Taiwanese Journal of Obstetrics & Gynecology 55 (2016) 394–398

Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Original Article

Vaginal birth after cesarean section: 10 years of experience in a tertiary medical center in Taiwan

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ARTICLE INFO

Article history:
Accepted 12 February 2015

Keywords:
cesarean section
forceps assisted
TOLAC
vacuum assisted
VBAC

ABSTRACT

Objective: 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 objective of this study is to find the factors that impact the success rate for TOLAC and to compare the results with Taiwan national registry data.
Materials and Methods: A longitudinal cohort study that includes a total of 254 cases of women receiving TOLAC in a tertiary medical center over a period of 10 years.
Results: A total of 254 participants who underwent TOLAC, which accounts for 1.67% of total labor instances (254/15,166), were enrolled for analysis. The success rate of TOLAC was found to be 80.70% (205/254), including 146 (57.5%) normal deliveries, 45 (17.7%) vacuum-assisted deliveries, and 14 (5.5%) forceps-assisted deliveries. The conversion rate to cesarean section was 19.3%. There were no uterine rupture cases in our study, and there were only two suspected cases, which turned out to have no actual rupture. When analyzing the factors affecting the results of TOLAC, we found that a successfully spontaneously delivered baby had a lower birth weight than the failed TOLAC cases that were converted to cesarean delivery (mean, 2989 g vs. 3379 g; $p < 0.001$). Among the patients who were converted to cesarean section, the most common reason was dysfunctional labor (79.6%), followed by fetal distress (14.3%).
Conclusion: Under intensive care and observation, TOLAC section may still be a feasible choice. Nevertheless, the body weight of the baby has been shown to be a factor that can influence the success rate.

Introduction

The cesarean delivery rate has increased worldwide. In the United States, the cesarean delivery rate was measured at 4.5% in 1965, but this figure increased to 32.8% in 2007. In most cases, the indication for elective cesarean section (CS) is previous CS. Many have tried trial of labor after cesarean (TOLAC) instead of elective repeat cesarean delivery (ERCD) as an attempt to reduce CS rates [1,2]. Generally speaking, TOLAC is relatively safe when compared with ERCD. Several large observational studies looking at TOLAC have provided information that generally has been reassuring [3–8]. In 2000, however, a meta-analysis reported a higher rate of uterine rupture and perinatal death following a trial of labor than following elective CS [9]. For this reason, the American College of Obstetricians and Gynecologists (ACOG) has recommended cautious use of TOLAC. Thus, the TOLAC rate around the world has decreased since that time [10,11]. During the same period, the incidence rates of abnormal placental implantations and ectopic pregnancy on CS scar increased significantly [12,13]. The increasing CS rate as well as decreasing TOLAC could be significantly correlated with complicated placentation and abnormal embryonic implantation. Hence, reducing repetitive CS rate might be the most important way to prevent pregnancy complications. Here, we present the experience of TOLAC over a period of 10 years in a single tertiary medical center, while assessing the primary outcomes; morbidities, such as uterine

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http://dx.doi.org/10.1016/j.tjog.2016.04.016

rupture; and neonatal outcomes. Also, there is emphasis on the birth weight and the success rate of vaginal birth [vaginal delivery after previous cesarean section (VBAC)].

Materials and methods

Between January 2001 and April 2011, there were total of 15,166 deliveries registered in Taipei Veterans General Hospital, a tertiary medical center and teaching center in Taiwan. The study was approved by the Ethics Committee of the Department of Obstetrics and Gynecology at Taipei Veterans General Hospital and was conducted with the consent of each participant. We collected data from patients receiving TOLAC as an option after CS, with a total of 254 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.

Results

Demographics

All 254 women enrolled for TOLAC were grouped by age, and the results are shown in Figure 1. Women who were approximately 31–35 years of age comprised the largest group. Demographic and other clinical characteristics are shown in Table 1. 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.

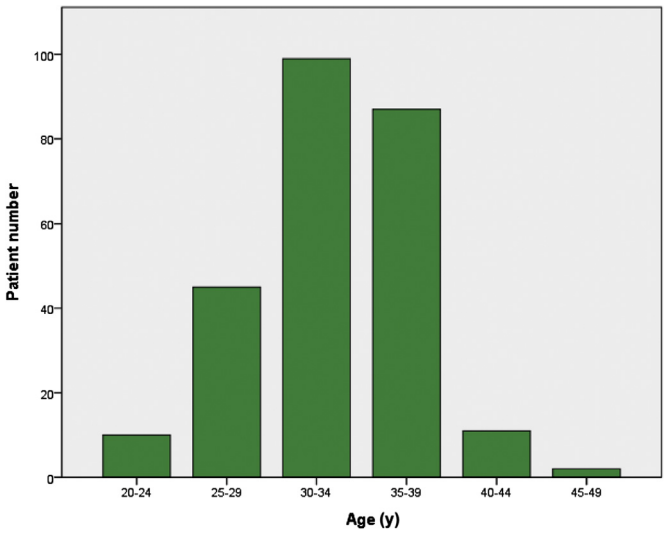

Figure 1. Age of patients, grouped.

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 2 demonstrates the number of cases for each method. The proportion of each delivery method is shown in Figure 2. There were 146 (57.5%) normal vaginal deliveries, 45 (17.7%) vacuum-assisted deliveries, and 14 (5.5%) low forceps-assisted deliveries. There were 49 cases that were converted to CS, and the conversion rate was 19.3%.

Previous vaginal delivery and repeated VBAC

In this study, there were 44 patients who have previous vaginal delivery before they underwent cesarean section. They have shown a higher successful VBAC rate than others—only two patients converted to cesarean section—given the success rate of 95.45% (42/44). Furthermore, 14 patients in our study group who had repeated VBAC all succeeded in a second VBAC.

The two patients (2/42) who had previous vaginal delivery but failed VBAC all transferred to CS because of dysfunctional labor. Both were term pregnancies: one was pregnancy 40 + 3/7 weeks and the other 40 + 1/7 weeks. Both were admitted for induction of labor, and oxytocin was used as a single induction agent.

Correlation between birth weight and delivery method

Birth weight has failed to show an increase in uterine rupture rate [14,15]. Nevertheless, we were curious if it would relate to the success of VBAC. When comparing the body weight 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 (3068 g vs. 3379 g, $p < 0.01$), as shown in Table 1. When we analyzed each method compared with CS, successful NVD (2989 g vs. 3379 g, $p < 0.01$) and forceps-assisted

Table 1
Clinical characteristics of the patients.

Variable	Failure ($N = 49$)	Success ($N = 206$)	p
Maternal age (y)	32.7 ± 4.6	33.8 ± 4.0	0.11
Gravidity	2.6 ± 0.9	2.9 ± 1.3	0.09
Gestational age at delivery (wk)	38.7 ± 1.5	38.2 ± 2.0	0.06
Birth weight (g)	3379.55 ± 449.58	3068.57 ± 518.09	<0.01
Apgar score at 1 min	7.84 ± 0.51	7.66 ± 0.97	0.22
Apgar score at 5 min	8.98 ± 0.14	8.82 ± 0.60	0.07
Blood loss (mL)	726.94 ± 313.97	270.73 ± 206.67	<0.01