OBSTETRICS

Outcome of trial of labor after cesarean section in women with past failed operative vaginal delivery

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OBJECTIVE: The objective of the study was to assess the outcome of trial of labor after cesarean (TOLAC) in women with past failed operative vaginal delivery (OVD).

STUDY DESIGN: A retrospective study of all women who underwent cesarean section (CS) because of a failed OVD in a tertiary medical center between 1996 and 2011. Women who had a subsequent delivery were identified, and the outcome of subsequent delivery was analyzed.

RESULTS: Overall, 533 women underwent CS because of failed OVD during the study period. A total of 204 women (38.3%) had a subsequent delivery, of whom 93 (45.6%) had a TOLAC and 111 (54.4%) had a repeat elective CS. The success rate in the TOLAC group was 61.3% (n = 57). The most common indication for repeat CS was lack of progress (72.3%) among the 36 women in whom TOLAC failed (38.7%). The rate of postpartum hemorrhage and prolonged maternal hospitalization was lower in the TOLAC group than in the repeat CS group (2.2% vs 10.8%, $P = .02$, and 0% vs 8.1%, $P = .005$). There were no cases of rupture or dehiscence of the uterine scar. Factors associated with failed TOLAC were the occiput-posterior position and prolonged the second stage as the indication for OVD in the index pregnancy, maternal age older than 30 years at the time of subsequent delivery, and a birthweight in the subsequent pregnancy that is higher than the birthweight in the index pregnancy.

CONCLUSION: TOLAC in women who underwent a previous CS because of a failed OVD is associated with a relatively high success rate compared with the reported success rates among women with past CS during the second stage of labor. This information and the risk factors for TOLAC failure can be used when counseling these women regarding mode of delivery in subsequent pregnancy.

Key words: cesarean section, operative delivery, trial of labor after cesarean

Cite this article as: Melamed N, Segev M, Hadar E, et al. Outcome of trial of labor after cesarean section in women with past failed operative vaginal delivery. Am J Obstet Gynecol 2013;209:49.e1-7.

Trial of labor after previous cesarean delivery (TOLAC) remains a matter of debate.[1] This controversy is reflected by the dramatic decrease in the rate of vaginal birth after cesarean (VBAC) in the United States during recent years from 28.3% in 1996 to 9.2% in 2004.[2] In the face of this trend, in 2010 the National Institute of Health Panel called organizations to facilitate access to TOLAC after recognizing TOLAC as a reasonable option for many women with 1 prior low transverse uterine incision.[3] Clearly, one of the measures that can assist clinicians in counseling women regarding TOLAC is improved prediction of the likelihood of successful VBAC.[4]

Previous studies identified a considerable number of factors that are associated with successful VBAC,[4-12] including the indication for cesarean section (CS) in the previous delivery. One specifically challenging scenario is the consultation regarding TOLAC to women for whom the previous CS followed a failed trial of operative vaginal delivery (OVD) using vacuum or forceps. Unfortunately, data regarding the likelihood of successful VBAC in this context are extremely limited.[13] Only one previous study, conducted approximately 15 years ago, addressed this specific question.[13] However, that study included women with past CS because of failed second stage of labor in general and was not focused on women with past failed OVD, and the number of women with past failed OVD was relatively small (n = 55).[13]

Intuitively, a history of failed OVD would be expected to be associated with low VBAC success rates because of concern that such a history might indicate pelvic pathology.[14] Nevertheless, failure of OVD may be related in many cases to relative or nonrecurring factors such as position of the fetal head, fetal macrosomia, or errors in the application of the vacuum cap or in the technique of OVD.[14,15] Other factors that have been found to be associated with failed OVD include advanced maternal age, nulliparity, maternal obesity, induction of labor, and lack of prenatal care.[15]

Prompted by the lack of data on the outcome of TOLAC in these cases, we aimed to assess the outcome of TOLAC in women with past failed OVD and to identify risk factors for TOLAC failure.

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Received Nov. 23, 2012; revised Feb. 26, 2013; accepted March 8, 2013.

The authors report no conflict of interest.

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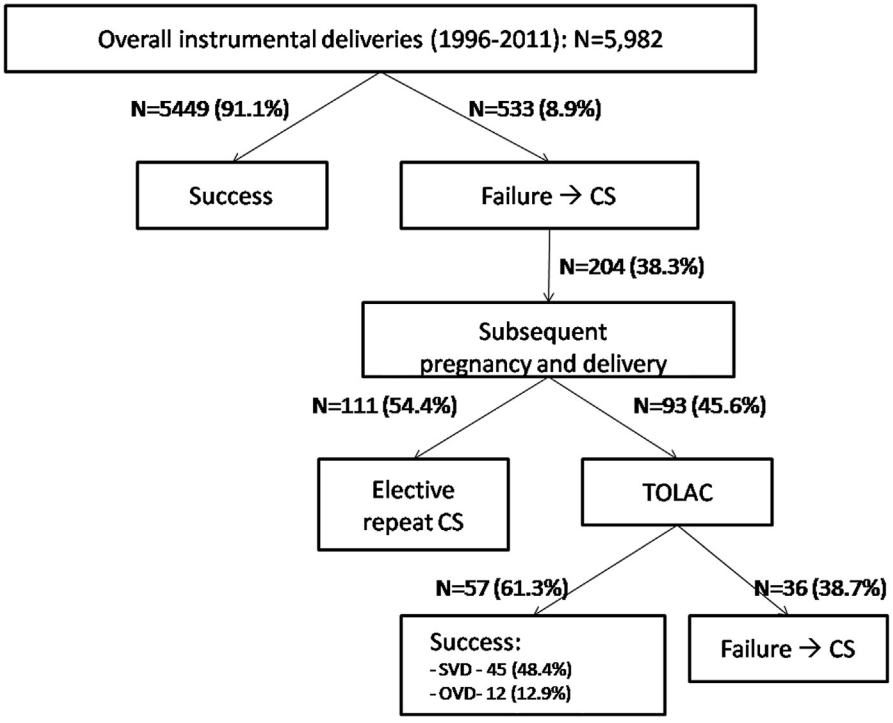
0002-9378/$36.00

http://dx.doi.org/10.1016/j.ajog.2013.03.010

FIGURE
Selection of the study group



CS, cesarean section; *OVD*, operative vaginal delivery; *SVD*, spontaneous vaginal delivery; *TOLAC*, trial of labor after previous cesarean delivery.

Melamed. Trial of labor after failed operative vaginal delivery. Am J Obstet Gynecol 2013.

Materials and Methods

Study population

This was a retrospective study of all women who underwent CS following a failed OVD in a university-affiliated tertiary medical center between 1996 and 2011 (index delivery, Figure). Those women who had a subsequent delivery in the same medical center were identified, and the outcome and mode of delivery in the subsequent delivery were assessed (Figure).

The characteristics of the index pregnancy and the outcome of subsequent pregnancy of women who had a TOLAC were analyzed and were compared with those of women who underwent an elective repeat CS in the subsequent pregnancy. In addition, to identify factors associated with TOLAC failure in this group of women, the characteristics of women who underwent a successful TOLAC (ie, those who eventually indeed delivered vaginally) in the subsequent pregnancy were compared with those of women in whom TOLAC failed (ie, those who eventually delivered by repeat CS).

Pregnancies complicated by any of the following conditions were excluded from the study group: multiple gestations, a history of a previous CS at the time of the index delivery, gestational age at delivery less than 37 weeks at the index or subsequent pregnancies, vertical uterine incision at the time of CS in the index pregnancy, the need for an urgent CS prior to the onset of labor in the subsequent pregnancy because of maternal and/or fetal complications, or major fetal anomalies. The study protocol was approved by the local institutional review board.

Data collection

Cases were initially identified using the comprehensive computerized perinatal database maintained in our medical center. Patient files and the electronic records were reviewed for demographic data, obstetrical history, data on index and subsequent pregnancies, labor and delivery data for index and subsequent pregnancies, and maternal and short-term neonatal outcome in the index and subsequent pregnancies.

Definitions

The indications for OVD in our center are prolonged second stage, as stipulated in the guidelines of the American College of Obstetricians and Gynecologists[16] for nulliparous and multiparous women and nonreassuring fetal heart rate (NRFHR). We perform only low or outlet OVD. Vacuum extraction is considered as the method of choice in our institution when OVD is indicated. Failed vacuum extraction (VE) is defined as 2 cup detachments or no progression of the fetal head despite appropriate traction.

Respiratory morbidity was defined as any of the following: respiratory distress syndrome (RDS), transient tachypnea of the newborn (TTN), or need for respiratory support. RDS was diagnosed by the presence of respiratory compromise, the need for administration of exogenous surfactant, and/or radiographic evidence of neonatal pulmonary hyaline membrane disease including atelectasis, air bronchograms, and a diffuse reticulogranular infiltrate.

Neonatal trauma was defined as any of the following factors: cephalohematoma, skull fracture, subdural/cerebral hematoma, intraventricular hemorrhage, or facial-nerve injury.

Data analysis

Data analysis was performed with the SPSS version 19.0 package (SPSS Inc, Chicago, IL). A Student *t* test and a Mann-Whitney *U* test were used to compare continuous variables with normal and nonnormal distribution between the groups, respectively. Normality was assessed using the Q-Q plot and the Kolmogorov-Smirnov test. The χ^2 and Fisher exact tests were used for categorical variables. Multivariable logistic regression analysis was used to identify factors associated with failed TOLAC. Variables that were found to be different between the VBAC failure and success groups ($P < .1$) in the bivariate analysis as well as variables that were