RESEARCH PAPER

Frequency of VBAC in Patients with Previous One Caesarean Delivery Presenting at a Tertiary Care Hospital

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ABSTRACT

Background: Vaginal Birth After Cesarean (VBAC) is an acceptable and safe option for appropriately selected women with one previous lower segment cesarean section. Successful VBAC avoids repeat abdominal surgery and is associated with reduced maternal morbidity, shorter hospital stay, and faster recovery.

Objectives: To determine the frequency of successful Vaginal Birth After Cesarean (VBAC) in women with one previous lower segment cesarean section presenting at a tertiary care hospital.

Study Design & Setting: This descriptive case series was conducted in the Department of Obstetrics and Gynecology, Fauji Foundation Hospital, Lahore, from 12 March 2026 to 12 June 2026.

Methodology: A total of 145 pregnant women with one previous lower segment cesarean section fulfilling the inclusion criteria were enrolled using non-probability consecutive sampling. Eligible women underwent a trial of labor after cesarean according to departmental protocol. Maternal age, parity, gestational age, BMI, previous vaginal delivery, mode of delivery, postpartum hemorrhage, uterine rupture, birth weight, APGAR score at 5 minutes, and neonatal intensive care unit (NICU) admission were recorded using a structured proforma. Data were analyzed using SPSS version 25. Quantitative variables were presented as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. Stratification was performed for maternal age, parity, and gestational age, and the Chi-square test was applied. A p-value of ≤0.05 was considered statistically significant.

Results: The mean maternal age was 29.84 ± 4.36 years, and the mean gestational age was 38.41 ± 0.82 weeks. Successful VBAC was achieved in 122 (84.1%) women, while 23 (15.9%) required repeat cesarean section. Postpartum hemorrhage occurred in 8 (5.5%) women, uterine rupture in 2 (1.4%), and no maternal mortality was observed. The mean birth weight was 3114.2 ± 369.4 g, the mean APGAR score at 5 minutes was 8.76 ± 0.63, and 9 (6.2%) neonates required NICU admission. No significant association was observed between successful VBAC and maternal age (p=0.318), parity (p=0.486), or gestational age (p=0.721).

Conclusion: A high frequency of successful VBAC was observed among women with one previous lower segment cesarean section. Maternal and neonatal complications were infrequent, supporting VBAC as a safe option in appropriately selected women under careful obstetric supervision.

Keywords: Cesarean section, Lower segment cesarean section, Trial of labor after cesarean, Vaginal birth after cesarean, VBAC.

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INTRODUCTION

According to the World Health Organization (WHO), the ideal cesarean section (CS) rate should not exceed 10–15%; however, the prevalence of cesarean delivery has increased substantially worldwide, including in Pakistan.[1] A considerable proportion of these cesarean deliveries are repeat procedures performed in women with a previous cesarean section.[2] Consequently, determining the optimal mode of delivery for women with a prior cesarean remains an important obstetric challenge, particularly when balancing the benefits and risks of vaginal birth after cesarean (VBAC) and elective repeat cesarean section (ERCS).[3]

VBAC is achieved through a trial of labor after cesarean (TOLAC) and offers several maternal benefits. It avoids major abdominal surgery, reduces maternal morbidity, shortens hospital stay, and promotes faster recovery.[4] Successful VBAC is also associated with lower rates of postpartum hemorrhage, thromboembolic events, postoperative infections, and surgical complications compared with repeat cesarean delivery.[5] However, TOLAC is not without risks. The most serious complication is uterine rupture, which, although

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uncommon, may result in significant maternal and neonatal morbidity.[6] Factors such as a previous vaginal delivery, a non-recurring indication for the primary cesarean section, spontaneous onset of labor, and a favorable Bishop score increase the likelihood of successful VBAC, whereas multiple previous cesarean sections, a short interpregnancy interval, fetal macrosomia, and maternal comorbidities reduce the probability of success and may favor ERCS.[7]

Elective repeat cesarean section remains the preferred option for women with contraindications to TOLAC or those considered at high risk for uterine rupture. ERCS allows planned delivery and avoids the uncertainty associated with labor; however, it is also associated with increased intraoperative blood loss, postoperative pain, adhesion formation, anesthetic complications, prolonged hospital stay, and a higher risk of placenta previa and placenta accreta spectrum disorders in subsequent pregnancies.[8] Therefore, selecting the appropriate mode of delivery requires careful evaluation of maternal and fetal factors to optimize outcomes.

Mehwish et al. (2021) conducted a study in Karachi involving 315 women who underwent TOLAC and reported a VBAC success rate of 83.8%, with spontaneous labor, Bishop score >5, and lower estimated fetal weight identified as significant predictors of successful vaginal delivery.[9] In contrast, a study conducted at CMH Rawalpindi in 2021 reported a substantially lower VBAC success rate of 28.7% among 150 women, highlighting considerable variation in clinical practice, patient selection, and institutional protocols.[10]

In low- and middle-income countries such as Pakistan, where access to comprehensive antenatal counseling and emergency obstetric services may be limited, decision-making regarding Trial of Labor After Cesarean (TOLAC) remains challenging. Cultural beliefs, healthcare accessibility, clinician preferences, and institutional policies further influence the utilization of TOLAC. Although international guidelines recommend offering TOLAC to appropriately selected women with one previous lower segment cesarean section, its implementation remains inconsistent, and the reported frequency of successful Vaginal Birth After Cesarean (VBAC) varies considerably across different healthcare settings. Moreover, local data regarding the frequency of successful VBAC are limited. Therefore, this study was conducted to determine the frequency of successful Vaginal Birth After Cesarean (VBAC) among women with one previous cesarean section presenting at a tertiary care hospital. The findings will provide local evidence to support antenatal counseling, appropriate patient selection, and evidence-based decision-making regarding TOLAC in women with a previous cesarean section.

METHODS

After obtaining approval from the Institutional Review Board (IRB) and synopsis approval from the College of Physicians and Surgeons Pakistan (CPSP), this descriptive case series was conducted at the Department of Obstetrics and Gynecology, Fauji Foundation Hospital, Lahore, from 12 March 2026 to 12 June 2026. A sample size of 145 women was calculated using a 95% confidence level, an expected VBAC success rate of 83.8%, and a margin of error of 6% among women with one previous lower segment cesarean section.9 Participants were enrolled using a non-probability consecutive sampling technique. Women aged 18–40 years with a singleton pregnancy in cephalic presentation at a gestational age of 37 weeks or more, confirmed by first-trimester ultrasound, having one previous lower segment cesarean section and no contraindication to vaginal delivery were included in the study. Women with a history of more than one previous cesarean section, previous classical or T-shaped uterine incision, previous uterine rupture or major uterine surgery such as myomectomy, placenta previa or placenta accreta spectrum disorders, multiple pregnancy, non-cephalic presentation, fetal growth restriction, major fetal anomalies, or maternal medical disorders contraindicating vaginal delivery, including uncontrolled hypertension and significant cardiac disease, were excluded. Women who refused participation or were unable to provide informed consent were also excluded.

Eligible women were counseled regarding the benefits and risks of Trial of Labor After Cesarean (TOLAC). Women considered suitable for TOLAC according to departmental protocol underwent a trial of labor with continuous maternal and fetal monitoring. Emergency cesarean section was performed whenever indicated because of fetal distress, non-progress of labor, or suspected uterine rupture. Data were collected by the principal investigator using a structured proforma. Maternal characteristics including age, parity, gestational age, BMI, previous vaginal delivery, and mode of delivery were recorded. The primary outcome was successful vaginal birth after cesarean (VBAC). Maternal outcomes including postpartum hemorrhage and uterine rupture, and neonatal outcomes including birth weight, APGAR score at 5 minutes, and neonatal intensive care unit (NICU) admission were also recorded.

All collected data were entered and analyzed using SPSS version 25. Quantitative variables including maternal age, gestational age, BMI, birth weight, and APGAR score at 5 minutes were presented as mean ± standard deviation, whereas categorical variables including successful VBAC, previous vaginal delivery, postpartum hemorrhage, uterine rupture, maternal mortality, and NICU admission were presented as frequencies and percentages. The frequency of successful VBAC was calculated. Stratification was performed with respect to maternal age, parity, and gestational age to control for effect modifiers. Post-stratification, the Chi-square test was applied to assess the association between successful VBAC and the stratification variables. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 145 women with one previous cesarean delivery were included in the study. The mean maternal age was 29.84 ± 4.36 years, with the majority of participants

belonging to the 26–30 years age group (39.3%), followed by 18–25 years (26.9%), 31–35 years (23.4%), and >35 years (10.3%). The mean parity was 2.31 ± 0.74, and most women were para 2 (42.1%), followed by para 1 (40.0%) and para ≥3 (17.9%). The mean gestational age was 38.41 ± 0.82 weeks, with 53.1% of women having a gestational age of more than 38 weeks. The mean BMI was 27.63 ± 3.18 kg/m², while 24.8% of women had a history of previous vaginal delivery and 75.2% had no previous vaginal delivery, as shown in Table 1.

Table 1: Baseline Characteristics of the Study Participants (n = 145)

Variable	Type	n (%) / Mean ± SD
Age (years)	Mean ± SD	29.84 ± 4.36
	18–25 years	39 (26.9)
	26–30 years	57 (39.3)
	31–35 years	34 (23.4)
	>35 years	15 (10.3)
Parity	Mean ± SD	2.31 ± 0.74
	Para 1	58 (40.0)
	Para 2	61 (42.1)
	≥Para 3	26 (17.9)
Gestational Age (weeks)	Mean ± SD	38.41 ± 0.82
	37–38 weeks	68 (46.9)
	>38 weeks	77 (53.1)
	Mean ± SD	27.63 ± 3.18
BMI (kg/m²)	Previous Vaginal Delivery	
	Yes	36 (24.8)
	No	109 (75.2)

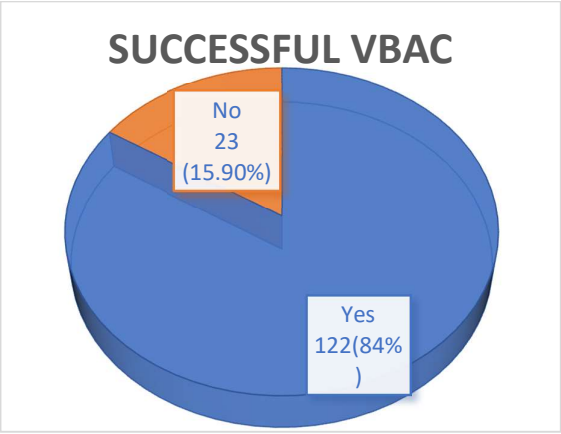

Figure 1: Frequency of Successful Vaginal Birth After Cesarean (VBAC) (n = 145)

Among the 145 women included in the study, 122 (84.1%) achieved successful vaginal birth after cesarean (VBAC), whereas 23 (15.9%) underwent unsuccessful trial of labor and required repeat cesarean section, as shown in figure 1.

Regarding maternal outcomes, postpartum hemorrhage was observed in 8 (5.5%) women, while uterine rupture occurred in 2 (1.4%) women. No case of maternal mortality was recorded during the study period, as shown in Table 2.

Table 2: Frequency of Maternal Outcomes Among the Study Participants (n = 145)

Maternal Outcome	n (%)
Postpartum hemorrhage	8 (5.5)
Uterine rupture	2 (1.4)
Maternal mortality	0 (0.0)

The mean neonatal birth weight was 3114.2 ± 369.4 g, while the mean APGAR score at 5 minutes was 8.76 ± 0.63. A total of 9 (6.2%) newborns required admission to the neonatal intensive care unit (NICU), as shown in Table 3.

Table 3: Neonatal Outcomes Among the Study Participants (n = 145)

Variable	n (%) / Mean ± SD
Birth weight (g)	3114.2 ± 369.4
APGAR score at 5 minutes	8.76 ± 0.63
NICU admission	9 (6.2)

Stratification of successful VBAC according to maternal age, parity, and gestational age showed that successful VBAC was achieved across all subgroups. However, no statistically significant association was observed between successful VBAC and maternal age (p = 0.318), parity (p = 0.486), or gestational age (p = 0.721), as shown in Table 4.

Table 4: Stratification of Successful VBAC with Respect to Maternal Age, Parity, and Gestational Age (n = 145)

Variable	Category	Successful VBAC Yes n (%)	Successful VBAC No n (%)	p-value
Maternal Age (years)	18–25 (n=39)	35 (89.7)	4 (10.3)	0.318
	26–30 (n=57)	49 (86.0)	8 (14.0)	
	31–35 (n=34)	27 (79.4)	7 (20.6)	
	>35 (n=15)	11 (73.3)	4 (26.7)	
Parity	Para 1 (n=58)	47 (81.0)	11 (19.0)	0.486
	Para 2 (n=61)	54 (88.5)	7 (11.5)	
	≥Para 3 (n=26)	21 (80.8)	5 (19.2)	
Gestational Age	37–38 weeks (n=68)	58 (85.3)	10 (14.7)	0.721
	>38 weeks (n=77)	64 (83.1)	13 (16.9)	

DISCUSSION

The increasing rate of cesarean section has resulted in a growing number of women with a previous cesarean

delivery who require counseling regarding the mode of delivery in subsequent pregnancies. Trial of Labor After Cesarean (TOLAC) provides an opportunity to achieve Vaginal Birth After Cesarean (VBAC), which is associated with avoidance of repeat abdominal surgery, shorter hospital stay, reduced maternal morbidity, and faster recovery when successful.[11,12] Despite recommendations from international guidelines supporting TOLAC in appropriately selected women, its utilization remains variable because of concerns regarding uterine rupture and neonatal complications.[13,14] Local evidence regarding the frequency of successful VBAC remains limited. Therefore, the present study was conducted to determine the frequency of successful VBAC among women with one previous cesarean section presenting at a tertiary care hospital.

Rashid et al. (2022) reported that among 109 women attempting TOLAC, 67 (61.47%) achieved vaginal delivery, while 42 (38.53%) underwent repeat cesarean section. Only one patient (0.91%) developed scar dehiscence, and 87% of newborns had an APGAR score greater than 8. The frequency of successful VBAC observed in the present study (84.1%) was considerably higher than that reported by Rashid et al., while uterine rupture remained similarly uncommon (1.4%). Likewise, the favorable neonatal outcomes observed in both studies further support the safety of TOLAC in appropriately selected women.[16]

Mekonnen et al. (2023) identified previous spontaneous vaginal delivery (AOR 2.92, 95% CI: 2.02–4.23), previous successful VBAC (AOR 5.29, 95% CI: 2.20–12.69), cervical dilatation ≥4 cm (AOR 2.14, 95% CI: 1.27–3.61), spontaneous rupture of membranes (AOR 1.32, 95% CI: 1.17–1.48), and rural residence (AOR 2.14, 95% CI: 1.01–4.52) as significant predictors of successful VBAC. Although these determinants were not specifically investigated in the present study, they provide plausible explanations for the high VBAC frequency observed and emphasize the importance of selecting appropriate candidates before attempting TOLAC.[17] Janjua et al. (2025) reported successful VBAC in 115 (72.78%) women and found that maternal age below 30 years, gestational age below 40 weeks, BMI less than 25 kg/m², and an inter-delivery interval greater than two years were associated with higher VBAC success. In contrast, the present study found no statistically significant association between successful VBAC and maternal age (p=0.318), parity (p=0.486), or gestational age (p=0.721). The variation between the studies may be attributed to differences in sample characteristics, inclusion criteria, sample size, and the evaluation of additional obstetric variables such as BMI and inter-delivery interval.[15]

Golzareh et al. (2025) evaluated 567 women and reported a successful VBAC rate of 79.2%, which was comparable to the 84.1% observed in the present study. They further identified lower gestational age (AOR 1.25, 95% CI: 1.05–1.48), absence of gestational hypertension (AOR 2.71, 95% CI: 1.26–5.85), cervical dilatation greater than 4 cm (AOR 2.77, 95% CI: 1.38–5.55), cervical effacement of at least 50% (AOR 2.13, 95% CI: 1.04–4.35), and absence of fetal distress (AOR 7.35, 95% CI: 4.29–12.60) as significant predictors of successful VBAC. Although these variables were beyond the scope of the present study, the comparable success rates reinforce that carefully selected women with one previous lower segment cesarean section can achieve a high frequency of successful VBAC with favorable maternal and neonatal outcomes.[18] Bano et al. (2023) reported a relatively low VBAC success rate of 28.67%. They observed postpartum hemorrhage in 2.32%, no scar dehiscence, low birth weight in 16.28%, APGAR score below 7 in 23.26%, and NICU admission in 9.30% of neonates. Compared with their findings, the present study demonstrated a substantially higher frequency of successful VBAC (84.1%) and a lower frequency of NICU admission (6.2%). Although postpartum hemorrhage was slightly more frequent (5.5%) in the present study, uterine rupture remained uncommon and neonatal outcomes were generally favorable. These differences may reflect variations in patient selection, obstetric management proocols, and institutional practices.[19] Masoom et al. (2021) evaluated factors associated with successful VBAC and found that spontaneous labor was associated with a substantially higher VBAC success rate than induced labor (58.8% vs. 10%). They also reported that 62.8% of booked women achieved successful VBAC compared with only 13.6% of unbooked women. Although labor induction and booking status were not evaluated in the present study, the higher VBAC frequency observed (84.1%) supports the importance of careful patient selection, appropriate antenatal care, and favorable obstetric characteristics in improving VBAC success.[20]

STUDY LIMITATIONS

This was a single-center study with a relatively small sample size, which may limit the generalizability of the findings. Only women with one previous lower segment cesarean section who were considered suitable for Trial of Labor After Cesarean (TOLAC) were included. Long-term maternal and neonatal outcomes following successful VBAC were not assessed.

CONCLUSION

A high frequency of successful Vaginal Birth After Cesarean (VBAC) was observed among women with one previous lower segment cesarean section undergoing Trial of Labor After Cesarean. Maternal and neonatal complications were infrequent, indicating that VBAC is a safe and feasible option in appropriately selected women. Careful patient selection, thorough antenatal counseling, and close intrapartum monitoring may further improve the success of VBAC in tertiary care settings.

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