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Original Research Article

Induction of labor versus expectant management for women with a prior caesarean delivery

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ABSTRACT

Background: This study aimed to evaluate the feto-maternal outcomes in women with a previous caesarean section (CS) who underwent labor induction versus those managed expectantly. Vaginal birth after a caesarean (VBAC) has been associated with lower maternal morbidity, fewer fetal complications, shorter hospital stays, and fewer transfusions. While spontaneous labor may not always occur in these women, labor induction can be necessary for those attempting a trial of labor.
Methods: This prospective randomized controlled trial was conducted in the department of obstetrics and gynaecology at Pt. BD Sharma PGIMS Rohtak over one year. 140 women with a history of previous LSCS were randomly divided into two groups: Group 1 received induction at 39 weeks, with monitoring and augmentation, if necessary, while Group 2 was managed expectantly until 41 weeks. The study aimed to compare the outcomes of induced labor versus expectant management in these women.
Results: In our study, 37 women (52.8%) in the expectant management group went into spontaneous labor. Of these, 32 women (86.4%) delivered vaginally. In our study, the caesarean section rate was significantly higher (75.57%) when women were induced at 41 weeks compared to 39 weeks (40%). Fetal distress was the most common indication of caesarean section when the patient induced at 41 weeks.
Conclusions: The study found that induction of labor in women with a previous caesarean section led to similar vaginal delivery rates as expectant management. No significant maternal or perinatal complications were observed, but close monitoring for fetal distress and scar rupture is essential.

Keywords: Induction of labor, Expectant management, Prior caesarean delivery

INTRODUCTION

Induction of labor refers to the deliberate initiation of labor to achieve vaginal delivery. Women with a previous caesarean birth may opt for an elective caesarean, advancements in surgical techniques and medical care have reduced caesarean-related risks, leading to an increase in caesarean rates over time.[1] However, repeat caesarean sections can result in greater maternal morbidity, including abnormal placental adherence and hysterectomy. A trial of labor after a previous low transverse caesarean is considered safe for many women, with studies suggesting that over 50% of such women are candidates for VBAC. Successful VBAC offers benefits such as quicker recovery, reduced complications, and lower fetal morbidity compared to repeat caesarean sections. The Royal College of Obstetricians and Gynaecologists (RCOG) recommends planned VBAC for most women with a single previous caesarean, a singleton pregnancy, and cephalic presentation at term. BAC is associated with lower risks of postpartum fever, prolonged hospital stays, and transfusions.[2] However, contraindications include a history of uterine rupture, classical caesarean scars, placenta previa, and cephalopelvic disproportion. Women with a prior caesarean can either await spontaneous labor or undergo

induction or caesarean delivery. Studies suggest that induced labor in these women results in higher VBAC success rates compared to expectant management.

General objective

To compare feto-maternal outcomes of women undergoing induction of labour and those undergoing expectant management ≥39 weeks of gestation in women with previous one caesarean.

Specific objectives

To study demographic profile of patient with previous LSCS. To study obstetric outcomes of patient undergoing induction and to compare with expectant management. To study neonatal outcome of patient undergoing induction and to compare with expectant management.

METHODS

Study design

Prospective randomized, non -blinded controlled trial.

Study area

Department of Obstetrics and Gynaecology, Pt. B. D. Sharma, PGIMS, Rohtak, Haryana.

Study period

January 2022- January 2023 (1 year).

Inclusion criteria

Women over 18, who had history of one LSCS and are at a gestational age of ≥39 week, with singleton foetus in vertex presentation, Women with interpregnancy interval greater than 15 months and women with no clinical evidence of cephalopelvic disproportion.

Exclusion criteria

Women having recurrent indication of caesarean section, women not willing for trial of labor after LSCS, malpresentation, pregnancy-induced hypertension (PIH), Antepartum haemorrhage (APH), Diabetes, Severe foetal growth restriction, Multiple pregnancy and oligohydramnios.

sample size

Formula used:

$$= \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2 (P_1Q_1 + P_2Q_2)}{(P_1 - P_2)^2}$$

Proportion of VBAC after induction in previous LSCS is P1=73.8%.

Proportion of VBAC after expectant management in previous LSCS is P2=61.3%.

Z_(1-α/2)=confidence interval (95%) at 5% level of significance (value 1.96).

Z_(1-β)=power of study (80%) (value 0.84)

Q_1=100-P_1

Q_2=100-P_2

$$= \frac{(1.96 + 0.84)^2 (73.8 \times 26.2 + 61.3 \times 38.7)}{(73.8 - 61.3)^2}$$

= 216 (in each group)

This is sample size for infinite population.

Adjustment for infinite population

C=finite P =100

$$n = \frac{\mathrm{N}}{1 + \mathrm{N/C}}$$

$$n = \frac{216}{1 + 216/100}$$

n = 68 (in each group).

After acquiring ethical clearance 140 women who had history of previous LSCS were enrolled from OPD and Labour room.

Data analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. Descriptive statistics included computation of percentages, means and standard deviations. The unpaired t test (for quantitative data to compare two independent observations) was applied. The chi square test was used for quantitative data comparison of all clinical indicators. Level of significance was set at P≤0.05.

Ethical approval

Ethical approval was obtained from the Pt. BDS PGIMS and informed verbal consent was secured from all participants after explaining the study's aims, procedures, alternatives, risks and benefits in the local language, ensuring confidentiality and the study's contribution to improved patient care.

RESULTS

Table 1 shows mean age in study group was 26.91±4.44 years and control group were 27.41±5.05 years. 65.71% women in study group and 57.14% women in control group pursued their education up to secondary level. It was also observed that, 54.28% from study group and 57% from control group were from rural area .47% in study group and 45% in control group of women belonged to lower socioeconomic status.

Table 1: Demographic profile.

Variable	Study group (n=70) %	Control group (n=70) %
Mean age	26.91±4.44 years	27.41±5.05 years
Education up to secondary level	65.71	57.14
Rural	54.28	57
Lower socioeconomic status	47	45

Table 2: Distribution of patients according to time interval between previous caesarean section and present pregnancy.

Time interval (years)	Study group (n=70) (%)	Control group (n=70) (%)	Total n=140
≥1.5 to 2.4 years	14 (20)	18 (25.71)	32 (22.85)
2.5 to 3.4 years	30 (42.85)	27 (38.57)	57 (40.71)
3.5 to 4.4 years	25 (35.71)	20 (28.57)	46 (32.85)
≥4.5	01 (1.4)	5 (7.14)	5 (3.5)
Mean±SD	2.81±0.92	2.76±0.82	

The majority of women in both the study group (42.85%) and the control group (38.57%) had an inter-pregnancy interval of more than 2.5 to 3.4 years.

Table 3: Outcome of expectant group.

Period of gestation (weeks)	Spontaneous labour	Vaginal deliveries	Caesarean section
39-39+6 n=11 (%)	11 (29.72%)	9 (81.81%)	2 (18.18%)
40-40+6 n=26 (%)	26 (70.2%)	23 (88.46%)	3 (11.53%)

Out of 37 women who went into spontaneous labour, 32 (86.4%) delivered vaginally and 5 (13.5%) women had caesarean section.

There was an increased rate of caesarean section in women who were induced after failure of expectant management and that was 75.7% in comparison to women who underwent spontaneous labour 13.5%. This data was statistically significant with p value <0.01.

Table 4: Outcome of expectant group who were induced.

Groups	Vaginal delivery	Caesarean section	Statistical significance P value
Induced group (n=33)	8 (24%)	25 (75.7%)	<0.01

Table 5: Outcome of induction of labor in both groups.

Outcome	Study group (n=70) (%)	Control group (n=33) (%)	P value
Vaginal delivery	42 (60)	8 (24.3)	0.001
Caesarean section	28 (40)	25 (75.7)	0.001

Table 6: Comparison of mode of delivery in both groups.

Groups	Total number of vaginal deliveries	Caesarean section	Statistical significance (P value)
Study group n=70 (%)	42 (60)	28 (40)	0.57
Control group n=70 (%)	40 (57.14)	30 (42.85)	

The comparison of outcomes for women induced in both groups revealed that vaginal delivery was achieved in 60% of women in the study group and 24.3% of those induced at 41 weeks in the expectant group. In contrast, 28 women (40%) in the study group and 25 (75.7%) women in the control group delivered by caesarean section. This difference was statistically significant, with a p-value of 0.001.

42 (60%) women in study group while 40 (57.14%) in control group delivered vaginally. 28 (40%) women in study group and 30 (42.85%) in control group delivered by caesarean section.

The difference in mode of delivery between both groups was not statistically significant (p value=0.57)

Fetal distress is most common indication for caesarean in control group while failed induction is most common indication in study group.

Table 7: Indication of LSCS in both groups.

Indication of LSCS	Study group n=28 (%)	Control group n=30 (%)	P value
Foetal distress	8 (28.57)	23 (76.6)	0.01 (s)
Failed induction	10 (35.7)	02 (8.6)	0.01 (s)
NPOL	06 (21.4)	02 (6.6)	0.8
Scar tenderness	02 (7.14)	03 (13.04)	0.36

Table 8: Maternal complications in both groups.

Groups	Study group n=70 (%)	Control n=70 (%)	P value
Scar dehiscence	03 (4.28)	05 (7.14)	-
Postpartum haemorrhage	03 (4.28)	02 (2.85)	0.74

Table 9: Neonatal outcome in both groups.

Apgar score <7	Study group n=70 (%)	Control n=70 (%)	Statistical significance
1 minute	05 (7.14)	10 (5.71)	0.17
5 minutes	03 (4.28)	06 (8.5)	0.17
Apgar score >7			
1 minute	65 (92.85)	60 (85.71	0.84
5 minutes	67 (95.71)	64 (91.4)	0.76

Table 10: Neonatal complications and NICU admission.

	Study group n=70 (%)	Control n=70 (%)	Statistical significance
	Study group n=70 (%)	**Control expected group n=70 (%)**	**Statistical significance**
Respiratory distress syndrome	02 (2.85)	02 (2.85)	-
Jaundice	01 (1.42)	01 (2.85)	
Seizure	01 (1.42)	03 (4.28)	-
Neonatal sepsis	01 (1.42)	03 (4.28	
Pneumonia	1 (1.42)	3 (4.28)	
Meconium aspiration	1 (1.42)	4 (5.71)	
Total NICU admission	07 (10)	16 (22.85)	0.04

No significant difference in both groups in scar dehiscence and postpartum haemorrhage in both groups.

There were no statistically significant differences in Apgar scores between the study and control groups at both 1 minute and 5 minutes (all p-values > 0.05).

There were more NICU admissions in expectant group.

DISCUSSION

Induction of labor is common in obstetrics, occurring in 20–25% of pregnancies. Studies suggest that inducing labor after a previous caesarean increases the risk of caesarean delivery by 15–20%.[3] However, comparing induction with spontaneous labor is criticized, as expectant management is the true alternative. Research indicates that induction may lower the risk of caesarean compared to expectant management.[4] Factors like the Bishop score and prior caesarean reasons influence VBAC success, and guidelines emphasize individualized, informed decision-making.

This one-year prospective study involved 140 pregnant women with a singleton pregnancy, a previous caesarean section, and no comorbidities conducted at Pt. B.D. Sharma PGIMS, Rohtak, the participants were divided into two groups of 70 each. In the study group 70 women induced at 39 weeks. The control group underwent expectant management until 41 weeks and were induced if labor did not begin spontaneously.

In our study, both the groups were comparable in terms of age, educational status, residential status, socio economic status, time interval between previous caesarean section and present pregnancy. Similarly, in a study by Bernardes et al and Sharma et al (2016) women in expectant and in induction group were comparable in these terms.[5,6]

In the present study, in expectant management group 37 (70.2%) women underwent spontaneous labour between

39-40+6 weeks. Out of 37 women, who went into spontaneous labour, 32 (86.4%) women delivered vaginally. Our study is consistent with a study done by Sharma et al (2015), who observed that 82.3% women delivered vaginally who went into labour spontaneously at 273.6 days.[6]

Caesarean sections were significantly higher (75.7%) in women who were induced after failure of expectant management with p value <0.01. This data is well supported by Ouzounian et al where the incidence of successful VBAC was significantly higher (86%) in spontaneous group as compared to induction group (66%) with a p value of <0.001.[7] A study by AL-Shaikh and AL-Mandeel is also consistent with our results. In this study the incidence of VBAC was significantly higher (72%) in spontaneous group when compared to induction group (63.5%) with a p value of 0.026.[8] Similar results were found in the study by Shatz et al where women in spontaneous labour had a higher VBAC rate in rate (73%) than those who had induced labour (67.4%).[9] Our caesarean rate resembles that of Delaney and Young, who reported a caesarean rate of 37.5% in induction group and 24.2% in spontaneous group with p value <0.001.[10]

The percentage of women who delivered vaginally in study group was 60% and it was comparable to study by Stock et al in which percentage of vaginal delivery was 61.83%.[11]

In present study 3 (4.28) cases of scar dehiscence were observed in study group and 5 cases in control group. Postpartum haemorrhage occurred in 3 (4.28) women in study group and 2 (2.85) women in control group. All these cases of postpartum haemorrhage were managed medically and none of them required ICU care. Similarly, in a study by Stock et al there was no significant increase in rates of uterine rupture in association with induction of labor in women with previous caesarean section.[11]

In this study, 7.14% and 5.71% newborn had 1 minute Apgar score, <7 in study group and control group respectively and the difference is not statistically significant. Our data corroborates with the study conducted by Palatnik et al their study indicated that overall neonatal outcome did not differ significantly among induction of labor and expectant management group.[12] Similarly in a study conducted by Sharma et al there was no significant difference in APGAR score in study group and control group. In this study all the neonates had APGAR between 6 to 8 in 1 and 5 minutes in each group.[6] In present study 7 (10%) neonates in study group and 16 (22.85) neonates in control group required NICU admission and this is statistically significant. 2.85% in each group had respiratory distress syndrome, 1.42% in each group had seizure 1.42% had neonatal sepsis in each group had neonatal sepsis. 1.42% and 2.85% respectively in each group had jaundice. The difference is not statistically significant. There was no neonatal mortality in our study, this was because all neonates were given immediate newborn care. Similarly, Palatnik et al showed in their study that, overall neonatal outcome at each gestational age (39-41) did not differ significantly among the comparison groups.[12]

Limitations

The study is limited by its small sample size (140 women), potentially reducing statistical power and generalizability. It lacks long-term follow-up on maternal and neonatal outcomes. Non-blinding may introduce selection bias. Single-center design limits applicability.

CONCLUSION

Induction of labour in women with previous caesarean section has always been a debatable issue. The present study concluded that percentage of vaginal deliveries in women with previous caesarean section were comparable in cases of induction and expectant management. Vaginal deliveries were more common in women who experienced spontaneous labor. The caesarean section rate was higher when labor was induced at 41 weeks compared to induction at 39 weeks. Fetal distress was the most frequent indication for caesarean delivery following induction at 41 weeks, whereas failed induction was the primary reason when labor was induced at 39 weeks. Induction at 39 weeks is associated with improved perinatal outcomes, including fewer cases of fetal distress and reduced need for neonatal intensive care. Elective induction at this stage (39 weeks) offers a balance between the benefits of a full-term pregnancy and the reduction of risks associated with prolonged gestation.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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