Assessment of outcome of Trial of Labour after caesarean in a tertiary hospital based setting : Prospective Observational Study

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Abstract

Objective: To determine the success rate of vaginal birth after caesarean (VBAC) in Indian women, identify the factors that predict its success, and assess the maternal and neonatal outcomes following a trial of labour after caesarean (TOLAC). Design: Prospective observational study Setting: Department of Obstetrics and Gynaecology, Post Graduate Institute of Medical Education and Research, Chandigarh, India Sample: 124 women with previous LSCS who opted for TOLAC Methods: A prospective observational study involving women with one previous lower segment caesarean section (LSCS) who were admitted for TOLAC between January 2019 and June 2020. Main outcome measures and Results: During the study period, 124 women with previous LSCS who opted for TOLAC were included, of whom 68 (54.8%) had successful VBAC and 56 (45.2%) had failed TOLAC. The induction of labour (IOL) rate in the study was 69.4%, and 30.6% of women had spontaneous onset of labor. VBAC rates were significantly higher in women who went into labour spontaneously (84.2% vs. 15.8%). Maternal complication rates were comparable, whereas the neonatal complication rate was significantly higher in neonates born by CS (51.7% vs. 30.8%), with a greater incidence of low birthweight (LBW) and transient tachypnea in the newborn (TTNB). Conclusions: TOLAC can be considered a safe option for women with a previous caesarean when combined with vigilant and stringent labour monitoring, despite the use of IOL agents. Funding : Not applicable.

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Funding : Not applicable.

Keywords

Vaginal birth after caesarean section, Trial of labour after caesarean section, Induction of labour

Introduction

Due to the rampantly rising caesarean section rates worldwide, a large number of women have a scarred uterus which makes the choice of mode of delivery in subsequent pregnancies very difficult and challenging for them owing to the numerous risks associated with both CS and TOLAC following a previous caesarean section.[1]

Although TOLAC is urged as a reasonable option for these women, its rates largely vary amongst various countries and institutions owing to the diverse population demographics and prevailing hospital protocols.[2] The proportion of women undergoing TOLAC has been on the decline, fuelled by reports of negative outcomes like ruptured uteruses and hypoxic ischemic encephalopathy in the neonate[3], and additionally due to the rigorous international criteria pertaining to the needed hospital facilities for pursuing a TOLAC.[4] The data from previous studies shows 60–80% TOLAC culminating in a successful vaginal birth.[5,6]

Ethnicity, age, BMI of the mother, history of a vaginal birth, birthweight of the previous baby, indication of previous caesarean, preeclampsia, the bishop's score at admission, and the need for labour induction are among the many studied factors that aid in the success prediction of TOLAC. [7]

One-fourth of the women undergoing TOLAC need IOL.[8]When labour onset is spontaneous, proceeding with TOLAC is easier than in induced labor, as the risk of uterine rupture is high when prostaglandins and oxytocin are used. [1] However, Foley's catheter, being a mechanical method of cervical ripening, and the IOL do not bear this disadvantage.

The purpose of this study was to determine the VBAC success rate and the factors that influence it in an Indian cohort while simultaneously assessing maternal and neonatal outcomes following TOLAC. There have been very few studies on the success of IOL in Indian women following caesarean section. In our study, the success rate of IOL in TOLAC was also evaluated.

Materials and methods

Women with previous caesarean deliveries visiting the hospital during their antenatal period were screened in their third trimester, and a well-informed consent was taken from those who fulfilled the inclusion criteria of the study. A detailed history was taken, and maternal characteristics (age, parity**,**BMI**,** any prior

vaginal delivery or prior VBAC**,** indication of the previous CS, birth weight of the previous babies, and inter-delivery interval) were noted. Previous operative records were checked for the type of caesarean, gestational age, place of previous CS, type of closure, and for any related intraoperative or postoperative complications. On admission of the woman for delivery, the estimated gestational age, presence or absence of preeclampsia (PE), and gestational diabetes mellitus (GDM) were checked and recorded. Cervical examination findings were noted, and a decision for or against the need for an IOL was made. Women who needed IOL, were induced by intracervical insertion of an 18F Foley's catheter under all aseptic precautions with the use of well-prepared and autoclaved Foley's insertion sets. Women with a higher Bishop's score were induced with oxytocin alone.

Maternal outcomes were assessed in the form of VBAC rate, CS rate, indication of repeat CS, methods of IOL used, rate of change of Bishop's score at the end of cervical ripening, IDI (induction-delivery interval), reasons for TOLAC failure, rate of scar dehiscence or rupture, PPH (postpartum haemorrhage), need for blood transfusion, and any other maternal morbidity. Neonatal outcomes were assessed in the form of birthweight, 1 minute and 5 minute APGAR scores, the requirement of ventilation, admission to the NICU, or any other neonatal morbidity (minor or major) during the hospital stay. Enrolment and analysis of the study is explained in figure 1.

Statistical Analysis

The mean values were compared for continuous variables using the Student t test or Anova, and the Chi square or Fisher exact test was used for categorical variables. Data were analysed using the Statistical Package for the Social Sciences (SPSS), version 20.

Results

The study enrolled 124 women (figure 1) who met inclusion criteria and underwent TOLAC, of whom 54.8% had VBAC and 45.2% had repeat CS. The IOL rate in the study was 69.4%, with only 30.6% of women experiencing spontaneous labor.

The baseline characteristics of the VBAC and CS groups are summarised in Table 1. There was no significant difference between the mean age, gravidity, mean gestational age at delivery, and EFW among women who had VBAC and CS following TOL. The mean height, weight, and BMI were also similar and did not affect TOLAC success. Foetal distress (25.8%) was the most common indication of previous CS in the enrolled women. Indication of the previous CS, inter-delivery interval, birthweight of the previous child, or history of prior VBAC or vaginal delivery did not influence the TOLAC outcome in our study.

When compared to women who had IOL, the VBAC rate was significantly higher in women who had spontaneous onset labour (84.2% vs. 52%). Women who had successful VBAC had significantly higher mean cervical dilatation (2.21 cm vs. 1.53 cm), mean cervical effacement (29.4% vs. 20.3%), and mean Bishop's score at admission (5.12 vs. 3.66) than those who had repeat CS.

Most of the women were induced between 37 and 38 weeks. Preeclampsia (16.9%), IUGR (14.9%), and ICP (12.9%) were the leading indications of IOL. Only for ICP, the VBAC rate was much lower than the CS rate (18.7% vs. 81.3%).

IOL was done in 35.5% of women using Foley's catheter plus oxytocin and in 33.9% of women using oxytocin alone. VBAC and CS rates were similar (50% each) in the oxytocin group, but the CS rate was significantly higher (65.9% vs. 34.1%) in the Foley plus oxytocin group.

The mean induction-delivery interval (IDI) for women who were induced with two IOL agents was significantly longer than that for those who were induced with a single IOL agent (17.46 vs. 8.7 hours) (p 0.001). Table 1 summarises the IOL-related findings in both groups.

The rate of operative vaginal delivery in the present study was 8.1%. The majority of the women (21.8%) had an emergency repeat CS due to pathological Cardiotocography (CTG). Figure 2 depicts the various indications for repeat CS in our study and the intraoperative findings observed. Out of the six caesareans

done for suspicion of scar dehiscence, scar dehiscence was present in only one case intraoperatively (16.6%). None of the women had a uterine rupture. The rate of scar dehiscence was 4% (5 out of 124).

Complications occurred in approximately 27.4% of women, with rates similar in the VBAC and CS groups, with 8% having atonic PPH, 5.6% receiving blood transfusions, and 4% having a cervical tear. The mean birthweight was similar in neonates born to women who had VBAC and CS (2.78 vs. 2.66 kg). Around 24.1% of neonates were LBW. A significantly higher number of LBW neonates were born by CS (63.4%) compared to VBAC (36.6%). The complication rate was significantly higher in neonates born by CS (51.7% vs. 30.8%) with higher incidences of LBW and TTNB. The majority of the neonates in the study did not have birth asphyxia, nor did they require mechanical ventilation or NICU transfer. Only one neonatal death was reported in the study.

The contraception acceptance rate was 29.8% in our study, and it was significantly higher in women who had CS compared to those who had VBAC (41% vs. 20.5%). Table 2 and 3 summarises the maternal and neonatal complications observed during the study.

Discussion

The goal of managing an antenatal woman with a scarred uterus is to provide the woman a well informed choice along with efficient and robust statistical data of the estimated risks associated with TOLAC and CS and also to make an individualised prediction of her estimated likelihood to have a successful VBAC if she wishes to opt for TOLAC. The most common indication of previous CS in the study population was foetal distress (25.8%) and the VBAC and CS rates were found to be similar for all indications of previous CS, comparable to study of Jozwiak et al[9] where 30% population had previous CS done for foetal distress and the indication of previous CS did not affect the outcome of TOLAC.

The maximum inter-delivery interval observed in this study was 11 years and the minimum was 1.5 years (mean 4.63 years). Inter-delivery interval did not influence the outcome of TOLAC in the present study which was in sync with the results published by Sinha et al[10], Patel et al[11] and Gobillot et al[12].

More women had VBAC compared to CS in the spontaneous labour group (84.2% vs 15.8%) whereas lesser women had VBAC compared to CS in the induced labour group (42% vs 58%). Sinha et al[10]demonstrated a similar CS rate of 48% in the induced group compared to the present study.

Mean cervical dilatation at admission was 1.9 cm and the mean cervical effacement at admission was 25.4%. The values of both were significantly higher in women who had VBAC (p=0.001). This was similar to the study by Landon et al[1] where mean dilatation at admission was 3.3 cm which was significantly higher in VBAC group than CS group and patients who had dilatation >4 cm had 83.8% VBAC success.

The mean Bishop's score at admission was 4.46 for the study population, 100% VBAC success was observed for patients with Bishop's score >6 and patients with Bishop's between 0-3 had only 39.5% VBAC rate. None of the previously done studies on outcomes following TOLAC assessed cervical effacement, station of vertex and Bishop's score at admission as potential influencing variables for TOLAC success.

VBAC success rate of 42% was observed in induced women in the present study which was comparable to the results of Atia et al (39.8%)[2]

Out of the 69.3% induced women, most were induced for Preeclampsia (16.9%) followed by IUGR (14.9%) and ICP (12.9%). VBAC and CS rates were similar for all other indications except, ICP in which a significantly higher CS rate of 81.2% was observed as most of these women developed foetal distress or MSL intrapartum. Contrary to our study, maximum proportion of women had IOL for post-dated pregnancy in all other studies.[2,3,12]

The present study had caesarean section rate of 45.2% which was similar to the studies by Jozwiak et al[9] and Goel et al[13] but higher than that observed in the studies by Landon et al, Sinha et al and Patel et al.[1,10,11]Pathological CTG (21.8%) was the leading indication of CS in the present study which was in

unison with the result of studies by Gobillot et al[12] and Goel et al[13] where most of the caesareans during TOLAC were done for foetal distress.

In the present study, the mean birthweight of the neonates born was 2.3 kg and it was similar among the VBAC and CS groups (2.78 vs 2.66 kg). Mean birthweight of the neonates had no influence on the outcome of TOLAC in our study and this was consistent with the results published by Atia et al and Patel et al.[2,11]

The mean Apgar scores at 1 min (7.79 vs 7.73) and 5 min (8.84 vs 8.79) were similar in neonates born by VBAC and CS in the present study which was consistent with the results of studies done by Atia et al and Shatz et al.[2,3]

In the present study, higher rate of neonatal complications were observed in the women who had failed TOLAC and underwent emergency repeat CS compared to those who had successful VBAC. Patel et al also observed similar results in their study cohort. [11]

Only one neonatal death occurred during the study which was consistent with the low rates of neonatal mortality as observed in the study by Jozwiak et al[9] (only 2 neonatal deaths).

Around 27.4% women in the study population had some complication (minor or major) during labour or in postpartum period. The complication rate was comparable among women who had VBAC and CS (29.4% vs 25%) in the present study. Patel et al and Gobillot et al also observed no significant difference in the complication rates among women who had VBAC and CS following TOLAC.[11,12] Contrary to this, Shatz et al and observed increased rates of infection, PPH and blood transfusion in women who had failed TOLAC.[3]

No case of uterine rupture was observed in the study population despite a high IOL rate of 69.3%, however 5 out of 124 women did develop scar dehiscence. The most frequently occurring complication in the study cohort was PPH (8%) similar to the 12% rate of PPH observed by Jozwiak et al.[9] The rate of occurrence of PPH was similar in VBAC and CS. Only one woman had massive PPH for which Bakri balloon was inserted and 5.6% women in the study cohort received blood transfusion. Around 4% women had cervical tear which is attributable to the 8% rate of forceps delivery in the study population. Only one woman developed vulvovaginal hematoma and one developed third degree perineal tear, consistent with the observations of Patel et al.[11]

Out of 124 women undergoing TOLAC, 37 (29.8%) accepted contraception. Around 12.9% women chose tubal ligation, 13.7% chose CuT 380 and 3.2% chose CuT 375 as the preferred contraceptive method. Contraception rate was significantly higher in women undergoing CS than in women who had VBAC (41% vs 20.5%) which reflects the likely ease of getting ligation done during the surgical procedure of CS itself. None of the previously published studies have evaluated the contraceptive choice of women following TOLAC.

Conclusion

Mode of labour onset, cervical dilatation, station of the vertex, and Bishop's score at admission significantly influenced the TOLAC outcome in the study population. TOLAC can be considered a safe option for women with a previous caesarean when combined with vigilant and stringent labour monitoring, despite the use of IOL agents. These results can help obstetricians make better decisions regarding the mode of delivery in women with previous caesareans, keeping in mind the demographics of Indian women. None of the previously done studies on outcomes following TOLAC assessed cervical effacement, station of vertex and Bishop's score at admission as potential influencing variables for TOLAC success.

Author contribution

Mahak Bhardwaj: Design, planning, conduct, data analysis, and manuscript writing.

Shalini Gainder: Design, planning and manuscript review.

Seema Chopra and Rashmi Bagga :Planning and manuscript review.

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Conflict of interest

Authors declare that they have no conflict of interest.

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