%(1)
El-Nahas et al ⁷	51.3%(20)	23.1%(9)	20.5%(8)	5.1%(2)
Jain et al ¹⁹	43.9%	41.5%	12.5%(1)	---
Our study	54%(7)	15%(4)	31%(2)	----

*arteriovenous fistula, ** pseudo aneurysm

Table-3: Angiography findings

nephrectomy was done in 2 patients. (Table 4)

DISCUSSION

Blood loss is one of the common complications of percutaneous nephrolithotomy with 1% to 11% requiring a blood transfusion.⁸ Bleeding may result from traumatized renal parenchyma or injury to the perinephric vessels.⁹ Massive bleeding can occur during needle puncture, tract dilatation, intraoperative instrument manipulation, or in the postoperative period.³ Renal vessel damage with subsequent formation of arteriovenous fistulas or pseudoaneurysms is a well-known source of bleeding after kidney operations.

Arteriovenous fistulas and pseudoaneurysms of the renal arteries are formed by a high-pressure leak from a lacerated artery. The leak is transmitted through the tract into a lower resistance system, such as a vein or a connective tissue space.¹⁰ There have been reports of bleeding attributable to arteriovenous fistulas or pseudoaneurysms as late as 13 weeks after a percutaneous nephrolithotomy.¹¹ In our study, 43% (6/12) of massive bleeding occurred in the early postoperative period (2 to 14 days after PCNL), and arteriovenous fistula formation as a late complication 40 days after PCNL was noted in 1 patient.

The first step in managing excessive blood loss is to monitor the vital signs of a patient. If nephrostomy tube is present, it is clamped for 4-8 hours, and an external compression dressing is applied.⁸ A larger nephrostomy tube will tamponade the tract better. If the bleeding from the nephrostomy tube continues or gross hematuria with acute urine retention occurs, a blood transfusion plus fluid resuscitation and Foley catheterization with urinary bladder irrigation should be administered.⁸ Hydration and intravenous administration of mannitol in hemodynamically stable patients can lead to rapid forced diuresis and swelling of the kidney within the capsule, which may enhance tract tamponade.²⁰

In case of failure of these maneuvers, further evaluation with diagnostic imaging tools like color duplex sonography/ CT/ MR angiography or renal angiography is recommended. We generally do a renal angiography when these maneuvers fail and/or there is massive hematuria (drop in Hb by 2gm/dl with 4 or more transfusions). Vascular lesions can be treated with angiographic embolization at the same setting.

Angiography in our series revealed AV fistula in 7 cases, pseudoaneurysm in 4 cases and both in 2 cases. The incidence of AV fistulas and pseudoaneurysm in patients with post PCNL hematuria differed in various studies (Table 3).

Hyperselective embolization in our series was effective in 10 of 13 cases, (success rate- 77%) which is comparable with reported success rate worldwide ranges from 72 – 95%.³⁻⁸ Embolization compromises blood flow to a portion of the kidney because of embolic occlusion of the intrarenal arterial branches. Partial renal ischemia and subsequent renal infarction are disadvantages of embolization which are minimized by super selective embolization. In our series embolization was not feasible due to technical difficulties in 3 cases, all of which were successfully managed by partial nephrectomy in 2 cases and total nephrectomy in one case. Minimizing the number of needle punctures and selecting the correct puncture site are important in preventing excessive

Angioembolization	10
Partial nephrectomy	1
Nephrectomy	2
Table-4: Mode of management of hematuria in Group A patients (n=13).	

blood loss and a thorough understanding of renal vascular anatomy is essential for determining a correct puncture site. Various risk factors were identified in various studies. In our study increased stone burden (p value - 0.00425), presence of diabetes (p value -0.0067), urinary tract infection (p value - 0.0038) are the risk factors for massive post PCNL hematuria that attained significant p value. Other patient-related factors, age, sex, hypertension and side of puncture did not show significant association.

Bleeding complications have been suggested to be greater in patients with renal insufficiency (creatinine 1.5 mg/dL) or hypertension. We did not find any increase in bleeding in either of these conditions. Diabetic patients are prone to increased blood loss due to associated arteriosclerosis with thickened basement membranes may make such patients more prone to bleeding after the initial trauma of tract formation.²

Stone burden was a significant risk factor in our study (p value - 0.00425). The incidence of massive hematuria post PCNL was more in patients with staghorn calculi (p value – 0.003) than renal or ureteric calculi. In Srivastava et al⁶ increased stone size was the only risk factor identified for vascular complications during PCNL. Kukreja et al¹² reported the same and suggested that staging the procedure for removal of large calculi may offset the correlation with blood loss.

In our study preoperative positive urine culture is also identified as risk factor for massive hematuria post PCNL. The presence of an underlying infection may delay the formation of firm blood clots at the vascular puncture site. Kidneys that have had retroperitoneal inflammation from renal infection and are fixed in the retro peritoneum are especially at risk of parenchymal trauma during percutaneous intrarenal surgery. Similar results were also reported by Wen Haung et al⁸ in 2003.

The role of prior intervention (open operation or PCNL) as a risk factor for increased blood loss during PCNL has been controversial. Netto and associates¹⁵ identified prior surgery as a risk factor for increased bleeding. Stoller and colleagues¹⁶ in their retrospective analysis, did not find any significant difference in blood loss in patients with and without a history of SWL or open surgery. Kukreja et al¹² in contrary found a significant decrease in blood loss in patients with a history of PCNL or open surgery and attributed it to reduced renal cortical thickness. In our study we did not find any relation between previous surgery and bleeding.

CONCLUSION

The PCNL is the procedure of choice for removal of large renal calculi. Despite surgical skills, an occasional vascular injury is probably unavoidable. Identification of risk factors influencing the incidence of severe vascular injuries is of the utmost importance for decreasing the rate of this serious and

sometimes fatal complication.

In the current study we addressed this issue and identified diabetes, increased stone burden and presence of preoperative positive urine culture as three risk factors for massive post PCNL hematuria.

From our experience, major bleeding due to vascular injuries could be managed nonoperatively using hyperselective embolization. The high success rate of embolization (77%), the low level of complications, and certainty of the result in case of no technical problems seem overwhelming reasons for our choice. Failure of embolization should be treated by open surgery.

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A Case Report of Non-Healing Surgical Site Infection Caused By Biofilm Producing Methicillin Resistant *Staphylococcus Epidermidis* (MRSE) in A Tertiary Care Hospital

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ABSTRACT

Introduction: Persistence of wound infections at surgical sites impair patient recovery and if that is due to biofilm producing bacteria it becomes even more difficult to manage. Biofilms are difficult to remove and they have increased resistance towards antibiotics and biocides.

Case report: We report a case of surgical site infection with discharging wound sinus by a biofilm producing Methicillin resistant *Staphylococcus epidermidis* (MRSE) along with catheter associated-urinary tract infection with multidrug resistant *Acinetobacter baumannii*, in a nine year old malnourished boy about six weeks after open cystolithotomy which has been rarely reported before. He was refractory to conventional treatment. Antibiotic sensitivity testing (AST) showed sensitive only for vancomycin for MRSE and congo red agar test method for detection of biofilm gave confluent growth of black colonies with crystalline consistency confirming it as biofilm producing MRSE. After proper debridement of wound and regular surgical dressing along with vancomycin infusion, wound started to heal.

Conclusion: If the bacteria that contaminate incision site of surgical wound have the ability to attach on a biological surface, they rapidly express new proteins, which becomes sessile and along with generation of protective exopolysaccharide matrix, it changes into biofilm states, which are significantly different from their planktonic counterpart. Antimicrobials and biocides fail to penetrate biofilm, resulting in persistence of wound infections. So, physical removal of biofilm from wound surface, followed by selective use of biocides in conjunction with systemic antibiotics should be the wound management strategy.

Keywords: Surgical site infections, biofilm, Methicillin resistant *Staphylococcus epidermidis*, *Acinetobacter baumannii*

INTRODUCTION

Surgical site infections (SSI) are important cause of hospital acquired infections (HAI) and responsible for significant post operative morbidity, mortality, prolonged hospital stay and increase in cost.¹ Persistence of wound infections at surgical sites can further impair patient recovery and if that is due to biofilm producing bacteria it becomes even more difficult to manage. This is because biofilms are difficult to remove and they generally have 100–1000-fold increased resistance towards antibiotics and biocides than equivalent populations of planktonic bacteria.² We report a case of SSI with discharging wound sinus by a biofilm producing Methicillin resistant *Staphylococcus epidermidis* (MRSE) along with catheter associated-urinary tract infection (CA-UTI) with multidrug resistant (MDR) *Acinetobacter baumannii*, in a nine year old malnourished boy about six weeks after open

cystolithotomy which has been rarely reported before.

CASE REPORT

A nine year old malnourished boy presented in urology out patient department of a tertiary care hospital with dysuria, intermittently interrupted urinary flow and pain in lower abdomen for one year. There was no history of recurrent urinary tract infections or hematuria. Ultrasonography of abdomen detected single urinary bladder stone of 14.6mm size and on X-ray of kidney and urinary bladder, stone was found to be radioopaque. Complete blood haemogram, urea, creatinine, uric acid, parathyroid hormone, serum calcium and routine examination of urine were within normal limits. There was no significant growth in urine culture pre-operatively. Open cystolithotomy was done under general anaesthesia. He was catheterised and a drain was placed for two days for drainage of retropubic space. Post operative dressing done and amoxicillin-clavulanic acid (375mg) was prescribed thrice daily for ten days. He was discharged with urinary catheter on seventh post operative day and was advised to apply mupirocin ointment topically at surgical site daily. But the surgical wound never healed properly and after six weeks patient presented with discharge of pus from incision site with lower abdominal pain and burning sensation in urethra. On examination there was pus discharging wound sinus at incision site and wound dehiscence. [Figure-1] Patient was referred to microbiology department for opinion. Pus from discharging sinus was squeezed out and collected aseptically in test tube and in sterile swabs. Immediately direct smear preparation and grams staining, ziehl neelsen (ZN) staining and KOH wet mount were done. Direct smear microscopy revealed plenty of pus cells with gram positive cocci in clusters, but no acid fast bacilli or fungal body were seen. Pus sample was inoculated in nutrient agar media, 5% sheep blood agar media and MacConkey agar media and incubated overnight aerobically at 37°C. As the patient was catheterised, urine sample was collected by sterile needle and syringe directly from the catheter after proper disinfection

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of the site with 70% alcohol. Microscopical examination of wet film of uncentrifuged urine under high power objective lens showed 5-10 pus cells per high power field indicating significant pyuria. Semi quantitative method of urine culture was done by standard loop method. Uncentrifuged urine sample were inoculated in nutrient agar media, 5% sheep blood agar media and MacConkey agar media and incubated overnight aerobically at 37°C.

Culture from pus sample gave smooth, low convex, opaque and white colonies of 2-4 mm diameter in nutrient agar media. Gram staining showed gram positive cocci in clusters. Biochemical tests for identification following standard methods were done.³ Catalase test was positive but slide and tube coagulase tests were negative. Mannitol fermentation test was negative. Novobiocin sensitivity test with 5µg novobiocin disc gave a sensitive zone diameter of 16mm indicating *Staphylococcus epidermidis*. To exclude skin contamination, pus was again collected from same site and there was repeated isolation of *Staphylococcus epidermidis*. Antibiotic sensitivity testing (AST) were done according to CLSI (Clinical and Laboratory Standards Institute) guidelines by Kirby-Bauer disk diffusion method in Mueller Hinton agar.⁴ It showed multidrug resistance to cefoxitin (30µg), amoxicillin-clavulanic acid (20/10µg), clindamycin (2µg), erythromycin (15µg), tetracycline (30µg), cotrimoxazole (1.25/23.75µg), ciprofloxacin (5µg), levofloxacin (5µg), linezolid (30µg) and teichoplanin (30µg). MIC testing by Epsilon meter (E test strip) Vancomycin-Cefoxitin Dual Ezy MIC strip (Himedia, India), was done and found to be resistant for cefoxitin (MIC>64µg/ml) and sensitive for vancomycin (MIC=1.5 µg/ml). So SSI pathogen was MRSE which was sensitive only to vancomycin. [Figure-2] Due to the non-healing nature of the wound, in addition to standard microbiological culture identification and sensitivity testing, test for detection of biofilm production by this MRSE strain was also performed by standard Congo Red agar method.⁵ A suspension of this MRSE strain was inoculated into plate containing specially prepared solid medium with Brain Heart Infusion broth (BHI) with agar added which was supplemented with 5% sucrose and Congo Red stain.⁵ The plates were incubated aerobically for 24-48 hours at 37°C that gave confluent growth of black colonies with crystalline consistency confirming it as biofilm producing MRSE.⁵ [Figure-3]

Urine culture gave significant growth of tiny, semi-translucent, low convex faint pink colonies on MacConkeys agar media which on gram staining gave gram variable diplo-cocco-bacilli and in singles also. After doing standard biochemical tests for identification, it was identified as *Acinetobacter baumannii*. It was catalase positive, oxidase negative, triple sugar iron (TSI) media gave alkaline slant and alkaline butt, ie non-fermentor, Hugh Leifsons O/F test showed oxidative break down of sugar and it was non motile.³ AST showed resistance to piperacillin (100µg), piperacillin-tazobactam (100/10µg), ceftazidime (30µg), ciprofloxacin (5µg), levofloxacin (5µg) but sensitive only to imipenem (10µg), amikacin (30µg) and colistin (10µg). Test for detection of biofilm production was also performed by standard Congo Red agar method, but no biofilm was



Figure-1: Surgical site infection with discharging pus

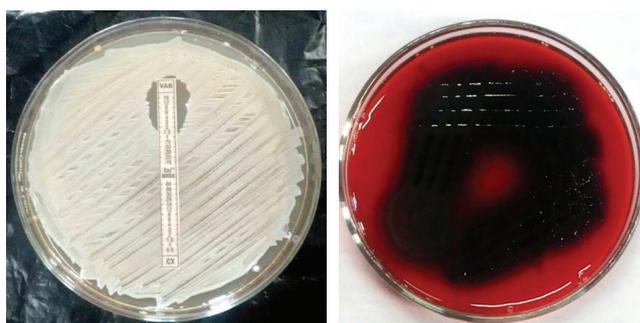


Figure-2: Epsilon meter (E test strip) Vancomycin-Cefoxitin Dual Ezy MIC strip showing resistance for cefoxitin (MIC>64µg/ml) and sensitive for vancomycin (MIC=1.5 µg/ml). **Figure-3:** Congo Red agar test gave confluent growth of black colonies with crystalline consistency.

produced. So, urinary isolate was multidrug resistant, but non-biofilm producing strain of *Acinetobacter baumannii*. Patient was finally treated with imipenem and cilastin infusion 250mg six hourly and urine culture showed no significant growth after seven days of treatment. Wound debridement and regular dressing of surgical site was done and vancomycin infusion 250mg twelve hourly given. The condition of the patient improved after seven days and SSI started to heal. After two weeks there was no purulent discharge. Patient was further lost to follow-up.

DISCUSSION

Surgical site infections (SSI) with delayed wound healing due to infection, inflammation, discharge and wound dehiscence accounts for 5% to 20%.¹ Bacterial biofilm is a wide spread problem nowadays and poses a potentially significant risk of hospital acquired infections. There is high probability that bacteria will contaminate incision site in a surgical wound. Now if the bacteria have the ability to attach on a biological surface they rapidly expresses new proteins, which becomes sessile and along with generation of protective exopolysaccharide matrix, it changes into biofilm states, which are significantly different from their planktonic counterpart. Surgical site infections lack the traditional host response seen in acute infections and have similar characteristics as observed in chronic wounds. The production of pro-inflammatory cytokines and exudates provide a highly nutritious and ideal environment for the bacteria within the biofilm to survive, may be totally unperturbed by activated

macrophages, neutrophils, antibodies, complement or other host defences.⁶ Moreover antimicrobials and biocides fail to penetrate biofilm resulting persistence of wound infections and wound dehiscence. Biofilms are often associated with chronic wound infections which is around 60%, whereas only 6% of acute wound infections are also associated with biofilm.⁷ We report this rare and interesting case of six weeks old SSI in a nine year old malnourished boy by a biofilm producing MRSE strain, following open cystolithotomy for removal of 14.6mm single urinary bladder stone.

Bladder calculi are one of the commonest health problems in young malnourished children below 10 years with low body mass index in endemic areas.⁸ They are related to peculiar feeding habit mainly dependant on cereal based diet and lacking animal proteins along with chronic dehydration with hot, arid and dry climate in the absence of obstruction or any bladder emptying disorders.⁸ Surgical management includes open cystolithotomy or percutaneous cystolithotomy in paediatric age group.⁸ A study by Satyanarayana V *et al* reported that SSI following open cystolithotomy is only 5.3%,¹ but no case has been reported by biofilm producing organism to the best of our knowledge.

Due to treatment refractoriness of biofilms, it is very difficult to manage and often show recurrences. An *in-vitro* study by Wasfi *et al* on antimicrobial activities against biofilm showed that at higher concentration of antibiotics in multiples of MIC, biofilm biomass and viable cells in biofilms were reduced.⁹ Similarly another *in-vitro* study by Chakraborty *et al* on efficacy of hospital disinfectants against biofilms, showed that much higher concentration and greater contact time than that recommended is required for reduction of biofilm bioburden.¹⁰ But none of the *in-vitro* studies showed complete elimination of biofilms by antibiotics and disinfectants. Hence physical removal of biofilm by debridement from the surface of wound is an essential step in management, followed by use of proper biocides and antibiotics. Also rigorous mechanical brushing, cleaning and proper disinfection of reusable medical devices, surgical instruments and hospital environment is essential to prevent transmission of hospital acquired infections due to biofilms. Second important aspect of our case report is hospital acquired urinary tract infection (UTI) by multidrug resistant *Acinetobacter baumannii*. Catheter associated - urinary tract infections (CA-UTI) are the most common type of hospital acquired infections accounting for 30-40%. Prolonged catheterisation inevitably predisposes UTI. So basic principles of hospital infection control should be practised to limit CA-UTI. Also antibiotic therapy should be given based on their antibiotic susceptibility pattern which is very important for avoiding the hazards of injudicious use of antibacterial agents and prevention of emergence of resistant strains.

CONCLUSION

Hence to conclude, any non healing SSI with pus discharging sinus should be evaluated for biofilm colonisation and wound management strategy should include physical removal of biofilm from the surface by opening of wound and aggressive debridement of surgical wound to remove devitalised tissues,

followed by using selective biocide like silver or cadexomer iodine in conjunction with appropriate systemic antibiotics.

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Blood Component Therapy in Pediatric Intensive Care Unit in Tertiary Care Center: An Audit

Maaz Ahmed¹, Sushma U Save²

ABSTRACT

Introduction: The skill of dealing with the fluids thus offering the hemodynamic aid is crucial while treating critically ill. With alarm regarding rate of inappropriate transfusion being carried out especially as against the rainbow of adverse effects of transfusion. Aim of the study was to investigate the current transfusion practice in the critically ill children and see whether the transfusions were in accordance to the Indian Academy of Pediatrics [IAP] recommendations.

Material and methods: Prospective observational exploratory study in Pediatric intensive care unit [PICU] of a Tertiary care center. The study enrolled 122 patients admitted in PICU with age 29 days to 12 years who received blood component therapy from the initiation of the study in 2012 over a period of 12 months. The qualitative data was represented in the form of frequency and percentage tables with the help of SPSS version 21.

Results: We found in our study that a total of 161 transfusions, 74.53% patients received packed cells, 14.28% received platelets and 11.18% patients received fresh frozen plasma. Twenty five percent packed cell transfusions were not in accordance to IAP recommendations and 44.5% were transfused with pre-transfusion hemoglobin more than 7 gm%. Among the packed cell transfusions received mean pretransfusion hemoglobin was found to be 7.45+/- 1.58. The platelets and fresh frozen plasma transfusions that were in accordance to IAP recommendations were 73.91% and 83.33% respectively.

Conclusion: Red blood cells are most frequently transfused blood component in PICU. Inappropriate transfusions of blood components are plaguing the optimal utility of this valuable resource. Thus regular audit of blood component therapy to review the optimum utilization of blood components becomes necessary.

Keywords: Blood component therapy, packed cell transfusion, Platelet transfusion, Fresh frozen plasma transfusion, Pediatric Intensive Care Unit.

current transfusion practices. Our aim was to investigate the current transfusion practice in PICU at tertiary care center in the critically ill patients and see whether the transfusions were appropriate as per the Indian Academy of Pediatrics [IAP] recommendations as standard in our study.^{7,8} We use these recommendations as these are locally applicable in this region.

MATERIAL AND METHODS

The prospective observational exploratory study was initiated after obtaining permission from the Institutional Ethics Committee. Waiver of consent was also obtained as ours being an observational study. There was no direct contact between the investigators and the participants or their guardians. The study was carried out in 2012 over a period of 12 months in the PICU of a Tertiary care center in Mumbai, with seven beds, seven ventilators; which admits only medically-critically ill children. The admissions in PICU during our study period were 510. The study enrolled the patients admitted in PICU of age 29 days to 12 years who received blood component therapy during 12 months period from the initiation of the study. We collected patients' demographic data [Inpatient number, age, and sex], diagnosis, duration of PICU stay, details of blood component therapy used [type, indication] the reason for transfusion was entered in the case record form. The recommendations that followed were IAP recommendations as these are locally based guidelines for blood component therapy. The transfusions being given to the cases was assessed whether they were in accordance to the recommendations. Being an exploratory study, no formal sample size calculations were carried out. We considered only packed cells, platelets and fresh frozen plasma [FFP] in our study as these are commonly transfused. As all patients admitted who received blood component therapy in the PICU during the study period of twelve months were enrolled, the effect of seasonal variations were minimized, though could not be nullified. Data analysis was done with the help of PSPP version 3. Qualitative data was represented in the form of frequency and percentage tables. Association among various study parameters, including frequency of blood components transfused, mean and median

INTRODUCTION

Blood component therapy is a life-saving treatment to provide hemodynamic stability in critically ill children in intensive care settings. About half of Pediatric intensive care unit [PICU] admissions are transfused with blood.¹ Many studies have shown inappropriate utilisation of blood components.²⁻⁵ The alarm regarding rate of inappropriate transfusion being carried out especially as against the spectrum of adverse effects of transfusion. In a randomised trial involving stable critically ill children and adult, 7 g per decilitre was taken as haemoglobin threshold thus reducing the transfusion requirements with no rise in adverse results.⁶ Despite this restrictive strategies are not commonly applied and liberal transfusion continue. Hence a need for audit of

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of pre transfusion hemoglobin of packed cells transfusion, percentage of packed cells transfusions below seven g%, recorded most common indications of each blood component transfusion and the percentage of transfusions of each blood component not in accordance to IAP recommendations were also analysed.

STATISTICAL ANALYSIS

The qualitative data was represented in the form of frequency and percentage tables with the help of SPSS version 21.

RESULTS

During the study period of 12 months in the year 2012, there were 510 admissions in PICU include only medically critically ill children between 28 days and 12 years. 82 patients required mechanical ventilation, 152 being respiratory cases and 48 being hematological cases.

We found total of 122 patients received 161 blood components as transfusion, 20 patients were transfused twice and 10 patients were transfused thrice. 120 (74.53%) patients received packed cell transfusion, 23 (14.28%) received platelet transfusion and 18(11.28%) patients received FFP [Table-1]. Packed cells were most commonly transfused, followed by platelets and FFP.

As seen in Table-2, of all the blood component transfusions 24.84% were not in accordance to IAP recommendations. The packed cell transfusions that were not in accordance to IAP recommendations were 25.84 %. Among the red blood cell transfusions received mean pretransfusion hemoglobin was found to be 7.45+/- 1.58 and mean pretransfusion hematocrit was 27.68 +/- 5.99. The median hemoglobin transfusion threshold in our study is 7.60g/dl (Interquartile range 4.15, 9.14g/dl). 44.5% of Red blood cell transfusions were with pretransfusion hemoglobin more than 7 g/dl. The indications not in accordance to IAP recommendations are anemia critically ill hemoglobin more than seven g/dl and, anemia with hemoglobin more than seven g/dl requiring >35% supplemental oxygen on Continuous Positive Airway Pressure [CPAP] and anemia with hemoglobin more than seven g/dl requiring Mean Alveolar Pressure [MAP] > 6 cm of water by invasive mechanical ventilation.

Name of the Blood Component	Frequency	Percent
Fresh frozen plasma	18	11.18%
Red cell cells	120	74.53%
Platelets	23	14.28%
Total	161	100.00%

Table-1: Distribution of study group as per frequency of blood component therapy

Blood component	In accordance to IAP recommendations
Red blood cells (n= 120)	89 (74.16)
Platelets (n= 23)	17(73.91)
Fresh frozen Plasma (n= 18)	15(83.33)
Total	121(75.15)

Figures in parentheses indicate percentages*

Table-2: Distribution as per accordance with IAP recommendations of each blood component.

Platelet Transfusions: All the 23 platelets transfusions were in the age group above four months of which 26.09 % transfusions were not in accordance to IAP recommendations. The transfusions that were not in accordance to IAP recommendations were done in cases of dengue and idiopathic thrombocytopenia without bleeding.

FFP Transfusion: Fresh frozen plasma transfused 18 patients received, 83.33% were in accordance to IAP guidelines. The indications not in accordance to IAP guidelines include altered Ryle tube aspirate and replacement in view of ascitic tapping with pretransfusion International Normalised Ratio [INR] < 1.5.

Table-3 gives frequency of transfusions of blood components in accordance to IAP guidelines of which most commonly adhered recommendations among packed cell transfusions above four months of age were anemia with congestive heart failure (30.4%) and anemia critically ill less than seven g/dl (25 %) and less than four months was packed cell volume < 36% requiring > 35% supplemental oxygen. Among platelet transfusions the most adherence were seen with bleeding with platelet counts less than 50000/dl (44 %) and platelet count less than 20000/dl and marrow failure with hemorrhagic risk factors (19%). Bleeding in a case of DIC (50%) was most adherent indication amongst FFP transfusions.

DISCUSSION

The problem of excessive transfusion of blood components do exists also that a significant number of transfusions are not in accordance to IAP recommendations.^{7,8} Though IAP recommendations are not the standard of guidelines but are locally applicable thus have been used as a benchmark for our study.

We found in our study that red cell transfusions were most frequently transfused followed by platelets and fresh frozen plasma. This is similar to findings in studies by Slonim et al, Bahadur et al and by other studies.⁹⁻¹²

Overall about one-fourth of all blood component therapy were not in accordance to IAP recommendations, of which 25.84% of red blood cell transfusions were not adherent to the recommendations. Wade et al showed 10.86% of overall transfusions were inappropriate, of these 11.1% red cell transfusions were inappropriate.¹³ Bahadur et al found 59.65 % of appropriate usage of blood components.¹⁰ Thus the inappropriate transfusions still continue. Thereby necessity to improve transfusion practices by standardising the indications of blood transfusion with more appropriate randomised clinical trials in critically ill children.

The mean pretransfusion hemoglobin for red blood cell transfusion was found to be 7.45+/- 1.58. Few studies show mean haemoglobin level as ranging from 7.7 to 10.5 g/dl.¹¹⁻¹⁶ Red blood cell transfusions with pretransfusion hemoglobin more than seven g/dl were 44.5%. Marvulo NL et al 58.1% varied from 7 to 10 g/dL, findings are similar to our study.¹⁵ Valentine SL et al showed 71% of patients were transfused at a hemoglobin threshold more than 7 g/dL.¹⁷ Demaret et al found that 96.4% of the first transfusion events aligned to main recommendation of the Transfusion Requirements in Pediatric Intensive Care Unit (TRIPICU) study, whereas in our study it was applied only in 55.4% of events.¹¹ The

Sl. No.	Indications	Frequency
A	Indications for RBC transfusion in children (<4 month)	
1.	Packed cell volume [PCV] < 36% requiring 35% supplemental oxygen MAP > 6-8 cm of water by CPAP or mechanical ventilation	10 1
2.	PCV < 31% and Requiring > 35% supplemental oxygen or MAP > 6 cm of water by CPAP or IMV	1
3.	PCV < 40% and Heart rate > 180 per minute or respiratory rate > 80 per min, persisting for > 24 hrs	3
4.	Hypovolemic shock associated acute blood loss	4
B	Indications for RBC transfusion in children (>4 months)	
1.	In deficiency anemia, with features of overt congestive heart failure	33
2.	Critically ill children < 7 gm %	29
3.	Significant preoperative anemia with cardio-respiratory disease < 8 gm/dl	1
4.	Malignancies with Hb < 8 gm/dl	6
5.	Aplastic anemia with Hb < 6-7 gm/dl	1
C	Indications for Platelet transfusion in children (> 4 months)	
1.	Platelet counts less than 50000/dl and bleeding.	11
2.	Platelet counts less than 50000/dl and an invasive procedures	0
3.	Less than 20000/dl and marrow failure with hemorrhagic risk factors.	5
4.	Less than 10000/dl and marrow failure without risk factors	1
D	Indications for transfusion of Fresh Frozen Plasma	
1.	Severe clotting factor deficiency and bleeding	3
2.	Severe clotting factor deficiency and planned invasive procedure	2
3.	DIC with bleeding	10

Table-3: Frequency of transfusions of blood components in accordance to IAP guidelines.

restrictive strategy with threshold for packed cells to be transfused is taken as 7 g/dl hemoglobin which has shown to decrease transfusion requirements without increasing adverse outcomes also reduce transfusion exposure in recipients.^{6,18-22} Hence the need to adopt restrictive transfusion policy need in our PICU. Further it is necessary to follow up the study down the lane to not only to see whether the recommendations will be followed but also assess the hemoglobin trigger for red cell transfusion and adoption of restrictive strategy red blood cell transfusion.

It has been seen in our study among the inappropriate red cell transfusion were given considering the oxygen requirement whether on CPAP or mechanical ventilation. The recommendations of IAP do not consider the oxygen requirement of the children above four months of age. This points out that should the transfusion only be based on hemoglobin level or whether the oxygen requirement should also be considered.

Platelet transfusions: In our study 26.09% of platelets transfusions were non-adherent to IAP recommendations. A study in India by Wade et al showed 7.14% of inappropriate transfusions, a South African study showed 34% and a Malaysian study found 18.5% also other studies too show inappropriate platelet transfusions.^{5,13,22,23} Our study did show a lower adherence to IAP recommendations. Thus inappropriate platelet transfusions do exist which calls for our attention.

Inappropriate platelet transfusions mainly were in patients with dengue with thrombocytopenia with no clinical bleeding and idiopathic thrombocytopenia without bleeding as a prophylaxis to prevent bleeding. With no clinical bleeding and platelet count above 10,000 does not require platelet transfusion even as prophylaxis for bleeding.²⁴ Hence we

could have averted these prophylactic platelet transfusions. Here we think a need for with more studies with regard to prophylactic versus therapeutic platelet transfusion.

Fresh Frozen Plasma transfusions: Our study reveals that 16.67% Fresh frozen plasma transfusions were not in accordance to IAP recommendations. In study by Wade et al 43.90% of FFP were given inappropriately, a significantly higher inappropriate FFP transfusions when compared to our study.¹³ Karam O et al found 34% and Moiz B et al study showed 21.3% of transfusions were used without any supportive evidence, results are consistent with our study that inappropriate transfusions of FFP are a problem.²⁵⁻²⁹

Inappropriate FFP transfusions were altered Ryle tube aspirate though INR was given as prophylaxis and replacement in view of ascitic tapping in both cases INR was less than 1.5. Wade et al also recorded inappropriately transfused were patients admitted in intensive units with coffee brown gastric aspirate and a child with hematemesis without deranged prothrombin time and INR.¹³ In fact clinical advantage plasma transfusion is minimal with INR value 1.7 and below.⁴ In keeping with risk posed by plasma transfusion and with no substantial evidence for prophylactic plasma transfusion as shown by 80 randomised control trials there should be a systematic approach to increase the understanding among clinicians about the adverse effects of transfusions and proper dissemination of information about the role of prophylactic plasma transfusion.^{30,31}

The limitations of our study is that it's an observational study with a small sample size involving single tertiary care centre hence the findings cannot be generalised. We did not study all the blood components like cryoprecipitate, intravenous immunoglobulin etc. The sample contains a heterogeneous group which included unstable critically ill children as well.

The decision to transfuse were made on subjective basis, customised criteria often included mechanical ventilation or oxygen requirement, a matter that can finally be resolved by further randomised clinical studies. The study only reviewed at 'Excessive transfusion' and did not study the aspect of patients who must have received the transfusion but did not.

CONCLUSION

Inappropriate transfusions of blood components are plaguing the optimal utility of this valuable resource. Thus a standard guidelines, restrictive transfusion policy and regular audit of blood component therapy to review the optimum utilization of blood components becomes necessary. The appropriate transfusions can be improved by increasing awareness among treating Pediatric intensivist and also frequent interactions with transfusion centre will lead to better utilisation of limited resources.

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Appendix 1: IAP Recommendations for Blood Component Therapy^{7,8}:-

Indications for RBC transfusion in children (<4 months)

1. Packed cell volume <36% requiring
 - a. >35% supplemental oxygen
 - b. Mean airway pressure > 6-8 cm of water by CPAP or IMV
2. PCV < 31% and
 - a. Requiring >35% supplemental oxygen or MAP >6 cm of water by CPAP or IMV
 - b. >9 episodes of apnea and bradycardia in 12 hrs. or 2 episodes in 24 hrs., requiring bag and mask ventilation while on methyl xanthine
3. PCV <40% and
 - a. Heart rate > 180 per minute or respiratory rate >80 per min, persisting for >24 hrs.
 - b. Weight gain <10 gm per day for 4 days while on 100 cal/kg/day
 - c. Undergoing surgery
4. PCV <21% and
 - a. Asymptomatic with reticulocytosis <2%
5. Hypovolemic shock associated acute blood loss

Indications for RBC transfusion in children (>4 months)

1. In deficiency anemia, with features of overt congestive heart failure
2. Critically ill children <7 gm %
3. Postoperative Hb <8 gm/dl with symptoms and signs of anemia
4. Significant preoperative anemia with cardio-respiratory disease <8 gm/dl
5. Malignancies <8 gm/dl
6. Aplastic anemia <6-7 gm/dl
7. Thalessemia major <9gm/dl

Indications for Platelet transfusion in (<4 months)

1. Platelets and < 1 lakh/dl and bleeding
2. Platelets <50000/dl and an invasive procedure
3. Platelets <20000/dl clinically stable
4. Platelets <1 lakh and clinically unstable
5. Platelets any count, but with platelet dysfunction plus bleeding or an invasive procedure.

Indications for Platelet transfusion in children (> 4 months)

1. Platelet counts less than 50000/dl and bleeding.
2. Platelet counts less than 50000/dl and an invasive procedures
3. Less than 20000/dl and marrow failure with hemorrhagic risk factors.
4. Less than 10000/dl and marrow failure without risk factors
5. Platelets any count, but with platelet dysfunction plus bleeding or an invasive procedure.

Indications for transfusion of Fresh Frozen Plasma (FFP)

1. Severe clotting factor deficiency and bleeding
2. Severe clotting factor deficiency and planned invasive procedure
3. DIC with bleeding
4. Reversal of warfarin effects emergently
5. Anticoagulant protein (antithrombin III, protein and protein S) replacement
6. Thrombotic thrombocytopenic purpura for exchange transfusion.

Short Term Comparative Evaluation of Metabolic Adverse Effects Profile of Mirtazapine Versus Paroxetine

Munish Kumar¹, Shalini Chandra², A.K. Kapoor², H.K. Singh³, Sangita Agarwal², Rakesh Yaduvanshi⁴

ABSTRACT

Introduction: Depression is the common psychological disorder worldwide and is a leading cause of disability. Second generation antidepressants (mirtazapine and paroxetine) are now acknowledged to be the first line treatment for depression. Aim of the study was to comparatively evaluate mirtazapine and paroxetine with regards to metabolic adverse effects (body weight, BMI, FBS, lipid profile) in cases of depression.

Material and methods: It is a short term prospective, randomized, open label, interventional clinical study of 6 months duration was conducted in the Department of Pharmacology and Psychiatry, Rohilkhand medical college and Hospital, Bareilly. A total of 60 newly diagnosed patients of depression (ICD-10, F32.0- F32.8) of age group 18-65 years of both the sexes were enrolled. Patients were randomly divided in two groups and were administered flexible dose of mirtazapine 7.5mg – 30mg daily and paroxetine 12.5mg – 37.5mg daily. A complete clinical examination and investigations were conducted on all subjects to rule out any chronic ailments referred to in exclusion criteria. Demographic parameters were recorded, following which patient's weight, BMI, fasting blood sugar and lipid profile was estimated at baseline. Follow up of the patients was done at 1, 3 and 6 months.

Results: Mirtazapine group shows statistically significant increase in Body weight from baseline 54.11 ± 5.07 kg (mean \pm SD) to 59.61 ± 4.87 kg after 6 months of therapy. Thus there was a marked increase in body weight (upto 5 kgs, $p < 0.0001$), Similarly BMI also increased from baseline 21.14 ± 1.44 kg/m² (mean \pm SD) to 23.30 ± 1.86 kg/m² after 6 months. However, none of the patients crossed the normal range. Statistically significant increase in B.W. and BMI was observed at each follow-up visits at 1,3 and 6 months. Data shows no statistically significant changes in FBS, TC, TG, HDL, LDL values.

Conclusion: In this short term study, Paroxetine was found to be associated with less increase in weight and BMI to Mirtazapine when used for the treatment of depression. However, definitely long term study with both the drugs is required to comparatively evaluate metabolic adverse effect profile in terms of weight gain, BMI, FBS and lipid profile.

Keywords: depression, mirtazapine, paroxetine, metabolic adverse effects.

Selective serotonin reuptake Inhibitors (SSRIs) and newer antidepressants namely mirtazapine, duloxetine etc. has replaced tricyclic antidepressants (TCA) and monoamine oxidase inhibitors (MAOIs).²

Antidepressant drugs increase the risk of weight gain, Type 2 DM, dyslipidemia and other metabolic adverse effects leading to discomfort and discontinuation of treatment.³

There is evidence that antidepressant drugs may induce a variable amount of weight gain but results are sparse and contradictory. SSRIs induced weight gain is most likely caused due to alteration in serotonin 2C receptor activity, increase in appetite, craving for carbohydrate, or recovery from clinical depression.⁴

Mirtazapine is a new antidepressant with unique pharmacological profile that differs from currently available antidepressants. It is a specific antagonist of alpha-2 receptors, which has only a marginal effect on alpha-1 receptors. Blockade of presynaptic alpha-2 auto receptors causes increased norepinephrine release, and direct blockade of inhibitory alpha-2 heteroreceptors, located on serotonin (5-HT) terminals, leads to increased serotonin release. As the 5-HT₂ and 5-HT₃ receptors are blocked by mirtazapine, however, serotonin release is produced exclusively by stimulation of the 5-HT₁ receptors. This dual action, via both neurotransmitter systems, is the reason that mirtazapine has been termed a noradrenergic and specific serotonergic antidepressant (NaSSA).⁵

Paroxetine is a selective serotonin reuptake inhibitor (SSRI) which is indicated for the treatment of depression and also for obsessive-compulsive disorder, panic disorder, social phobia, generalized anxiety disorder, post traumatic stress disorder, premenstrual dysphoric disorder and chronic headache. Paroxetine is the most potent inhibitor of 5-HT reuptake of all currently available antidepressants. It is a very weak inhibitor of norepinephrine uptake but it is still more potent at this site than the other SSRIs and this may contribute to its efficacy at higher doses. The selectivity of paroxetine, i.e. the ratio of inhibition of uptake of NE to 5-HT is amongst the highest of the SSRIs.⁶

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INTRODUCTION

Depression is one of the common psychological disorder which affects about 121 million people worldwide. World health organization (WHO) had already stated that depression is one of the major cause of disability and the fourth major contributors to the global burden of disease.¹

Pharmacological treatment dominates the management of depressive disorders. Trends in pharmacotherapy in depression have changed over the past few years.

Indians are more susceptible to the metabolic effect of psychotropic drug and there are very less studies conducted in this regard.³ Because of less data available on Indian Studies², we conduct this short term study to compare the metabolic adverse effects profile of Mirtazapine versus Paroxetine.

Aim and objective of the research was to comparatively evaluate mirtazapine and paroxetine with regards to metabolic adverse effects (body weight, BMI, FBS, lipid profile) in cases of depression.

MATERIAL AND METHODS

A six months (short term) prospective, randomized, interventional, open label flexible dose clinical study to compare the metabolic adverse effects in patients of depression receiving treatment with either mirtazapine or paroxetine was conducted in the department of Pharmacology and department of Psychiatry, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh. Approval for the study protocol was obtained from the Institutional Ethical Committee. Each subject signed an informed consent statement prior to participation and could withdraw without prejudice at any time.

Patients of 18-65 years age group and of both genders attending to Psychiatry outpatient department during the study period diagnosed with depression falling under the group (F32.0-F32.8) as per criteria of the 10th edition of the International Classification of Diseases (ICD-10) receiving either mirtazapine or paroxetine were included in the study. It is ensured that they have not received any antidepressant agent earlier as the study was carried out in drug naïve individuals of depression.

A total of 60 patients (MIR=30 and PAR=30) comprised of sample size and all patients were allotted a reference number. Simple randomization was done and the odd numbers were assigned to mirtazapine and even numbers to paroxetine group.

Flexible dose schedule of both drugs were used, mirtazapine 7.5-30mg/day and paroxetine 12.5-40mg/day depending on evaluation of clinical condition and clinical response by the

consultant psychiatrist, though initially lower doses were administered. No other antidepressant drug therapy was given to patients except test drugs during the study period. All the patients who were enrolled and participating in the clinical study were emphatically told that they have to take the prescribed medicine for at least 6 months despite adequate control to prevent reoccurrence of depression.

Newly diagnosed, first episode cases of depression (ICD-10, F32.0- F32.8, drug naïve patients) of age group 18-65 years, of both sexes were included in the study.

Following patients were excluded from the study: Patient of age group less than 18 and more than 65 years. Pregnant and lactating females. Patients with history of taking antidepressant before the study. Patients with history of Diabetes mellitus. Dyslipidemic and obese patients. History of significant and untreated medical illnesses including severe cardiovascular disease, hepatic, renal, or untreated thyroid disease, hepatitis and HIV. Patients currently taking the following medication, antiepileptic, antipsychotic, antiparkinsonian drugs, birth control pills, steroids, propranolol, thiazide diuretics and agents that induce weight loss.

Following investigations to be done for screening of patients: Fasting Blood sugar; Lipid profile: LDL, HDL, TG, TC; ECG; Renal function test; Liver function test; T3, T4, TSH; Pregnancy test (females); Urine routine and microscopy. While fasting blood sugar and lipid profile done in each follow up.

A complete preliminary clinical examination was conducted on all the subjects included in the study to rule out any chronic ailments referred to in the exclusion criteria. After initial screening, the socio demographic data regarding age, sex, socio-economic status, family history and other demographic parameters were recorded in the case report form. Patients were then evaluated by senior consultant psychiatrist.

For calculating body mass index (BMI= kg/m²) patient's height and weight were taken using measuring tape and weighing machine respectively. Blood pressure was measured with using standard protocol. Thereafter, relevant

Characteristic	Group A(Mir)	Group B (parx)	table-Value	P-Value	Significance
Age	39.13 ± 5.77	40.2 ± 6.70	0.6628	0.5101	NS
Sex					
Male	13	14	0.067	0.795	NS
Female	17	16			
Locality					
Ruler	19	14	1.684	0.1943	NS
Urban	11	16			
Education					
Illiterate	14	11	0.617	0.4321	NS
Literate	16	19			
Socio-economic Status					
Lower	9	2	8.455	0.0762	NS
Lower middle	8	12			
Upper	0	1			
Upper Lower	11	9			
Upper middle	2	6			

Table-1: Demographic characteristic

Parameters	Baseline	1 Month	t-value	p-value	3 Months	t-value	p-value	6 Months	t-value	p-value
Body Weight	54.11 ± 5.07	55.00 ± 4.97	5.3986	0.0001	56.18 ± 4.78	5.3853	0.0001	59.61 ± 4.87	6.7562	0.0001
BMI	21.14 ± 1.44	21.48 ± 1.46	4.7868	0.0001	21.42 ± 1.40	5.3202	0.0001	23.30 ± 1.86	6.5979	0.0001
FBS	84.46 ± 5.19	84.61 ± 5.73	0.1779	0.8601	84.11 ± 4.86	0.3287	0.7449	84.29 ± 6.23	0.1125	0.9113
TC	138.82 ± 16.33	138.29 ± 12.23	0.2007	0.8424	138.75 ± 16.18	0.0202	0.9841	138.50 ± 23.14	0.603	0.9502
TG	124.25 ± 13.75	124.96 ± 8.10	0.3989	0.6931	124.21 ± 6.11	0.0159	0.9874	124.32 ± 6.55	0.0239	0.9811
LDL	85.32 ± 5.36	85.04 ± 3.55	0.2546	0.8009	85.96 ± 6.81	0.4121	0.6835	85.57 ± 4.24	0.1738	0.8633
HDL	44.75 ± 3.01	44.89 ± 3.44	0.1768	0.861	44.00 ± 2.39	0.133	2.2672	44.93 ± 2.91	0.2461	0.8075

Table-2: Shows the effect of mirtazapine on mean body weight BMI, FBS and lipid profile

Parameters	Baseline	1 Month	T-value	P-value	3 Months	T-value	P-value	6 Months	T-value	P-value
Body Weight	55.45 ± 6.16	55.55 ± 6.03	1.7974	0.0831	55.71 ± 5.92	2.5564	0.0163	56.48 ± 5.55	3.9761	0.0004
BMI	20.85 ± 1.22	20.90 ± 1.17	1.8431	0.075	20.95 ± 1.15	2.5033	0.0184	21.27 ± 1.11	3.9223	0.0005
FBS	83.97 ± 3.98	83.93 ± 4.92	0.0333	0.973	83.69 ± 5.02	0.2294	0.8202	83.66 ± 5.41	0.2780	0.7831
TC	136.59 ± 14.20	136.17 ± 11.54	0.3662	0.7170	136.76 ± 8.14	0.1045	0.9152	136.24 ± 5.94	0.1631	0.8716
TG	125.14 ± 8.36	125.17 ± 10.18	0.0214	0.9831	125.0 ± 13.49	0.0583	0.954	125.06 ± 11.33	0.0317	0.9750
LDL	83.66 ± 4.30	83.38 ± 4.00	0.2514	0.8030	83.72 ± 3.32	0.0759	0.9400	83.76 ± 3.79	0.1080	0.9147
HDL	45.66 ± 3.66	45.65 ± 2.53	0.0000	1.000	45.17 ± 2.70	0.6834	0.5000	45.69 ± 2.42	0.0429	0.9661

Table-3: Shows the effect of paroxetine on mean body weight BMI, FBS and lipid profile.

investigations were done. Patient's fasting blood sugar and lipid profile was estimated at baseline. After baseline investigations, patients were randomly divided in two groups one group was administered flexible dose of mirtazapine 7.5-30 mg daily and the other group received flexible dose of paroxetine 12.5-40 mg daily as per the clinical response.

Patients under study were subsequently monitored and reassessed at 1 month, 3 month and 6 month. During each follow up visit weight of the patient was recorded to calculate body mass index, blood glucose level and lipid profile were also estimated and the result of investigations was compared from baseline and last follow up visit details. Psychiatric evaluation of the patients was also done by the consultant psychiatrist during each visit. All adverse events or associated side effects during treatment were recorded in case report form. The treatment compliance was evaluated at each monthly visits using tablet counts and questioning the parents/relatives.

STATISTICAL ANALYSIS

Statistical analysis was performed with (SPSS) windows version 20. Change in mean values of body weight, body mass index (BMI), blood sugar level and lipid profile (at baseline, 1 month, 3 month, 6 month) were compared between two groups by using unpaired 't' test and in the groups by paired 't' test.

RESULTS

Table-1 shows the demographic parameters and socioeconomic status of the patients enrolled in the study. There were no statistically significant difference between both the groups with respect to age ($p=0.5101$), Sex ($p=0.795$), locality ($p=0.194$), education ($p=0.432$) and socioeconomic status ($p=0.0762$).

Table-2 shows statistically significant increase in body weight from baseline 54.11 ± 5.07 kg (mean \pm SD) to 59.61 ± 4.87 kg after 6 months of therapy. Thus there was a marked increase in body weight (upto 5 kg, $p<0.0001$), weight gain was evident after 1 month of therapy with mirtazapine.

Similarly mirtazapine also increased mean BMI from baseline 21.14 ± 1.44 kg/m² (mean \pm SD) to 23.30 ± 1.86 kg/m² after 6 months. However, none of the patients crossed the normal range. Statistically significant increase in B.W. and BMI was observed at each follow-up visits at 1, 3 and 6 months.

Regarding effect of Mirtazapine on FBS, mean FBS at baseline was 84.46 ± 5.19 mg/dl and at the end point was 84.29 ± 6.23 mg/dl, thus reflecting no significant changes in FBS ($p=0.9113$). No statistically significant alteration at end point in TC ($p=0.9505$) and TG ($p=0.9811$) levels were recorded LDL and HDL levels also showed no statistically significant increased $p=0.8633$ and 0.8075 at end point respectively thus indicating that mirtazapine did not significantly altered lipid profile parameters.

Mean body weight at baseline was 55.45 ± 6.16 kg and it increased to 56.48 ± 5.55 kg at the end of 6 months. Thus, paroxetine also showed a statistically significant increased in body weight (upto 1.1kg $p=0.0004$) and the increase was evident as early as after 2nd follow-up visit at 3 months.

Mean BMI at baseline was 20.85 ± 1.22 kg/m² and it was statistically significantly increased to 21.27 ± 1.11 kg/m² at the end point. The increase in BMI was observed after 3 months of treatment. However, none of the patients crossed the normal range ($18.5 - 24.99$ kg/m²).

Weight	Group A(Mir)	Group B (parx)	P-Value	Significance
Baseline	54.11 ± 5.07	55.45± 6.16	0.3743	NS
1 month	55.00± 4.97	55.55± 6.03	0.7111	NS
3month	56.18± 4.78	55.71± 5.92	0.7431	NS
6month	59.61± 4.87	56.48± 5.55	0.0283	Significant
BMI				
Baseline	21.14± 1.44	20.85± 1.22	0.4277	NS
1 month	21.48± 1.46	20.90± 1.17	0.0960	NS
3month	21.92± 1.40	20.95± 1.15	0.0057	Very significant
6month	23.30± 1.86	21.27± 1.11	<0.0001	Highly significant

Table-4: Comparison of Meanweight and BMI in Group A and Group B in Follow-up visit

FBS	Group A(Mir)	Group B (parx)	t-Value	P-Value	Significance
Baseline	84.46± 5.19	83.97± 3.98	0.4008	0.6901	NS
1 month	84.61± 5.73	83.93± 4.92	0.4813	0.6322	NS
3month	84.11± 4.86	83.69 ± 5.02	0.3208	0.7496	NS
6month	84.29± 6.23	83.66± 5.41	0.4081	0.6848	NS

Table-5: Comparison of Mean FBS in Group A and Group B in Follow-up visit.

TC	Group A(Mir)	Group B (parx)	t-Value	P-Value	Significance
Baseline	138.82± 16.33	136.59± 14.20	0.5507	0.5840	NS
1 month	138.29± 12.23	136.17± 11.54	0.6733	0.5036	NS
3 month	138.75± 16.18	136.76± 8.14	0.5897	0.5578	NS
6 month	138.50± 23.14	136.24± 5.94	0.5090	0.6128	NS
TG	Group A(Mir)	Group B(parx)	t-Value	P-Value	Significance
Baseline	124.25± 13.75	125.14± 8.36	0.2965	0.7680	NS
1 month	124.96± 8.10	125.17± 10.18	0.0860	0.9318	NS
3 month	124.21± 6.11	125.0± 13.49	0.2830	0.7782	NS
6 month	124.32± 6.55	125.06± 11.33	0.3005	0.7650	NS

Table-6: Comparison of Mean TC and TG in Group A and Group B in Follow-up visit.

Adverse Effects	Mirtazapine (n=30)	Paroxetine (n=30)
Somnolence	20 (66.66%)	0(0.00%)
Dizziness	8 (26.66%)	0(0.00%)
Headache	4 (13.33%)	2 (6.66%)
Insomnia	0 (0.00%)	13 (43.33%)
Nausea	7 (23.33%)	20 (66.66%)
Anxiety	2 (6.66%)	5 (16.66%)
Tremors	1 (3.33%)	5 (16.66%)
Dry Mouth	2 (6.66%)	0 (0.00%)
Sexual Dysfunction	0 (0.00%)	4 (13.33%)

Table-7: shows main adverse effects associated with mirtazapine versus paroxetine

Paroxetine does not significantly alter the mean FBS as FBS at the baseline was 83.97 ± 3.98 mg/dl (mean \pm SD) and after 6 months 83.66 ± 5.41 .

No statistically significant rise in mean TC ($p = .9502$) and mean TG ($p = 0.9811$) level from baseline till the end point. Also mean LDL ($p = 0.9147$) and mean HDL ($p = .9661$) were not significantly raised, which indicated that on lipid profile parameters paroxetine had no significant effect.

Table-4 Shows comparative evaluation of mirtazapine and paroxetine on body weight and BMI, both agents caused increase in body weight but mirtazapine comparatively cause more increased in body weight at 6 month. Significant difference in body weight between two agents were

noted only after 6 months, a markedly significant p value ($p = 0.0283$) was obtained.

Similarly mirtazapine caused more marked significant rise in BMI compared to paroxetine and statistically significant difference was noted after 3 months onwards.

Table-5 shows comparative evaluation of FBS between mirtazapine and paroxetine treated groups. No statistically significant difference in mean FBS was observed in both the groups.

Table-6, shows comparative evaluation of mirtazapine and paroxetine on TC, TG, LDL and HDL levels. No statistically significant difference was recorded between two groups in lipid profile.

The present study also compared various other adverse effectsover 6 monthstreatment who received mirtazapine and paroxetine. The most common adverse experiences occurring during 6 months treatment with mirtazapine were somnolence (66.66%), Dizziness (26.66%), headache (13.33%), Nausea (23.33%), anxiety (6.66%), dry mouth (6.66%). With paroxetine the common adverse effects noted were insomnia (43.33%), Nausea (66.66%) anxiety (16.66%), tremors (16.66%) and sexual dysfunction in males (13.33%).

DISCUSSION

Depression is one of the leading causes of global disease, burden and disability.⁷ The Pharmacological tretament of

depression include TCAs, Monoamine oxidase Inhibitors (MAOIs) and SSRIs. Because of serious adverse effect and dangerous food interactions TCAs and MAOIs are not preferred these days and are being largely replaced by SSRIs and novel antidepressants like mirtazapine, duloxetine etc.

Mirtazapine is a new antidepressant that is noradrenergic and specific serotonergic antidepressant. Paroxetine is specific serotonergic receptor Inhibitor. There is a limited data available among Indian population regarding the associated between these drugs and metabolic adverse effect profile.

The primary objective of our study was short term comparison of the metabolic adverse effect of Mirtazapine versus Paroxetine. In the present study, patients of young age group predominated with insignificant difference in number of males and females.

In this study, Mirtazapine caused significant increase in weight as early as after 1 month onward and marked increase up to approximately 5.5 kg at the end point (6th month) whereas Paroxetine caused lesser increase in weight approx. 1.04kg. Our findings are in the accordance with the studies of Chen-Jee Hong et al,⁷ who observed greater weight increase for the mirtazapine treated patients. In a retrospective study done by Lahon et al.² treatment with Mirtazapine for depression was associated with weight gain. The association of Mirtazapine with weight gain is also supported by previous studies.⁸ Weight gain was with the highest incidence in the Mirtazapine groups ($p=0.04$) when compared with fluoxetine (SSRIs).⁹

In our study Mirtazapine showed statistically significant increase in weight in the all follow-ups within the group (5.5.kg at end point). Paroxetine also showed increase in weight (1.04 at end point) but the pattern of increase in weight differed in both with higher gain with Mirtazapine group.

Although some SSRIs are typically associated with weight loss during initial therapy.^{10,11} Weight is often regained after 6 months and can be followed by additional weight gain with long term use. Uncontrolled studies have reported weight gain of 10.80 kg for paroxetine after 6-12 months of therapy.¹⁰ Nihalani Net al¹² in their study reported that Mirtazapine had shown greater weight gain when compared to SSRIs (Paroxetine, Fluoxetine and Citalopram). In a double-blind design study,¹³ Mirtazapine showed statistically significant increase of 2.5% body weight over the course of the study that appeared to reach a plateau as early as 3 weeks of the study. In an 8 weeks open-level pilot study¹⁴ of Mirtazapine in children (age 8-12 years) with social phobia showed significant weight gain was observed with Mirtazapine. Lamer M et al¹⁵ in their 6 weeks period controlled clinical study trial observed mean \pm SD body weight increase from 63.6 ± 13.1 kg to 66.6 ± 11.9 kg during Mirtazapine treatment ($p= 0.27$) and fat mass increase in study subjects from 20.9 ± 9.6 kg to 22.1 ± 9.3 kg ($p= 0.018$). In these studies weight gain with mirtazapine occurred in early weeks of treatments. Our findings consistent with these authors.

Short-term antidepressant therapy studies have suggested that the chances of weight gain is less likely to occur when SSRI are used in the short term (3 to 6 months).⁸ In contrast to this a 24 weeks double blind study of paroxetine and

sertraline showed significantly gain in weight.¹⁶ Four US studies in their meta analysis report found that there was gain in weight with mirtazapine during the first four weeks of treatment.¹⁷ This is in line with our observations. Though blockade of histamine H_1 , and Serotonin 2C receptors mirtazapine is likely to be related to weight gain in both the short-term and long term.¹⁸

Paroxetine may be more likely than other SSRIs to cause weight gain during short-term or long-term treatment.¹³ Weight change induced by Paroxetine is probably related to alliteration in serotonin 2C receptor activity, appetite increase, carbohydrate craving or recovery from clinical depression.¹⁶ Moreover, there were no patients who had significant weight gain (increase of $\geq 7\%$ to baseline body weight) among 60 patients at the end point in both the group. Weight gain as a side effect of antidepressant therapy¹⁹ in the short-term (3 to 6 months) and the long term (1 year or longer) contribute to the reluctance of patients to continue or start treatment.¹⁶

In our study, highly significant increase ($p<0.0001$) in BMI was observed with mirtazapine after each 1,3 and 6 months follow-up. 17 cases (56.66%) showed increase BMI with mirtazapine. Paroxetine also caused significant increase in BMI after 3 months of therapy and observed in only 8 patients (26.66%).

Few studies have reported increase on BMI with SSRI.^{20,21} Kim EJ et al²² in their study observed that after 3 months of paroxetine treatment BMI was unchanged which is not in line with our observations.

In our study, regarding FBS, it was observed that both mirtazapine and paroxetine treated groups did not significantly after FBS values. Hyperglycemia was associated with mirtazapine in retrospective study done by Lahon et al.² Derijks H J et al²³ also observed that mirtazapine was associated with hyperglycemia. Hyperglycemia was reported by star Khoza et al²⁴ following treatment with mirtazapine and paroxetine. The time to onset of glucose dysregulation ranged from 4 days to 5 months after initiation of antidepressant therapy. More than two thirds (68%) of the cases ($n=1$) reported glucose control disturbances with 1 month of therapy. All these observation do not support our study regarding glucose disturbances.

Reader et al²⁵ reported an association between the use of SSRI and abdominal obesity, hypercholesterolemia and a trend toward diabetes. Mirtazapine did not influence the glucose homeostatic in 6 weeks study by Lamer M. et al¹⁵, which as supporting our study. A number of research workers^{2,26,13} observed hypercholesterolemia and abnormal lipid profile when mirtazapine prescribed for depression and commented that mirtazapine was a drug that was known to cause dyslipidemia. Mirtazapine subjects also showed significantly increased TC at week 4 ($p=0.16$) and a transient rise in TG that normalized by week 4 no significant changes observed in any of the other lipid parameters.

Paroxetine cause increased cholesterol, increased LDL as well as HDL in the 3 months study by Kim et al.²² Julie L et al²⁷ in their study found that mirtazapine associated hypertriglyceridemia had contributing to the development of acute pancreatitis and diabetic ketoacidosis.

Dyslipidemia was noted in 2 (6.66%) patients with mirtazapine group which was not significant.

The adverse effect profile is an important consideration while prescribing drug in the treatment of depression. The present study also compared various other adverse effects over 6 months treatment who received mirtazapine and paroxetine. The most common adverse experiences occurring during 6 months treatment with mirtazapine were somnolence (66.66%), Dizziness (26.66%), headache (13.33%), Nausea (23.33%), anxiety (6.66%), dry mouth (6.66%). With paroxetine the common adverse effects noted were insomnia (43.33%), Nausea (66.66%) anxiety (16.66%), tremors (16.66%) and sexual dysfunction in males (13.33%).

Dropouts within the mirtazapine group were 2 subjects because of somnolence and weight gain. 1 subject receiving paroxetine dropped-out of the study because of insomnia.

There were some differences in the adverse effects profile of the two antidepressants. Many authors^{28,29} observed similar type adverse effects with mirtazapine and paroxetine in short term studies. However, Wade et al,³⁰ in their 24 weeks treatment observed only one adverse effect which state significantly higher incidence of fatigue with paroxetine found increased sweating, headache and nausea. Davis R et al³¹ short term 5 to 6 weeks randomized double-blind comparative trial observed drowsiness, excessive sedation, dry mouth, increased appetite occurred significantly more frequently with mirtazapine. In another prospective, open randomized comparative 8 weeks study done by Tae Sukkim et al.³² Reported that the subject (12%) paroxetine treated groups discontinued therapy because somnolence and other common adverse effects were nausea, headache, sweating, dizziness and sexual dysfunction. Metabolic syndrome has been recognized as a risk factor in patients with severe mental illnesses like schizophrenia.^{33,34}

In the present study mirtazapine treated group had been largely associated with increase in Bodyweight, BMI as compared to paroxetine treated group while effect on glucose, and lipid levels were unaffected by the both drugs. In our study no serious adverse effect which required hospitalization were found with either drugs.

Limitation

Because short duration of study and relative small sample size any definite conclusion could not be achieved.

CONCLUSION

In this short term study, Paroxetine was found to be associated with less increase in weight and BMI to Mirtazapine when used for the treatment of depression. However, definitely long term study with both the drugs is required to comparatively evaluate metabolic adverse effect profile in terms of weight gain, BMI, FBS and lipid profile.

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Leaching from Thermoplastic Sheets-A Quantitative Assessment

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ABSTRACT

Introduction: With the increasing popularity of clear aligners, newer materials are introduced in the form of thermoplastic sheets which are polyurethane polymers possessing superior mechanical properties. They are highly abrasion resistant and elastic with high shear strength and transparency. However, biocompatibility of these materials with human soft tissues is still under research. Aim of the study was to quantitatively assess the organic compounds leached out from the thermoplastic sheets using “high-performance liquid chromatography”

Material and methods: Thermoplastic sheets from five manufacturers CA, Scheu, Germany; Ultradent, US; 3A Medes, Korea; Avac R, Jaypee, Kerala; EVA, Endent Pvt. Ltd., Delhi; were collected and investigated. All samples selected were 2mm thick and 2x4cm in dimension. These pieces were cut out from the excess material left after manufacturing the aligners. Each sample was powdered using liquid nitrogen prior to elution. Elution was performed with ethanol (75%) + water (25%) in a shaker incubator at 35.5°C for 7days. The extract medium obtained is then subjected to High Performance Liquid Chromatography which provides a precise quantification of the leachables from the thermoplastic sheets thereby determining the biocompatibility of the samples.

Results: The biocompatibility of the samples will be better known in terms of concentration of the released organics compounds from each sample using liquid chromatography. The test performed showed ULTRADENT with the greatest amount of leaching whereas JAYPEE, kerala with the least leaching potential among the five samples studied.

Conclusion: The sample with the highest concentration of the leached out compounds will be least biocompatible. Thus, the compatibility factor in descending order was found in jaypee followed by CA, Scheu, Germany, 3A Medes, Korea, EVA, Endent Pvt. Ltd., Delhi, and the least compatible was Ultradent, USA.

Keywords: high-performance liquid chromatography, thermoplastic sheets, leaching.

oral tissues as well. As a result of this, there is an increasing concern about the biocompatibility of these materials with the tissues. Although there is limited research data available on this topic, few previous studies performed on these materials to determine their tendency to leach out organic compounds, have suggested positive results for leaching. However, none of the previous studies have been able to successfully quantify the amount of leaching from these thermoplastic sheets. Plus there is wide variety of thermoplastic sheets that are available in the market to choose from, everyday newer brands and materials are emerging. The companies' confidentiality policies make the exact content unknown to the users, thus raising questions. Hence there is a need for a more precise and specific method which can be done to find the least leaching and thus most biocompatible product out of the options available.

The aim of this study was to quantitatively assess the organic compounds leached out from the thermoplastic sheets using “high-performance liquid chromatography”.

The objectives of this study were to help obtain a quantitative measure to which a polymer leaches oxidisable, organic matter; thus giving a relative comparison between the various options available to clinicians.

Another objective was to allow the manufacturer to optimize his product, the clinician and the researcher to select the least harmful and the researcher to follow the progress of the leaching in time.

MATERIAL AND METHODS

The sample collection for this particular study was done with the help of over 20 different dental laboratories using these thermoplastic sheets. For the purpose of convenience, five commonly used brands were shortlisted. These were; CA, Scheu, Germany; Jaypee, Kerala, India; Ultradent, US; 3A Medes, Korea; EVA Endent Pvt. Ltd. New Delhi, India. Medium consistency sheets which were 2mm in thickness were selected. Each sample was cut into 2cms X 2cms pieces to maintain uniformity of size between the samples (Fig-1). Each of the pieces cut were obtained from the remnant excess material after the manufacturing process of the aligners, as

INTRODUCTION

The use of “retainers” in orthodontics started in the 1980s, in the form of thermoplastic vacuum formed sheets fitting tightly over the teeth. The name “aligner “ came into use as it became clear over time that these retainers can be used as tooth moving devices if the teeth were reset slightly before forming. The extent of its use for more than just minor movements was realized soon.¹ The use of these aligners has almost brought about a shift in the paradigm from unesthetic brackets and arch wires to invisible orthodontics.

As these materials have found abundant increase in their usage over the recent past, there has been a simultaneous increase in the duration of contact of these materials with the

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Figure-1: 2cms X 2cms pieces of samples of thermoplastic sheets

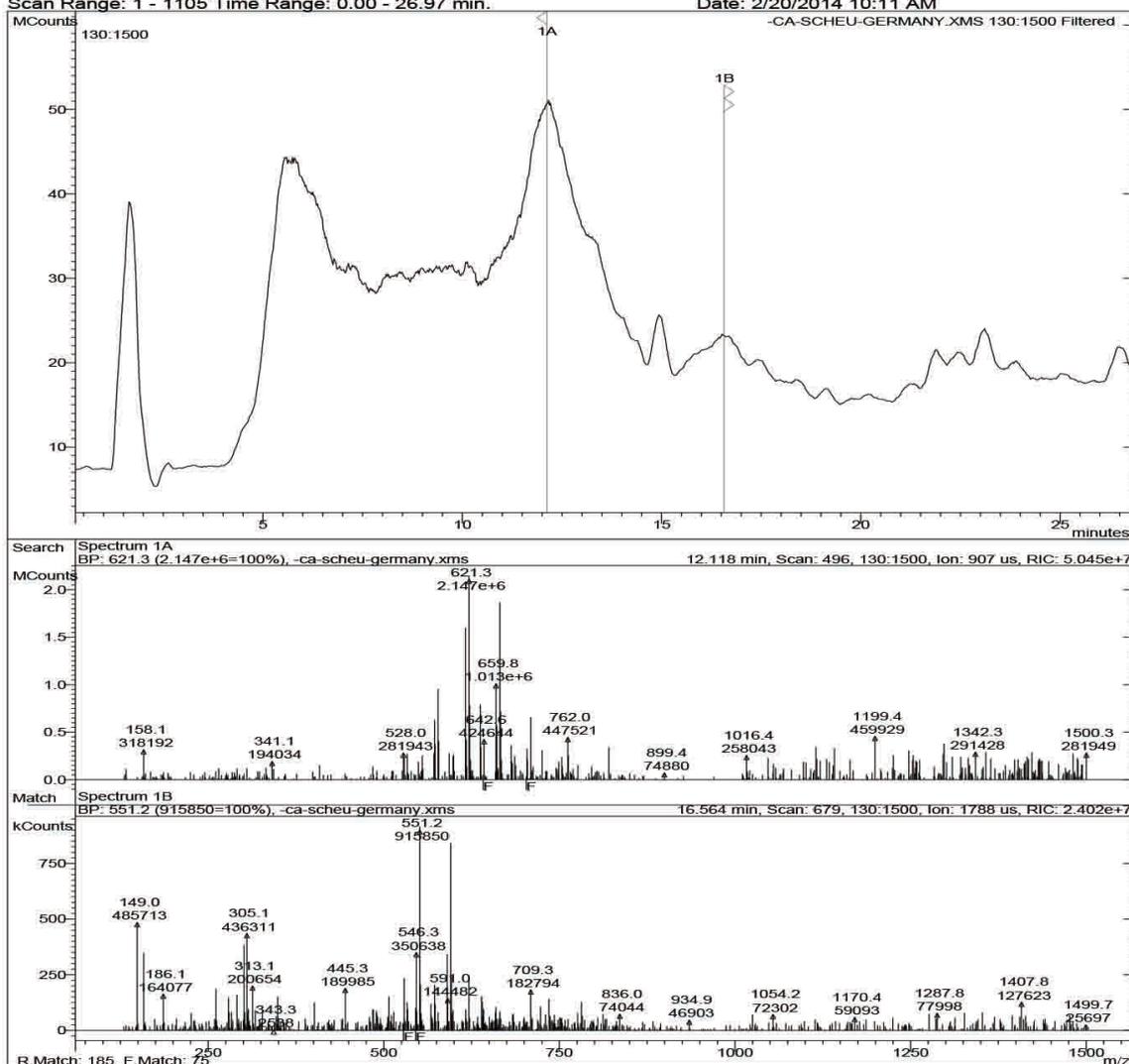


Figure-2: Powdered samples in solvent (75% ethanol + 25% water)

MS Data Review All Plots - 2/20/2014 2:08 PM

File: c:\data\external\lcmms-90\ca-scheu-germany.xms
 Sample: -CA-SCHEU-GERMANY
 Scan Range: 1 - 1105 Time Range: 0.00 - 26.97 min.

Operator:
 Date: 2/20/2014 10:11 AM

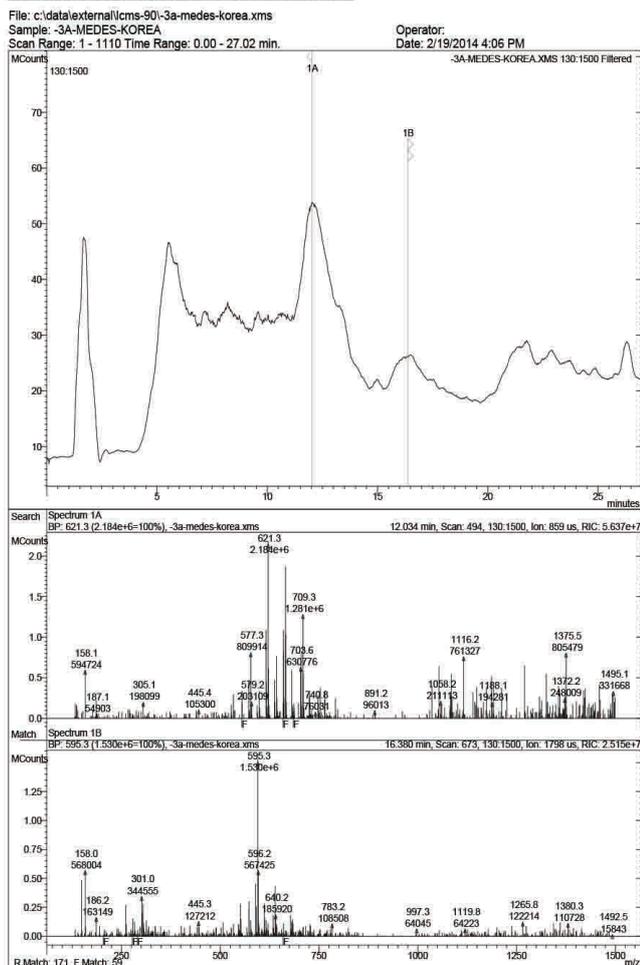


Graph-1: CA Scheu(Germany)

a result of which, every sample had already undergone one customary heating and cooling cycle before delivery. Each of the samples was powdered using liquid nitrogen as the powdered form will have a greater surface area exposed

to the solvent in separate test tubes (Fig. 2) prior to elution. Elution in this case, is the process of separating the organic compounds from the material using a solvent. Elution is carried out using 75%(v/v) ethanol - 25% water immersion

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Graph-2: 3A Medes (Korea)

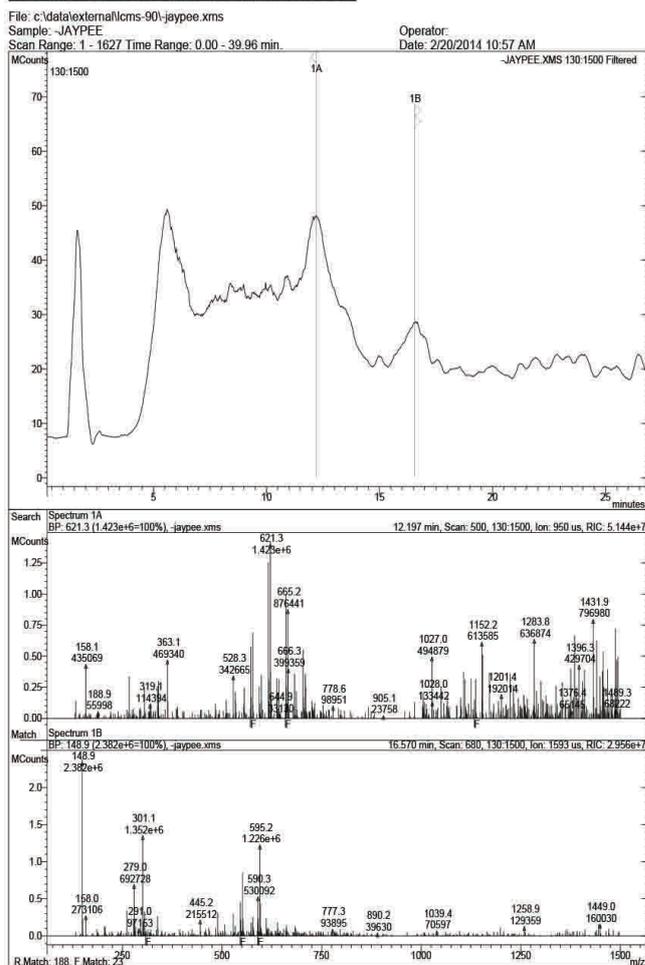
medium for 1 week at 23°C in a shaker incubator to simulate accelerated aging as proposed previously.²

This is done in order to obtain the extract containing the leached out organic compounds from the thermoplastic sheets. This extract is then subjected to high performance liquid chromatography (HPLC)³ using the ProStar / Dynamax system. Approximately 10 mL of the samples was extracted with 10 mL HPLC-grade dichloromethane, and the extract was dried over anhydrous sodium sulfate at 350°C under a pressure of 15.0 psi. the nebulizer gas used was nitrogen under a nebulizer pressure of 30.0 psi. A PB-5 column of 30 m in length was used with the carrier gas at a flow rate of 30 cm/msec. The column program was 5 minutes at 40°C, 140°C intermediate temperatures, at a rate of 5°C per minute, 290°C final temperature at 10°C per minute, and 20 minutes holding time.

RESULTS

All the products that were tested leached, but the amount varied from one product to another. The results were consistent on repeated testing over a number of days. The Figs. (1-5) show the graphical records depicting the amount of leaching by each of the products; The amount of methyl methacrylate leaching from the polymethyl methacrylate-based thermoplastic material CA Scheu(Germany) – 51 MCounts (Graph:1), 3A Medes (Korea) – 54 MCounts

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Graph-3: Avac R, Jaypee (Kerala, India)

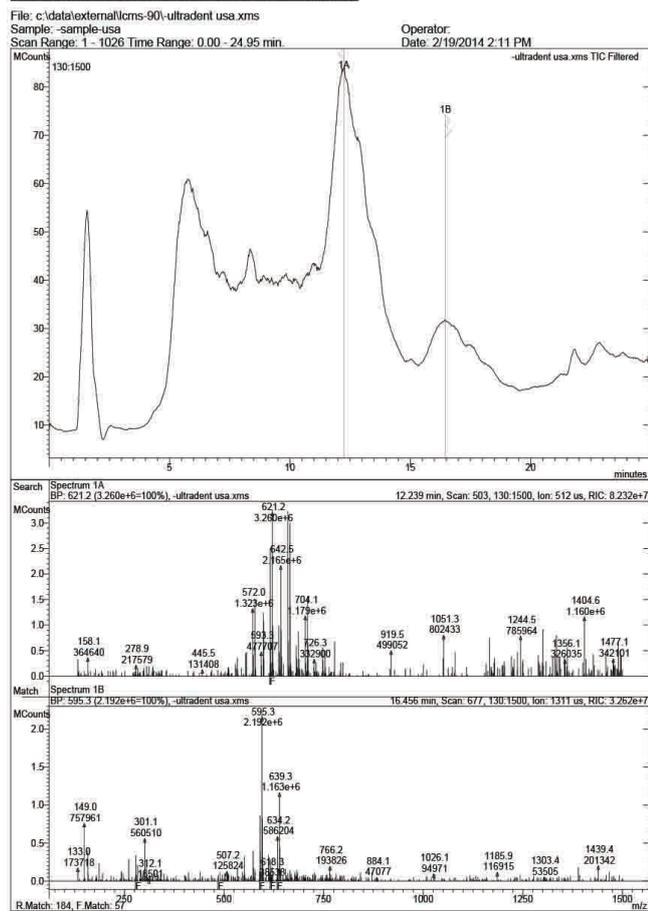
(Graph: 2), Avac R, Jaypee (Kerala, India) –48 MCounts (Graph: 3) Ultradent (USA) – 82 MCounts (Graph:4), EVA, Endent Pvt. Ltd. (Delhi, India) – 63 MCounts (Graph:5), respectively.

DISCUSSION

Polymer leaching is a common finding in all the previous studies performed. However the rate of leaching of the polymer differed considerably. However various factors could be the reason for this differential rate of polymer leaching. According to the study previously performed by Matasa,^{4,5} the amount of polymer leaching is reduced with increase in the molecular weight of the polymer. This is because the increased molecular weight and density of the crosslinked network cause the larger molecules to get entangled and remain within the polymer structure thus causing lesser amount of leaching.

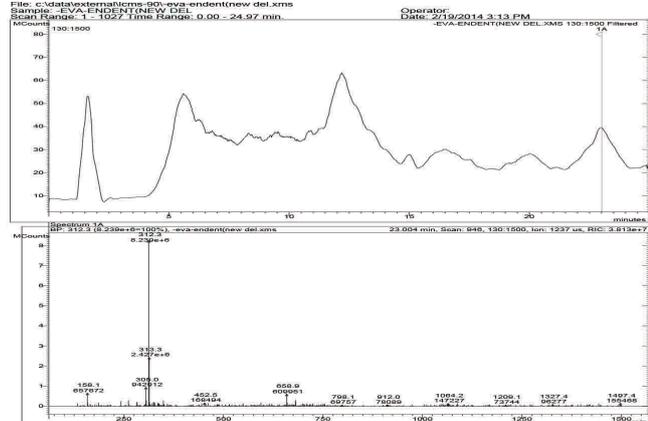
Leaching from thermoplastic sheets generally results in the release of monomers such as bisphenol A (BPA). The implications of BPA related from dental biomaterials were first reported in a study that assessed dental sealants. BPA is known to cause skin allergies,⁶ adverse effects on the reproductive systems of animals,⁷ cell death via necrosis,⁸ and high hemolytic activity.⁹ The role of BPA as a potent endocrine disruptor with a weak estrogenic effect is well known. Terhune et al¹⁰ in their study have suggested

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Graph-4: Ultradent (USA)

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Graph-5: EVA, Endent Pvt.Ltd (Delhi, India)

clinicians against the prolonged contact of thermoplastic materials with the patient's gingiva, mucosa or skin.

This study will only provide a quantitative measure to which a polymer leached oxidizable, organic matter. While the latter may not always be harmful, as a general rule the less leaching, the safer the product is considered. Also, the amount of leaching quantified may not show significant clinical alterations in patients subjected to these materials during treatment rather a relative comparison between the various options available to clinicians. The results of this study show the amount of leaching in a comparative manner that helps in the optimization of the product by the manufacturer, the ease

of selection of the least harmful product for the clinician and the researcher and also enhances the ability of the researcher to study the progress of leaching in time.

The shortcomings of this study are that it is very elaborate, expensive and requires specific machinery and trained personnel to perform the test.

CONCLUSION

Within the limitations of this in vitro study, it was found that the amounts of leaching varied with the Ultradent (USA) with the greatest amount of leaching followed by EVA, Endent Pvt. Ltd (Delhi, India), 3A Medes (Korea), CA Scheu (Germany) whereas Avac R, Jaypee (Kerala, India) with the least leaching potential among the five samples studied.

These results help in concluding that Avac R, Jaypee (Kerala, India) is relatively superior in terms of its biocompatibility with the oral tissues as compared to the other materials tested. Also, though the overall amount of leaching from each product may not be clinically significant, as a general guideline, the safety of the product is inversely proportional to the amount of leaching.

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Risk Factors Affecting the Postoperative Cerebrospinal Fluid Leak in Brain Surgery

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ABSTRACT

Introduction: During the brain surgeries, durotomy is the entering gate for the brain. The dural closure is important to prevent CSF leak, subgaleal collection and future infection. The aim of our study is to compare between different techniques of duroplasty in relation to postoperative complication rate.

Material and Methods: the patients' medical files were reviewed retrospectively for demographic data, diagnosis, comorbidities (diabetes mellitus, hypertension, dyslipidemia and smoking), location of pathology, type of surgery, type of closure and evidence of CSF leak. The risk for developing cerebrospinal fluid leak was calculated and the correlation with different parameters was done.

Results: 45 patients were included. The mean age was 36.4 ± 22 years. The mean follow up was 9 months. There were 18 (40%) males and 27 (60%) females. The different types of dural closures were not statistically significant for postoperative CSF leak. The pericranial flap showed statistically significant difference in preventing CSF OR 3.2, 95%CI [1.07, 9.54], *P*= 0.04.

Conclusion: Different dural closure and reinforcing techniques seem to have similar protective outcome with statistically significant superiority to the pericranial flap. Diabetes, hypertension, dyslipidemia or postoperative chemo- or radiotherapy do not seem to be a risk factor for post operative CSF leak.

Keywords: craniotomy, craniectomy, CSF leak, dural repair, pericranium

INTRODUCTION

The brain is protected mechanically by the meninges: Dura, arachnoid and Pia mater. The dura is the first layer to be encountered after bone flap removal in craniotomy surgeries. Microscopically the outer layer of the dura is composed of fibroblast and collagen. The inner most layer is formed by flattened cells with sinuous processes.¹ Previous studies revealed some important biologic function of the dura beside its protective function.^{2,3}

During the brain surgeries, durotomy is the entering gate for the brain. The dural closure is important to prevent CSF leak, subgaleal collection and future infection. The dura can be closed by either primary closure or duraplasty. The duraplasty can be done by autologous or synthetic dural substitutes.

Dural substitute development began in the 1890's with the use of gold foil or rubber, which proved unsatisfactory.⁴ Nowadays, many advances are made. Options for dural substitution materials include: Autograft (Pericranium and fascia lata), Allograft (Amniotic membrane, pericardium, lyophilized dura), Xenografts (bovine or porcine pericardium) and synthetic materials (polytetrafluoro ethylene, polyester

urethane). However, each material had advantages and drawbacks that may limit their usage.^{5,6}

Neurosurgeons used autologous pericranium, which is easy to harvest and heals well. However, it can be thin and fragile to the extent that may require some reinforcement with sealant.^{7,8} On the other hand, KRH von Wild on 1999, examined prospectively the safety and efficacy of an absorbable dura mater substitute (Dura-Patch) on 101 patients, in normal applications in Neurosurgery. His results shows the suitability of Dura-patch.⁹ Whereas, when Malliti et al compares retrospectively the synthetic dural substitute (Neuro-Patch) (among 61 patients) and pericranium graft (in 63 patients) with regards to deep wound infection and CSF leak for one year. They report the raised risk of complications with the synthetic (Neuro-Patch) graft as a foreign body.¹⁰

A recent monocentric prospective study from Italy, is conducted by G. Sabatiro et al, which compared the galea pericranium dura plasty with non-autologous dural surrogates. The only difference was the cost, while the other clinical variables didn't show any significant statistical difference.¹¹

Several reports have described the duraplasty method by each particular synthetic substitutes^{10,11} specially in cases like extensive meningioma resection (simpson 1 or 2)^{4,10,11} or decompressive craniectomy.¹² But still the ideal substitute has not yet been well established.

So, the aim of our study is to compare between different techniques of duroplasty in view of postoperative complication; also to compare different reinforcing techniques at King Abdulaziz University Hospital (KAUH)-Jeddah.

MATERIAL AND METHODS

This was a retrospective study and ethical approval was obtained from institutional ethical board. The patients' medical files were reviewed. Any patient who underwent craniotomy or craniectomy with dural closure was included. Exclusion criteria were: deficient files for any parameter of the study and extracranial surgeries. The parameters reviewed were: patient demographic data, diagnosis,

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comorbidities (diabetes mellitus, hypertension, dyslipidemia and smoking), location of pathology, type of surgery, type of closure and evidence of CSF leak.

STATISTICAL ANALYSIS

The data was analyzed using SPSS 21 software. The parametric data were presented by mean ± standard deviation. The odd ratio (OR) was calculated to find out the risk of CSF leak in correlatin with dural closure type. The nonparametric correlation was calculated using Pearson’s correlation. P-value of < 0.05 was considered significant. This study was approved by the Biomedical Ethics Research Committee at King Abdulaziz University, Jeddah (HA-02-J-008).

RESULTS

Total of 45 patients were included. The mean age was 36.4 ± 22 years. The mean follow up was 9 months. There were 18 (40%) males and 27 (60%) females (table-1).

Among different pathologies included in this study, the most common one was the intra-axial tumors 22(48.9%) figure-1). 9 (20%) of patients had CSF collection/leak. Of those 5 were males, and 4 were females. Factors associated with high CSF leak (table-2) were:

1. Postoperative radiotherapy: there was no statistically significant association between radiotherapy and CSF leak OR 1.4, 95% CI [1.13, 1.8], P=0.18.
2. Postoperative chemotherapy: there was no significant association between chemotherapy and CSF collection/leak, OR 1.4, 95% CI [1.12, 1.76], P=0.24.
3. Diabetes was not a risk factor for CSF. leak OR 0.86, 95% CI [0.06 - 12.22], P=0.4.
4. Hypertension was not a risk factor for CSF leak OR 0.69, 95% CI [0.09 - 5.26], P=0.8.
5. Smoking was not a risk factor for cSF leak OR 1.28, 95% CI [1.08 - 1.5], P=0.3.
6. Dyslipidemia was not significantly associated with CSF leak OR 1.27, 95% CI [1.08 - 1.49], P=0.3.

Comparison of different closure techniques and CSF leak

Different dural closure techniques were reviewed and a correlation was calculated with CSF leak risk. The results showed no statistical difference for most of the techniques including primary closure, use of povine pericardium (Dura - Guard®), use of regenerative matrix (DuraGen Plus®) except for the pericranium were it showed statistically significant difference in preventing CSF OR 3.2, 95%CI [1.07, 9.54], P= 0.04.

The reinforcing material that were used in some patients (fat graft, fibrin sealant or cyanoacrylate glue) were tested for correlation with CSF leak and showed no statistical difference (table-3).

Risk of developing complications, infection or seizure

In this study we reviewed the possibilities of developing complications (at the surgery site such as wound dehescence or systematic such as allergic reaction), infection or seizure in relation with the dural closure technique. There was no statistically significant correlation (table-4)

Length of stay and outcome versus the type of dural closure

The length of stay showed no statistical difference between

Socio-demographics	Number (%)
Age (mean) Mean ± SD	36.4 ± 22.6
Gender	
Male	18 (40.0)
Female	27 (60.0)
Nationality	
Saudi	11 (24.4)
Non-Saudi	34 (75.6)
Smoking	
Yes	4 (8.9)
No	41 (91.1)
Diabetes	
Yes	9 (20.0)
No	36 (80.0)
Hypertension	
Yes	11 (24.4)
No	34 (75.6)

Table-1: Socio-demographic characteristics of the participants (n=45)

Variable	Pearson Chi-Square value	p-value
Gender	1.134	.287
Diabetes	.556	.456
Hypertension	.030	.862
Dyslipidemia	.804	.370
Steroids > 7 days	3.021	.388
Smoking	1.098	.295
Pathology	5.411	.248
Location	3.640	.056
Surgery type	4.606	.100
Reoperation	.108	.742
Radiotherapy	5.625	.18
Chemotherapy	5.081	.24

Table-2: CSF leak correlation with different factors

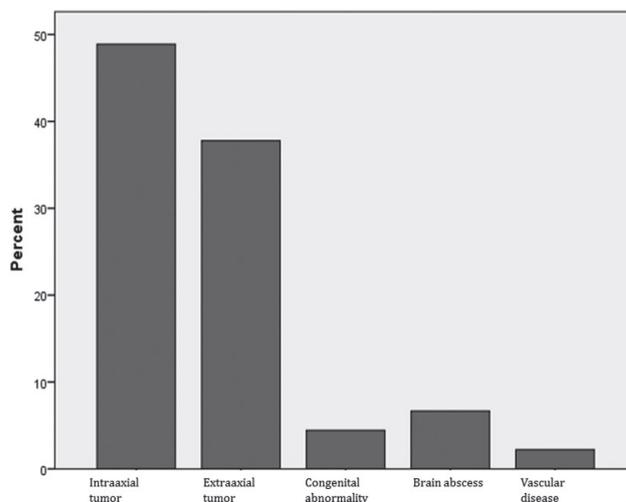


Figure-1: Types and percentage of pathologies included

the different dural closure techniques. The outcome was divided into four different categories: no symptoms, no disability with symptoms, disability and death. Accordingly, the analysis did not show a statistical difference between different dural closure techniques (table-4).

DISCUSSION

Cerebrospinal fluid leakage is not uncommon complication after most types of neurosurgical procedures, provided that watertight dural closure sometimes is not achievable. Known methods for repairing dural defects may involve direct primary suture, but frequently the gaps may not be amenable to closure primarily. As well, watertight primary closure of the dura sometimes cannot be achieved due to dural shrinkage secondary to dural dissection after a prolonged procedure.¹³ The problem of CSF leakage whether it is collected under the scalp or dripping out of the skin is the high risk of developing an infection that can lead to serious morbidities and possible mortality.

At KAUH different dural closure techniques have been used, so the set up is suitable to compare between those different techniques.

In the current study we show that postoperative chemotherapy is not associated with a CSF leak, this finding is different than what is reported in the literature before on a limited number of patients.¹⁴⁻¹⁶ However, the difference is that we studied the post operative chemotherapy administration risk while the other articles study the preoperative risk. So, we may conclude that the postoperative chemotherapy administration of chemotherapy is less risky in developing CSF leak than preoperative administration.

The postoperative radiotherapy, as well, is not a risk factor for developing CSF leak. The preoperative radiotherapy has been reported as a risk factor for CSF leak before.^{17,18} Again, the postoperative radiotherapy does not seem to be a risk for CSF leak.

Boudreaux, B et al. advocates for the use of vascularized graft for repair of CSF leak in high risk patients, his recommendation is in line with our finding of using the

pericranial flap that has better sealant effect.¹⁹

Different available materials for closure of the dura (such as; fascia lata, pericranium, dural adhesion barrier matrix or pericardial graft) seem to be similar with a little superiority to the pericranial flap.

Huter et al. article showed that the CSF leak rate increased with diabetes, increased CRP and the need for dural patch. In our study there is no statistical difference between diabetics and non-diabetics as well there is no difference between the primary dural closure and the use of patch closure. The exact reason for this contradicting results is unclear, however, it may be related to the additional use of "tachosil" in Huter's study, different pathologies or immune compromise in diabetics that need a tight control, or possible presence of the infections as suggested by elevated CRP.²⁰

A recent study shows that Infratentorial surgery and > 8 days of postoperative corticosteroid were significant predictors for the development of CSF leak. In our study, that is not the case with unclear reason, further studies are needed to explore this issue further.²¹

The use of reinforcing closure material (i.e. fat graft, fibrin sealant or cyanoacrylate glue) does not show any statistical difference regarding the superiority of one over the other. Keeping in mind that fat graft is cheaper and readily available, however, it requires a separate surgery for harvesting the graft. Fibrin sealant is a natural extract, but the cost is sometimes a limiting factor. Finally, the cyanoacrylate glue is a synthetic material, cheaper than the fibrin glue but it can lead to inflammatory reaction, gliosis or meningeal irritation.^{22,23}

The limitations of this study are the retrospective design, limited number of patients, single center experience, different pathologies and not addressing the cost effectiveness. So, we recommend to conduct a prospective multicentric study with a larger number of patients and a unified type of pathology to limit the confounder in the study.

CONCLUSION

Different dural closure and reinforcing techniques seem to have similar protective outcome with statistically significant superiority to the pericranial flap. Diabetes, hypertension, dyslipidemia or postoperative chemo- or radiotherapy do not seem to be a risk factor for post operative CSF leak.

The authors report no conflict of interest involved in this study.

Variable	Pearson Chi-Square value	p-value
Water tight closure	1.177	.278
Fascia lata	.256	.613
Pericranium	4.201	.040
Dura guard	.804	.370
Duragen	.523	.469
Fat graft	.523	.469
Fibrin glue	.069	.793
Gluebran	.523	.469

Table-3: CSF leak correlation with different dural repair techniques

	Primary d/closure (n=16)	Pericranium (n=9)	Dura guard (n=19)	Duragen (n=1)	
Post-operative complication	5 (31.3)	3 (33.3)	12 (63.2)	0	N.S.
Post-operative infection	7 (43.8)	4 (44.4)	8 (42.1)	0	N.S.
Post-operative seizure	4 (25.0)	2 (22.2)	7 (36.8)	0	N.S.
Length of hospital stay (days)	47.5±90.6	19.6±16.9	36.6±84.3	8.0	N.S.
Follow-up (months)	3.3±3.7	14.2±25.9	12.1±20.7	2.0	N.S.
Outcomes	No symptom - 3 (18.8) No disability - 7 (43.8) Disability - 4 (25.0) Dead - 2 (12.5)	No disability - 8 (88.9) Disability - 1(11.1)	No symptom - 1 (5.3) No disability - 7 (36.8) Disability - 9 (47.4) Dead - 2 (10.5)	No disability - 1 (100.0)	N.S.

N.S. - Not significant

Table-4: Comparison of different procedures for dural repair (n=45)

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Engineering of Tissues: A Boon For Medical Science

Himanshu Trivedi¹, N D Gupta², Afshan Bey³, Mahira Kirmani¹

ABSTRACT

Disease or injury may lead to damage and degeneration of body tissues, which requires treatments to facilitate their repair, replacement or regeneration. Tissue engineering is a recent advancement in the field of medicine that has opened new avenues in the field of regeneration of lost body structures. It is a triad of scaffold, cells and growth factors which acts in unison to achieve desired results. The field of tissue engineering aims to regenerate damaged tissues, in place of replacing them, by developing biological substitutes that restore, maintain or improve tissue function.

Keywords: Tissue engineering, Regeneration, Growth factors

INTRODUCTION

From ages man has made attempts to replace the body parts with inanimate objects made by him to restore the functional and esthetic demands of general population. Current advancements in science and technology has opened up a new era for tissue engineering which uses body's own potential for regeneration of missing body parts. In dentistry it has led to the regeneration of missing teeth and supporting structures. Tissue engineering is a new frontier in treatment of various oral diseases proving it's worth with each passing day.

The term 'tissue engineering' was first given at a National Science Foundation workshop in 1988 to denote 'application of the principles and methods of engineering and life sciences towards the basic understanding of structure-function relationships in normal and pathologic mammalian tissues and the development of other biological options to restore or/and maintain or improve tissue function'. As stated by Langer and Vacanti¹, tissue engineering is the research field which combines the principles of engineering, and life and health sciences with the development of biological functional substitutes. The aim is to restore, protect (halt disease progression) or improve the function of the damaged tissue and/or organ.

Application of tissue engineering strategies^{2,3} has three main variables by definition: (i) tridimensional porous supports or scaffolds,^{4,5} (ii) cells, and (iii) bioactive agents, i.e. physical stimulus,⁶ and/or growth factors (GFs).^{7,8} Cells can be imparted and cultured onto a structure or scaffold capable of supporting three-dimensional tissue formation.⁹ Growth factors can be used in the isolated form in injured tissue/organ, or in association with scaffolds and/or cells of different types (Differentiated and undifferentiated).^{10,11}

SCAFFOLDS

The developing field of tissue engineering (TE) aims to regenerate damaged tissues by uniting cells from the body with highly porous scaffold biomaterials, which act as templates or framework for regeneration of tissues, to initiate

and promote the growth of new tissue. Numerous scaffolds produced from a variety of biomaterials and manufactured using a various techniques have been used in attempts to regenerate different tissues and organs in the human body. Regardless of the tissue being targeted, a number of factors and determinants are important when designing and selecting scaffolds for use in tissue engineering.

A scaffold should be biocompatible so as to not induce any reaction in the recipient's body, biodegradable so that it is replaced by body's own cells and tissues with time, strong enough to maintain sufficient space, porous to facilitate the growth and in seeding of desired cell lineages and cost effective.

Typically, three groups of biomaterials, synthetic polymers, ceramics and natural polymers, are used in the fabrication of scaffolds or templates for tissue engineering. Each of these individual biomaterial groups has specific advantages and disadvantages so the use of composite scaffolds consists of different phases is becoming increasingly common. Specially for hard tissue regeneration, there has been widespread use of ceramic scaffolds, such as hydroxyapatite (HA) and tri-calcium phosphate (TCP). Ceramic scaffolds are typically characterized by high mechanical strength (Young's modulus), substantially low elasticity, and highly brittle surface. From a bone perspective, they exhibit excellent biocompatibility due to their chemical and structural resemblance to the inorganic phase of native bone. The interactions of bone cells with ceramics are very instrumental for bone regeneration as ceramics are known to promote osteoblast differentiation and proliferation.

Numerous synthetic polymers have been used to produce desired scaffolds including polystyrene, poly-L-lactic acid (PLLA), polyglycolic acid (PGA) and poly-DL-lactic-co-glycolic acid (PLGA). Although these materials have shown good clinical success as they can be fabricated with a remarkable architecture, and their degradation characteristics controlled by varying the amount of polymer itself or the composition of the individual polymer, they have drawbacks including the risk of failure due to reduced bioactivity. In addition, concerns exist about the degradation process of PLLA and PGA as they degrade by hydrolysis, producing carbon dioxide and thus lowering the local pH which can

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result in cell and tissue necrosis.

Biological materials such as collagen, various proteoglycans, alginate-based substrates, bone tissues and chitosan might have all been used in the production of scaffolds for tissue engineering. Unlike synthetic polymer-based scaffolds, natural polymers are biologically active and significantly promote excellent cell adhesion and growth. Furthermore, they are biodegradable too allowing host cells, over time, to produce their own extracellular matrix and replace the degraded scaffold. With all natural polymers, one major problem with using collagen as the main constituent of a scaffold for tissue engineering is that it has relatively bad mechanical properties. However the compressive and tensile mechanical properties of collagen can be improved through physical and chemical cross-linking methods.

Other tissues, such as bone for inference, have an intrinsic property to repair, remodel and regenerate as such. Therefore the task in the field of tissue engineering is to try and harness this innate regenerative capacity of bone. One way to do so might be to mould the scaffold in such a way that the scaffold itself provides regenerative signals to the cells which negate the requirement for prolonged in vitro culture prior to implantation.

CELLS

The source of cells used in tissue engineering can be autologous (from the patient), allogenic (from some other human donor), or xenogenic (from a different species donor).¹² Autologous cells have been proved to be a potential source for use in tissue engineering owing to the low association with immune complications. Autologous cells though are not cost effective and batch controlled for universal clinical usage.¹³ In contrast, allogenic cells offer advantages over autologous cells in terms of uniformity, standardization of procedure, quality control and cost effectiveness.¹³

Cell sources can be further be classified into mature (non-stem) cells, adult stem cells (somatic stem cells), embryonic stem cells (ESCs), and totipotent stem cells or zygotes.¹⁴ The utility and applicability of mature cells is restricted because of its poor proliferative and differentiating capacity. Adult stem cells are stem cells found at specific sites or tissue compartments and play a vital role in maintaining the integrity of tissues like skin, bone and blood.¹⁵ They are undifferentiated cells that can be processed to differentiate into specific tissue types. Traditionally, adult stem cells were believed to produce a smaller number of cells restricted to a particular germ layer origin; however, some evidence now indicates that adult stem cells isolated from diverse tissues have greater plasticity than previously thought. Several researchers have attributed this obvious plasticity of adult stem cells to developmental signals-mediated differentiation.

GROWTH FACTORS

Growth factors are proteins that may act locally or systemically to affect the growth and function of cells in several ways. They may act in an autocrine manner, where the cells that produce them are also affected by them; or more commonly, in a paracrine manner, such that the production of a growth factor by one cell type affects the

function of a different cell type. These factors may control the growth of cells and hence the number of cells available to produce a tissue. They may also control the metabolism of a particular cell type: for example, the rate of production of an extracellular matrix component such as collagen.¹⁶ Several growth factors such as platelet derived growth factor, nerve growth factor, fibroblast growth factor, insulin derived growth factor as single agents or in combinations, have been examined for their regenerative potential in animal models and in the clinic.¹⁷

CONCLUSION

Clinical application of tissue engineering ranges from the regeneration of craniofacial structures to skin and cardiac tissues. Present studies are focusing on the development of a best possible scaffolds and cell delivery systems that have properties and surgical practicality appropriate for successful clinical outcomes. It appears that well defined discriminating preclinical models followed by well framed clinical trials are needed to further investigate the true potential of these and other candidate factors.

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Assessing the Role of Topical Tranexamic Acid Application in Post-Reduction Mammoplasty Patients

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ABSTRACT

Introduction: Antifibrinolytic action of tranexamic acid by intravenous route reduces the need for blood transfusion and blood loss by about one-third in major surgery and trauma cases. However, risk of thromboembolism precludes its routine administration during surgery. This study assessed the topical application of tranexamic acid for reducing postoperative bleed onto a wound surface.

Material and Methods: Twenty five women undergoing bilateral reduction mammoplasty were selected. The wound surfaces on the test side were moistened with tranexamic acid just before closure, and saline was used as a placebo control on the other side. Production of drain fluid was measured for 24 hours post-surgery and pain was evaluated 4 hours after surgery and after 24 hours. Post-operative complications like infection, secondary bleeding and suture response were recorded.

Results: It was found that a topical application of tranexamic acid post operatively onto the wound surface significantly reduced drain fluid production by 42%. No adverse effects were observed. No significant differences could be registered in postoperative pain scores or post surgical complications.

Conclusion: It was concluded that a topical application of dilute tranexamic acid post-reduction mammoplasty can significantly reduce wound bleeding after surgery.

Keywords: Tranexamic acid; IV route; Mamoplasty

INTRODUCTION

Unwanted post-surgical bleeding may hamper the maintenance of adequate haemostasis in cases of major surgery and trauma. Among the antifibrinolytics, tranexamic acid is the most commonly used. It blocks the lysine-binding sites on plasminogen, preventing the activation of plasminogen to plasmin.¹ Tranexamic acid can be given orally or through intravenous route, but nowadays topical use is becoming increasingly popular. It has been shown that intravenous administration of tranexamic acid in cases of major surgery reduces the need for blood transfusion as much as by 32–37 per cent, and postoperative bleeding by 34 percent.² Single intravenous doses suggested in various studies are 1–2 g.² Major safety concerns as thrombosis and renal impairment are associated with higher doses.³ Due to the associated uncertainty about the vaso-occlusive effect of tranexamic acid, it cannot be recommended for regular use during most surgical procedures.⁴ Nowadays, topical application of tranexamic acid has been seen to provide a high drug concentration locally and vice versa.^{5,6} Studies have shown an equal effect of topical compared with intravenous tranexamic acid on both post-operative bleeding and requirement for transfusion.^{7,8} No adverse effects or drug interactions have not been reported with topical use.

Thus, this study was to assess whether moistening of a wound surface with tranexamic acid can reduce post-opera-

tive bleeding in women undergoing bilateral reduction mammoplasty.

MATERIAL AND METHODS

Study was done in the department of Surgery, Career institute of medical sciences, Lucknow after ethical approval from the institution and written informed consent from subjects. Twenty five women above 25 years of age undergoing bilateral reduction mammoplasty were selected for the study based on inclusion exclusion criteria. Exclusion criteria were a history of present or familial thromboembolic disease, pregnancy or severe co-morbidity and subjects using anticoagulants. Informed consent was obtained from all participants before inclusion in the study.

The women received topical tranexamic acid application to one breast and a placebo to the other after reduction mammoplasty. All personnel involved in surgery and postoperative follow-up were blinded to the study. The tranexamic acid was diluted only to a volume sufficient to moisten a fairly large wound surface to ensure a sufficiently high concentration at the site of wound: 20ml moistens at least 1500 cm². The prepared solution contained 20ml of 25mg/ml tranexamic acid. The other side received saline as placebo.

Two surgeons carried out the operation on one breast each. Local anaesthetic was injected into the breasts at the end of surgery. The contents of the suitable bottles containing tranexamic acid or placebo were spread on to the wound surfaces before closure. Vacuum drains were then placed symmetrically and the wounds were closed with subcutaneous suturing. No routine thromboprophylaxis was performed and the patients received oral analgesics after surgery.

Post-operatively, drain fluid volume was recorded 24 hours after surgery and drains were removed when production was below 50 ml per 24 hour. Another outcome recorded was postoperative pain, which was registered for each breast 4 hours after surgery and 24 hours after surgery, using a visual analogue scale from 0 (no pain) to 10 (unbearable). Medical and surgical serious adverse events were recorded at the scheduled follow-ups.

STATISTICAL ANALYSIS

Data were recorded as mean \pm s.d. or median as appropriate.

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Differences in drain fluid volume and pain between breasts were examined using a paired Wilcoxon signed-rank test. Differences in variables between groups were evaluated with Fisher's exact test. $P < 0.050$ was considered significant. All analyses were done using SPSS® version 22.0.

RESULTS

Twenty-five women were selected eligible for final study; the mean age was 43 (25–67) years. None of the women used platelet inhibitors or anticoagulants.

S. No.	Tranexemic Acid Group (ml)	Placebo Group (ml)
1	10	25
2	8	17
3	7	6
4	6	13
5	13	12
6	21	35
7	10	8
8	4	29
9	15	37
10	14	17
11	18	22
12	21	26
13	21	29
14	17	19
15	13	29
16	23	44
17	12	35
18	15	37
19	13	38
20	13	31
21	12	42
22	17	15
23	16	25
24	13	13
25	8	17

Table-1: Comparison of production of drain volume after 24 hours among the two groups

Drain production was found to be 42 per cent lower in breasts that were treated with tranexamic acid as compared to the placebo ($P=0.026$) (Fig 1).

Pain scores were similar in breasts treated with tranexamic acid or placebo on the day of surgery (median 3.5 (0–6) versus 3.0 (0–6); $P=0.183$) and after 24 h (1.5 (0–6) versus 2.0 (0–6) respectively; $P=0.568$). No adverse effects were recorded after topical tranexamic acid.

DISCUSSION

The present study clearly showed that a topical application of tranexamic acid after reduction mammoplasty significantly reduced wound drainage. Wounds on the surface can usually be assorted (burns, massive weight loss surgery), and it is often difficult to devise a study with correspondent wounds. Females undergoing bilateral reduction mammoplasty provide almost identical wounds in a usual clinical setting.

The overall reduction recorded in drain fluid production of about 42 per cent after topical administration of tranexamic acid here is in accordance with previously published studies^{7,8} which regularly reported a reduction in need for transfusion.

This present study opted for a higher concentration of 25mg/ml, but still it was dilute enough to provide a volume sufficient to moisten large surface areas. Few published studies have a similar mode of application comparable to the moistening used in the present study. A mouthwash containing 4.8mg/ml tranexamic acid was found to be effective after dental extraction⁹, however Hinder and Tschopp¹⁰ found no significant effect of use a gargle containing 1.7mg/ml tranexamic acid solution post-tonsillectomy. Athanasiadis et al¹¹ reported a significant hemostatic effect after spraying the wound surfaces with tranexamic acid in cases of endoscopic sinus surgery. The optimal concentration, however, remains unknown.

Tranexamic acid is not at all expensive. Its cost-effectiveness has been thoroughly documented in literature pertaining to general as well as orthopaedic surgery.¹² Even in operations where bleeding is less common, topical application of

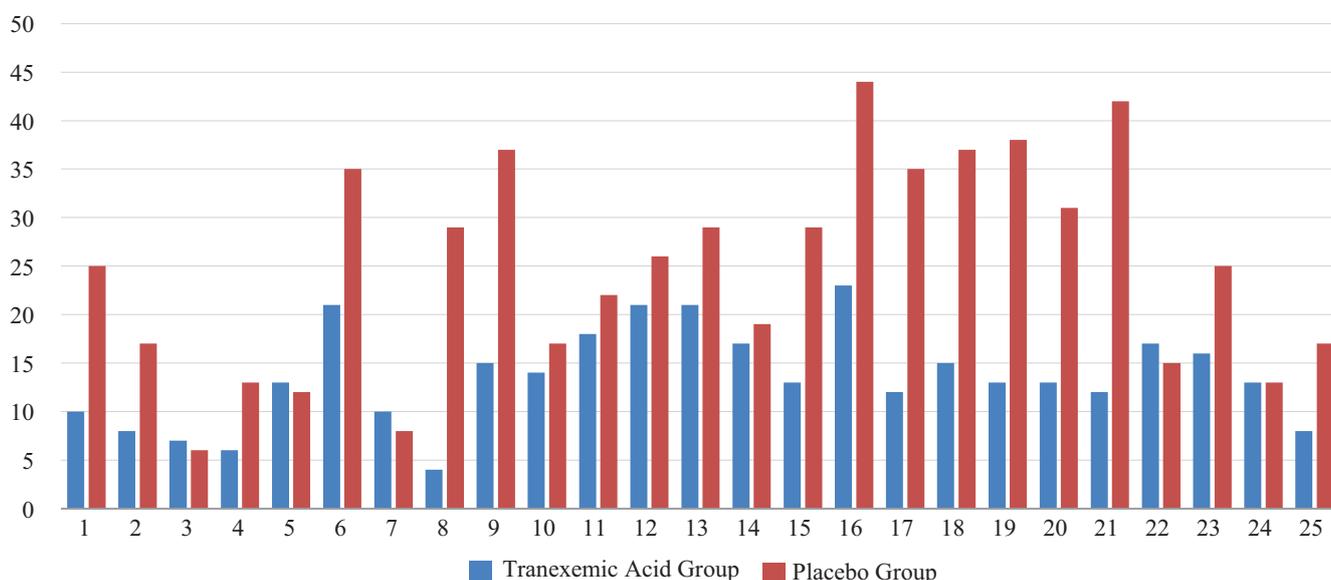


Figure-1: Comparison of production of drain volume after 24 hours among the two groups

tranexamic acid post – operatively can reduce the need for drains and outpatient visits. This simple method has potential for improving post-operative wellness of the patient and hence can be recommended for widespread application after surgery.

CONCLUSION

The present study suggests that topical tranexamic acid can significantly reduce production of drain fluid after reduction mammoplasty cases to below the cut-off value in almost all patients, and thus in future may obviate the need for a drain.

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Effectiveness and Comparison of Various Audio Distraction Aids in Management of Anxious Dental Paediatric Patients

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ABSTRACT

Introduction: The child's uncooperative behavior due to dental anxiety may restrain the effective delivery of dental care that may compromise the quality of treatment provided. Thus, the present study was commenced to evaluate and compare audio distraction aids in management of apprehensive pediatric patients in dental clinics.

Material and Methods: The present interventional prospective study comprised of 45 subjects selected randomly in the age group of 5-12 years visiting first time for the dental treatment. The study compared anxiety pre and post-treatment among patients with audio distraction aids of their interest, audio distraction aids without asking their choice and control group without any distraction aids. Venham's Anxiety Scale and Pulse rate were used to assess child's anxiety level pre and post treatment. Data so obtained were analyzed using SPSS-version 22 and statistical analysis was carried out using Chi-square test with p value <0.05 as significant value.

Results: The difference in post-treatment anxiety was found to be significant in group I and II with $p < 0.05$. The difference in the pulse rate in group I was significant with $p < 0.05$ and was insignificant in group II and control group.

Conclusion: Anxiety or fear of dental treatment is an important factor that results in avoidance of treatment. The present study found a significant difference among study group and control group and thus concludes that managing pediatric patients with audio distraction aids of their choice is an effective method for comfortable handling of these patients in dental clinics.

Keywords: Audio distraction; Anxiety; Pedodontics

INTRODUCTION

Dental anxiety among pediatric patients is a great challenge posed to every dentist in everyday dental practice. The child's uncooperative behavior may restrain the effective delivery of dental care that may compromise the quality of treatment provided.¹ Behaviour management techniques are meant to reduce the need for excessive and unsafe use of medications. There is evidence to indicate that an integration of good behavioural techniques leads to better results, lessened drug requirements, greater patient safety and reduced side-effects. The present trend advocates the use of techniques that diverts the patient's attention from unpleasant situation.² The success of distraction technique in medical settings and in adult patients is well recognized, but literature reports sparse data to assess the efficacy of distraction methodology in pediatric dental patient.³ Thus, the present study was commenced to evaluate and compare audio distraction aids in management of apprehensive pediatric patients in dental clinics.

MATERIAL AND METHODS

The present interventional prospective study comprised of 45 subjects selected randomly in the age group of 5-12 years visiting first time for the dental treatment. Study was conducted after ethical approval and voluntary informed consent. The study group I comprised of 15 pediatric patients who were given audio distraction aids of their choice i.e. either nursery rhymes or latest songs (regional/bollywood) or audio stories according to their preference. The study group II comprised of 15 pediatric patients who were given audio distraction aids without asking their choice i.e. either nursery rhymes or latest songs (regional/bollywood) or audio stories randomly. The control group comprised of 15 patients who underwent pediatric treatment without any distraction aids. This study was approved by ethical committee of the institute and written informed consent was obtained from children and their guardians before commencement of the study. Venham's Anxiety Scale^{2,4} was used to evaluate child's anxiety level pre and post treatment. Pulse rate was recorded using pulse oximeter which was used for physiological assessment of child's anxiety level pre and post treatment.

STATISTICAL ANALYSIS

Data so obtained were analyzed using SPSS-version 22 and statistical analysis was carried out using Chi-square test with p value <0.05 as significant value.

RESULTS

A total of 45 subjects were enrolled for the study, out of which 37 showed anxiety for the dental treatment. The mean reported pre-treatment anxiety score for the audiovisual group I was 4.34 ± 1.36 , for study group II was 4.32 ± 1.22 and for the control group was 4.89 ± 2.04 . The difference between these scores was not significant with $p > 0.05$. The mean value of anxiety found post treatment for the audiovisual group I was 1.64 ± 1.21 , for the audiovisual group

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Score	
0	Relaxed, smiling, willing and able to communicate
1	Uneasy, concerned, indicates discomfort. Hands shows discomfort signals. Child agreeable and able to interpret experience as requested. Tense facial expression, may have tears in eyes.
2	Child appears scared. Tone of voice, questions and answers reflect anxiety. During stressful procedure, child protests verbally and cries. Child interprets situation and copes with his/her anxiety.
3	Shows unwillingness to enter situation. Pronounced verbal protest, crying. Try to stop procedure with his/her hands.
4	Anxiety interferes with ability to assess situation. General crying not related to treatment.
5	Child out of contact as he/she actually feels threat. General loud crying and do not listen to verbal communication. Physical restraint required.

Table-1: Venham's anxiety rating scale

Variables	Audiovisual group I with music of pediatric patient choice			Audiovisual group II with music without asking patient's choice			Control group		
	Pre-treatment	Post-treatment	P value	Pre-treatment	Post-treatment	P value	Pre-treatment	Post-treatment	P value
Anxiety Scale Score	4.34 ±1.36	1.64±1.21	< 0.05.	4.32 ±1.22	2.79±1.04	< 0.05.	4.89±2.04.	3.94±1.58	>0.05.
Pulse rate	96 ±1.3	92.05±1.1	< 0.05.	95 ±1.9	94.03±1.1	> 0.05.	95±1.6.	94.12±0.46	>0.05.

Table-2: Comparison of anxiety score and pulse rate

II was 2.79±1.04 and in the control group it was found to be 3.94±1.58. The difference in post-treatment anxiety was found to be significant with $p < 0.05$. The mean reported pre-treatment pulse rate for the audiovisual group I was 96 ±1.3, for the audiovisual group II was 95 ±1.9, and for the control group was 95±1.6. The difference between these scores was not significant with $p > 0.05$. The mean value of anxiety found post treatment for the audiovisual group I was 92.05±1, for the audiovisual group II was 94.03±1.1 and in the control group it was found to be 94.12±0.46. The difference in the pulse rate in group I was significant with $p < 0.05$ and was insignificant in group II and control group.

DISCUSSION

The rate of prevalence of dental anxiety is 5-20% in most of the populations which is seen more in children and this tends to decrease as age advances. It is also revealed that females are more prone to dental anxiety as compared to their male counterparts. The relation of dental anxiety with the incidence of caries is well documented thus signifying their avoidance for dental visits.⁵

The present study found significant decrease in anxiety in patients with audio- distraction aids as compared to control group. The study also found that audio- distraction aids of child's interest are even more effective. The reason attributing to this might be due to child listening to music tends to close his or her eyes thereby screening out the sight. Moreover, music helped to decrease the unpleasant noise created by dental hand pieces or other anxiety inducing stimuli and these two advantages coupled with the effect of choice based music provided relaxation might be due to playing familiar songs helped child to manage with his fear of dental treatment and unpleasant stimulus and thus, gave them a feeling of being in the familiar environment.⁶

Naithnaini M et al¹ compared audio distraction and audiovisual distraction in the management of anxious pediatric patients and reported decrease in anxiety scores in subsequent visits in both audio and audio-visual distraction groups. Kaur R et al⁶ also compared effectiveness of audio and audiovisual

distraction aids and found that children were most relaxed in audiovisual group followed by audio group and were least relaxed in control group during three dental visits. Jindal R et al⁷ also found that audio distraction aids decreased the level of anxiety in anxious pediatric dental patients to a significant level. Muppa R et al⁸ evaluated fear or anxiety levels associated with noise in a dental clinic and concluded that the noise created in dental clinic provokes anxiety and leads to avoidance of dental treatment. The most likely responses to dental stimuli in case of children reporting for first dental visit would be either fear or anxiety. Anxiety is associated with short-and-long-term impairment in social, academic, familial, and psychological functioning. Most children experience anxiety purely on the basis of psychological, social and environmental influences and parents face special challenges because children with anxiety tend to be nervous, avoidant, annoying or exhausting, however it is also revealed that the offspring of parents with anxiety disorders are more likely to develop anxiety, because of genetic factors and the atmosphere in which they are raised.⁵

CONCLUSION

Anxiety or fear of dental treatment is an important factor that results in avoidance of treatment. The behavioral management of pediatric patients is a great challenge faced by the dentist. The present study found a significant difference among study group and control group and thus concludes that managing pediatric patients with audio distraction aids of their choice is an effective method for comfortable handling of these patients in dental clinics.

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Outcome Analysis of Open Reduction and Internal Fixation with Calcaneal Plate: An Observational Study Among Unicondylar Fracture of Distal Femur

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ABSTRACT

Introduction: Open reduction and internal fixation (ORIF) is strongly recommended in literatures for unicondylar fracture of femur and specifically designed implant for isolated medial or lateral condyle fracture is lacking. Objective: Find out therapeutic outcome of distal femur unicondylar fracture fixed with D-shaped calcaneal plate.

Material and Methods: Study was conducted on 17 skeletally mature patients of unicondylar fracture femur (AO type 33B1, 33B2, 33B3) without neurovascular deficit operated during June 2011 to May 2014. Standard medial or lateral surgical approach was chosen. D-shaped calcaneal plate was applied with help of 3.5 mm cancellous and locking cortical screws after restoring articular congruency. Functional outcome was evaluated at 12 months by Neer scoring system.

Result: Excellent results were observed in nine cases (Neer score > 85 units). Satisfactory outcome was observed in five cases (Neer score 70-80 units). Only one case show unsatisfactory outcome with Neer score of 58 units and two cases were considered as failure with Neer score less than 55 units.

Conclusion: Calcaneal plate is a good modality to fix femoral condyle fracture as it can be used to fix any pattern of fracture and also it provides absolute stability, thereby achieving early mobilization and excellent function outcome.

Keywords: D-shaped calcaneal plate, Hoffa's fracture, Neer score and Unicondylar fracture femur.

INTRODUCTION

Unicondylar femoral fractures accounts for less than 1% of all femoral fractures.^{1,2} It is defined by avulsion of one femoral condyle with the other intact condyle remaining in continuity with femoral metaphysis.³ Literatures regarding description of these fractures and their management are scarce. These fractures are usually associated with other injuries in the limb. Unicondylar fractures show great anatomical variability resulting in different radiological evaluation and therapeutic approaches. They have almost always been included in the generic group of distal third femoral fractures.^{2,4} Usually occurring following direct impact, avulsion, or action of shear force on the knee, generally in the sports activity or traffic accidents, particularly dashboard trauma.^{2,5-7} The lateral condyle involvement is three times more frequently than the medial condyle due to physiological valgus causes an abduction component which explains the greater frequency of lateral condyle fractures.^{7,8} In these injuries, non-operative management has often led to unsatisfactory results due to resultant deformities (varus and valgus malangulation), varying incidence of delayed union and non-union, joint contracture, knee instability, and posttraumatic arthritis.⁹⁻¹¹

Therefore open reduction and internal fixation is strongly recommended in literatures for all kind of unicondylar femur fractures.¹² Various types of implants were used to fix these fractures like cannulated cancellous screws, DCS screws and plates.³ The main drawback was that most of these implants were contoured to fit lateral condyle only and medial fracture fragments were addressed with indirect reduction as there is no specific implant design for medial femoral condyle fractures. The advantage of calcaneal plate is that they are mouldable and can be used for either side as well as either condyle irrespective of fracture pattern. Hence this study was done for outcome analysis of unicondylar fracture of distal femur by fixation with D shaped locking calcaneal plate.

MATERIAL AND METHODS

Subjects

After receiving approval from research review board of SMS Medical College Jaipur, skeletally mature patients with unicondylar fracture of distal femur, without neurovascular deficit were admitted from emergency and outpatient department and written consent for study was taken from each patient. This study was carried out at SMS hospital Jaipur during June 2011 to May 2014. Skeletally immature patients and patients with open injuries and compromised neurovascular status were not included in study design.

Material

D-shaped locking calcaneal plate (Figure-1) made of stainless steel or titanium alloy was chosen and fixed with help of 3.5 mm locking cortical and 4 mm cancellous screws using principles of fracture fixation. Pre-operative radiograph (Figure-2) and CT scan (Figure-3) with 3D reconstruction was done in each patient.

Procedure

All surgeries were done in supine position with tourniquet, under spinal anesthesia. For lateral condyle fractures (sagittal or coronal) incision of approximately 10 cm starting in mid-lateral line to curve it anteriorly over lateral femoral condyle, towards tibial tubercle was made. Vastus lateralis muscle

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incised from lateral intermuscular septum and elevated anteriomedially. Joint capsule was incised over anterior one third of lateral femoral condyle to facilitate exposure of the articular surface. After anatomical reduction under direct vision fracture was temporally fixed with k-wires. Similarly for medial condyle fractures (sagittal or coronal) incision was made on medial aspect of knee approximately 10 cm proximal to joint line in the line of posterior border of tendon of adductor magnus and extended distally toward tibial tuberosity. Adductor magnus muscle and tendon retracted posteriorly and vastus medialis retracted anteriorly to expose the joint. The capsule and synovium incised at the joint over anterior one third of medial femoral condyle in the line of skin incision. This incision extended proximally enough to expose the medial femoral condyle, the Patellofemoral groove and the intercondylar area. After anatomical reduction fracture is temporally fixed with k-wires.

After attaining articular congruency D-shaped calcaneal plate was chosen and moulded to fit the contour of condyle. Plate was fixed with 3.5 mm locking cortical and 4 mm cancellous screws. Hemostasis achieved by electrocautirization after tourniquet release and thus drain was not use. Capsule Closure done with absorbable sutures and skin and subcutaneous tissues closed in a routine manner.

Post operative x ray was taken (Figure-4). Post operatively a posterior splint or articular splint was applied for 2 days. For initial 48 hours active toe movements and quadriceps

strengthening exercises was done. On post operatively 3rd day assisted active knee mobilization was started. Partial weight bearing was started at 10-12 weeks and progressed to full weight bearing as tolerated. Regular follow-up was done at 2 weeks, 1 month, 3 months, 6 months and 12 months.

Evaluation at final follow up

Functional outcome was analyzed by Neer¹⁰ scoring at 12 months as follows;-

- Excellent- more than 85 points
- Satisfactory-70-85 points
- unsatisfactory-55-69 points
- Failure- less than 55 points

STASTICAL ANALYSIS

Data were arranged in form of mean and S.D. These were analyzed by analysis of variance (ANOVA) tests. Final outcome data were expressed in form of proportions. Difference in proportions were analyzed using chi square test. The level of significance was kept 95% for all statistical analysis.

RESULTS

Total 21 cases of unicondylar fracture of distal femur cases reported at SMS hospital during June 2011 to May 2014, out of these 17 cases met eligibility criteria of study. Out of 17 treated patients 16 were male and only one patient was female. Average age was 36.76 (21-65) years. All patients



Figure-1: D-shaped locking calcaneal plate

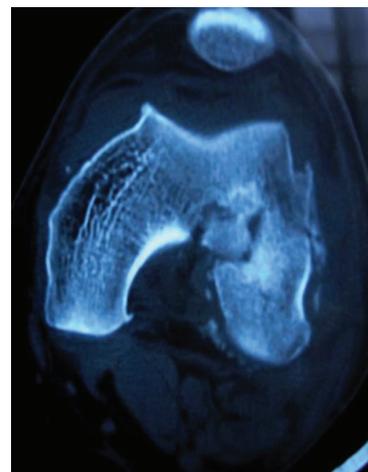


Figure-3: CT-Scan



Figure-2: Anteroposterior and Lateral view of X-ray



Figure-4: Post operative X-ray

sustain their fracture from severe direct trauma i.e. motor vehicle accident (14 cases), slip on ground (one case), fall of heavy weight (one case) and assault (one case). Out of 17 cases five cases were classified as AO 33B1, five cases as AO 33B2, and seven cases as AO 33B3 (Hoffa’s fracture) according to the AO-ASIF system.

There was a significant improvement in range of motion from 22.82(±11.25) to 108.52(±35.72) from 2 weeks to 1 year post operative period (P=<0.001) (Table-1). This improvement in range of motion was not associated with type of fracture statistically (P>0.05) (Table-2).

Out of total 17 cases, majority (14/17=82.35%) has good (excellent and satisfactory) outcome of the procedure whereas in only 3 cases it was either unsatisfactory or poor. Overall outcome was not significantly associated with type of fracture (P=0.109) (Table-3).

One patient with unsatisfactory result was of communitated lateral condyle Hoffa’s fracture. At follow-up of 12 months his fracture was healed but he had limited range of motion of knee joint. Other four patients with Hoffa’s fracture maintain satisfactory reduction overtime with three excellent and one satisfactory result; moreover no avascular necrosis of the fracture fragment was observed. There was no angular

displacement, no infection or non -union of unicondylar fractures during follow-up.

Rest of five lateral condyle fractures (AO 33B1) and five medial condyle fractures (AO 33B2) were having excellent to satisfactory results. Patient with satisfactory results had moderate to mild pain, together with mild loss of ROM at knee joint.

DISCUSSION

Management of unicondylar fracture femur ranges from conservative to open reduction and internal fixation. Non-operative management of undisplaced distal femoral fracture consist of a closed reduction and cast completion, a prolonged period of skeletal traction, and subsequently a variable period of external immobilization, which has led to many unsatisfactory results.¹² Displaced fractures are usually treated by open reduction and internal fixation as malangulation, rotation deformity, loss of knee motion, joint contracture, and post traumatic arthritis was often associated with non-operative treatment.¹² Open reduction achieve articular congruency, rigid fixation, maintain length, alignment, rotation, and allow early mobilization. The main disadvantage of surgical procedure is damage to vascularity which may lead to non-union, malunion and infection. Most commonly used cancellous cannulated screws provide overall good result, but lack of rigid fixation and failing in maintaining congruence of articular surface with loosening of screws also has been reported. Other commonly used method of fixation by plating have disadvantage that they have predetermined screw trajectories, requires too much soft tissue dissection due to big size of implant and also the cost of implant is considerable.

Persistent exploration has evaluated surgical techniques and implant outline to alleviate these intricacies however

S. No.	Follow-up (Duration)	Range of motion
1	2 weeks	22.824±11.254
2	1 month	44.824±18.885
3	3 month	70.824±22.954
4	6 month	95.059±32.539
5	1 year	108.529±35.728

Repeated ANOVA = 30.37, P< 0.001

Table-1: Functional outcome in the form of range of motion (ROM) at knee

S. No.	Type of fracture	No. of cases (n=17)	R.O.M at 2 week	R.O.M.at 1 month	R.O.M. at 3 month	R.O.M. at 6 month	R.O.M. at 1 year
1	Lateral condyle coronal split (Hoffa #)	6	23.333 ± 13.352	43 ± 22.935	56.167 ± 27.636	83.667 ± 46.676	91.333 ± 51.624
2	Medial condyle Coronal split (Hoffa #)	*1	20	40	67	70	79
3	Lateral condyle sagittal split	5	26.2 ± 9.149	51.8 ± 20.055	89 ± 6.083	111.4 ± 7.987	125.4 ± 10.089
4	Medial condyle sagittal split	5	19.4 ± 12.992	41.0 ± 16.643	71 ± 19.416	97.4 ± 27.492	118.2 ± 23.210
5	* ANOVA Test		P=0.661, NS	P=0.107, NS	P=0.061, NS	P=0.407, NS	P=0.264, NS

*not included in calculation as n<2

Table-2: Functional outcome in the form of ROM according to type of Fracture

S. No.	Type of fracture	Excellent A	Satisfactory B	Unsatisfactory C	Poor D
1	Lateral condyle coronal (n=6)	3	-	1	2
2	Medial condyle coronal (n=1)	-	1	-	-
3	Lateral condyle sagittal (n=5)	4	1	-	-
4	Medial condyle sagittal (n=5)	2	3	-	-
5	Total (n=17)	9	5	1	2

*A and B considered good result and C and D considered poor results. Chi square=6.679 with three degree of freedom P=0.109

Table-3: Overall Functional outcome according to type of Fracture

agreement in regards to standard implant for unicondylar fracture is as yet inadequate. In absence of specific implant design for isolated condyle fracture we applied calcaneal plate in medial, lateral as well as in tangential posterior fractures of distal femur (AO 33B1, 33B2, 33B3). In our study design features make the D-shaped calcaneal plate appropriate for fixation of isolated femoral condyle fractures. This plate provide a wide area of bone coverage, increasing the surface area of fixation while the spanning structural design of the construct offers regions of intermittent fixation, which likely promotes periosteal preservation and ultimately fracture union. In appropriate setting, the plate can be used as a large washer, representing a unique management option for communitated pattern, osteoporotic or osteopenic bones. The plate design includes as many as 13 screw holes which may be strategically placed for fracture reduction depending on injury pattern. Low profile design of the plate (thickness of 3 mm) reduces the risk of irritation of the surrounding soft tissue. It can be contoured as per need of fracture pattern, while maintaining fatigue strength and durability. Numerous holes allow variety of possible fixation for communitated fractures; whereas conventional plates with predetermined screws trajections and precontured design cannot meet all demands of fracture pattern. In this study with small series of 17 cases calcaneal plate has shown promising results. Surgical dissection increase chance of infection and nonunion however none of our patient has non-union, infection or any other complication. Also it cannot be used when bi condylar fracture is present as it lacks metaphyseal stability.

CONCLUSION

Operative management with D-shaped calcaneal plate has shown promising results however a randomized control trial with large number of cases is required to validate the results.

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Clinicoepidemiological Study on Traumatic Cataract

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ABSTRACT

Introduction: Ocular trauma is one of the important cause of acquired monocular blindness in the world. Both penetrating and concussion injuries can cause cataract. With these rationale a hospital base cross sectional study was carried out at the Regional Institute of Ophthalmology, Guwahati with the objective to know the profile of patient presenting with traumatic cataract, to study the mode of presentation and type of injury causing it and to know the associated ocular morbidities of traumatic cataract.

Material and Methods: All the patient admitted for traumatic cataract in Regional Institute of Ophthalmology during the study period were taken for the study. history was taken in a pre designed pre tested proforma for all 48 patient got during the period. Ocular examination was also done.

Results: Maximum number of traumatic cataract were among male patient (66%) and children below 10 years are mostly (27.08%) affected. Maximum (58%) numbers of traumatic cataract were due to blunt ocular trauma. Wooden stick was the commonest object causing both blunt as well as penetrating ocular injuries. it was observed that cornea involvement, anterior capsular tear, posterior synechia, subluxation or dislocation, uveities, raised IOP etc are some of the common morbidities associated with traumatic cataract.

Conclusion: Maximum numbers of patients were children and they were mostly related to unsupervised activities. As corneal involvement is one of the common morbidities associated with traumatic cataract early reporting and adequate follow up need to be emphasized to the masses.

Keywords: Ocular trauma, traumatic cataract, morbidities, blunt injury, penetrating injur

INTRODUCTION

Ocular trauma is regarded as one of the most important public health problem worldwide. It is the single most important cause of acquired monocular blindness in the world. Approximately 1.6 million people in the world become blind as a result of ocular injury. Around 40% of monocular blindness may be related to ocular trauma.^{1,2} cataract formation is a sequel after trauma.

A traumatic cataract may develop after various type of ocular insult including blunt and penetrating trauma. Other rare causes of traumatic cataract include infrared energy, ionizing radiation and ultraviolet radiation.³ Mode of injury in children is mostly domestic injury most commonly during playing at home or school. Sports and work related eye injuries most commonly occur in young adults followed by injuries related to accidents because of involvement of children in high risk sports without supervision or without employing protective measures.⁴

Developments of cataract during the early life leads not only to visual impairment due to the cataract itself, but also to amblyopia. Any significant stimulus deprivation during the

amblyogenic age can profoundly affect the further visual development.

Both penetrating and concussion injuries can cause cataract. The visual prognosis of traumatic cataract depends upon the type of ocular trauma, extent of lenticular involvement and associated damage to the ocular structure. However regarding the time of intervention of cataract surgery it has been emphasised that for a better prognosis the treatment should be completed within a year after initial surgery in case of adult and it is better to complete the treatment within six months in children.⁵

With these rationale this study was done with the objective to know the profile of patient presenting with traumatic cataract, to study the mode of presentation and type of injury causing traumatic cataract and to know the associated ocular morbidities of traumatic cataract.

MATERIAL AND METHODS

Ethical clearance was taken from institutional ethical committee of Gauhati Medical College and hospital in the meeting held on 19th nov.2013.

Study Design: This is a hospital base cross sectional study carried out at the RIO (Regional Institute of Ophthalmology), Guwahati from June 2013 to May 2014

Study population: All the traumatic cataract patient (with inclusion criteria) admitted for traumatic cataract in RIO during this period (june2013-may 2014) were taken for the study. A total number of 48 patient got during the period.

Inclusion criteria

Patient of age group 6-60 years of both male and female The patient who are diagnosed as having unilateral traumatic cataract by history, clinical findings and investigations.

A total number of 48 patient got during these period and meticulous history was taken in a pre designed pre tested proforma. Examination was done by using torch light in diffuse illumination, A thorough slit lamp examination was done to examine the eyelids, conjunctiva, sclera, cornea, anterior chamber, pupils, iris and lens. Intraocular pressure measurement was done using Goldmann applanation tonometry where applicable. Informed consent of the pateints was taken before starting the study.

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STATISTICAL ANALYSIS

The Data collected was compiled, tabulated and subjected to statistical analysis wherever applicable. Statistical significance test like Chi-square test was employed where appropriate. The analysis was done in computer using MS excel package and SPSS11.5 software.

RESULTS

Out of 48 cases, 32 were male and 16 were female. Maximum number of cases found is in the age group of below 10 years. (27.08%) (Table-1).

It was observed that maximum (58%) number of traumatic cataract were due to blunt ocular trauma. It was also observed that in case of blunt trauma female suffered more (62.5%) than male (56.25%) whereas in case of penetrating trauma male suffer more (43.75) than female (37.5). But this association between sex and type of trauma was not statistically significant (Table-2).

Wooden stick was the commonest object causing both blunt

Age (years)	Male (%)	Female (%)	Total (%)
<10	9 (28.13)	4 (25)	13 (27.08)
11-20	3 (9.37)	1 (6.25)	4 (10.53)
21-30	2 (6.25)	3 (18.75)	5 (13.16)
31-40	6 (18.75)	2 (12.5)	8 (16.67)
41-50	5 (15.63)	5 (31.25)	10 (20.83)
51-60	7 (21.87)	1 (6.25)	8 (16.67)
Total	32 (100)	16 (100)	48 (100)

NB: parenthesis indicate column wise percentage

Table-1: Age and Sex wise distribution of traumatic cataract

Type of trauma	Male (%)	Female (%)	Total (%)
Blunt	18 (56.25)	10 (62.5)	28 (58)
Penetrating	14 (43.75)	6 (37.5)	20 (42)
Total	32 (100)	16 (100)	48 (100)

df=1, $X^2=0.9974$, $p>0.05$, NB: parenthesis indicate column wise percentage

Table-2: Type of trauma causing traumatic cataract

Object causing injury	No	Percentage%
Stick	21	43.75%
Wire/ iron nail	6	12.5%
Stone	5	10.42%
Toy	4	8.33%
Hand	4	8.33%
Needle	3	6.25%
Fruit	3	6.25%
Other	2	4.17%
Total	48	100

Table-3: Distribution of cataract according to the type of object causing injury

Type of injury	Soft cataract	Total cataract	Rosette cataract	Total
Blunt	0	22 (59.45%)	5 (100%)	27 (56.25%)
Penetrating	6 (100%)	15 (40.54%)	0	21 (43.75%)
Total	6 (100%)	37 (100%)	5 (100%)	48 (100%)

NB: Parenthesis indicate column wise percentage

Table-4: Morphology of traumatic cataract according to type of injury

as well as penetrating ocular injuries. (44%). Wire or iron nail comes as second important object in ocular trauma (12%) (Table-3).

It was observed from the study that 59% of total cataract is due to blunt trauma where as 41% of total cataract is due to penetrating trauma. All the 6 cases of soft cataract was due to penetrating trauma and all the 5 cases of Rosette cataract was due to blunt trauma. These difference of type of trauma and morphology of traumatic cataract was found statistically significant (Table-4).

From table-5 it was observed that 38% of patient presented with corneal involvement along with traumatic cataract. Beside cornea involvement, anterior capsular tear, posterior synechia, subluxation or dislocation, uveities, raised IOP etc are some of the common morbidities associated with traumatic cataract. It was also observed that only 4% of patient suffering from iris injury along with the cataract.

DISCUSSION

The present study showed that majority of cases (26%) occurred in below 10 years of age. This is most probably because children are more active and commonly meet with accident during playing. Lack of adult supervision is also responsible for trauma. Daljith singh⁶ also showed similar observation in their study

It was observed that traumatic cataract were more among male patient (66%). Man seem to be more exposed to ocular trauma because they spend most of their time in outdoor activities. Bhatia CM, Panda A and Sood NN (1982)⁷ in their study found similar observation. and Krishnamachiary M, (1997)⁸ also observed similar male preponderance in their study. Shah MA, Shah SM (2011)⁹ and Memon MN (2012)¹⁰ observed around 71% and 75.6% male involvement respectively in their study.

It was evident from this study that blunt trauma was the commonest mode of injury. Around 58% patient gives the history of blunt trauma where as 42% had penetrating trauma. Other studies showed similar pattern of type of trauma were Blum M (1996)¹¹ (57.4%), Brar GS et al (2001)¹² (55%).

Out of total 48 patient 21 patient (44%) had injury with wooden stick or bamboo during work or play. study done by Krishnamachiary M, (1997)⁸ and Memon MN (2012)¹⁰ found that 54.7% and 44% patient had stick injury respectively in their study. These finding comply with the present study.

Present study showed that 37 patient (78%) had total cataract, 6 patient (12.5%) had soft cataract and 5 cases had rosette cataract. A statistical significance was also observed in type of trauma and morphology of the cataract. similar observations was also found by Krishnamachiary M, (1997).⁸ But Shah MA, Shah SM (2011)⁹ found soft cataract in majority (60%) of cases.

Out of 48 cases of traumatic cataract 18 patient (37.5%)

Morbidities	Number	Percentage %
Corneal involvement	18	37.5%
Ant.capsular tear with lens mater in AC	10	20.83%
Posterior synechia	8	16.67%
Dislocation/ subluxatio	7	14.58%
Uveities	5	10.42%
Raised IOP	4	8.33%
Irish injury	2	4.17_%

Table-5: distribution of ocular morbidities associated with traumatic cataract

presented with corneal involvement in the form of scars, opacity or sealed corneal wound. posterior synechiae was observed in 7 (14.5%) patient. Uveities in 5 (10.4%) cases, raised IOP in 4 (8.3%) cases and observed by Blum M (1996),¹¹ Daljith singh,¹ Krishnamachariy M, (1997),⁸ and Loncar VL, Petric I (2002)¹³

CONCLUSION

Maximum number of patients were children and they were mostly related to unsupervised activities. Adult supervision and awareness can reduce the occurrence of ocular trauma in children. The commonest mode of injury was found to be the blunt trauma and maximum had injury with wooden stick or bamboo during work or play. So awareness and careful attitude of people can reduce the trauma. As corneal involvement is one of the common morbidities associated with traumatic cataract early reporting and adequate follow up especially in children suffering from traumatic cataract need to be emphasized to the masses.

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Prospective Randomised Study to Evaluate the Efficacy of Midazolam as an Adjuvant to Local Anaesthetics in Brachial Plexus Block

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ABSTRACT

Introduction: Adjuvants are used to potentiate the action of local anaesthetics and prolong the duration of analgesia. Midazolam, a water soluble benzodiazepine is known to possess antinociceptive effects. It has been used epidurally and intrathecally in combination with local anaesthetics. Our study aimed to evaluate the efficacy and safety of midazolam added to brachial plexus anaesthesia.

Material and Methods: This was a prospective, randomised, double blind study in 60 ASA I or II patients undergoing upper limb surgeries under supraclavicular brachial plexus anaesthesia. Group BLM(n=30) received Inj Bupivacaine (0.5%) 20ml + Inj Lignocaine (2%) 10ml with adrenaline (1:200000) + Inj Midazolam 50 mcg/kg. Group BL (n=30) received Inj Bupivacaine (0.5%) 20ml + Inj Lignocaine (2%) 10ml with adrenaline (1:200000). We compared onset and duration of sensory and motor block, hemodynamic variables, pain and sedation scores and post-operative analgesic requirements.

Results: There was statistically significant difference ($P < 0.001$) in the onset of sensory block in group BLM (2.37±1.54min) as compared to group BL(6.33±3.20min). Onset of motor block was faster in group BLM (2.57±1.68 min) than group BL (7.33 ± 3.41 min.) ($P < 0.001$). Duration of sensory block was significantly longer ($P = 0.004$) in group BLM (19.20± 5.98 hr) versus group BL (14.6±6.04 hr.) Motor block was prolonged in group BLM (9.4±3.02 hr) compared to group BL (6.87±2.45 hr). ($P = 0.001$). Mean postoperative Pain scores were lower in group BLM than in group BL ($P < 0.05$). In the post-operative period 6.67% patients in group BLM demanded analgesia as compared to 63.33% in group BL. ($P < 0.001$)

Conclusion: Midazolam (50 ug/kg) as an adjuvant hastens the onset and prolongs the duration of both sensory and motor block and reduces post-operative analgesic requirements.

Keywords: supraclavicular brachial plexus block, bupivacaine, lignocaine, adjuvants, midazolam

and dense anaesthesia targets the brachial plexus trunks. At this location the sensory, motor and sympathetic innervation which is carried in three nerve structures is limited to a minute region.^{2,3} However the limited period of analgesia may prove to be a drawback in case the duration of surgery is prolonged. Bupivacaine has been the local anaesthetic most frequently used due to its longer duration of action but has a ceiling dose and potential for cardiotoxicity. This can be overcome by continuous regional anesthesia techniques using catheters or malleable needles but these have their own problems. Adjuvants added to local anaesthetics have been found to enhance the quality of the block and decrease the requirement of local anaesthetics. Various studies have investigated several adjuvants, including opioids, clonidine, neostigmine, hyaluronidase, and bicarbonate⁴⁻⁸ Midazolam, a water-soluble benzodiazepine, is known to produce antinociception and to enhance the effect of local anaesthetic when given epidurally or intrathecally.⁹⁻¹¹ Midazolam produces this effect by its action on gamma amino butyric acid-A (GABA-A) receptors which have also been found in peripheral nerves.¹²⁻¹⁴ At our institute we routinely use a combination of bupivacaine and lignocaine for the brachial plexus block. We carried out this study to evaluate if the addition of midazolam improved the quality of the block and any adverse effects that could arise by its inclusion.

MATERIAL AND METHODS

This was a prospective, randomised, double blind study conducted after institutional ethics committee approval and written informed consent from the patients. 60 patients scheduled for elective or emergency surgeries on the forearm or hand were enrolled for the study. We included ASA I and II patients of either gender, aged 18-60 year, weighing 40-70kg. Patients with bleeding disorders or receiving anticoagulants or chronic analgesic therapy and those with contralateral hemidiaphragmatic paralysis, vocal cord palsy, h/o allergy to the study drugs were excluded. Patients were divided into 2

INTRODUCTION

Brachial Plexus Block is a feasible alternative to general anaesthesia for upper limb surgeries. The profound muscular relaxation provides good operating conditions and the intense analgesia which extends into the post-operative period decreases the demand for pain relief. Intraoperative hemodynamics are better maintained and the associated sympathetic block decreases vasospasm, edema and post-operative pain.¹ There are various approaches to block the brachial plexus namely the interscalene, supraclavicular, infraclavicular and axillary approach. Of these the supraclavicular technique is commonly used for surgeries on the forearm and hand. This block which provides faster

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groups using computer generated randomisation.

Group BLM (study group)

Inj Bupivacaine (0.5%) 20ml + Inj Lignocaine (2%) 10ml with adrenaline (1:200000) + 50 mcg/kg of Midazolam

Group BL (control group)

Inj Bupivacaine (0.5%) 20ml + Inj Lignocaine (2%) 10ml with adrenaline (1:200000)

Care was taken to note that the safe upper dose limit of the drugs was not exceeded. The solution to be injected was made by an anaesthetist not involved in performing the block, patient care or data collection. The block was performed by a senior and experienced anaesthesiologist. All patients were premedicated with 1-2 mcg/kg Fentanyl i.v. With the patient in the supine position and the head turned to the opposite side and the ipsilateral arm adducted. The interscalene groove was identified and the finger was moved towards the clavicle to palpate the subclavian artery. The stimulating insulated needle [STIMUPLEX 22 G 50 mm] was inserted just above the palpating finger and advanced in a direction caudad running parallel to the sagittal axis until any two of the following motor responses were elicited.

I] Upper arm: - flexor - biceps, extensor - triceps

II] Fore arm: - extensor - brachioradialis, wrist extensors,

III] Hand: - flexors or extensors of the fingers.

We initially used a current of 0.8 mA frequency 1 Hz to elicit the desired motor

response. The current was gradually reduced to obtain the best possible motor response at a current of 0.6 mA. The current was further reduced to 0.2 mA to rule out the intraneural placement. The needle was repositioned and the drug solution injected on

obtaining the best response at 0.4- 0.6 mA after confirming negative aspiration for blood.

The following parameters were studied.

1] **Onset of sensory block**:- the time from injection till there was absence of sensation in the areas supplied by medial, radial, ulnar and musculocutaneous nerves measured at 0, 2, 5, 10, 20 and 30min

0= no block (normal sensation)

1= partial block (decreased sensation)

2= complete block (no sensation)

A cotton swab dipped in spirit was used to test the sensory block.

2] **Onset of motor block**: - Motor block was measured at 0,2,5,10,20, and 30 min by assessing the following motor functions i.e. flexion at elbow (musculocutaneous nerve), wrist and elbow extension, opposition of thumb and index finger (median nerve) and opposition of thumb and little finger (ulnar nerve).

Motor block was graded as:

0= no block (full muscle activity)

1= partial block (decreased muscle activity)

2= complete block (no muscle activity)

3] **Duration of sensory block**:-Time elapsed between injection of the drug and appearance of pain requiring analgesia.

4] **Duration of motor block**: Time elapsed between injection of the drug to complete return of motor power.

5] **Hemodynamic parameters**: Heart rate, systolic and diastolic blood pressure and arterial oxygen saturation (SpO₂) were measured at 0, 2, 5, 10, 20, 30 min and thereafter every 15 min till the end of surgery.

6] Sedation was assessed using the Ramsay sedation score at 0, 2, 5, 10, 20, 30 min and repeated every 15 min till surgery was completed.

1 Anxious or restless or both

2 Cooperative, orientated and tranquil

3 Responding to commands

4 Brisk response to stimulus

5 Sluggish response to stimulus

6 No response to stimulus

7] Pain score using visual analogue scale where 0 is no pain and 10 is worst possible pain s(VAS): was recorded at 6,12 and 24 hr post-operative period

8] Number of patients demanding analgesia in the post-operative period: Analgesia in the form of injection diclofenac was given on demand by the patient or when the VAS score was ≥ 3

Only patients with complete sensory and motor block were included in the study. Patients who had to be supplemented general anaesthesia at any time during the intraoperative period were excluded from the study.

According to previous studies¹⁵ all the patients (100%) in the plain bupivacaine group needed rescue analgesia whereas only 15% demanded analgesia in the bupivacaine plus midazolam group. A power analysis indicated that a sample size of 60 was sufficient to detect a large statistical difference with an $\alpha = 0.05$

STATISTICAL ANALYSIS

Statistical Analysis was performed using SPSS version 15. All results were expressed as Mean \pm SD. Comparison of the demographic variables, hemodynamic parameters, onset and duration of sensory and motor block was performed using the unpaired t test. Sedation and pain scores at various intervals were compared with Mann Whitney U test while the post-operative analgesic requirements were compared using Chi square test.

RESULTS

Demographic variables(age, gender distribution and weight) were comparable. Duration of surgery was similar. Onset of sensory block occurred earlier in group BLM (2.37 \pm 1.54 min) as compared to group BL (6.33 \pm 3.20) ($P < 0.001$). Onset of motor block in Group BLM was also faster (2.57 \pm 1.68min) versus Group BL 7.33 \pm 3.41min ($P < 0.001$). Duration of sensory block in Group BLM was longer (19.20 \pm 5.98hr) as compared to Group BL(14.60 \pm 6.04 hr) ($P = .004$). The motor block also lasted longer in Group BLM (9.40 \pm 3.02 hr) versus Group BL (6.87 \pm 2.45 hr) ($P < .001$)

Sedation scores were comparable during the intra and post-operative period. The post-operative pain scores at 6,12 and 24hr were lower in group BLM as compared to group BL (P

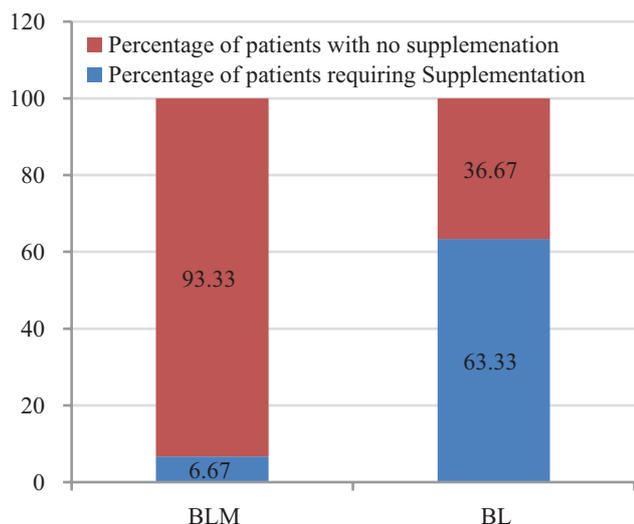
Parameter	Group BLM			Group BL			Unpaired t test	P value
	Mean	SD	Range	Mean	SD	Range		
Onset of sensory block(min)	2.37	1.54	2-10	6.33	3.20	5-20	6.119	P< .001
Onset of Motor block(min)	2.57	1.68	2-10	7.33	3.41	5-20	6.877	P< .001
Duration of sensory block (hours)	19.20	5.98	12-24	14.60	6.04	6-24	2.965	P = 0.004
Duration of motor block (hours)	9.40	3.02	6-12	6.7	2.45	2-12	3.568	P< .001

Table-1: Time for Onset and Duration of Sensory and Motor block

Group		Number of Patients Required Supplements		Total
		Yes	No	
Group BLM	Count	2	28	30
	Percent	6.67%	93.3%	100%
Group BL	Count	19	11	30
	Percent	63.33%	36.67%	100%
Total	Count	21	39	60
	Percent	35.0%	65.0%	100%

Table-2: Number of Patients requiring analgesics in the 24 hour post-operative period

Chi-Square Test	Value	Df	P value	Association
Pearson Chi-Square	21.17	1	<0.0001	Significant
Fisher's Exact Test			<0.0001	Significant



Graph-1: Comparison between the number of patients who required analgesic supplementation in the 24 hour post-operative period

< 0.05).

The number of patients who demanded post-operative analgesia were significantly less in group BLM(6.67%) as compared to group BL(63.33%). Other than arterial puncture which occurred in four patients(2 from either group), no adverse events were recorded.

DISCUSSION

The advantages of performing upper limb surgeries under brachial plexus block are many but the limited duration of action in prolonged surgeries is a significant drawback. When continuous catheter techniques are not available, adjuvants help by potentiating the action of local anaesthetics. The various adjuvants investigated include opioids, clonidine, dexamethasone, neostigmine, hyaluronidase and

bicarbonate.⁴⁻⁸

We evaluated the efficacy and safety of midazolam when combined with a mixture of bupivacaine and lignocaine for supraclavicular brachial plexus block. This was a prospective randomised study where the control group received a mixture of only local anaesthetics in the same volume and concentration as the study group. The onset time of sensory block was 2.37±1.54 min in the midazolam group as compared to 6.33±3.20 min in the control group. Our findings were in consonance with those of Jarbo, Batra et al where the onset of sensory block was 12 ± 2.9 min with midazolam as compared to 20 ± 3.8 min in the control group. Onset of block was faster in our study as we had used a combination of lignocaine and bupivacaine as compared to Jarbo, Batra et al¹⁵ who used only bupivacaine. Onset of motor block was 2.57±1.68 min in the midazolam group as compared to 7.33 ± 3.41 min in the control group. Similar results were found by Jarbo et al¹⁵ where the onset of motor block with addition of midazolam was 9.2 ±2.38 min as compared to 17.1±3.83 min with plain bupivacaine. This could be due to a local anaesthetic property of midazolam and its synergistic action with that of local anaesthetics.⁹⁻¹¹

In our study however, the onset of sensory block was faster as compared to motor block. This was in contrast to studies conducted by Winne et al¹⁶ and Jarbo Batra et al where the motor block preceded the onset of sensory block. A study was conducted by Winnie et al which studied separate onset and recovery of sensory and motor block in peripheral (mantle)and central (core) bundle within nerve trunks. Due to the somatotrophic configuration of nerve fibres in the trunks, motor block sets in earlier than sensory block. Motor fibres are located more peripherally than sensory fibres and hence a local anaesthetic injected peripherally will arrive at and begin to block motor fibres before it reaches the more centrally located sensory fibres.

The duration of sensory blockade (19.20±5.98 hr) was significantly longer (P <0.05) in the midazolam group as compared to the control group (14.6±6.04 hr). The duration of motor block was also significantly prolonged to 9.40±3.02hours when midazolam was added as compared to 6.87±2.45 hours with only local anaesthetics. Prolongation of motor block may be undesirable in surgeries of short duration.

We noted a longer duration of both sensory and motor block as compared to the study by Jarbo Batra et al. This was probably because we used an adrenalized solution of local anaesthetics in both groups. Our results show that sensory block tended to last longer as compared to motor block which is similar to the observation by Winnie et al and Jarbo Batra et al. These authors explained that large fibres require higher concentration of local anaesthetics than small fibres.

Time	Group BLM				Group BL				Mann-whitney U test	P Value
	Mean	SD	Median	IQR	Mean	SD	Median	IQR		
0min	6.47	1.85	7.00	2.00	6.83	1.44	7.00	2.00	400	0.460
2 min	4.13	1.59	4.00	2.00	6.30	1.26	6.50	2.00	127	<0.01
5 min	1.23	1.59	1.00	2.00	4.97	1.47	5.00	2.00	54	<0.01
10 min	0.00	0.00	0.00	0.00	1.60	2.08	0.00	3.00	255	<0.01
20 min	0.00	0.00	0.00	0.00	0.17	0.59	0.00	0.00	405	0.506
30 min	0.00	0.00	0.00	0.00	0.10	0.40	0.00	0.00	420	0.657
1 hr	0.00	0.00	0.00	0.00	0.07	0.25	0.00	0.00	420	0.657
2 hr	0.00	0.00	0.00	0.00	0.07	0.25	0.00	0.00	420	0.657
6 hr	0.20	0.66	0.00	0.00	3.33	2.28	4.00	3.00	122	<0.01
12 hr	2.90	1.35	3.00	2.00	5.47	1.11	6.00	1.00	69	<0.01
24 hr	4.20	0.76	4.00	1.00	5.90	0.99	6.00	2.00	94	<0.01

Table-3: Peri-operative Pain Scores using Visual Analogue Scale

The minimal effective concentration of local anaesthetics for large motor fibres is greater than for small (sensory) fibres.¹⁷ Postoperatively significantly lower pain scores were recorded at 6 hr, 12 hr and 24 hr with addition of midazolam which could be due to its antinociceptive action on GABA-A receptors present in the brachial plexus. Bhisitkul et al¹³ showed that axonal GABA receptors are present on both normal and regenerated sensory fibres in rat peripheral nerve. It was Cairns et al who discovered that activation of GABA receptors within the temporomandibular joint could diminish the conduction of nociceptive signal transmission.¹⁴ The Ramsay sedation score was comparable between the two groups and the highest score recorded was 2. The study conducted by Jarbo Batra et al showed higher sedation scores with midazolam 15 min after injecting the drug until 30 min postoperatively. The sedative effects of midazolam are observed due to partial vascular uptake of the drug and its transfer to the central nervous system. Midazolam is highly lipophilic and diffuses faster in to the blood vessels. It has a rapid clearance (6-11 ml/kg/min) and short half life (1.7 – 2.6hr)¹⁸

Similar to other studies we did not find any significant difference in the pulse rate, systolic and diastolic blood pressure and arterial oxygen saturation intra-operatively and until 24 hr post-operatively. When midazolam is added in doses of about 1- 2 mg intrathecally has a positive effect on perioperative and chronic pain. Intrathecal midazolam has not been associated with neurotoxic problems in animals.¹⁹ Tucker et al found that midazolam given intrathecally potentiates the analgesic effect of intrathecal fentanyl in labouring patients²⁰

We studied midazolam at a dose of 50mcg/kg as others have used the same doses for neuraxial blocks and have not observed any serious consequences. The average dose we used was 2.5mg to 3 mg. Trivedi V, Patel N²¹ compared the sedation scores of 5mg of midazolam with that of 150mcg of clonidine in combination with local anaesthetics in supraclavicular brachial plexus block. They concluded that Clonidine provides better postoperative analgesia and more sedation than midazolam. Kim Min Soo et al²² compared the effects of fentanyl 100 mcg versus 3 mg midazolam versus a combination of 3 mg midazolam + 100 mcg fentanyl added to local anaesthetics (40 ml of 1.5% lignocaine). They concluded that incidence of successful block was higher

when a combination of midazolam and fentanyl was added. Hayes et al²³ found that the group which received 50mcg/kg midazolam intra-articularly in combination with 0.25% bupivacaine (20ml) had significantly lower VAS at rest and during movement as compared to the group receiving 50mcg/kg midazolam in normal saline(20ml) and the group given only 0.25% bupivacaine(20ml).

CONCLUSION

We conclude that midazolam in the dose of 50mcg/kg can be safely used to potentiate the action of local anaesthetics in brachial plexus block.

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