PERINATAL JOURNAL

Original Article

Perinatal Journal 2023;31(2):118-124

A comparative study for feto-maternal outcome of trial of labour after caesarean: spontaneous versus induction

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Abstract

Objective: The purpose of this study was to compare the foeto-maternal outcome of trial of labour after previous one lower segment caesarean section in spontaneous and induced labour and to ascertain the success rate of VBAC. (Vaginal birth after cesarean section)

Methods: It was a prospective study conducted from May2019-November2020.The pregnant women admitted in BPSGMC (BPS Government Medical College), labour ward who had previous one caesarean section undergoing trial of labour after either spontaneous onset or induction of labour, were included in the study

Results: Total patients were 130, [65 each, in group I(spontaneous) and group II (induced)]. Successful TOLAC (Trial of labour after cesarean section) happened in 80% in spontaneous labour (gp I) patients and 66.2 % women in induced patients (group II), (p value-0.075). There was no significant difference in age, parity and gestational age (p value >0.05), APGAR score and NICU (Neonatal intensive care unit) admissions in both spontaneous labour(gp I) and induced patients (gp II). There incidence of fetal distress was not statistically significant in spontaneous (group I) and induced patients (group II), (p value-0.744). Indication of primary LSCS (Lower segment cesarean section) showed no significant effect on outcome of TOLAC in spontaneous and induced group patients. History of prior vaginal delivery had more chances of VBAC. Hospital stay and PPH was more in induced patients(group II). The dfference of scar dehiscence in group I(spontaneous) and II (induced) were not statistically significant (p value=0.721). There were no cases of scar rupture in both the groups.

Conclusion: Induction of labour and spontaneous labour both have almost similar VBAC success rates. Also with fewer scar dehiscence and no rupture, IOL (Induction of labour) is a good option in previous one cesarean patients.

Keywords: Trial of labour after cesarean section, vaginal birth after cesarean, labour, induced labour

Introduction

Caesarean section (CS) is one of the known lifesaving procedures, but increasing rate of CS is an alarming situation. This has led to an increase in number of pregnant women with previous uterine scar. Data from 121 countries revealed an average worldwide rate of caesarean section had increased almost threefold (from 6.7% to 19.1%) between 1990 and 2014. As per the latest Indian data (National Family Health Survey 2015-2016, NFHS-4) the caesarean rate at the population level seems to rise to 17.2% as compared with NFHS-1 (1992-93) when it was 2.9%.[1,2] Women who had delivered their first baby by caesarean section have two delivery options: Trial of Labour After Caesarean (TOLAC) or Elective Repeat Caesarean Section (ERCS). A trial of labour is a planned attempt to birth vaginally in a woman with previous caesarean section and has been accepted to lower the overall rate of caesarean sections. A systematic review found that the number of surgical injuries, rate of blood transfusions, and adhesion formation, number of hysterectomies all increased with the growing number of caesarean sections. Nonetheless, several other researchers have also found that multiple repeat caesarean sections can lead to increased risk of maternal morbidity and mortality especially because of abnormal placenta adherence and caesarean hysterectomy and these risks increase with each subsequent caesarean section.[3] Vaginal delivery is associated with fewer risks, requires minimal or no anaesthesia, po-

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How to cite this article: Singh A, Mahendru R, Khandelwal S, Sangwan V, Lakra P, Upadhyay M. A comparative study for feto-maternal outcome of trial of labour after caesarean: spontaneous versus induction. Perinatal Journal 2023;31(2):118-124 DOI: 10.59215/prn.23.0312007

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ses a lower potential for postpartum morbidity, involves a shorter duration of hospital stay, is more affordable. These advantages are significant, especially in our poor resource setting where socio-cultural aversion to Cesarean delivery is also common. So, obstetricians should always offer TOLAC and discuss the benefits and risks of TOLAC with these patients. Studies have indicated that success rate of planned TOLAC is 72-75%.

We can't deny the truth that spontaneous labour is more successful than induced labour in TOLAC. As suggested by many studies, induction is a better option when indicated as it gives good results when done under strict vigilance. Several studies did not find any significant association between induction and poor materno-foetal outcome.In present study we did not keep cesarean section as first option for previous cesarean. We gave them option of TOLAC, thus decreasing the morbidity associated with cesarean. So, the present study was done to compare the success rate of TOLAC in spontaneous versus induced labour in women who have had previous one lower segment caesarean section.

Methods

IIt was a prospective study conducted at a rural tertiary care center over duration of 18 months. The study sample consisted of a total of 130 patients admitted in labour room with previous one CS fulfilling following inclusion criteria. The patients with spontaneous labour were kept in group I and patients with induced labour were kept in group II. Inclusion criteria-All the females of 18-35 years with singleton pregnancy, cephalic presentation, term gestation (37 weeks to 42 weeks), one prior lower segment transverse caesarean section with non-recurrent indication, post caesarean interval 918 months, without any obstetric or medical problem were included in the study.

Using n Master 2.0 software taking proportion in group I = 66.6% & group II = 50% at 95% confidence interval the required sample size was 65 in each group i.e., the total number of patients were 130. Cases who fulfilled the inclusion criteria were enrolled for the study. At the time of the recruitment, the patients, who were subjected to study, were counselled regarding all the risks and benefits pertaining to TOLAC and, the success rate. The procedure was explained to all the cases individually and a written informed consent was taken from each. All the patients were subjected to detailed history taking, a complete physical examination and investigations. The condition of fetus was assessed by clinical assessment of growth,amniotic fluid volume and fetal movements count. Admission Non-Stress Test (NST) was performed. Then, the women were monitored closely for vital signs, uterine activity, foetal heart rate (FHR).

In the first stage of labour, temperature, pulse rate and blood pressure were evaluated every 4 hourly. In active phase of labour, progress of labour was monitored by WHO partograph. In 2nd stage of labour, patients vitals were taken every 15 minutes. Fetal heart rate was monitored every 30 minutes in 1st stage. In 2nd stage of labour continuouos fetal monitoring was done by CTG. Per vaginum examination was done every 4 hourly or earlier, if indicated. Group I: Included 65 patients who were admitted with spontaneous onset of labour. Group II: Included 65 patients who underwent induction of labour. In the group II, induction of labour was done only after completion of 39 weeks of gestation,[5] using PGE2 (Dinoprostone) gel as per indication. The 2nd PGE2 gel was repeated after 6 hours, whenever needed. If the patient did not enter into the active phase after 2nd dose of cervigel, then patient was monitored for next 24 hours. After 24 hours if there was no progress of labour, it was considered as failure of induction and the patient was taken up for cesarean scetion. In active phase of labour, augmentation was done, if required in both the groups, by artificai rupture of membrane and or oxytocin. Patients were examined for signs of scar dehiscence such as tachycardia, acute abdominal pain, abdominal tenderness in suprapubic area (in post contraction phase), fetal heart rate alteration, palpation of fetal parts outside the uterus, vaginal bleeding and loss of station. Patients who had any signs of scar dehiscence were immediately taken up for Caesarean section with provisional diagnosis of an impending scar rupture. In postpartum period patients were strictly monitored for vitals and bleeding per vaginum. To measure blood loss during delivery, dry weight (grams) of a sanitary pad was taken and then wet pad was weighed (grams). Difference of weight was converted in milliliter using simple formula 1gram=1millilitre.

Both maternal and perinatal outcome measures were considered i.e., mode of delivery, indication of caesarean section, scar dehiscence and scar rupture, PPH, birth weight, NICU admission within 24 hours, Apgar score at the 1st and 5th minutes after birth, post- partum hemorrhage and duration of hospital stay. Statistical analysis was performed by the SPSS program for Windows, version 17.0 (SPSS, Chicago, Illinois). Kolmogro smirnow test was applied to check normality of the data. Data was normally distributed. We also applied the chi square test to find out the association between categorical data. Continuous variables were presented as mean±SD and were analyzed by

Student's t test, and categorical variables were presented as absolute numbers and percentage. For all statistical tests, a p-value less than 0.05 was taken to indicate a significant difference. This study was approved by ethical committee of the institute (Registration number BPSGMCW/RC 418/IEC /19).

Results

Total 130 patients fulfilling the inclusion criteria were included in the study. Table-1 summarizes the maternal characteristics. There was no significant difference in age, period of gestation (POG) and parity in group I and II. Number of cases with parity 1 was 63.1 % in group I and 73.8% in group II. Success rate of TOLAC was higher with higher parity in both the groups. History of vaginal delivery before and after cesarean had more success in spontaneous group. Indication of primary caesarean section was not related to outcome of TOLAC. Fetal distress and malpresentation were most common indication for primary caesarean section in group I, whereas in group II it was fetal distress followed by NPOL. Incidence of CS due to fetal distress was not statistically significant among the groups (p values= 0.744). Modified Bishop Score at the time of recruitment was higher in group I (p values=<0.01). VBAC rate was higher with score >6, so it was a key factor in the success of TOLAC.

Table 1. Maternal Characteristics

	Group I	Group II	p value
Age (Mean ± S.D.)	28.02 ± 2.64	27.62 ± 3.18	0.441
Period of gestation (Mean ± S.D.)	39.52 ± 1.39	40.21 ± 1.81	0.116
Parity (Mean ± S.D.)	1.5 ± 0.77	1.34 ± 0.69	0.320
Modified Bishops score at time of recruitment (Mean ± S.D.)	5.34 ± 1.82	3.23 ± 0.93	< 0.01
Previous vaginal delivery before cesarean	24.61 %	7.69%	0.009
Previous vaginal delivery after cesarean	16.92 %	4.61%	0.024
Indication of CS for primary cesarean			
Fetal distress	40 %	44.6 %	0.663
Malpresentation	29.2 %	18.5 %	0.095
Non progress of labour	23.1 %	26.2 %	0.743
Others	7.7 %	10.7 %	-

Others-Oligohydramnios, Abruptio placenta, Cord prolapse, Multiple pregnancy

Table-2 comprises the maternal outcomes. Rate of VBAC success was more (80 %) in group I than (66.2 %) group II (p values=0.075), but the rate was not statistically significant. The most common indication for induction was postdatism (66.15%) followed by pregnancy induced hypertension. Incidences of fetal distress, NPOL, and impending scar rupture were similar in both the groups and the difference was not statistically significant. Cases taken for emergency caesarean section with indication of impending scar rupture were 3.1% in group I and 4.6% in group II (p values=0.721). All these patients had operative finding of scar dehiscence. Incidence of atonic PPH and hospital stay was significantly higher in group II as compared to group I (p values <0.001).

Table 2. Maternal Outcomes

		Group I (%)	Group II (%)	p value
Outcome of TOLAC	**Successful VBAC**	80	66.2	0.075
	Emergency CS	20	33.8	
Indication of CS	**Fetal distress**	9.2	6.2	0.744
	Failed Induction of labour	0	10.8	0.013
	Impending scar rupture	3.1	4.6	1.000
	Non progress of labour	3.1	9.2	0.274
	Others	4.5	4.6	-
Per op	**Scar dehiscence**	3.1	4.6	0.721
	Scar rupture	0	0	0
PPH		12.3	16.9	<0.001
Hospital stay	**Vaginal**	2.06±0.461	2.76±0.692	<0.001
(Mean± S.D.)	**CS**	4.38±0.87	5.3±0.559	<0.001

TOLAC= trial of labour after cesarean,VBAC=vaginal birth after cesarean,CS=cesarean section

Table-3 compares the neonatal outcome. There was no statistically significant difference between Apgar score at 1 min and 5 min (p value=0.483 and 0.785 respectively) of either of the groups. There was no statistically significant difference between incidence of NICU admission in either of the groups (p value=0.545). In our study, success rate of TOLAC was higher when birth weight was below 3000 grams in both the groups.

Table 3. Comparison Of Outcome Of Tolac According To Neonatal Outcome

Apgar Score	Group I	Group II	p Value
1 Minute	6.98 ± 0.78	7.08 ± 0.71	0.483
5 Minute	8.49 ± 0.69	8.52 ± 0.59	0.785
Nicu Admission Duration			
None	92.3 %	89.2 %	0.545
Total	7.7 %	10.8 %	0.545
Day 1	1.5 %	3.1 %	1.000
Day 2	3.1 %	3.1 %	1.000
Day 3	3.1 %	4.6 %	1.000

Discussion

The success rate of TOLAC ranges from 50% to 85%. [6] ACOG 2010 quoted success rate of TOLAC to be 60-80%. [13] Several studies show that success of TOLAC in spontaneous and induced labour vary from 52.1 % to 86.82 % and 50% to 71.4 % respectively. [7, 8, 27, 33, 36] Overall success rate in our study was 73.1%. In group I, 80% cases had successful VBAC and in group II, 66.2% cases had successful VBAC. Success rate of TOLAC also varies between institution and service provider. Mishra et al.[7] reported a success rate of 52.17% which is much lower than our study. The present study observed that chances of successful TOLAC resulting in vaginal birth are higher in women who had spontaneous onset of labour compared to those in whom labour was induced.[18, 19, 20, 21] observed that women who presented in spontaneous labour and had less oxytocin use were more likely to deliver vaginally (69% to 83%).

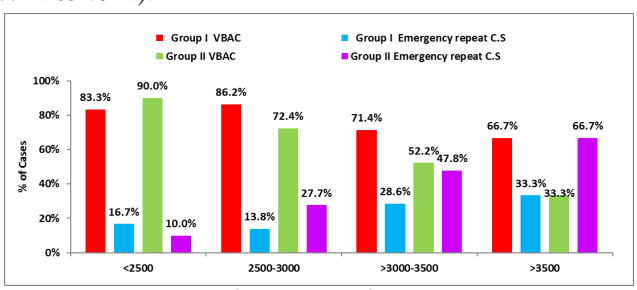

Fig. 1. Comparison Of Outcome Of Tolac According To Birth Weight

According to literature maternal age, parity, gestational age and birthweight are some of the key factors for evaluating the success of TOLAC. In present study it was observed that mean gestational age in group I was 39.52± 1.39 and in group II was 40.21±1.81. Success rate of TOLAC was not significantly associated with period of gestation in both the groups, as supported by Birara et al.[39] But Zelop et al. [12] demonstrated that gestational age >40 weeks was significantly associated with a decreased likelihood of VBAC for both spontaneous and induced labour. Raja et al. [40] found that gestational age was an important individual factor affecting mode of delivery after induction. In present study the mean parity was 1.5±0.77 in group I and 1.34±0.66 in group II. It was observed that success rate of TOLAC increased with increasing parity, similar to studies by Balchandran et al.,[8] while Birara et al. [39] observed that parity is not significantly associated with success of VBAC. Doshi et al. [11] and others reported that maternal age > 35 years and birth weight >3.5 kg were related with decreased rate of successful TOLAC. In this study mean age was 27.62 ± 3.18, which is less than western countries, but similar to studies done by Asian continent.[8, 26] This may be due to racial, nutritional and monetary factors. It was observed that success rate of TOLAC increased with increasing parity, as supported by others.[8] It was observed that success rate of TOLAC decreased with increasing birth weight as observed in these studies.[12, 13, 14]

We found that in group I, 24.6% patients had history of vaginal delivery before caesarean section and all of them had successful VBAC while 16.9% patients had history of vaginal delivery after caesarean and 90.9% had successful VBAC in present pregnancy. In group II, 7.7% patients had history of vaginal delivery before primary caesarean section and 80% of these patients had successful outcome of trial of labour while 4.6% had history of vaginal delivery after caesarean section and all these patients had successful VBAC. There is consistent evidence to show that a prior vaginal delivery and, particularly, a prior VBAC is associated with a higher rate of successful TOLAC compared with no prior vaginal delivery.[12,15,17,18,19,20] According to the RCOG guidelines, past history of VBAC is associated with a planned VBAC success rate of 85–90% [16] and is also associated with a reduced risk of uterine rupture. History of vaginal delivery is the most favorable factor for VBAC. However the proportion of women who had history of vaginal delivery was significantly higher in group I as compared to group II (41.5 % vs 12.3 %).It was found that most common indications for primary caesarean section were foetal distress and malpresentation in present study. Foetal distress was indication in 40% cases in group I and 49.2% in group II out of which 77.0 % in group I and 68.8% in group II had successful VBAC in present pregnancy. There was no significant difference in outcome of trial of labour based on indication of primary caesarean in both the groups, which is in accordance with Tater et al.[21] Landon et al. [22] found a history of CPD as indication of LSCS in previous pregnancy to significantly reduce the chance of vaginal delivery as compared to others as malpresentation

and fetal distress.

In group II all the patients had Modified Bishop's Score 44 but in group I, success rate of TOLAC was higher when Modified Bishop's Score >6. Similarly,Macones et al., Sahu et al.[23, 24] (p value = < 0.001) and Al Qahtani et al.[25] also found that Bishop's score was significantly associated with success of TOLAC. So, cervical dilatation is the most important factor for predicting the success of TOLAC. The patients in group II had poor Bishop's Score, which was converted into favorable score using PGE2 gel. It resulted in comparable outcome of successful VBAC with spontaneous group.

The correlation of doses of gel and VBAC success is shown in Table 4. The success of VBAC was more than 60% in this study by using 2 doses of PGE2 gel, which is comparable to other studies [36,37] done by 3 doses of PGE2 gel. But there is need of more studies to decide the number and dose of gel for successful VBAC. Other methods of induction as Foley's and mifepristone should also be studied.

Table 4 . Correlations Of Pge2 Gel And Vbac Success

Study	Maximum No. Of Pge2 Gel Used	VBAC Success In Spontaneous (%)	VBAC Success In Induced (%)
Puliyath G [51]	3	79	65.21
Rashmi S Singh et al. [52]	1	73.68	
Vijayata et al. [50]	3	86.82	64.34

According to RCOG (level B evidence), planned VBAC is associated with 1 in 200 (0.5%) risk of uterine rupture. In contrast, scar dehiscence is more common than uterine rupture, and seldom results in maternofetal complications. According to ACOG guidelines, although induction by PGE2 gel has higher rate of uterine rupture in TOLAC but it can be an option for delivery in previous cesarean.[13] A meta-analysis done in 2015 reported that incidence of scar dehiscence was 1.9%.[4] In the present study, it was (2 cases) 3.1 % in the induced group and (3 cases) 4.6 % in the spontaneous group, but the difference was not statistically significant (p value=0.721) similar to the result of other studies.[20, 26, 27, 28, 29, 30] All cases of IOL in previous one CS must be strictly monitored in a center with facility of cesarean section.Maternal complication such as PPH (postpartum hemorrhage) was significantly higher (p-value <0.001) in induced group, as also seen in the study done by Delaney T et al., [31] but it was not significant in study done by Puliyath G et al. [37] In this study in group II, 11 patients had PPH, out of them 4 patients were multipara and 3 were grand multipara. Patients who were induced and had emergency CS were in second stage, thus had more PPH. Only 1 case with scar dehiscence had atonic PPH. Hence multiparity and second stage cesarean might be the confounding factors for PPH in this case.

Most of the large studies in literature on VBAC trial have shown a higher incidence of maternal and perinatal morbidity associated with TOLAC and failed trial.[23, 24, 34] In present study incidence of CS due to fetal distress was not statistically significant among the groups (p value=0.774) i.e., induction doesn't increase the fetal distress rate. In this study, there was no significant difference in Apgar score at 1 minute and 5 minute in both the groups (p value 0.483 and 0.785 respectively). So, NICU admissions can't be attributed to IOL either. The findings correlate well with Durnwald CP et al.,[32] but Pradhan K et al. [29] differ in their results (5.84% Vs 6.25%). Total NICU admissions were 10.8 % in our study. Out of this only one admission had scar dehiscence; others were due to fetal distress, DTA (deep transverse arrest), second stage arrest and others. So, IOL can't be blamed as only cause of neonatal morbidity in this study. Group I patients were already in active labour. Duration of hospital stay in patients was higher in group II, as they had to wait for 24-48 hours for Bishop's improvement by induction (p-value <0.001). Difference in duration of hospital stay was 48 hours, in group I and II (p value=<0.001), like the studies done by Mishra et al. [7] and Murphy et al.[35]

More and more studies of IOL in previous 1 CS patients are needed to build up the evidence in favor of IOL, so that fear among care givers in management of induced patients can be reduced. Our study has a limitation which the sample size in this study appears to be small to generalize the results.

Conclusion

Although IOL in previous 1 CS using PGE2 gel is not free of risks, but it reduces the complications associated with repeat CS. The results of the present study are quite promising and favour TOLAC and IOL in previous 1 CS, since both the study groups had similar VBAC rates with fewer cases of scar dehiscence and fewer NICU admissions, especially in countries like India which has higher parity and limited resources. Hence, IOL can be tried in patients of previous 1 CS who don't have spontaneous onset of labour or have other indications of IOL.

Conflicts of Interest: No conflicts declared.

Abbreviations	Full Forms
VBAC	Vaginal birth after cesarean section
BPSGMC	BPS Government medical College
TOLAC	Trial of labour after cesarean section
NICU	Neonatal intensive care unit
LSCS	Lower segment cesarean section
PPH	Postpartum hemorrhage
IOL	Induction of labour
CS	Cesarean section
NFHS	National Family Health Survey
ERCS	Elective repeat cesarean section
FHR	Fetal heart rate
WHO	World Health Organisation
PGE2	Prostaglandin E2
POG	Period of gestation
NPOL	Non progress of labour

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