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Maternal and Neonatal Outcomes for Women Giving Birth after Previous Cesarean

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Abstract: ***Because of the increased risk of uterine rupture and other morbidities, instances of trial of labor after cesarean (TOLAC) have decreased in number each year. Nevertheless, under careful assessment and advanced medical care, TOLAC is still a safe option for delivery. The aim of this study is determine the factors that impact the success rate for TOLAC. This is a prospective study conducted at the Department of Obstetrics and Gynecology, University Hospital "Koço Gliozheni", Tirana, Albania, in the period 2015-2019. We collected data from patients receiving TOLAC as an option after CS, with a total of 76 patients enrolled. In our study, we found a high success rate and safety of TOLAC/VBAC is reasonable. Under intensive care and observation, trying vaginal delivery after previous CS is still a feasible choice. Nevertheless, the body weight of the baby has been shown to be a factor that can influence the success rate.***

Keywords: previous cesarean birth, maternal and neonatal outcome

1. Introduction

The rate of cesarean section (CS) has increased worldwide leading to higher number of women with previous uterine scar (1). Pregnant women with one previous CS are faced with two delivery options: vaginal birth after cesarean (VBAC) section or elective repeat CS. Rates of successful VBAC vary from one study to another. For instance, a large study in the USA (33, 560 women) showed that women attempting a vaginal birth after a prior CS had around 73% of success rate (2). VBAC section has less complications and faster recovery compared with CS. Conflicting data exist concerning the safety of induction of labor (IOL) in women with previous single lower segment CS (LSCS). The greatest impact of failed trial of VBAC is emergency CS (4, 5).

CSs are associated with more blood loss, more risk of bladder and ureteral injuries, postpartum infections, pulmonary embolisms, and more risks of neonatal respiratory complications (if performed before 39 weeks) (3, 4, 5). In addition, multiple repeat CSs can lead to increased risk of maternal morbidity and mortality because of abnormal placental adherence and cesarean hysterectomy, which increases with each subsequent CS (6, 7). Such complications are difficult to manage and can cause significant consequence sand even maternal death (7). Studies have shown that women with one previous CS who undergo IOL have lower success rates of vaginal delivery compared with those who presented in spontaneous labor (8). Women who had a previous successful VBAC have the best chance to deliver vaginally with success rate of 85%–90% (10). Other prognostic variables include maternal age <40 years, ethnicity, body mass index (BMI) <30, gestational age <40 weeks, infant birth weight <4 kg, and higher admission bishop score (10, 11). Success rate of VBAC correlates with the indication of the previous CS; CS for fetal malpresentation had higher success rate (84%) compared with CS for either labor dystocia (64%) or fetal distress (73%) (12). Uterine rupture rarely occurs in unscarred uterus (may occur in neglected prolonged labors). In western societies, rupture of uterus may occur in women undergoing VBAC. A study done in the Netherland showed that the use of PGE2, for induction or augmentation of labor with low bishop score, increased the risk of uterine rupture (12). One study, including 20, 059 women (done in the USA) who had one previous CS, found a rate of uterine rupture of 0.52% for spontaneous labor, 0.77% for induced labor with cervical catheter, and 2.22% for PG induction (10). Secondary analysis of the study showed that proper selection of women most likely to give birth vaginally and avoiding sequential use of multiple doses of PG and oxytocin are the best ways to avoid uterine rupture (11). Results from multiple studies done in the USA showed that previous vaginal delivery is independently associated with reduced risk of uterine rupture (5). The aim of this study is determine the factors that impact the success rate for TOLAC.

2. Material and Methods

This is a prospective study conducted at the Department of Obstetrics and Gynecology, University Hospital "Koço Gliozheni", Tirana, Albania, in the period 2015-2019. We collected data from patients receiving TOLAC as an option after CS, with a total of 76 patients enrolled. The data were collected from individual medical records and entered into an electronic database. The collected information included the participant's age, pregnancy weeks at delivery, the method of delivery [normal vaginal delivery (NVD), low forceps- or vacuum-assisted vaginal birth, or conversion to CS), and the potential obstetric complication of uterine rupture. Fetal status included the fetal birth weight, and the Apgar scores rated at 1 minute and 5 minutes after delivery were all collected. Statistical analysis was done by individual t test. We also compared the total cesarean delivery rate and the TOLAC rate with the national data. A p-value of < 0.05 was considered statistically significant.

3. Results and Discussion

All 76 women enrolled for TOLAC were grouped by age. The mean age of women was 37 (14.2) years old with the predominance of age group 31-34 yrs (36.8%) followed by age group 35-39yrs (32%).

We defined a successful TOLAC (or defined as VBAC) as deliveries with NVD, vacuum-assisted delivery, or low forceps assisted delivery. A failed TOLAC represented the cases that ended with receiving a CS for any reason. Induction of labor/augmentation Induction of labor and augmentation using a single agent of oxytocin was applied for most of the patients after informed consent. The usage and dose were given individually by the patient's labor course and the frequency of uterine contractions.

Method of delivery: We classified the method of delivery into NVD, low forceps- or vacuum-assisted vaginal birth, or CS. Patients who were put in to trial of labor first tried delivery spontaneously with or without the help of induction. If faced with difficulty while delivering, then either a low forceps- or a vacuum-assisted procedure would be used, according to the visiting staffs' decision. Conversion to cesarean delivery was indicated when the patient experienced either difficult labor or complications. Table 1 demonstrates the number of cases for each method. There were 54 (71.1%) normal vaginal deliveries, 9 (11.8%) vacuum-assisted deliveries, and 5 (6.6%) low forceps-assisted deliveries. There were 8 cases that were converted to CS, and the conversion rate was 10.5%.

Correlation between clinical and neonatal outcome: Birth weight has failed to show an increase in uterine rupture rate (13, 14). Nevertheless, we were curious if it would relate to the success of VBAC. When comparing the bodyweight of the newborn between VBAC (normal vaginal deliveries with assisted deliveries) and failure of TOLAC (conversion to cesarean), failure of TOLAC was significantly associated with higher newborn weight (3058 g vs. 3377 g, $p < 0.01$), as shown in Table 2. We recorded the Apgar score at 1 minute and 5 minutes after delivery to evaluate the neonatal outcome. The Apgar scores of 1 minute and 5 minutes failed to show a difference between the VBAC group and the cesarean group, as shown in Table 2. Even when we analyzed each subgroup with the cesarean group, there was no significant difference in neonatal outcome.

Conversion to cesarean: Failure of VBAC and conversion rate to CS was 10.5%. Among the patients who failed VBAC and converted to cesarean section, the most common reason was dysfunctional labor (75%), followed by fetal distress (12.5%). Other reasons included two induction failures and one abrutio placentae. Our subgroup of dysfunctional labor involved the use of oxytocin, either for induction of labor or labor augmentation, but did not include induction failure (prolonged latent phase). However, the dosage of oxytocin and the time involved were not analyzed in this study.

Uterine rupture: Uterine rupture has been always a concern for TOLAC, as it is an emergent complication that may cause mortality of both the infant and the mother. Although the prevalence is low of all the reasons that might cause uterine rupture, previous CS has been shown to be the most important risk factor. In our study, there were two suspicious cases receiving emergent laparotomy immediately, both of which turned out to have no uterine rupture. Recent publications have shown various trends in obstetric practice, including a significant increase in the incidence rates of CS. The patients could choose repetitive CS or TOLAC after a discussion with their own obstetrician. Most obstetricians might encourage repetitive CS to avoid any risks from TOLAC. Although TOLAC is considered safe, induction of labor is thought to increase the risk of uterine rupture (15-17). The risk of uterine rupture undergoing induction is estimated at about 1%, which is about 3 times higher than spontaneous labor (0.3%) (16). The risk of uterine rupture has been considered to differ with the various methods of induction of labor. The risk of uterine rupture with Prostaglandin E2 (PGE2) use for cervical ripening has been estimated to be 2.0% (18-22). In contrast, the risk of uterine rupture following induction or augmentation of labor with oxytocin has been reported at 1.1% (18). Therefore, we have chosen only oxytocin as a single agent for induction or augmentation of labor. In our study, we applied oxytocin either for induction of labor or augmentation of labor, and there were no cases of uterine rupture. This shows the safety and feasibility of oxytocin augmentation/induction use for TOLAC. Our success rate for TOLAC is 89.5%, which is comparable with that in other studies, which ranged from 60% to 80% (17, 22). If patients have previous vaginal deliveries or repeated VBAC, the successful rate can be as high as 95.45-100% in our study group. Next, we analyzed the reason(s) for failure of TOLAC and found that dysfunctional labor was the most common reason, accounting for 75% of all cases. The second most common reason was fetal distress (12.5%). In other studies, birth weight has shown no increase in risk of uterine rupture. Nevertheless, in our study, we have noticed that birth weight was higher in the failure group (3068 g vs. 3379 g, $p < 0.01$). As a result, higher birth weight might influence the success of TOLAC. This is consistent with the report of the ACOG in 2010 and other studies that macrosomia (>4000 g) may have a lower likelihood of VBAC (15).

4. Conclusion

In our study, we found that success rate and safety of TOLAC/VBAC is relatively high. Under intensive care and observation, trying vaginal delivery after previous CS is still a feasible choice. Nevertheless, the body weight of the baby has been shown to be a factor that can influence the success rate.

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Table 1: Frequency of delivery methods

Delivery methods	N	%
Normal vaginal delivery	54	71.1
Vacuum-assisted delivery	9	11.8
Low forceps-assisted delivery	5	6.6
Cesarean section	8	10.5

Table 2: Clinical characteristics of the patients and neonatal outcome

Variables	Failure	Success	P
Maternal age (y)	34.7 ± 3.5	32.6 ± 3.0	0.1
Gravidity	2.6 ± 0.8	2.9 ± 1.2	0.08
Gestational age at delivery (wk)	38.6 ± 1.4	38.1 ± 1.9	0.07
Birth weight (g)	3377.6 ± 439.4	3058.7 ± 503.0	<0.01
Apgar score at 1 min	7.83 ± 0.49	7.67 ± 0.88	0.2
Apgar score at 5 min	8.97 ± 0.13	8.81 ± 0.58	0.06