Examining the Frequency of Complications of Vaginal Birth After Cesarean Delivery in Postpartum Time: A Retrospective Case-Series

Mahshid Shooshtari[1], Shohre Movahedi[1], Shima Tavakkolian[2], Ghazal Roshanzadeh[3,4], Zahra Ghalenoee[1*]

[1] *Department of Obstetrics and Gynecology, Baharloo Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[2] *Department of Obstetrics and Gynecology, Ayatollah Mousavi Hospital, Zanjan University of Medical Sciences, Zanjan, Iran*

[3] *Clinical Research Development Center, Baharloo Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[4] *Department of Midwifery and Reproductive Health, Tehran University of Medical Sciences, Tehran, Iran*

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Abstract- This study investigates the complications associated with unplanned vaginal birth after cesarean delivery (VBAC) among women in Sistan-Balochistan province, who often delay hospital visits until labor is imminent due to concerns about clinician acceptance. A retrospective case-series study was conducted at Khash and Baharloo hospitals from September 2021 to October 2022. Data on all VBAC deliveries were collected from hospital records with informed consent. Maternal demographics, delivery profiles, and complications were analyzed using SPSS 22 software. The study investigated the safety and complications associated with vaginal birth after cesarean (VBAC) among 120 women, ultimately analyzing data from 114 participants after excluding those who underwent cesarean delivery due to failed trial of labor after cesarean (TOLAC). Out of 114 women who achieved VBAC, there were no maternal deaths. Complications included 5 (4.3%) uterine ruptures and 2 (1.7%) cases of endometritis. Four neonates had an Apgar score< 7 at five minutes, including one intrauterine fetal death (IUFD). Understanding the complications associated with VBAC is essential for developing localized guidelines tailored to individual patient needs.

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Introduction

Cesarean section (C/S) has become increasingly common worldwide, exposing both mothers and fetuses to early and long-term complications in subsequent pregnancies. Notably, C/S can significantly affect the course and outcomes of future pregnancies. This increases the risk for conditions such as placenta accreta spectrum disorder (1-6). Since 1985, there has been no evidence indicating that the rising rates of C/S correlate with a decrease in maternal or fetal mortality. Consequently, the World Health Organization (WHO) recommends that the rate of C/S should not exceed 10-15% in any region globally (7). According to WHO, in 2015, the cesarean section rate among Robson group 5 (women with a previous cesarean) ranged from 63.2% to 72.1% in low-income countries, 85.2% to 87.5% in middle-income countries, and 78.1% to 79.4% in high-income countries (8). Counseling women with a history of cesarean delivery is often debated in obstetric practice. The rate of vaginal birth after cesarean (VBAC) is declining globally, while cesarean sections are on the rise, with repeat cesarean deliveries being the primary factor contributing to this increase (9-11). Furthermore, women with a prior cesarean tend to prefer repeat cesarean delivery due to concerns regarding maternal and neonatal safety and potential complications (9-13). To mitigate the rising rates of cesarean deliveries, vaginal birth after cesarean (VBAC) has emerged as a viable strategy (13). For women with a history of one prior C/S, two options are available: VBAC or elective repeat cesarean section (ERCS) (14). Each option carries its own set of risks for

Corresponding Author: Z. Ghalenoee
Department of Obstetrics and Gynecology, Baharloo Hospital, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 9151708756, E-mail address: z.gh.5068@gmail.com

both mothers and infants (14).

The risks associated with VBAC for mothers include an increased likelihood of emergency cesarean section due to failed VBAC attempts, hemorrhage, transfusion requirements, uterine rupture, and endometritis. For infants, VBAC can heighten the risks of asphyxia or perinatal death. Conversely, ERCS is linked to surgical complications, longer recovery times, and a higher likelihood of requiring cesarean delivery in future pregnancies. Other complications include placenta previa/accreta, adhesions, infections, ileus, venous thromboembolism, significant perioperative hemorrhage, and anesthetic complications. Notably, the risk of maternal death is higher in ERCS compared to planned VBAC (13 per 100,000 vs. 4 per 100,000), as is the incidence of neonatal respiratory morbidity (2-3% with planned VBAC vs. 3-4% with ERCS) (15).

A systematic review highlighted that clinicians' personal beliefs significantly influence decision-making regarding delivery methods. Factors related to the healthcare system, such as legal implications and insurance coverage, also play critical roles in these decisions (16). Moreover, a meta-synthesis revealed that in cultures with low rates of VBAC, women often perceive the process as unclear due to insufficient information from healthcare providers during pregnancy and labor (17). In Sistan-Balochistan province in Iran, which has the highest total fertility rate among provinces at 3.714, many women express a strong preference for vaginal delivery—even those with a history of C/S. However, it is common for these women to delay hospital visits until labor symptoms become pronounced due to fears about clinician acceptance of their choices. Many refuse ERCS outright. This study aims to investigate whether unplanned VBAC poses significant complications.

Materials and Methods

This retrospective case series study was conducted at Khash and Baharloo Hospitals in the Sistan-Balochistan province between September 2021 and October 2022.

Sample size determination

A total of 120 women who underwent vaginal birth after cesarean (VBAC) were initially included in the study. The sample size was determined based on the number of VBAC cases recorded during the study period at the two hospitals. This approach ensured we captured a comprehensive dataset that reflected the local population.

Inclusion criteria

The following criteria were used to include participants in the study:

Women with a history of one previous cesarean section (C/S) who requested a trial of labor.

Singleton pregnancy with vertex presentation.

A minimum interval of 18 months since the last C/S.

Estimated fetal weight below 4000 grams based on clinical examination.

Absence of vertical or classic uterine incisions.

No contraindications for vaginal delivery.

Exclusion criteria

Participants were excluded from the study if they met any of the following conditions:

Underwent cesarean delivery due to failed trial of labor after cesarean (TOLAC).

Previous C/S due to arrest of descent or cephalopelvic disproportion.

Presentation to the hospital was too late for safe transfer to an operating room, where immediate surgical intervention was necessary.

All patients provided informed consent to participate in the study, which received ethical approval from the School of Medicine, Tehran University of Medical Sciences (ID: IR.TUMS.MEDICINE.REC.1400.446). The study adhered to the Declaration of Helsinki guidelines.

Data collection

Data were collected from hospital records and included:

Maternal Age

Body mass index (BMI) from the first prenatal visit

Obstetric history

Marital status

Medical history

Number of previous C/S and normal vaginal deliveries (NVD)

Time interval since last C/S

Indication for previous C/S

Type of uterine incision

Gestational Age (GA)

Simplified Bishop Score at admission

Duration of labor in the hospital

Reason for hospital referral

Use or non-use of labor stimulation or augmentation methods

Birth weight and Apgar score at five minutes post-delivery

Statistical analysis

Data entry and analysis were performed using SPSS version 22 software. Descriptive statistics were calculated as follows:

Frequencies (percentages) for categorical variables.

Results

During the study period, 120 women were initially included in the VBAC cohort. After excluding 6 women who underwent cesarean delivery due to failed trial of labor after cesarean (TOLAC), data from 114 women were analyzed. Table 1 summarizes the maternal demographic information.

Complications observed among the participants are detailed in Table 2.

No maternal mortality was recorded during the study period. Among the five cases of uterine rupture, three were asymptomatic and identified during routine examinations, while two presented with vaginal bleeding requiring surgical intervention. All mothers with uterine rupture were under the Age of 40, and all newborns had a healthy outcome with Apgar scores greater than 7 at five minutes. Statistical analysis was performed using SPSS version 22. Descriptive statistics included frequencies and percentages for categorical variables, and means with standard deviations for continuous variables. The significance level was set at $P<0.05$ $P<0.05$.

Table 1. Maternal demographic information

Variable	Value
Total Participants	114
Age (Mean ± SD)	31.5 ± 5.2 years
Previous normal vaginal deliveries (NVD)	65 (57%)
Previous cesarean sections	8 (7%)
Classic incision history	1 (0.87%)
Gestational age (weeks)	41.5 ± 1.2

Table 2. Complications of VBAC

Complication	Frequency (%)
Uterine rupture	5 (4.3%)
Endometritis	2 (1.7%)
Placenta retention	1 (0.8%)
Retained product of conception	1 (0.8%)
Uterine atony	1 (0.8%)
Uterine hematoma	1 (0.8%)

Discussion

The findings of this study provide valuable insights into the complications associated with vaginal birth after cesarean delivery (VBAC) in a population where many women express a desire for this mode of delivery. The observed incidence of uterine rupture at 4.3% in our cohort is notably higher than the rates reported in larger studies, which typically range below 1% for women attempting VBAC following a single low transverse cesarean (18). This discrepancy may stem from differences in patient selection criteria, monitoring practices, and the healthcare environment.

Our results align with existing literature indicating that women with a history of prior vaginal deliveries tend to experience lower rates of significant maternal morbidities when attempting VBAC compared to those opting for elective repeat cesarean sections (ERCS) (15-23). Some studies have concluded that although the absolute rates of adverse outcomes in VBAC trials are low, they are still associated with higher relative rates of severe morbidity and mortality in mothers and neonates (24). In a multicenter study involving over 25,000 patients with prior low transverse cesarean delivery, the authors found that the incidence of uterine rupture was higher in women attempting VBAC than in those who delivered by elective repeat cesarean delivery (RR 21.1, 95% CI 18.6-51.5, P=0.001) (20). In that study, the incidence of uterine rupture was less than 1%, whereas it was 4.3% in our study population. This difference may be attributed to their practice of not routinely examining the uterine scar after delivery, even in asymptomatic women. They determined uterine rupture at laparotomy following either non-reassuring fetal heart rate tracing, signs or symptoms of acute maternal blood loss, or the presence of blood in the maternal abdomen at the time of laparotomy (20). However, our patients were routinely examined after delivery for uterine rupture. Indeed, the incidence of symptomatic uterine rupture was 1.7% in our study. Another reason for the higher rate of uterine

rupture in our study is that our patients had a history of more than one cesarean section. There is limited confidence in the evidence regarding cervical ripening and labor induction techniques; thus, we used only amniotomy for this purpose (25). We only used the amniotomy method for this purpose.

The most common reason for converting to C/S in our patients was dysfunctional labor followed by fetal distress, which is in line with a study in Taiwan (26).

Reports indicate a higher rate of major operative injuries such as bladder injury, bowel injury, and uterine artery laceration (0.9% vs. 0.6%) in women who underwent a trial of labor after cesarean (TOLAC) compared to those who had an ERCS (15), however, we observed no cases of major operative injury in our study population (20).

The risk of endometritis after VBAC is reported to be approximately 2.7%; this complication occurred in 1.7% of our parturients. In a retrospective cohort study among term singleton pregnant patients delivered by VBAC in-hospital, 2.68% of neonates had a 5-minute Apgar score less than 7 (27). All neonates with a 5-minute Apgar score< 7 were preterm; therefore, we could not determine whether this complication was due to prematurity or was a consequence of VBAC. Overall, neonatal and maternal outcomes were favorable in women undergoing TOLAC versus ERCD. A failed TOLAC was responsible for the majority of morbidity. It is expected that the cohort studies in the future will examine the maternal and perinatal morbidity of women who have planned TOLAC compared to women who attempt to do unplanned VBAC.

Overall, neonatal and maternal outcomes were favorable in women undergoing TOLAC versus ERCS. A failed TOLAC was responsible for the majority of morbidity. Future cohort studies should examine maternal and perinatal morbidity among women who have planned TOLAC compared to those who attempt unplanned VBAC.

The strengths of this study include sampling from two independent centers; however, some limitations should be acknowledged. The relatively small sample size may limit the generalizability of our findings; thus, further well-designed studies with larger samples are required to confirm these results.

In summary, this study reveals that while vaginal birth after cesarean delivery can be a viable option for many women, it carries significant risks, including a higher incidence of uterine rupture compared to established literature. Understanding these complications is crucial to developing localized guidelines that inform obstetricians and empower patients in their decision-making. Future research should focus on larger, multicenter studies to validate these findings and explore strategies to minimize risks associated with VBAC. Additionally, investigating the long-term outcomes for mothers and infants following VBAC could provide further insights into optimizing care for this population.

The study received ethical approval from the School of Medicine, Tehran University of Medical Sciences (ID: IR.TUMS.MEDICINE. REC.1400.446).

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