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Original Research Article

A retrospective analysis of vaginal birth after caesarian-predictors of success and its outcomes

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ABSTRACT

Background: A repeat caesarian delivery (C-section) after a previous C-section increases maternal and foetal complication and poses an enormous burden on the economy of nations and individuals. The success of vaginal birth after C-section (VBAC) is affected by various antepartum, intrapartum factors as well as the difference in the obstetric population. This study aims to analyse the maternal and neonatal outcomes and factors associated with successful VBAC.
Methods: The study is a retrospective analysis of 12 months hospital data conducted at BloomLife hospital, a private multispeciality hospital at Chennai during September 2022 to September 2023. The inclusion criteria were pregnant women with gestational age of 37±40 weeks who had intention for vaginal delivery, previous non recurrent indicating pregnancy, inter-delivery interval of at least 2 years, cephalic presentation, low risk pregnancies. High risk maternal and fetal factors were excluded from the study.
Results: Among 204 women who had previous history of LSCS, 124 women were offered a trial of labour after caesarean (TOLAC) among which 56 (45%) of them successfully delivered through VBAC. Out of 124 women, 44 women out of 124, had opted for holistic approach during antenatal and intrapartum period among which n=27 (67.5%), had a statistically significant successful VBAC (Chi-square statistic is 6.25 p=0.012, significant at p<0.05). The most common reason for repeat C-section after TOLAC were labor dysfunction and fetal distress (n=2, 3.5%). Incidence of maternal complications in the study was atonic postpartum hemorrhage (n=7, 12.5%) that was well managed medically. All the babies had an Apgar >7 at 5 minutes. There was no maternal or neonatal mortality.
Conclusions: Statistically significant rate of success was found in women who went into spontaneous labor and had antenatal and intrapartum holistic interventions. The study results demonstrates that an integrated approach with qualified birth support team will improve the success rate as well as reduce the maternal and fetal morbidity.

Keywords: VBAC, TOLAC, Holistic birth, Caesarean indications, Post natal complications, Fetal outcomes

INTRODUCTION

Vaginal birth after cesarean section (VBAC) describes a vaginal delivery in a women who has given birth via cesarean section in a previous pregnancy.The repeat C-section after a previous C-section has increased risk of maternal complication and poses an enormous burden on the economy of nations and individuals.[1] Women with previous cesarean sections constitute a high risk group in obstetrics, with associated medical and legal implications.[2] International obstetric guidelines universally indicate that attempting VBAC is a safe and appropriate choice for most women.[3] When a woman had a previous caesarean birth, there are two options for her in a subsequent pregnancy-planned elective repeat caesarean or planned vaginal birth.[3]

Repeat CS also increases the risk of placenta accreta predisposing mother to life-threatening haemorrhage. Placenta accreta risk is 0.24%, 0.31% and 0.57% after frst, second and third caesarean section, respectively.[4] An increase in perinatal complications due to high operative interventions is a major national concern.[5] The success of vaginal birth after caesarean is affected by various antepartum, intrapartum factors as well as the difference in the obstetric population. Predicting success of VBAC after TOLAC is still a difficult task due to the lack of a validated prediction tool.[6] Studies on predictors of success are few and most of them conducted in developed countries are difficult to generalize.[7]

Therefore, in order to address this issue, a private multispeciality hospital at Chennai has taken efforts to provide an option of TOLAC for previous one LSCS women with no other maternal and fetal complications. The present retrospective study represents the 12 months data (September 2022-September 2023) to analyse the maternal outcome variables such as antenatal and intrapartum interventions, mode of delivery, intrapartum and postpartum complications and the neonatal outcomes such as Apgar score, fetal distress and other neonatal complications if any.

METHODS

Study design

Women who opted for trial of labour after C-section for VBAC during September 2022 September 2023 were included in this study and retrospective analysis was performed.

Study setting

BloomLife hospital is a multispeciality hospital with a high-risk obstetrics care centre with well-equipped surgical and neonatal intensive care units and resident doctors available 24/7. The setting has a well-trained birthing team and good infrastructure to provide quality care at international standards. All data were collected anonymously from records.

Selection criteria of study subjects

The inclusion criteria were pregnant women with gestational age of 37±40 weeks who had intention for vaginal delivery, Previous non recurrent indicating pregnancy, inter-delivery interval of at least 2 years, cephalic presentation, low risk pregnancies. High risk maternal and fetal factors will be excluded from the study. Maternal aspects of high risk factors include women with ≥2 previous caesarean sections, inter-pregnancy interval less than 2 years, previous classical caesarean section, multiple gestation, malpresentation, antepartum bleeding, oligohydroamniosis (AFI)<8 cm, those not willing for procedure, placental abnormalities, uterine malformations, pelvic malformations/CPD, preeclampsia. The fetal factors for exclusion were intra uterine growth restriction, preterm and previous history of birth asphyxia.

Study procedure

The present work is a retrospective study conducted at BloomLife hospital a tertiary hospital with a high-risk obstetrics care. The data were collected from September 2022 September 2023 (12-months period). The subjects with one previous LSCS were recruited for the study after careful consideration of the inclusion and exclusion criteria. The available hospital data on maternal age, gestational age, gravidity, parity, type of rupture of membrane (spontaneous vs. artificial) and mode of delivery (spontaneous vaginal delivery, vacuum, CS for failure to progress or fetal distress) were entered in excel sheet, coded as numerical values and tabulated in an excel file.

The labour induction was performed used foley catheter (mechanical), PGE2 gel (Prostaglandin) whenever required by the subjects. The bishop score was used to derive a decision for induction versus augmentation with oxytocin +/- artificial rupture of membranes (ARMs). Indications such as fetal distress or failure to progress defined the need for an emergency CS delivery.

Each participant's condition was evaluated individually to determine her eligibility for VBAC and a person-centered assessment of the suitability for success of VBAC was made for each patient based on the bishop score, indication for the previous CS, presence of medical problems, and fetal positions. The final plan of delivery was written in the medical record by the obstetrics team before the expected date of delivery. Our hospital approach is to offer VBAC to the majority of women with singleton cephalic presentation after 37 weeks' gestation

In this study, 204 women were booked in our hospital and they were counseled regarding mode of delivery. The 39% (n= 80 women) of these fitted into the exclusion criteria and were not included in the study. The remaining 60.7% (n=124 women) were provided with trial of laboure after cesarian (TOLAC) out of which 54% (68 subjects) went into repeat CS.

Among 124 TOLAC subjects, 35% (n=44 women) opted for antenatal or intrapartum holistic approach offered by naturopathic birth consultant team and 39% (n=80) did not opt for holistic approach (Figure 1 and 3).

In all cases (booked and unbooked), soon after admission, adequate detailed examination was carried out to assess condition of fetus, position and presentation of the fetus, cervical dilatation.

Admitted patients had continuous external electronic fetal monitoring once they are in active phase of labor. Intermittent monitoring was done in latent phase.

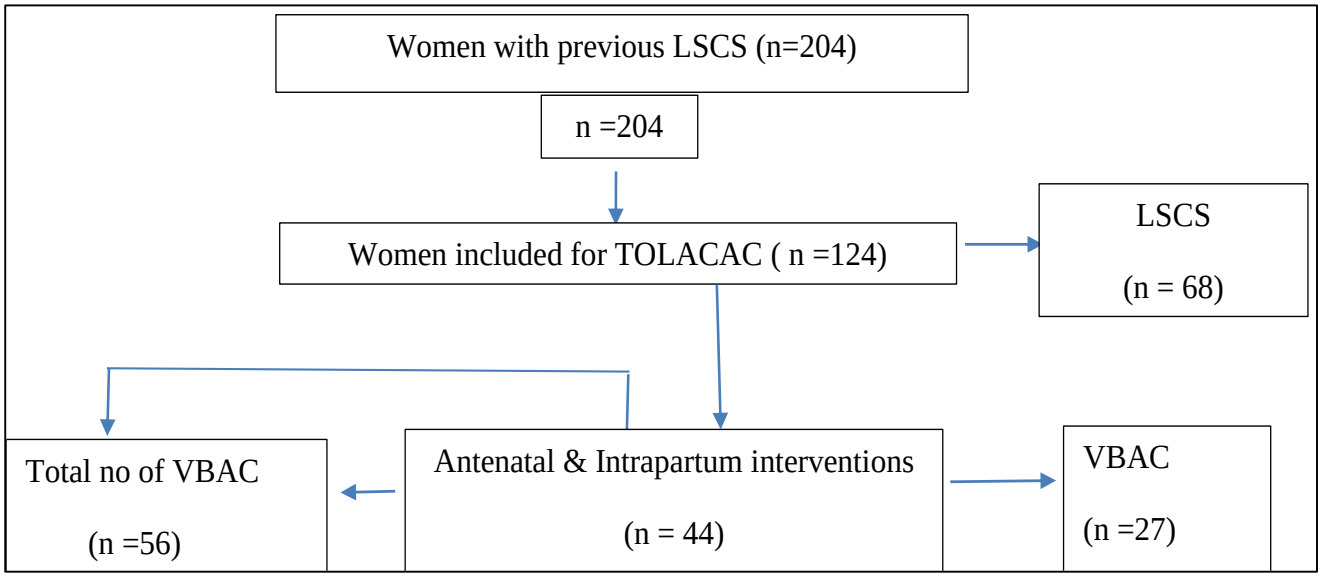

Figure 1: Study methodology and outcomes.

Outcome assessment

The primary outcome measures were VBAC attempt rate (proportion of eligible women who opted for labour) and VBAC success rate (Success rate of vaginal birth among the women who opted for TOLAC). The secondary outcomes were proportion of spontaneous delivery and instrumental delivery in women who ended up inVBAC, Proportion of women required labour analgesia and other pain relief options, proportion of women who underwent antenatal and intrapartum interventions.

Ethical considerations

Informed consent was obtained from the patient after educating them about the procedure in detail along with the expected outcomes. The study was approved by the institutional ethics committee of Bloom Life hospital, Chennai (IEC-BLH/2024/A04/001).

Data analysis

Data were collected from the departmental database, including maternal age, maternal gestational age at delivery, parity, delivery mode, fetal birth weight, and the Apgar score. The continuous and categorial variables were descriptively analysed. Online social science statistics calculators were used for the statistical calculation. Chi-square 2×2 contingency tables were used for testing statistical differences between the groups. $P<0.05$ was considered statistically significant difference.

RESULTS

The mean age of women who underwent successfull VBAC was 30.16 and the mean gestational age was 39 weeks. The VBAC Attempt rate was 60.7% (n=124/204) and VBAC Success rate was 45% (n=56/124) (Table 1).

The most common reason for repeated C-section (Failed VBAC) labour dysfunction and fetal distress (Table 2).

Among n=44 women who had antenatal and intrapartum interventions (Holistic naturopathic approach), 27 of them had successful VBAC (Table 3).

In this study of women who had successful VBAC n=32 had spontaneous labour others were more likely to be intervened with augmentation (n=14) either using oxytocin or AROM, followed by induction (n=10), epidural (n=10) and vacuum delivery (n=15). The reasons for vaccum delivery was fetal distress (n=2), failed descent-(n=2), maternal exhaustion(n=11). The present study used foley catheter (mechanical), PGE2 gel (Prostaglandin) as methods of induction) (Figure 2).

The post partum complications in our study data includes blood transfusions (n=2), 2 placental abruptions (n=2), 2 scar rupture (n=2), scar dehiscence (n=3), manual removal of pacenta (n=2) and atonic PPH (n=5). There was no reported mortality. Incidence of maternal complications in the study with successful VBAC was atonic postpartum which was managed efficiently with careful adherence of proven strategies to manage third stage of labour concerns (Figure 4).

Table 1: Mean age, gestational age, VBAC attempt and success rate.

Study particulars in VBAC attempted women	Descriptive analysis
Mean age (in weeks)	30
Mean gestational age (in weeks)	39
VBAC attempt rate	60.7%
VBAC success rate	45%

Table 2: Reasons for LSCS among unsuccessful VBAC.

Reason for LSCS	N
Abruption placenta	2
Cord prolapsed	4
CPD	2
Eclampsia	1
Failed descent	5
Failed induction	10
Failed vaccum	5
Fetal distress	5
Grade 3 MSL	8
Intra partrum bleeding	1
Maternal request	3
Labour dysfunction	13
Scar dehiscence	2
Scar rupture	2
Severe oligohydramniosis	1
Shoulder dystocia	2
Unfavourable cervix	2

Table 3: Chi-square analysis for the association of holistic approach and VBAC rates.

Variables	Holistic 1	Non-holistic 2	Marginal row totals
VBAC 1	27	29	56
LSCS 2	17	51	68
Marginal column totals	44	80	124 (Grand Total)

*The chi-square statistic is 7.2291. The p=0.007173 at p<0.05. The chi-square statistic with yates correction is 6.2507. The p=0.012415 significant at p<0.05.

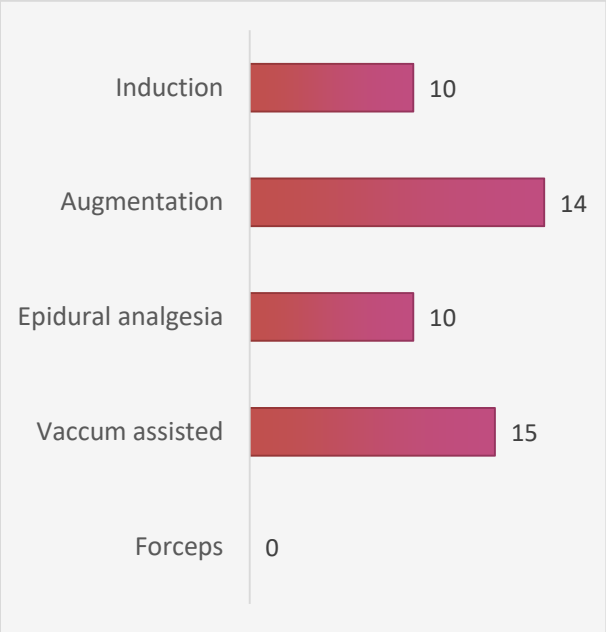

Figure 2: Labour interventions in subjects with successful VBAC.

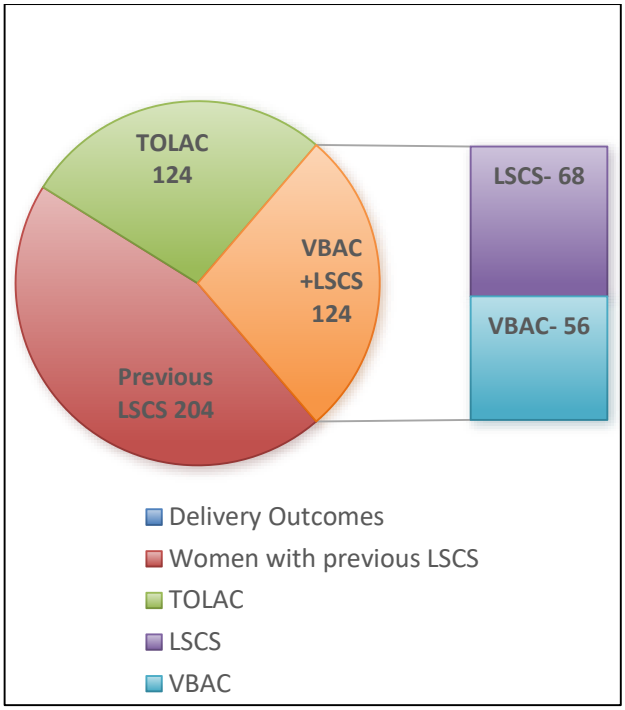

Figure 3: Delivery outcomes of the study.

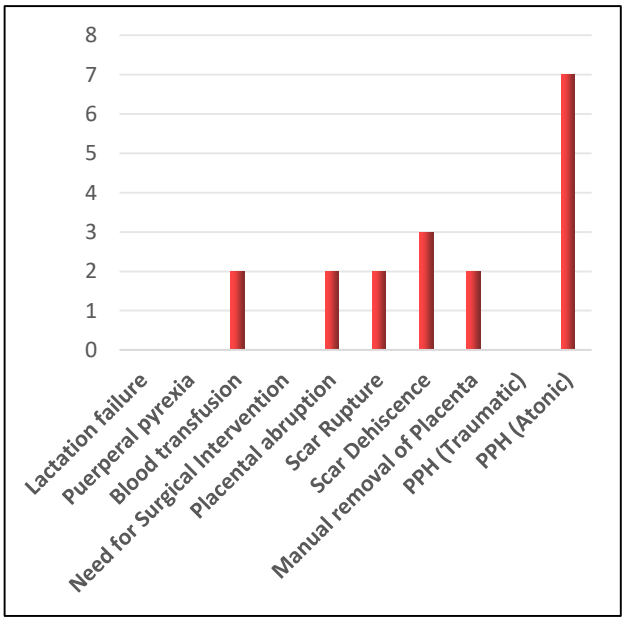

Figure 4: Postpartum complications in VBAC.

DISCUSSION

In the present study, among 124 women who were offered a TOLAC, significant rate of successful VBAC (45%) were contributed by factors such as proper selection of cases along with good antenatal and intrapartum interventions that ended up with significant rates of successful VBAC (Table 1).

The present study reported out of 56 women who underwent VBAC, n=32 had spontaneous labour and

others were intervened through augmentation (n=14) either using oxytocin or AROM and (n=10) induction (Figure 2). While oxytocin usage and AROM are routine methods to strengthen contractions and accelerate labor whenever required, studies have shown they are associated with increased rates of uterine rupture during VBAC.[8] But according to analyses by Grylka-Baeschlin et al and Lan et al women who have a VBAC have a lower rate of oxytocin and AROM usage than women who are primiparous or not multiparous.[9] Study reports have also confirmed that low-dose oxytocin may be safe and helpful in VBAC as there is a dose-dependent link between oxytocin usage and uterine rupture. The present study subjects were given low dose oxytocin and AROM and there was no reported uterine rupture.

The success rate of vaginal birth after using a Foley catheter to induce labour has not been extensively studied. A recent study involving 208 women who had previously had a caesarean delivery and used a Foley catheter to induce labour found that the success rate was 71%, with two perinatal deaths (1.0%), one of which was caused by uterine rupture (0.5%). In the previous study by Gonsalves et al the success rate of vaginal birth after using a Foley catheter was 69.1%, without an incidence uterine rupture or perinatal death.[10] In the present study no cases of uterine rupture or perinatal death were observed similar to the previous study.

For women undergoing planned VBAC, epidural analgesia is encouraged to provide pain relief without increasing the risk of postpartum bleeding or uterine rupture.[11] Our study data also evidence that women with successful VBAC had epidural analgesia (n=10) similar to the previous reports by Hehir.[12]

Our study has reported vaccum delivery (n=15) and the reasons were fetal distress (n=2), failed descent (n=2), maternal exhaustion (n=11). Madi et al reported the rate of forceps deliveries was 5.3% in women who underwent VBAC and was also evidenced by similar report of 3.6% by Lan et al.[9,13] Forceps-assisted vaginal births were associated with maternal adverse outcomes such as sphincter damage, pudendal nerve damage, third- and fourth-degree perineal laceration, as well as neonatal adverse outcomes like subdural or cerebral hemorrhage, facial-nerve injury, brachial plexus injury, and the increased rate of mechanical ventilation. It is noteworthy to mention here that in our study we did not use forceps.

Among n=44 women who had antenatal and intrapartum interventions (Holistic naturopathic approach), 27 of them had successful VBAC out of which only 2 of them needed epidural analgesia for pain management. The interventions included acupressure, reflexology, massage, hydrotherapy, yoga, diet, aromatherapy, childbirth classes and doula care under a naturopathic physician from 28 weeks of gestation till delivery. Previous studies also suggests that those who engaged in regular prenatal exercises such as yoga, experienced notably lower rates of caesarean sections, optimal weight gain, reduced pain and discomfort during labour, lower back pain during pregnancy, and an earlier postpartum recovery than those who did not do specific exercise or walked during pregnancy.[14]

Similar reports are evidenced from studies that women assigned to water immersion during the initial stage of labour used less epidural, spinal, paracervical, analgesic, and anaesthetic drugs than women who were not assigned to water immersion.[15] Similarly practising Yoga, massage therapy and acupressure has also contributed for noteworthy difference in the pain scores during labour, use of analgesics and shortens the labour duration.[15] These measures have been scientifically confirmed to release natural painkillers called endorphins and therefore experience less pain at birth and shortens the second stage of labour.[16]

In this study, the most common reason for repeat C-section (n=68) after TOLAC was labor dysfunction and fetal distress. Providing a TOLAC and a vaginal birth afterward can help lower the rate of caesarean sections. The complications associated with repeat C-Section are the possibility of uterine rupture, need for blood transfusions, infection, injury to the bladder and intestines, and deep vein thrombosis. Additionally, there can be issues with placenta previa in a later pregnancy or trouble conceiving.[17] However in our present study there was reduced rates of complications associated with C-section with only one case of PPH (atonic) and the need for blood transfusions (n=1) which was due to severe anemia. This may be due to the proper case selection for TOLAC and the antenatal interventions**.**

Women trying TOLAC had a higher risk of suspected newborn sepsis, however this risk seems to be limited to those who fail TOLAC and need a second caesarean surgery. Non-progress of labour (n=13) and a failed induction (n=10) of labour were the most frequent reasons for repeat emergency LSCSs in the present study (Table 2). While both these reasons contribute for about 90% of all repeat emergency LSCSs. Our study results are also similar and agree with the previous research.[18]

Though, hysterectomy, blood transfusion, PPH, pyrexia, and minor morbidities such as episiotomy site hematoma, cervical tear, and perineal tear are among the major problems associated with VBA.[18] The lesser complications in our study could have been contributed by antenatal and intrapartum interventions. The post partum complications in our study data includes blood transfusions (n=2), 2 placental abruptions (n=2), 2 scar rupture (n=2), scar dehiscence (n=3), manual removal of placenta (n=2) and atonic PPH (n=5) (Figure 4). There was no reported mortality. This is most likely because, particularly in women who have had a previous caesarean section, women's myometrial muscle strength may decrease as parity and gravidity grow owing to the loss of collagen fibres.[9] An analysis from a tertiary hospital at Saudi Arabia

revealed that episiotomy is associated with increased severity of atonic PPH and women who had episiotomies were at higher risk of bleeding.[19] Studies by Almutari et al, Ekin et al and Sheldon et al revealed a significant association between the severity of atonic PPH, Labour induction and augmentation.[20,21] Oxytocin is prescribed as an active management of the third stage of labor, with a recommend dosage of 10 IU to induce and augment labour.[22] Additionally, several studies revealed a direct relationship between the amount of oxytocin administered and the severity of the atonic PPH as prolonged exposure to oxytocin causes uterine atony due to inadequate contraction of the corpus uteri myometrial cells in response to endogenous oxytocin release.[19] Studies also show that vaginal delivery after CS increased the odds, whereas repeat delivery by CS decreased the odds of atonic postpartum hemorrhage. Therefore careful adherence to proven strategies for managing the third stage of labour concerns is said to be associated with reducing the postpartum hemorrhage.[19] The present study reported 10 cases of induction and 14 cases of augmentation and atonic PPH has occurred in only 5 cases (Figure 4). Out of 5 cases of atonic PPH, two cases were on augmentation with oxytocin with an inter-delivery interval of 19 hours and 48 hours respectively. However, the inconsistency in our present study could be due to lesser sample size and poor documentation as this is a retrospective study.

The total number of women who had previous history of LSCS were 204 among which 124 were offered a TOLAC in which which 56 (45%) of them successfully delivered through VBAC. 44 women out of 124, had opted for holistic approach during antenatal and intrapartum period among which n=27 (67.5%), had a significantly successful VBAC (Chi-square statistic is 6.25 p=0.012, significant at p<0.05) (Table 3).

Neonatal outcomes

In the present study all babies (n=56) of successful VBAC had an Apgar <7 at 5 minutes and an optimal birth weight. There was no maternal or neonatal mortality.

Limitations

Our study is a retrospective data analysis with lesser sample size with inconsistent data and follow ups. There was not much difference in the obstetric population since the hospital setting is in a metropolitan city. These facts could contribute to the discrepancy in our study results. In future, a prospective multicentric study with clearly defining the study design and objectives can help minimize bias and ensure that the results are interpretable and generalizable.

CONCLUSION

In the present study, among 124 women who were offered a TOLAC, significant rate of successful VBAC (45%) were contributed by factors such as proper selection of cases along with good antenatal and intrapartum interventions that ended up with significant rates of successful VBAC. Incidence of maternal complications in the study with successful VBAC was atonic postpartum hemorrhage which was managed efficiently with careful adherence of proven strategies to manage third stage of labour concerns. The most common reason for repeated C-section (Failed VBAC) was labour dysfunction and fetal distress.

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