Original Research Article

Incidence of caesarean delivery after induction of labour in nulliparous women with unfavorable bishops score at tertiary care centre

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ABSTRACT

Background: Induction of labour means initiation of uterine contractions before onset of spontaneous labour to achieve vaginal delivery, because birth by caesarean delivery is more hazardous than vaginal delivery. Prostaglandins are used in management of Labour and are introduced as agent for induction of Labour. Nulliparous women are more likely to undergo induction of labour and are at a higher risk of caesarean delivery after induction of labour, as compared to multiparous women. Objective of current study was to determine the incidence of caesarean delivery in nulliparous women with unfavourable bishop's score when induced with dinoprostone gel.
Methods: This Hospital based Prospective interventional Study was conducted among 200 nulliparous women of 18-35 years of age with a singleton pregnancy with cephalic presentation at 37-42 weeks with unfavorable bishop score (≤5) and reactive fetal heart rate pattern with no contraindication of vaginal delivery.
Results: In our study of 200 participants majority were in the age group of 18-25 years (86%), with period of gestation 40 weeks (45.5%), most common indication of induction was postdated pregnancy (46.5%). Incidence of caesarean delivery was 28.5% and most common indication of caesarean was secondary arrest of labour in 46.5%.
Conclusions: The current study concluded that incidence of LSCS was found to be 28.5%. Duration of induction and dose of dinoprostone had positive association with increased incidence of LSCS.

Keywords: Induction of Labour, Dinoprostone gel, Bishop's score, Nullipara

INTRODUCTION

Induction of labour means initiation of uterine contractions after a period of viability but before onset of spontaneous labour, by any method (medical, surgical or combined) for the purpose of vaginal delivery. Over the years, various professional societies have recommended the use of induction of Labour in circumstances in which the risk of waiting for the onset of spontaneous labour are judged by clinician to be greater than the risk associated with shorting the duration of pregnancy by induction.[1] In addition, local resources, preference and profile of the women, cervical status and associated medical and obstetric conditions are also taken into account. Since induction of Labour is associated with the risk of uterine stimulation leading to foetal distress and uterine rupture, it should be carried out in facilities where maternal and foetal well-being can be monitored and caesarean section can be performed.[2] Birth by caesarean delivery is generally more hazardous than a normal vaginal delivery, and also poses more risk for subsequent pregnancies.[3-4] Therefore, it is hypothesized that prediction of success rate of induction of Labour might lead to reduction in caesarean delivery and thereby its complications. The relation between clinical state of cervix and spontaneous onset of Labour has been known for many years.[5] The traditional method of predicting whether an induced labour will result in successful vaginal delivery is based on the pre induction favourability of the cervix as assessed by Bishop Score described by Bishop in 1964.[6]

It is simple and has the most predictive value. This score uses cervical dilatation, effacement, consistency, position and the station of the presenting part. Modified bishop's score subset. Intuit length of cervix for % of effacement.[7] Bishop Score states that score of: 7 or less: do not attempt induction without ripening the cervix first, 9 or more: favourable to attempt induction, 12 or more: she is quite ready for labour or in early Labour.[8]

Accepted absolute indication of induction of labour

Hypertensive disorders: pre-eclampsia or eclampsia and induction of Labour according to the severity of disorders. Maternal medical conditions: diabetes mellitus, renal disease, chronic pulmonary disease. Foetal compromises: foetal growth restriction, isoimmunisation, non-reassuring antepartum foetal testing, oligohydroaminos. Pre Labour-Rupture of membranes: before 37 completed weeks of gestation, fetal demise, chorioamnionitis, prolonged pregnancy (>42 weeks).

Relative indication for induction of labour

Logistic factors: risk of rapid labour, distance from hospital, psychological indications, advanced cervical dilatation, polyhydramnios, previous stillbirth, post term pregnancy (>41 weeks).[9]

Contraindications

Prior classic uterine incision or trans fundal uterine surgery, active genital herpes infection, placenta or vasa previa, umbilical cord prolapse, transverse or oblique fetal lie, absolute cephalopelvic disproportion, cervical carcinoma. The association of prostaglandins release with labour was first discovered by Karim who noted a marked rise in PGE2 and PGF2α in amniotic fluid during spontaneous Labour.[10] Prostaglandins are used in management of Labour and are introduced as agent for induction of Labour.

PGE 2 is used for induction of Labour by oral, parenteral, vaginal, extra amniotic and intracervical route. The most convenient route is intra cervical application of gel.[10] It offer an advantage of lower dose and lesser side effects. In comparison to multiparous women, nulliparous women are more likely to undergo induction of labour and are at a higher risk of caesarean delivery after induction of labour.[11-12]

Current study was design to find out the incidence of caesarean delivery after induction of labour in nulliparous women at term pregnancy with Dinoprostone gel in unfavourable bishops score at tertiary care centre.

Aims and objectives

Objectives of current study were to determine the incidence of caesarean delivery after induction of labour in nulliparous women at term pregnancy with Dinoprostone gel in unfavourable bishops score at tertiary care centre and to find the association of caesarean delivery with duration of induction and dose of dinoprostone.

METHODS

This Hospital based Prospective interventional Study was conducted among 200 nulliparous women of 18-35 years of age with a singleton pregnancy with cephalic presentation at 37-42 weeks with unfavourable bishop score (≤5) and reactive fetal heart rate pattern with no contraindication of vaginal delivery admitted in the Department Of obstetrics and gynecology, Government medical college and associated group of hospitals, Kota, Rajasthan, between February 2020 to December 2021

Exclusion criteria

Exclusion criteria for current study were; multiparity, age <18 or>35 years, allergy to prostaglandins, any history of previous uterine surgery or previous caesarean, malpresentation, abnormal fetal heart rate pattern (nonreactive NST), moderate to severe anaemia with haemoglobin <10 gm%, post term and preterm pregnancy.

Indications for induction

Indications for induction were; post-dated pregnancy, PIH, oligohydramnios, fetal growth restriction (FGR), gestational diabetes mellitus (GDM), congenital anomaly, premature rupture of membrane (PROM).

Each eligible subject was explained about the purpose of the study. Written and informed consent was obtained from the participants before proceeding the study. Those who gave the consent to participate in the study were included. Baseline Demographic characters such as age, weight, height, BMI, residence were noted in pre-designed questionnaire. A careful history, general physical examination, systemic examination and per abdomen examination was done and non-stress test was performed for the assurance of fetal wellbeing. Routine investigations were done. Digital vaginal examination was done for recording the Bishop Score. The induction of labour was decided after initial vaginal examination during evaluation of Bishops score. If the Bishops score is ≤5 then induction was done by Dinoprostone gel after taking informed and written consent. PGE2 was instilled in form of 0.5 mg Dinoprostone gel in prefilled catheter which is supplied by govt. The patient was instructed to recline for at least 30 minutes after drug instillation. After that patient was monitored for progress of labour and fetal heart rate was monitored by auscultation. A partogram was strictly maintained in all study participants. The patient was assessed after 6 hours of gel instillation and changes in Bishop's score was noted. A second dose of PGE2 was administered if there is no progress; likewise maximum of three doses (1.5gm) was

used as per guidelines. Data analysis was done using licensed SPSS software version 21.0 (Chicago, Illinois). Univariate analyses were done initially and the results were presented with the help of tables. Descriptive statistics were used to calculate frequencies of categorical variables, and measures of central tendencies and dispersion were used to describe continuous variables. Unpaired t-test and ANOVA test were used to compare the continuous variable and chi-square test was used for categorical variables. Data are presented as mean (standard deviation) or number or proportions, $p < 0.05$ was considered as statistically significant.

RESULTS

Table 1: Demographic and obstetric characteristics of study participants.

Parameters	N (%)
Age group (years)	
18-25	172 (86)
26-30	24 (12)
>30	4 (2)
Residence	
Urban	122 (61)
Rural	78 (39)
POG (weeks)	
37	13 (6.5)
38	43 (21.5)
39	44 (22.0)
40	91 (45.5)

Table 2: Induction characteristics of study participants.

Parameters	N (%)
Bishop's score	
2.0	16 (8.0)
3.0	64 (32.0)
4.0	66 (33.0)
5.0	54 (27.0)
Indications of induction	
Post-date pregnancy	93 (46.5)
PIH	47 (23.5)
PROM	25 (12.5)
Oilgohydraminos	22 (11.0)
GDM	7 (3.5)
FGR	5 (2.5)
Congenital anomaly	1 (0.5)
Induction duration (hours)	
1-12	108 (54.0)
12-24	92 (46.0)
Dose of dinoprostone used	
1.0	154 (77.0)
2.0	38 (19.0)
3.0	8 (4.0)

A convenient sampling technique was used to enrolled the participants in study till the sample size of 200 completed during study period.

Out of 200, 127 participants are booked and 73 are unbooked. Results in our study, out of 200 participants, maximum 172 (86.0%) were in age group of 18-25 years followed by 24 (12.0%) participants in 26-30 years of age group. Mean age was 23.2 year. Maximum 91 (45.5%) were belongs to POG of 40 weeks followed by 44 (22%) were in POG of 39 weeks (Table 1).

Table 3: Distribution of study participants according to mode of delivery.

Parameters	N (%)
Mode of delivery	
LSCS	57 (28.5)
NVD	143 (71.5)
Indication of caesarean	
Secondary arrest of labour	26 (45.6)
Fetal distress	19 (33.3)
FIOL	7 (12.3)
DTA	5 (8.8)

Out of 200 participants, maximum 66 (33%) had bishop's score of 4 followed by 64 (32%), 54 (27%) and 16 (8%) participants had bishop score of 3, 2 and 1 respectively. Mean bishop score was 3.8 with SD of 0.9. Most common indication of induction in our study was post-dated pregnancy in 93 (46.5%) participants, other indications are PIH, PROM, Oligohydramnios, GDM, FGR and congenital anomaly in 23.5, 12.5, 11, 3.5, 2.5 and 0.5% cases respectively.

Table 4: Association of mode of delivery with age groups.

Age group (years)	Mode of delivery				P value
	LSCS		**NVD**		
	N	%	N	%	
18-25	42	73.7	130	90.9	
26-30	13	22.8	11	7.7	0.06
>30	2	3.5	2	1.4	
Total	57	100.0	143	100.0	

Duration of induction in majority 108(54%) participants was between 1-12 hours and in remaining 92 (46%) it was more than 12 hours. In our study of 200 participants, maximum 154 (77.0%) were delivered after single dose of dinoprostone, 38 (19.0%) participants needed 2 doses and only 8 (4.0%) participants were given maximum 3 doses of dinoprostone gel for induction (Table 2). Out of 200,143 (71.5%) participants were delivered vaginally after induction and only 57 (28.5%) landed up in LSCS. Hence incidence of LSCS in our study was found to be 28.5%. In our study, most common cause of LSCS was secondary arrest of labour in 26 (45.6%); fetal distress, FIOL and DTA were other causes in 19 (33.3%), 7

(12.3%) and 5 (8.8%) participants respectively (Table 3). In our study, no statistically significant age difference was found between participants delivered by LSCS and NVD (Table 4). In our study, a statistically significant duration of induction difference was found between participants delivered by LSCS and NVD. A significantly more participants delivered by LSCS had >12 hours of duration of induction (Table 5). A statistically significant dose of dinoprostone difference was found between participants delivered by LSCS and NVD. A significantly more participants delivered by LSCS had required 2 and 3 doses (Table 6).

Table 5: Association of mode of delivery with duration of induction.

Duration of induction (hours)	Mode of delivery				P value
	LSCS		NVD		
	N	%	N	%	
1-12	15	26.3	93	65.0	
12-24	42	73.7	50	35.0	0.0001
Total	57	100.0	143	100.0	

Table 6: Association of mode of delivery with dose of dinoprostone.

Dose	Mode of delivery				P value
	LSCS		NVD		
	N	%	N	%	
1.0	30	52.6	124	86.7	
2.0	20	35.1	18	12.6	0.0001
3.0	7	12.3	1	0.7	
Total	57	100.0	143	100.0	

DISCUSSION

In our study, mean age of study participants was 23.2 years with SD of 2.6 years. Youngest participant was 18 years old while oldest was 33 years and out of 200 participants, maximum 172 (86%) were in age group of 18-25 years followed by 24 (12%) participants in 26-30 years of age group. Similar age profile was described by Mehta et al.[13] In this study a total 200 participants were included and among them 87.5% were in below the age of 25 years followed by 11.5% participants in 26-30 years of age group. Son et al included a total 276 nulliparous patients and mean age was 30.01 years with SD of 2.91.[14] The mean age in present study was less than other above study because of early marriages in this part of India. In present study, Bishop's score 5 and less were included and mean Bishop's score was 3.8 with SD of 0.9, out of 200 participants, maximum 66 (33%) had Bishop's score of 4 followed by 64 (32%) participants had 3. Mehta et al also included patients with Bisop's score 5 or less.[13] Son et al also included patients with similar Bishop's score.[14] In our study, out of 200 participants, maximum in 46.5% participants, indication of induction was postdatism pregnancy followed by 23.5% had indication due to PIH and mean duration of induction was 12.2 hours with SD of 2.9. In our study, out of 200 participants, maximum 54% had duration of induction between 1-12 hours and rest were more than 12 hours. Mehta et al also reported the most frequent cause of induction of labour was postdatism (47.5%) followed by PIH (25.5%) and PROM (13%).[14] Less frequent causes were IUGR, DFM and IUFD. Duration of induction <12 hours was observed in 54.5%. The most common cause seen by Yeast et al was also postdatism.[15] The mean induction to delivery interval in this study was 13.38±7.91 hours. In our study, out of 200 participants, maximum 154 were given 1 dose of dinoprostopne for induction. Incidence of LSCS after induction was found to be 28.5%. Similarly Mehta et al found mode of delivery by caesarean section in 27%.[14] The caesarean rate ranged from 23.3% to 33.8% in study conduct by Prins et al, Neilson et at, Calder et al and Macer et al.[16-19] Most common cause for failure of induction in present study was secondary arrest of labour i.e. 26 (45.6%) followed by fetal distress in 19 (33.3%). Mehta et al reported that the main indication for caesarean section was failed progress (48.14%) followed by fetal distress (31.48%) similar indications were also reported by Calder et al and Macer et al.[13,19] In our study, a statistically significant duration of induction difference was found between participants delivered by LSCS and NVD. A significantly more participants delivered by LSCS had >12 hours of duration of induction. So more the duration more the chances of LSCS. In our study, a statistically significant dose of dinoprostone difference was found between participants delivered by LSCS and NVD. A significantly more participants delivered by LSCS had more 2 and 3 doses so with increasing dose, incidence of LSCS were also increased. Son et al found that out of the 276 nulliparous patients, nearly one third (N=82) were delivered by CS.[14] CS was performed due to failure to progress of labor (N=58), suggested fetal distress (N=17), or other maternal problem (N=7). Vahratian et al found that elective induction in nulliparous women with an unfavourable cervix result in a high rate of labour arrest and a significantly higher risk of caesarean birth. They had much longer latent and early active periods. When compared to women who start

labour spontaneously, they have a 2-to-3-fold greater chance of caesarean birth. In our study, duration of induction was also associated with the increased incidence of LSCS.[20]

CONCLUSION

In current study of 200 participants concluded that the incidence of caesarean delivery was found to be 28.5% when nulliparous pregnant women with poor bishop's score was induced by dinoprostone gel. Duration of induction and dose of dinoprostone had positive association with increased incidence of LSCS. Most common indication of LSCS was found to be secondary arrest of labour.

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