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Factors Determining Successful Outcome of Vaginal Birth After Caesarean: A Prospective Observational Study

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Abstract

Background: There is considerable variation in the proportion of women who are offered an attempt to VBAC across various centres. Though morbidity and mortality associated with repeat LSCS is higher than vaginal delivery (VBAC), still clinicians are offering repeat LSCS due to fear of scar dehiscence which is not well supported with clinical evidence. The aim of this study was to evaluate variables in previous and present pregnancy to predict the success of VBAC.

Methods: Pregnant women with 34 weeks or more period of gestation with previous one LSCS having no contraindication for vaginal delivery and without any other high risk factors such as Anemia, Hypertensive Disorders, Gestational Diabetes Mellitus and who are willing for VBAC were included in the study. Any recurrent indication for LSCS and an inter-pregnancy interval less than 12 months at the time of recruitment were considered as exclusion criteria. Labour was monitored with partographic control and electronic fetal heart rate monitoring and outcome data collected.

Results: Out of the total 100 cases with previous caesarean section, successful vaginal delivery was possible in 61% (n=61) cases and the remaining 39% (n=39) underwent caesarean delivery. Mean BMI (25.7 ± 4.0vs 23.3 ± 4.1kg/ m^2; $p<0.01$) and gestational age (38.9 ± 2.2vs 36.4 ± 2.1weeks; $p<0.01$) was significantly higher among cases who failed in attempted vaginal delivery. History of vaginal delivery was given by 19 cases. Out of these 19 cases, vaginal delivery in present pregnancy was possible in 15 cases (78.9%), which is significantly higher than cases with no previous vaginal delivery (56.8%). A significant association was observed between history of elective caesarean in the last pregnancy and successful vaginal birth in present pregnancy. Percentage of successful vaginal birth in elective cases was 71.6% as compared to 39.4% in emergency cases ($p<0.01$).

Conclusion: The present study demonstrates that over half of the women with a previous caesarean section successfully achieve a vaginal delivery. We found evidence of variation in the uptake and success of VBAC according to maternal clinical characteristics.

These factors should be utilized in counselling women when offering the trial of labour after caesarean and making appropriate and timely decision in their labour.

Keywords: VBAC, vaginal delivery, previous caesarean

Introduction

Although caesarean delivery is considered a safe method of delivery, it has a higher risk of complications than does a vaginal birth. Wide spread improvements in anaesthesia, surgical technique, antibiotics and blood transfusions have decreased the morbidity and mortality from caesarean section, but it is not without hazard.[1] Also, another caesarean delivery in women with prior caesarean is associated with myriad of intra-operative difficulties which multiplies with each caesarean delivery.[1,2] Because of increased risk of maternal complications with repeat caesarean section and safety of vaginal birth after caesarean (VBAC), trial of labour for selected group of patients with previous scar has become a preferred strategy. In1988, ACOG recommended that, in the absence of a contraindication, a woman with one previous low-transverse caesarean delivery be counselled to attempt labour in a subsequent pregnancy.[3] VBAC is associated with shorter maternal hospitalizations, less blood loss and fewer transfusions, fewer infections, and fewer thrombo-embolic events than planned repeat caesarean delivery. Several reports have indicated that the absolute risk of uterine rupture attributable to a trial of labour is about 1 per 1000.[3-5] A 60 to 80% success rate of vaginal birth after previous caesarean section has been reported by many authors if the primary caesarean was done for nonrecurring indication.[4] Some of the non-recurring indications for caesarean section are: poor labour progress, foetal distress, placenta previa, fetal malpresentation, and multifetal gestation.[6] There is considerable variation in the proportion of women who are offered and attempt VBAC across centres. British figures indicate that among women with a prior caesarean section, 33% will successfully achieve vaginal birth in the subsequent pregnancy. Again there was considerable variation across institutions, ranging from 6% to 64%.[7] Though morbidity and mortality associated with repeat LSCS is higher than vaginal delivery, still clinicians are offering repeat LSCS due to fear of scar dehiscence which is not well supported with clinical evidence. The aim of our study was to evaluate variables in previous and present pregnancy to predict the success of VBAC.

Materials and Methods

The study was conducted in the Obstetrics department of a tertiary care teaching hospital between December 2017 and November 2019. It was a prospective observational study and was cleared by Institute Ethics Committee. Taking prevalence of VBAC as 44%,in the department where study was being undertaken and keeping a 10% allowable error at 95% confidence interval, estimated number of subjects required for study was kept as100.

Pregnant women with 34 weeks or more period of gestation with previous one LSCS having no contraindications for vaginal delivery and without any other high risk factor such as Anemia, Hypertensive Disorders, Gestational Diabetes Mellitus and who are willing for VBAC were included in the study. Any recurrent indication for LSCS and an inter-pregnancy interval less than 12 months at the time of recruitment were considered as exclusion criteria. Written informed consent was obtained from all study participants. The cases were managed in ANC units as per protocol. The plan for delivery i.e. spontaneous or induction and the method of cervical ripening was decided as per

standard protocol. Labour was monitored with partographic control and electronic fetal heart rate monitoring. Outcome of labour, whether successful VBAC or emergency caesarean was recorded in detail and statistical analysis was performed.

All statistical analysis was carried out by using SPSS software version 21. The quantitative data was represented as their mean ± SD. Categorical and nominal data was expressed in percentage. The t-test was used for analysing quantitative data, or else non parametric data was analyzed by Mann Whitney test and categorical data was analyzed by using chi-square test. Pearson correlation co-efficient was used for computing correlation between quantitative variables. The significance threshold of p-value was set at <0.05.

Results

Out of the total 100 cases with previous caesarean section, successful vaginal delivery was possible in 61% (n=61) cases and the remaining 39% (n=39) underwent caesarean delivery. Most common reason for failed attempt to vaginal delivery was failure of labour to progress (43.6%, n=17) followed by failure of induction (25.6%, n=10) and non-reassuring FHR (20.5%, n=8). A total of 4 participants (10.3%, n=4) changed their mind and opted for caesarean delivery. Mean BMI (25.7±4.0vs 23.3±4.1kg/ m^2; p<0.01) and gestational age (38.9±2.2vs 36.4±2.1weeks; p<0.01) was significantly higher among cases who failed in attempted vaginal delivery as depicted in Table -1. A total of 29 participants had gestational age > 40 weeks and the remaining 71 were at or below 40 weeks. Out of the total 29 cases with gestational age over 40 weeks, 58.6% (n=17) underwent caesarean delivery as compared to 31% (n=22) with gestational age less than 40 weeks (p<0.01).

Table 1: Mean age, BMI and Gestational Age comparison among cases with and without successful vaginal delivery

Variables	Successful VBAC (n=61)	Emergency LSCS (n=39)	'p' value
Age (yrs)	31.2±5.4	30.8±5.7	0.32
BMI (kg/m^2)	23.3±4.1	25.7±4.0	<0.01
Gestational Age(weeks)	36.4±2.1	38.9±2.2	<0.01

History of previous vaginal delivery was given by 19 cases. Out of these 19 cases, vaginal delivery in present pregnancy was possible in 15 cases (78.9%), which is significantly higher than cases with no previous vaginal delivery (56.8%). A significant association was observed between history of elective caesarean in the last pregnancy and successful vaginal birth in present pregnancy. Percentage of successful vaginal birth in elective cases was 71.6% as compared to 39.4% in emergency cases (p<0.01).

A significant association was observed between cervical dilation at the time of reporting to labour room and mode of delivery. In cases with cervical dilation of more than 4 cm, successful vaginal delivery was reported as 68.5% as compared to 40.7% in cases with dilation of less than equal to 4 cm (p<0.01). Mean cervical length at term, as measured by transvaginal sonography, was comparable among cases with and without successful vaginal delivery (31.02±4.13 mm vs 30.6±3.93 mm; p=0.39).

Mean birth weight was higher among babies delivered via caesarean section as compared to vaginally born babies (2.87±1.01 vs 2.6±0.69 kg; p<0.05). No difference was observed among babies with respect to APGAR score at 1 and 5 mins (p>0.05).

Discussion

Present hospital based observational study aimed to evaluate the success rate of vaginal births after caesarean section (VBAC) and to find various clinical factors associated with successful VBAC. Out of the total 100 cases with previous caesarean section, successful vaginal delivery was possible in 61% cases.

ACOG 2010 quoted success rate of VBAC of 60-80%.[8] Aram T et al. aimed to determine the effectiveness of trial of labour after caesarean (TOLAC) and the factors associated with a successful TOLAC. Among the 704 cases eligible for TOLAC, 355 (60%) had a successful vaginal birth and 237 (40%) had a failed TOLAC.[9] Senturk MB et al. in a similar study observed that vaginal birth after caesarean section was successful in 55% of cases.[10] Knight HE et al. in another similar study observed that overall 47,602 women (63.4%) out of 75,086 who attempted a VBAC had a successful vaginal birth.[11] Our results were also comparable to other researchers like Doshi et al, Narang et al, Sahu et al. and Maykin et al. had VBAC rates of 75%, 46.2%, 40%, 70% respectively in their studies.[12-15]

In the present study, most common reason for failed attempt to vaginal delivery was failure of labour to progress (43.6%) followed by failure of induction (25.6%) and non-reassuring FHR (20.5%). A total of 4 participants (10.3%) changed their mind and opted for caesarean dlivery. Knight HE et al. in their study also observed non-progress and failed induction as the common reasons for unsuccessful attempt of VBAC.[11] Similar results were also reported by Doshi et al. and Narang et al.[12,13]. Aram T et al. in their study observed that the most common reason for caesarean section in women giving trial of vaginal delivery was change of mind (43%) followed by non-progress progress of labour (29.53%), failure of induction (12.7%) and non-reassuring FHR (8.9%).[9]

In our study, mean gestational age was significantly higher among cases who failed the attempted vaginal delivery. Moreover, a significant number of cases with gestational age over 40 weeks underwent caesarean delivery. Increasing gestational age is associated with a decreased rate of successful VBAC. Three potential factors are related to the association of increasing gestational age with an increased rate of caesarean delivery; increasing birth weight, increased risk of fetal intolerance of labour, and increased need for induction of labour. However, in a recent study that controlled for both birth weight and induction/augmentation of labour, gestational age of greater than 41 weeks was still associated with failed VBAC. Senturk MB et al. in their study also observed that low gestation age is associated with success of VBAC.[10] Aram T et al. in a similar study observed that lower birth weight or gestational age are the independent factors associated with the success rate of TOLAC.[9]

Metz TD and colleagues in their study concluded that body mass index less than 30 is a significant predictor of successful VBAC.[16] Tessmer-Tuck and colleagues also reported that VBAC success was independently associated with a body mass index of $<30 kg/m^2$.[17] Aram T et al. in a similar study reported that independent factors associated with the success rate of TOLAC includes low maternal BMI.[9] Similar findings were also observed by Senturk MB et al. and Knight HE et al.[10,11] In our study also, mean BMI was significantly higher among cases who failed the attempted vaginal delivery.

Several components of the cervical examination have been investigated, including cervical dilation, cervical effacement and cervical length. Flamm et al. in their

study demonstrated that patients presenting with dilation greater than or equal to 4 cm had an 86% rate of VBAC.[18] Birara M et al. in their study observed that cervical dilatation of more than 3 cm at admission is an independent factor determining successful VBAC.[19] Senturk MB et al. also reported that advanced cervical opening and effacement were factors associated with successful vaginal birth.[10] In the present study, a significant association was observed between cervical dilation and mode of delivery. In cases with cervical dilation of more than 4 cm at the time of presentation to labour room, successful vaginal delivery was reported as 68.5% as compared to 40.7% in cases with dilation of less than or equal to 4 cm ($p<0.01$). However no association was observed with cervical length at term.

Several studies have examined prior vaginal delivery as a predictor of outcome in subsequent VBAC. Results unanimously showed that patients with a prior vaginal delivery have higher rates of successful VBAC than patients without a prior vaginal birth.[9-11] In an unadjusted comparison, patients with 1 prior vaginal delivery had an 89% VBAC success rate compared with a 70% success rate in patients without a prior vaginal delivery. Tessmer-Tuck and colleagues developed a model to predict VBAC.[17] They observed that VBAC success was independently and most strongly associated with prior vaginal delivery. Similarly Senturk MB et al. and Aram T et al. also concluded in their study that prior vaginal birth is an independent factors associated with the success rate of VBAC.[9,10] Our study also has produced similar results.

Studies have shown that women whose first birth was by emergency caesarean section, when attempted VBAC, had a lower success rate than women who had a prior elective caesarean section.[9-11] Knight HE et al. reported that Among women whose first birth was by emergency caesarean section, were the least likely group both to attempt and to succeed with a VBAC ($p<0.001$).[11] Percentage of successful vaginal birth in elective cases was 71.7% as compared to 60% in emergency cases ($p<0.01$). Similar results were also reported by Doshi et al., Narang et al. and Sahu et al.[12-14] In present study, we also observed a significant association between history of elective CS in the last pregnancy and successful vaginal birth in present pregnancy. Percentage of successful vaginal birth in elective cases was 71.6% as compared to 39.4% in emergency cases ($p<0.01$).

Conclusion

The present study demonstrates that over half of the women with a previous caesarean section successfully achieve a vaginal delivery. We found evidence of variation in the uptake and success of VBAC according to maternal clinical characteristics. The risk of unsuccessful attempt increases by the presence of obesity and higher gestational age. Attempt and success rates also varied according to the indication for the primary caesarean section. Women with a history of emergency caesarean section were more likely to fail a VBAC than women who had an elective caesarean for their first birth. Thus to conclude, these factors should be utilized in counselling women when offering the trial of labor after caesarean, and making appropriate and timely decision in their labor.

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