

Original Article

Prognostic factors for successful vaginal birth after cesarean section - Analysis of 162 cases.

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Abstract

Objective : To analyze the success rate of VBAC (Vaginal birth after cesarean section) with reference to various factors and derive simple and easily usable prognostic factors to predict successful VBAC. **Methods (Study Design)** In this retrospective observational study, 162 women who had undergone successful trial of labor were analyzed to study the factors which contributed to successful trial of labor over a study period of one year. Maternal age, prior antenatal visits, prior obstetric history, neonatal weight and interconceptional period were studied with reference to outcome of VBAC. Success of VBAC when compared with prior indication for CS was studied. The role of instrumental deliveries for VBAC was analyzed. Maternal and perinatal mortality and morbidity were assessed. Chi square test was used to analyze the significance of each factor. **Results** Success rate of VBAC was 75%. Maternal age, prior antenatal care, prior vaginal delivery, neonatal weight and interconceptional period were all statistically significant predictors ($P < 0.001$) of successful VBAC. Instrumental deliveries were helpful in successful VBAC and can be used prophylactically to cut short second stage. VBAC had no adverse maternal or perinatal outcome. **Conclusion:** VBAC can be successfully tried in all women with prior cesarean section by careful selection and employing simple predictive factors.

Introduction

Between 1970 and 1988, the cesarean delivery rate in the United States increased dramatically from 5% to nearly 25%¹. The causes were many; declining practice of midpelvic forceps and vaginal breech deliveries, increasing safety of Cesarean sections, and increasing reliance on continuous electronic FHR monitoring.

VBAC is the best modality to reduce overall CS rate and various guidelines were framed to encourage its use.³

During the period (1989-1996), the VBAC rate increased, so did the number of well publicized reports of uterine rupture and other complications of VBAC¹. The ACOG hence gave a stringent guideline that VBAC should be attempted in institutions equipped to respond to emergencies with physicians immediately available to provide emergency care, which was a deterrent to may non institutional private practitioners¹. This contributed to the resurgence in cesarean delivery rate, reaching an all time high of 26.1% in 2002, while the VBAC rate decreased from 55% to 12.6%³.

Wide variations in VBAC rates still exist at various centers in India and elsewhere. At our institution, we cur-

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rently have a VBAC rate of 75%, that is well in accordance with various other centers in India and abroad^{4,5}. Regular review of simple selection criteria for trial of labor in women with previous caesarean section will increase the scope of VBAC and help lower the overall caesarean section rate in institutions, as well as among private practitioners.

This study attempts to highlight the various factors which have a prognostic significance for success of VBAC.

Methods

This is a retrospective analytic study of 162 women who had a successful vaginal delivery following prior caesarean section. All the patients with previous caesarean section who came for routine antenatal care, or were admitted in the labor room as emergency cases, were evaluated thoroughly. A detailed history regarding the number of previous caesarean sections, type of operation, indication, birth weight of infant, prior vaginal births, puerperal complications in previous deliveries etc, were obtained. A thorough general medical and obstetric examination was carried out. The presentation, estimated birth weight of present infant, condition of scar and adequacy of pelvis was ascertained. Routine investigations like Hb, Rh group etc. was carried out. Ultrasonography was carried out in all the booked patients to know the maturity of fetus, placental localization and to rule out anomalies. The patients were carefully selected for vaginal trial of labor based on the ACOG recommendations, and were taught to recognize the basic signs and symptoms of labor as well as scar dehiscence.

Criteria for exclusion:

- 1 Previous classical caesarean or hysterotomy scar
- 2 Previous two or more LSCS
- 3 Previous LSCS with contracted pelvis
- 4 Previous LSCS with other obstetric complications such as malpresentation, placenta previa, fetal distress or other medical complications
- 5 Presence of signs and symptoms of scar dehiscence/rupture uterus

Informed consent was taken for VBAC after explaining the benefits and inherent risks. Cross match was sent,

compatible blood was secured, IV line was kept patent and the patient was kept NBM in readiness for an emergency LSCS. The patients were carefully monitored for

- Temperature, pulse, respiratory rate and blood pressure monitored every 15 minutes
- Scar tenderness assessed every half hourly.
- Fetal distress (tachycardia, bradycardia, meconium) by continuous EFHRM.
- Satisfactory progress of labor monitored by per abdominal & per vaginal examination.
- Hematuria

No obstetric analgesia was given to any of these patients for fear of masking the scar tenderness. The patients who successfully delivered vaginally were then studied for the various factors affecting trial of labor and the benefits of vaginal delivery over LSCS. Chi Square Test was used for statistical evaluation for each factor contributing to successful VBAC. Episiotomy was given prophylactically in all the patients to cut short the second stage of labor. Ventouse or forceps was applied whenever indicated. The patients were watched closely for any immediate postpartum complication. Maternal morbidity after delivery was assessed using the criteria of excessive blood loss, puerperal sepsis, pyrexia, UTI, PPH, urinary retention and thrombophlebitis. Fetal well being was also assessed. The patients were counseled for sterilization or advised acceptable contraception.

Results

Of the 216 women who were studied, 162 had a successful VBAC, yielding a success rate of 75%. Majority of the women were second gravida, as women with more than one prior CS were excluded from the study. Successful VBAC was analyzed with respect to various parameters (Table 1).

Age: Majority of the women were in the age group of 21-30 years. The success of VBAC declined significantly as the maternal age increased beyond 35 years (P<0.01)

Antenatal care: The success rate of VBAC was significantly high in women who had received regular antenatal care compared to those who were emergency admissions (P<0.01).

Table 1.**Significance of various parameters for successful VBAC**

Parameter	No of patients with successful VBAC	P-Value
Age ≤35 years	154	<0.01
Age >35 years	8	
Registered Patients	109	<0.01
Emergency Patients	53	
Vaginal delivery after LSCS	20	<0.02
Vaginal delivery before LSCS	12	
Weight of neonate ≤3 kg	148	<0.01
Weight of neonate >3 kg	14	
Interconceptional period >2 years	127	<0.01
Interconceptional period ≤2 years	35	

History of prior vaginal delivery: Women who had a vaginal delivery following CS were significantly more likely to have a successful VBAC compared to those who had one prior to CS ($P<0.01$).

Weight of neonate: The success rate of VBAC was significantly higher in women who had infants weighing ≤3 kg ($P<0.01$).

Interconceptional period: VBAC was associated with significantly higher success rates in women whose interconceptional period exceeded two years ($P<0.01$).

Majority of the patients with nonrecurrent indications delivered vaginally with success. Out of these, patients with prior LSCS for malpresentations had the highest rate of successful VBAC, followed by those with prior

Table 2.**Correlations of VBAC success rates with indication of previous LSCS**

Indication of previous LSCS	No. of cases VBAC	Percentage
Malpresentation	67	42
Fetal distress	24	15
Failure to progress	20	12
APH	13	8
PIH	13	8
Post date	10	6
CPD	10	6
Oligohydramnios	5	3
Total	162	100

LSCS for fetal distress and patients with prior LSCS for non progress of labor (Dystocia). It was significant to note that, 10 patients with previous LSCS done for CPD had a successful VBAC; seven of these patients delivered neonates with birth weights exceeding those in the previous LSCS (Table 2).

The incidence of instrumental deliveries was 30%. They were carried out for 42 women with 26 forceps applications and 16 vacuum applications, and prophylactic instrumentation was performed in 20 of these women (Table 3).

There were three cases of perinatal mortality in the study, which amounted to a perinatal mortality of 2%. Two neonates were delivered by forceps and the cause of death was severe birth asphyxia due to meconium aspiration in post term pregnancy. One case was a vacuum delivery and cause death was severe birth asphyxia in IUGR baby with respiratory distress syndrome. There were eight babies with jaundice who were treated conservatively. Only four infants had five minute Apgar score <4, out of which three expired and one was well on discharge with no evidence of neurological impairment.

Table 3.
Indications for instrumental deliveries in VBAC

Indications	Forceps	Vacuum
Prophylactic to cut short second stage of labor	16	4
Fetal distress in second stage of labor	7	3
Non progress of second stage of labor	3	9
Total	26	16

There was no maternal mortality in the study. Incidence of maternal morbidity was 3.7%. There were five women who had puerperal pyrexia. One had episiotomy wound gape which required resuturing.

Discussion

VBAC is the strongest modality to combat the rising cesarean section rate. In the study, VBAC was successfully implemented in 162 cases that were included as per proper guidelines¹, and factors contributing to the success of VBAC were identified and analyzed. A number of factors emerged as being strongly predictive of a successful VBAC.

The first one was maternal age, with women >35 years having a clearly reduced likelihood of VBAC. Bujold et al⁴ reported from their 14 year study covering 2493 women that maternal age at the time of TOL equal or greater than 35 years old was associated with a lower rate of successful vaginal delivery (OR: 0.73, 95% CI: 0.56-0.94).

VBAC rate was also significantly high among patients who had availed regular antenatal care compared to the emergency cases. This was highlighted by the TOLAC guidelines formulated by the AAFP³ which clearly stated that proper counseling and evaluation of women with previous cesarean section is essential to ensure successful VBAC, as well as to reduce the rate of complications like uterine rupture.

Prior vaginal delivery subsequent to LSCS was also associated with higher chances of VBAC in our study. In a study of 318 women by Iyer² it is stated that there are more chances of VBAC (84.8%) in women with history of previous vaginal delivery compared to ones without (62.7%) (P<0.01).

Women with neonatal weights exceeding 3 kg in our study had less chances of successful VBAC compared to those having neonatal weights <=3 kg. A similar result was obtained by another study in which it was concluded that the chances of vaginal delivery decreased as the fetal weight exceeded 3.5 kg (P<0.05)².

Interconceptional period of >=2 years was associated with higher VBAC rates as per our study. Chhabra³ concluded that an interconceptional period of <19 months was associated with adverse outcome of VBAC. In a retrospective (n=2,409) study of VBAC vs. TOL1, it was found that uterine rupture occurred in 1.05% of TOL if the interval was more than 18 months from the last delivery. In contrast, a shorter interval (<18 months) -uterine rupture occurred in 2.25%.

The indication of prior cesarean section was significantly associated with the success of current VBAC in our study. VBAC was maximally successful in patients who were operated previously for non recurrent indications such as malpresentations, fetal distress, dystocia, antepartum hemorrhage etc. A pertinent point in this study was that the patients who were diagnosed as CPD and subjected to LSCS delivered vaginally subsequently. This underlines the need to evaluate such women with more precision while subjecting them to a primary caesarean section, and to clinically correlate the cases which were subjected to LSCS for so called fetal distress. In a prospective study carried out on 263 women by Shakti et al⁵, significantly higher success rates were observed for VBAC in women with prior cesarean for nonrecurrent indications- 91% for breech, 88% for fetal distress and 70% for dystocia. Also, VBAC rates approaching 67% are seen when prior section is done for CPD. Brill and Windrim⁷ systematically reviewed all English-language articles describing the impact of various factors on outcomes when VBAC is attempted. Articles reviewed included published abstracts, retrospective and prospective studies, and meta-analyses. They concluded that a nonrecurrent indication for previous caesarean section (CS), such as breech presentation or fetal distress, is associated with a much higher successful VBAC rate than recurrent indications,

such as cephalopelvic disproportion (CPD). Even with a history of CPD, two-thirds of the women will have successful VBAC, though rates decrease with increasing numbers of prior CS.

The use of instrumental deliveries was pivotal for successful VBAC in our study, with instrumental delivery being employed in 30% of the women, and prophylactically to avert rupture due to prolonged labor in 20% of the women. This is supported by Saropala⁸, who quoted a high instrumental rate of 40% with a majority of them being done prophylactically, in a study of 650 women enrolled in the first VBAC program in Thailand, where an inordinately high rate of cesarean section exists.

VBAC was associated with a remarkably low maternal and perinatal morbidity and mortality rate as illustrated by this study. Chhabra³ quoted a zero maternal mortality rate and a morbidity rate of 0.68%, which was unrelated to trial of labor. CS at term before the onset of labor was associated with significantly greater risk of neonatal respiratory morbidity than delivery by other means. Overall intraoperative complications occur in 12-15% of the cesarean deliveries, postoperative complications occur in 35.7% of the cases, and fourfold increase in maternal mortality rate is observed. Women considering planned VBAC should be informed that this decision carries a 2-3/10,000 additional risk of such birth related perinatal death when compared with ERCS. The absolute risk of such birth related perinatal loss is comparable to the risk for women having their first birth. VBAC carries an 8/10,000 risk of the infant developing hypoxic ischemic encephalopathy. However, the following maternal risks significantly increase with the increasing number of repeated caesarean deliveries: placenta accreta, injury to the bladder, bowel or ureter, ileus, the need for postoperative ventilation, intensive care unit admission, hysterectomy and blood transfusion. Based on these risks, one decision model analysis found it reasonable to consider a trial of labor if the chance of success is 50% or greater and the desire for future pregnancy after cesarean delivery is at least 10-20%⁶.

The ability to predict women who are at high risk for

failing trial of vaginal delivery and those with high probability of successful vaginal delivery would help guide clinicians and women in making good clinical decisions and minimizing adverse events. This study presents certain simple factors such as maternal age, prior antenatal care, prior vaginal delivery, estimated birth weight of the baby, interconceptional period and prior CS indication - which can be easily assessed from history and basic examination. These factors are highly significant in deciding success of VBAC. If properly implemented, they can be used to greatly improve VBAC rates in practice.

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