

Factors predicting Success of Vaginal Birth after Cesarean Section

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ABSTRACT

Aim: The aim of this article is to study the various factors that can predict the success of vaginal birth after cesarean (VBAC) section.

Materials and methods: A retrospective cohort study of deliveries was conducted from 1 January 2014 to 31 December 2014 by the Department of Obstetrics and Gynecology in our hospital. Patients with previous low transverse cesarean section who had undergone a trial of labor were identified. Maternal inpatient and prenatal records were reviewed in all eligible subjects. During labor, uterine activity and fetal heart rate were monitored. When indicated, oxytocin or prostaglandin E2 was used for induction of labor according to Bishop score. Emergency cesarean delivery was considered in cases with the appearance of scar tenderness, fetal distress, nonprogress of labor, and deep transverse arrest.

Results: A total of 200 women were eligible for VBAC, but after written informed consent, 131 (65.5%) subjects were given trial of labor at term after one prior cesarean delivery among 3,604 deliveries while 69 (34.5%) subjects opted for elective repeat cesarean section. The overall VBAC success rate was 63.3% (76 of 120) in our study. History of spontaneous labor ($p = 0.042$) and history of previous vaginal delivery ($p = 0.038$) were found to be significantly associated with increased chance of success of VBAC, and lesser interdelivery interval was not found to be associated with decreased success rate ($p = 0.096$). Neither indication of previous cesarean nor birth weight of newborn (>3 kg) was found to be related to the success of VBAC.

Conclusion: Vaginal birth after cesarean section is a safe practice as long as it is offered with a proper selection of candidates with factors having a high success rate. Physicians need to be aware of factors having a good outcome before counseling mothers so that failure rates decrease and successful VBAC is increased.

Keywords: Trial of labor after cesarean, Vaginal birth after cesarean scoring, Vaginal delivery after cesarean vaginal birth after cesarean section.

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INTRODUCTION

Nowadays, vaginal birth after cesarean (VBAC) section is a well-established evidence-based practice, because the safety of VBAC has been demonstrated in various studies.¹ It is being used to decrease the overall incidence of cesarean rate as elective repeat cesarean section (ERCS) is, although safe, not devoid of complications like placenta previa, placenta accreta, placenta increta, and increased neonatal respiratory morbidity.² However, before a pregnant woman is given trial of labor in the VBAC group, it is important to know about the factors that can predict successful outcome of VBAC because unsuccessful trial of VBAC may be associated with increased maternal and perinatal morbidity.³

Association of various factors like history of prior vaginal delivery, especially if vaginal delivery follows prior lower segment cesarean section (LSCS), nonrecurring indication of previous cesarean section, and spontaneous onset of labor with success of VBAC, has been studied over a period of time.⁴⁻⁶ However, association of some factors, such as effect of shorter interdelivery interval (interval between prior cesarean delivery and trial of labor in index pregnancy), with success of VBAC is not well established.⁷⁻¹⁰ The majority of these studies have been done in the developed world. Due to paucity of data from India, we decided to conduct this study with the primary aim of determining the success of VBAC and factors affecting it.

MATERIALS AND METHODS

A retrospective cohort study of deliveries was conducted from 1 January 2014 to 31 December 2014 by the Department of Obstetrics and Gynecology in our hospital. Patients with previous low transverse cesarean section who had undergone labor trial were identified. Maternal inpatient and prenatal records were reviewed in all eligible subjects. Demographic data and neonatal information

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were extracted. We also obtained data on maternal or neonatal complications, such as uterine rupture (complete disruption of previous cesarean scar, causing maternal or neonatal morbidity), sepsis, hemodynamic or coagulation derangement, respiratory impairment, and neurologic damage. The analysis was limited to patients who had a period of gestation greater than 37 weeks with one lower segment transverse cesarean section. Women having two previous LSCS, previous myomectomy, classical cesarean, malpresentation, and placenta previa were excluded from the study. During labor, uterine activity and the fetal heart rate were monitored. When indicated, oxytocin or prostaglandin E2 was used for induction of labor according to Bishop score. Emergency cesarean delivery was considered in cases with appearance of scar tenderness, fetal distress, nonprogress of labor, and deep transverse arrest. Chi-square and Fisher exact tests were used for categorical variables, and the Student t-test was used for continuous variables. A p-value of <0.05 was considered significant.

RESULTS

A total of 200 women were eligible for VBAC, but after written informed consent, 131 (65.5%) women were given a trial of labor at term after one prior cesarean delivery among 3,604 deliveries, while 69 (34.5%) women opted for ERCS. We excluded 11 patients because of incomplete data. Complete information was available in 120 cases. Maternal demographics and clinical characteristics are listed in Table 1. The overall VBAC success rate is 63.3% (76 of 120) in our study. In the subanalysis of various factors (Table 2), history of spontaneous labor was significantly associated with increased chance of success of VBAC as 100 patients underwent spontaneous labor, out of which 68% (68 out of 100) delivered vaginally, while in the induction group, success rate was only 40% (8 out of 20; p=0.04). The presence of previous vaginal delivery was also found to be associated with increased chance of success of VBAC (p = 0.04). The shorter interdelivery interval was not found to be associated with reduced chance of success of VBAC

Table 2: Factors predicting success of VBAC

Parameters		Group I (LSCS)	Group II (vaginal)	Total	p-value
Previous cesarean with or without labor	With labor	34 77.3%	60 78.9%	94 78.3%	0.419
	Without labor	10 22.70%	16 21.1%	26 21.70%	
History of previous vaginal delivery	Yes	5 11.4%	4 5.3%	9 7.5%	0.038
	No	39 88.6%	72 94.7%	111 92.5%	
Spontaneous labor	Yes	32 72.7%	68 89.5%	100 83.3%	0.042
	No	12 27.30%	8 10.5%	20 16.70%	
Birth weight	<3 kg	30 68.2%	51 67.1%	81 67.5%	0.903
	>3 kg	14 31.8%	25 32.9%	39 32.5%	
Grouping of interdelivery interval (in months)	<18	4 9.1%	6 7.9%	10 8.3%	0.853
	18-24	8 18.2%	17 22.4%	25 20.8%	
	>24	32 72.7%	53 69.7%	85 70.8%	

(p = 0.96). Neither indication of previous cesarean section nor birth weight of newborn (>3 kg) was found to be associated with the success of VBAC. Indications for induction of labor in 20 patients are shown in Table 3. Indications of cesarean section in 44 patients are shown in Table 4. In per-operative findings, a total of 11 patients had thinned out scar, of which 4 were less than 18 months (36.6%), while 7 were more than 24 months (63.3%); so shorter interdelivery interval cannot be taken for increased maternal and fetal morbidity. No major complications like uterine rupture or hysterectomy were found in the trial group. In failed VBAC, there were four neonatal intensive care unit admissions; however, there was no perinatal mortality in any of the two groups.

Table 1: Maternal demographic and clinical characteristics

Parameters	Group I (LSCS) (n = 44) (mean ± SD)	Group II (vaginal) (n = 76) (mean ± SD)	p-value
Maternal age (years)	26.55 ± 2.94	25.97 ± 3.38	0.352
Gravida	2.36 ± 0.78	2.49 ± 0.77	0.404
Parity	1.20 ± 0.51	1.28 ± 0.60	0.508
Interdelivery interval (in months)	41.43 ± 24.71	41.64 ± 28.18	0.967
Induction delivery interval (hours)	8.07 ± 4.05	9.5 ± 3.94	0.060

SD: Standard deviation

Table 3: Indication of induction of labor

Indication	Number of patients
Preeclampsia	6 (30%)
Postdated pregnancy	3 (15%)
Cholestasis of pregnancy	3 (15%)
Severe intrauterine growth restriction	5 (25%)
PPROM	3 (15%)
PPROM: Preterm premature rupture of membranes	

Table 4: Indication of cesarean section

Nonreactive nonstress test	21/44 (47.7%)
Thick meconium in latent phase of labor	8/44 (18.8%)
Scar tenderness	12/44 (27.2%)
Arrest of descent of head	3/44 (6.8%)

DISCUSSION

The main aim of this study is to find out the success rate of VBAC at tertiary center and various factors, which can predict the success of VBAC. There is interest in predicting the factors for the success of VBAC owing to increasing evidence that a failed attempt of VBAC is associated with various maternal and neonatal complications.³ These include chorioamnionitis, postpartum endometritis, and uterine rupture requiring hysterectomy, blood transfusion, perinatal and neonatal deaths, and neonatal neurologic impairment. Furthermore, these patients are at greater risk for complications than those of with ERCS without labor.

The overall success rate in this study is 63.3%, and it is 68% in the group who had spontaneous onset of labor. A wide range of success has been shown in various studies, for example, in the study from Balachandran et al,¹¹ 83.47% (96 women) had successful VBAC section and 16.5% (19 women) had failed, whereas a 50% (95/190) successful vaginal birth rate after cesarean section and 50% (95/190) failure rate were recorded in the study by Ugwu et al.¹² A 66% (344/522) successful vaginal birth rate after cesarean section was recorded by Durnwald and Mercer,¹³ but in a recent systematic review on the safety of VBAC, the authors reported that 74% of the women who had trials of labor delivered vaginally.¹⁴

Cheng et al¹⁵ and Srinivas et al¹⁶ analyzed the relation between maternal age and VBAC success. Both the studies concluded that women >35 years of age were more likely to experience unsuccessful trial of labor. In this study, the mean age in both the groups was found to be similar, so it does not show an association between increased maternal age and decreased success of VBAC.

History of previous vaginal delivery has been found to be associated with increased chance of success of VBAC in many studies. In this study also, the presence of vaginal delivery was associated with increased success rate.^{4,6,17,18} Although the overall chance of successful VBAC is greater in women with a prior vaginal birth, these women as well as those without a prior vaginal birth have a decreased chance of a successful VBAC after induction of labor if initiated with an unfavorable cervix. Failure of VBAC in labor induction group has been supported by other studies.¹⁹ As was also concluded in the study by Sondgeroth et al,²⁰ the VBAC success rates in our study improved as the Bishop score at admission increased, implying that modified Bishop score is an important predictor of success of VBAC.

Incomplete healing of the uterine scar from a previous cesarean delivery, as a result of the short interdelivery interval, has been suggested as a risk factor for uterine

rupture during a trial of VBAC. Bujold and Gauthier⁷ supported this idea, in a report of increased rate of uterine rupture during a trial of labor, in VBAC patients with an interdelivery interval less than 18 months than those with longer intervals. Esposito et al²¹ also observed an increase in the rate of uterine rupture with short interdelivery intervals. Potentially, a short interdelivery interval can adversely affect uterine activity during labor as a result of the inadequate postpartum healing of the previous cesarean scar. Characteristics associated with successful trials of labor after cesarean deliveries have been extensively studied. In our study, the rate of VBAC success did not appear to be affected by the interdelivery interval between prior cesarean delivery and the index pregnancy. Furthermore, there was no increase in the rate of symptomatic uterine rupture in those patients with shorter interdelivery intervals. These findings are contradictory to previous studies, although this finding may be limited by the small sample size.

Vaginal birth after cesarean section is a safe practice as long as it is offered with a proper selection of candidates with factors having a high success rate. Physicians need to be based on knowledge of factors that have good outcomes for counseling mothers so that failure rates decrease and successful VBAC is increased.

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