

Study of Correlation between Induction of Labour and Caesarean Section

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ABSTRACT

Introduction: Induction of labour is defined as the process of artificially stimulating the uterus to start labour. Induction is generally done with prostaglandins or oxytocin and should be performed only when there is a clear medical indication as there are chances of failure resulting in caesarean delivery. Study aimed to collect patient information including age, parity, gestational age, body mass index, Bishop score, indication of caesarean section and fetal outcome in labour induced patients and to assess whether there is a statistical significance between labour induced women having a vaginal versus caesarean delivery.

Material and methods: This study was carried out in Rajendra Institute of Medical Sciences, Ranchi; Chandrama Imaging and Health care, Ranchi and Seva Sadan, Daltonganj. 400 women were included in the study, all of whom had been induced for labour from March 2014 to March 2017. For each case of caesarean delivery after failed induction, two women with successful induction of labour were selected as controls.

Result: Women with Bishop Score <6 were induced with intra vaginal prostaglandin E1 or E2 and women with Bishop Score ≥ 6 were induced with oxytocin infusion. Caesarean delivery was significantly associated with poor Bishop Score and induction by prostaglandin. The most common indications for induction of labour in both groups were postdated pregnancy. Most common indication for caesarean section was non-reassuring fetal heart rate.

Conclusion: Induction in the setting of unfavourable cervix especially in nulliparous women can result in failed induction and an increased likelihood of caesarean delivery.

Keywords: Bishop Score, Prostaglandins, Oxytocin.

INTRODUCTION

Induction of labour is defined as the process of artificially stimulating the uterus to start labour.¹

Over the years, various professional societies have recommended the use of induction of labour in circumstances in which the risks of waiting for the spontaneous onset of labour is greater than the risks associated with shortening the duration of pregnancy by induction.

Traditionally labour is induced by oxytocin infusion but its relative ineffectiveness in women with unfavourable cervix has instigated search for methods to improve cervical inducibility. There are number of techniques available for induction of labour. However, prostaglandins remain the single most effective means of achieving cervical ripening and inducing labour when combined with a judiciously timed amniotomy, providing good clinical effectiveness and patient satisfaction. Prostaglandin E2 is registered for labour

induction in many countries. However, it is expensive and is sensitive to temperature change, it needs to be kept under refrigeration. Misoprostol (a prostaglandin E1 analogue) has several potential advantages: it is stable at room temperature, it is relatively inexpensive and it can be given via several routes (oral, vaginal, sublingual, buccal). These properties make misoprostol a good agent for induction of labour, particularly in settings where the use of prostaglandin E2 is not possible owing to lack of availability, facilities for storage, or financial constraints.²

WHO technical consultation held in Geneva, Switzerland, on 13-14 April 2010 formulated the recommendations based on the evidence profiles for induction of labour.

General principles related to the practice of induction of labour:

- Induction of labour should be performed only when there is a clear medical indication.
- In applying the recommendations, consideration must be given to the actual condition, wishes and preferences of each woman, with emphasis on cervical status, the specific methods of induction of labour and associated conditions such as parity and rupture of membranes.
- Induction of labour should be performed with caution since the procedure carries risk of uterine hyperstimulation, rupture and fetal distress.
- Wherever induction of labour is carried out facilities should be available for assessing maternal and fetal well being and to perform emergency caesarean section.

This study examined a number of contributing factors and indications for Caesarean section in induced patients. The purpose of this study is to improve our understanding of why there is an increase in C-section deliveries among women whose labour is induced and what factors determine if a C-section is more likely.

Study aimed to collect patient information including maternal age, parity status, gestational age, body mass index (BMI), Bishop Score, indication of caesarean section and fetal outcome in labour induced patients and to assess whether

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there is a statistical significance between labour induced women having a vaginal versus caesarean delivery.

MATERIAL AND METHODS

This study was carried out in the department of Obstetrics and Gynaecology, Rajendra Institute of Medical Sciences, Ranchi; Chandrama Imaging and Health care, Ranchi and Seva Sadan, Daltonganj. A total of 400 women were included in the study, all of whom had been induced for labour from March 2014 to March 2017. Standard guidelines followed and informed consent taken from all patients. For each case of caesarean delivery after failed induction, two women with successful induction of labour were selected as controls. Successful induction was defined as achieving a vaginal delivery anytime after the onset of induction of labour.

Inclusion criteria

- Age between 18 and 35 years
- Period of gestation ≥35 weeks
- Parity ≤3
- Single live fetus in cephalic presentation

Exclusion criteria

- Contracted pelvis
- Malpresentation
- Placenta previa
- Previous 2 caesarean section
- Previous myomectomy scar
- Repaired vesicovaginal fistula
- Heart disease
- Active genital herpes infection
- Pelvic tumour

The induction agents used were:

- Prostaglandin E2 gel 0.5mg intracervically 6 hourly to a maximum of 3 doses.
- Prostaglandin E1 tablet 25µg intravaginally 4 hourly to a maximum of 8 doses.
- Oxytocin infusion in escalating dose starting at the rate of 2.5miU/minute at a Bishop score of ≥6.

For cases and control following data were collected:

- Name
- Registration number
- Age
- Parity
- Gestational age
- Body mass index
- Bishop score
- Inducing agent
- Indication for induction of labour
- Presence or absence of prolonged latent phase of labour
- Mode of delivery
- Indication for caesarean section
- Birth weight of baby
- Apgar score at 1 minute and 5 minute

STATISTICAL ANALYSIS

P values were calculated using chi square distribution table (available at medcalc.org-statistical software). Chi

square($X^2 = \sum \{(o-e)^2/e\}$, where o is the observed value and e is the expected value.

RESULT

Total number of pregnant women who entered the study was 400. All women underwent induction of labour. The study group (Group A) comprised of 150 pregnant women who delivered by caesarean section. The control group (Group B) comprised of 250 pregnant women who delivered vaginally. The mean age of women in Group A was 24.03 years with a minimum age of 20 years and a maximum age of 39 years. The mean age of women in Group B was 22 years with a minimum of 19 years and maximum of 34 years. Caesarean delivery risk was not significantly associated with the age of women ($p > 0.05$).

Out of 150 women in Group A 108 (72%) women were nulliparous while in group B out of 250 women 100 women (40%) were nulliparous. Thus nulliparity is significantly associated with caesarean delivery ($p < 0.05$).

The mean BMI of women in group A was 27.942 ± 1.904 with a minimum value of 23.6 and a maximum value of 32.2. The mean BMI of women in group B was 24.653 ± 1.402 with a minimum of 22.5 and a maximum value of 29.9. The odds of having a caesarean delivery were higher in women with a BMI of ≥ 25 . $P < 0.0001$.

The women included in both groups were further divided according to period of gestation. In group A, 14 patients were in gestational age 35 to 36+6 weeks, 74 patients were in gestational age between 37 to 39+6 weeks and 62 patients were of >40 weeks gestation. In group B, 20 patients were in gestational age 35 to 36+6 weeks, 63 patients were in gestational age between 37 to 39+6 weeks and 67 patients were of >40 weeks gestation. The odds of caesarean delivery for post-dated pregnancy when compared with term pregnancy were not statistically significant $P > 0.05$.

The Bishop score at the start of induction in both groups were compared (table 1). The odds of caesarean delivery increased with a lesser Bishop score. Odds ratio with Bishop Score of < 6 is 2.1243 [CI 2.269 – 6.2899] $p < 0.05$.

Women in both group A and group B were induced with either intravaginal prostaglandin or oxytocin infusion (table 2). All women with a Bishop Score of less than 6 were induced with intra vaginal prostaglandin E1 or E2 and women with Bishop Score ≥ 6 were induced with oxytocin

Bishop Score	Group A		Group B	
	Number	Percentage (%)	Number	Percentage (%)
2	0	0	6	02.4
3	38	25.33	16	60.4
4	56	37.33	74	29.6
5	10	66.67	48	19.2
6	16	10.67	76	30.4
7	20	13.33	26	10.4
8	10	06.67	4	01.6
Total	150	100%	250	100%

Table-1: Bishop Score at the start of induction

infusion. Most commonly used agent was prostaglandin E2 and least common agent was prostaglandin E1. Caesarean delivery was significantly associated with induction by prostaglandin. P<0.05.

The most common indications for induction of labour in both groups were postdated pregnancy followed by prelabour rupture of membranes (Table 3).

Most common indication for caesarean section after induction of labour was non-reassuring fetal heart rate followed by meconium stained liquor in the first stage of labour (Table 4). The mean birth weight of babies in Group A was 2.79±.529 kg with a minimum of 1.75kg and a maximum of 4.2 kg. The mean birth weight of babies in Group B was 2.70±.453kg with a minimum of 1.5kg and maximum of 4.5 kg.

Apgar score was evaluated at 1 and 5 minutes. 14% of group A and 13% of group B had Apgar score of less than 7 at 1 minute while only 1% of babies in both groups had Apgar score less than 7 at 5 minutes.

DISCUSSION

Induction of labour is one of the fastest growing medical procedures in current obstetric practice. American studies have documented a nationwide doubling of induction rates between the late eighties and the late nineties³

Rate of caesarean section is also increasing despite the risk associated with caesarean delivery. Most of the studies have found that there is a 2 fold increased risk of caesarean delivery with induction of labour compared to spontaneous labour.⁴

Most authors have noted that increasing parity had a favourable bearing on the outcome of induction. In this study, it was found that induction of labour in nulliparous women is a significant risk factor for emergency caesarean delivery. An Austrian study by Rouse et al⁵ and American study by Bodner- Adler⁶ also cite primiparity as significantly reducing the probability of successful induction compared to multiparity.

The rate of caesarean section was much high in women with BMI ≥25 in our study. Uyar et al⁷ in their study have concluded that BMI was an independent variable in determining the risk of caesarean section.

Induction with Bishop Score <6 was done with prostaglandins. Because an unfavourable cervix negatively affects the course of labour, there was increased incidence of caesarean section in women with Bishop Score <6. Vrouenraets et al⁸ also concluded that a Bishop score of 5 or less was a predominant factor for caesarean delivery. Induction of labour results in high failure rate if the cervix is not ripe has also been stated by Dean.⁹

Common indications for induction of labour in both groups were postdated pregnancy, prelabour rupture of membranes and hypertensive disorders of pregnancy. These three indications were also on the top list in the study conducted in Kathmandu by Rayamajhi.¹⁰

In our study, caesarean section was commonly done for non reassuring fetal heart rate and meconium stained liquor in first stage while in a similar study conducted by Luthy et al¹¹ the most common indication for caesarean section was cephalopelvic disproportion.

Birth weight of babies also determined the mode of delivery. Birth weight >3.5kg was significantly associated with Caesarean section. Similar results were found in the studies conducted by Vrouenraetes et al.⁸

CONCLUSION

Induction of labour is necessary in many situations and is done with the aim of achieving vaginal delivery. But sometimes

Agent	Group A		Group B	
	Number	Percentage (%)	Number	Percentage (%)
Oxytocin	46	30.67	106	42.4
PGE1	14	09.33	28	11.2
PGE2	90	60.00	116	46.4
Total	150	100	250	100

Table-2: Distribution of patients according to induction agent

Indication for induction	Group A		Group B	
	Number	Percentage (%)	Number	Percentage (%)
Post dated	44	29.33	90	36.00
Prelabour rupture of membranes	38	25.33	84	33.60
Hypertensive disorders	34	22.68	42	16.80
Intrauterine growth retardation	14	09.33	20	08.00
Olighydramnios	12	08.00	6	02.40
Isoimmunisation	6	04.00	4	01.60
Diabetes	2	01.33	4	01.60
Total	150	100	250	100

Table-3: Indication for induction of labour

Indication for Caesarean	Number	Percentage (%)
Non-reassuring fetal heart rate	58	38.67
Meconium stained liquor	44	29.33
Cephalopelvic disproportion	28	18.67
Non progress of labour	20	13.33
Total	150	100

Table-4: Indication for caesarean section in Group A

there is failure of induction resulting in caesarean delivery. This study was mainly done to know the common indications for induction, reasons for its failure and indications of caesarean section. Induction in the setting of unfavourable cervix especially in nulliparous women can result in failed induction and an increased likelihood of caesarean delivery. Other variables which increased the likelihood of failed induction were maternal BMI in overweight and obese range and birth weight ≥ 3500 g. The most common indication of caesarean section was non-reassuring fetal heart rate. These information will allow more accurate counselling and better informed consent in the decision making process regarding induction of labour. Further multicentre, prospective studies of a larger sample size to have a better understanding of factors leading to failure of induction of labour is recommended.

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