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Obstetrical Variables Leading to Successful Vaginal Birth After a Cesarean Section in a Tertiary Care Hospital of Pakistan

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ABSTRACT

Objectives: To determine the frequency of vaginal birth and association of it with obstetrical factors that led to successful vaginal delivery after a previous one cesarean section in a tertiary care hospital.
Study Design: Cross-sectional study.
Place and Duration of Study: Pak Emirates Military Hospital, Rawalpindi Pakistan, from Apr to Sep 2022.
Methodology: A total of 340 pregnant females who fulfilled the selection criteria were enrolled after written informed consent. All patients underwent a trial of labor and were followed till the delivery of the baby. Obstetrical factors were noted down. Successful vaginal birth after trial of labor was noted down and findings were subjected to statistical analysis.
Results: The mean age (in years) of the females was 27.71±3.05. Vaginal Birth After a Cesarean occurred successfully in 70.6% females. The obstetrical factors that were significantly associated with successful Vaginal Birth After a Cesarean were inter-pregnancy interval (p=0.01), cervical dilatation (p=0.013), cervical effacement (0.019) and duration of active phase of labor (p=0.043).
Conclusion: Successful vaginal delivery was frequently seen in females who had previous one cesarean section i.e. in 70.6% females and had significant association with inter-pregnancy interval, cervical dilatation, cervical effacement and duration of active phase of labor.
Keywords: Cesarean Section, Delivery, Trial of Labor.

How to Cite This Article: *Shehzadi H, Choudhry A, Mehmood F, Riaz T, Shafique S, Zahra. Obstetrical Variables Leading to Successful Vaginal Birth After a Cesarean Section in a Tertiary Care Hospital of Pakistan. Pak Armed Forces Med J 2025; 75(Suppl-2): S345-S350. DOI: https://doi.org/10.51253/pafmj.v75iSUPPL-2.9776*

INTRODUCTION

A cesarean delivery (CD) is the commonest obstetrical procedure on a global scale.[1] Although there are variations in CD rates between nations, they currently range from 10% to 40%.[1] Globally, previous cesarean sections (CS) have been proven to be the most frequent factor increasing the rate of CS.[2] In 1988, ACOG suggested that a woman who had one prior low-transverse CD be encouraged to try labor in a second pregnancy if there was no contraindication.[2] Vaginal birth after previous CS (VBAC) is associated with less infections, fewer thrombo-embolic events, and shorter maternal hospitalizations than CD.[3]

According to literature, there is a 1 in 1000 absolute chance of uterine rupture linked to a labor trial.[4] Many publications have noted a 60 to 80% success rate of vaginal birth following a prior CS if the first cesarean was performed for nonrecurrence reasons.[4] Poor labor progression, distress in the fetus, placenta previa, transverse lie, breech presentation, oblique lie, pregnancy-induced hypertension and twins are a few of the non-recurring reasons for a CS.[5]

The percentage of women who are given and attempt VBAC varies widely between centers.[5] According to British statistics, 33% of women who have had a previous CS will give birth vaginally in their next pregnancy.[6] In sub-Saharan nations, a meta study revealed a VBAC success rate of 63–75%.[7] In a study conducted in Lahore, 70% of patients experienced successful vaginal delivery, whereas 30% required a second emergency CS.[8] Failure to progress, fetal discomfort and scar soreness were the main reasons for repeat cesarean procedures. No complications for the mother or the fetus occurred.[8]

The most crucial element in providing a labor trial is the mother's decision on the method of delivery.[9] In addition to being aware of the benefits and risks, women's expectations for childbirth and preferred delivery methods are also influenced by demographic, obstetrical, and societal factors.[9] Having this knowledge will be useful when advising mothers to have VBACs. How to accurately forecast a vaginal

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Received: 08 Jan 2023; revision received: 13 Mar 2023; accepted: 14 Mar 2023

delivery after a CS and how to calculate the level of risk of failure that women are willing to take are key issues.[10]

Numerous research have examined techniques for determining women at low and high risk of failing a vaginal birth attempt after a previous CS, but none of them have produced a conclusive finding. Even the variables that have been linked to successful VBAC differ from center to center. Therefore, there is not yet a single tested method that can be used to predict successful vaginal birth in women who have had a previous CS. Hence, the current study aimed to determine the frequency of vaginal birth and association of it with obstetrical factors that led to successful vaginal delivery after a previous one CS in a tertiary care hospital. The study would be beneficial for obstetricians when making shared decisions with patients in terms of providing trial of labor and identifying patients who can have a successful trial and thus would help in avoiding unnecessary CS in such females.

METHODOLOGY

It was a cross-sectional study, which was carried out after taking approval from the Ethical review committee (ERC number A/28/EC/436/2022), at the Obstetrics and Gynecology Department of Pak Emirates Military Hospital, Rawalpindi Pakistan, from Apr to Sep 2022. Sample size of 340 females was calculated keeping 95% confidence interval, 5% margin of error and expected prevalence of successful VBAC as 33%.[6]

Inclusion Criteria: Pregnant females at term i.e. >37 weeks, with one previous lower uterine segment scar who had previous indications of non-recurring nature, had singleton pregnancy, with cephalic presentation and an estimated fetal weight of ≤4 kg, who had no current indication for cesarean section and were in spontaneous labor in the absence of maternal or fetal compromise (ante-partum hemorrhage, fetal distress) or those who were admitted for induction and those willing to undergo a trial of labor after previous CS (TOLAC) were included in the study.

Exclusion Criteria: Females who had previous 2 more lower segment CS, had a contracted pelvis, had other obstetrical complications such as placenta previa, malpresentation/malpositioning of the fetus, failed induction, fetal distress and other medical comorbidities (uncontrolled diabetes, severe hypertension, acute liver disorder etc), with a history of myomectomy, intrauterine growth retardation and those who had signs and symptoms of ruptured uterus or scar dehiscence were excluded from the study.

Successful TOLAC was defined as a spontaneous or instrumental (vacuum or low forceps aided) birth to a woman undergoing TOLAC. Failure to achieve a vaginal birth after cesarean section in women undergoing a TOLAC and the delivery ending by emergency CS is defined as an unsuccessful TOLAC.

After giving their consent, the participants in this study underwent a thorough history to identify their maternal as well as obstetric characteristics (age, weight, height, gestational age, BMI) and indication of prior CS as well as a standard examination to determine the size of the fetus, the engagement of the head of fetus, the characteristics of the intrapartum membranes of the fetus and dilatation of the cervix. After determining the start of the active phase from the history for women who were admitted with cervical dilatation >4 cm, the overall labor duration was calculated.

Data was analyzed using Statistical Package for social sciences (SPSS) version 25.00. Quantitative data such as age, gestational age, duration of labor, estimated fetal weight, inter-pregnancy interval and bishop score was presented as mean and standard deviation. Qualitative data such as reasons of previous CS, interpregnancy interval, need of labor induction, method of induction, need of labor augmentation, PROM, cervical dilatation and effacement at admission, onset of labor, duration of passive and active phase of labor and VBAC was presented as frequency and percentage. Association between obstetrical factors and VBAC was determined by using Chi square test and a *p*-value of ≤0.05 was considered as significant.

RESULTS

A total of 340 females were enrolled. The mean age (in years) of the females was 27.71±3.05, the mean gestational age (in weeks) was 38.18±0.71, the mean bishop score was 6.63±2.11, the mean duration of labor (in hours) was 7.89±2.55, the mean estimated fetal weight (in Kgs) was 2.78±0.25 and the mean interpregnancy interval (in months) was 13.71±6.38 (Table-I).

The reasons for previous CS was breech presentation in 66(19.4%) patients, dystocia in 230(67.6%) females and cephalopelvic disproportion in 44(12.9%) females. Interpregnancy interval of 3 months was seen in 37(10.9%) females, of 3-6 months

was seen in 29(8.5%) females, of 7-12 months was seen in 111(32.6%) females, of 13-24 months was seen in 142(41.8%) and of >24 months was seen in 21(6.2%) females. Induction of labor was done in 35(10.3%) females and the method used was prostin in 18(5.3%) females, foleys in 15(4.4%) females and both in 2(0.6%) females. PROM occurred in 57(16.8%) females. Cervical dilatation at admission was ≤3cm in 82(24.1%) females and more than 3cm in 258(75.9%) females. Cervical effacement of ≤50% was seen in 102(30%) females and >50% occurred in 238(70%) females. Onset of labor was spontaneous in 305(89.7%) females and induced in 35(10.3%) females. VBAC was seen in 240(70.6%) (Table-II).

Table-I: Mean of Quantitative Variables (n=340)

Variables	Mean±SD
Age (in years)	27.71±3.05
Gestational age (in weeks)	38.18±0.71
Bishop score	6.63±2.11
Duration of labor (in hours)	7.89±2.55
Estimated fetal weight (in Kgs)	2.78±0.25
Interpregnancy interval (in months)	13.71±6.38

Table-II: Frequency Distribution of Qualitative Variables (n=340)

Variables	Frequency/percentage
Reason of previous CS:	
Breech presentation	66(19.4%)
Dystocia	230(67.6%)
Cephalopelvic disproportion	44(12.9%)
Interval between pregnancies:	37(10.9%)
0 to <3 months	29(8.5%)
3 to 6 months	111(32.6%)
7 to 12 months	142(41.8%)
13 to 24 months	21(6.2%)
>24 months	35(10.3%)
Induction of labor:	305(89.7%)
Yes	18(5.3%)
No Method of induction:	15(4.4%)
Prostin	2(0.6%)
Foleys	57(16.8%)
Both	283(83.2%)
PROM:	
Yes	
No	
Cervical dilatation at admission:	
≤3cm	82(24.1%)
>3cm	258(75.9%)
Cervical effacement: <50%	102(30%)
>50%	238(70%)
Onset of labor:	305(89.7%)
Spontaneous	35(10.3%)
Induced	206(60.6%)
Duration of passive phase of labor:	95(27.9%)
<12 hours	21(6.2%)
12 to 23 hours	18(5.3%)
24 to 48 hours	230(67.6%)
>48 hours Duration of active phase of labor:	94(27.6%)
<5 hours	16(4.7%)
5 to 8 hours	240(70.6%)
>8 hours	100(29.4%)
VBAC:	
Yes	
No	

Successful vaginal birth occurred more in females in which previous CS occurred because of dystocia, the interpregnancy interval was between 13 to 24 months, labor was neither augmented nor induced, there was no PROM, cervical dilatation was >3cm and cervical effacement was >50%, onset of labor was spontaneous, the duration of passive phase of labor was less than 12 hours, duration of active phase of labor was <5 hours, the Bishop score was more than 7 and the gestational age was between 36 to 39 weeks (Table-III).

DISCUSSION

The current study revealed that VBAC occurred successfully in 70.6% females. The obstetrical factors that were significantly associated with successful VBAC were interpregnancy interval (p=0.01), cervical dilatation (p=0.013), cervical effacement (0.019) and duration of active phase of labor (p=0.043). Among the obstetrical factors, successful VBAC occurred commonly in females who previously had CS because of Labour dystocia (47.4%), the interpregnancy interval was between 13 to 24 months (26.8%), cervical dilatation was of more than 3cm (56.2%), cervical effacement was more than 50% (52.1%), underwent spontaneous labor (64.1%), duration of passive phase of labore was <12 hours (41.5%), duration of active phase of labor was <5 hours (50.6%), bishop score was >7(34.4%), gestational age was between 36 to 39 weeks (47.4%) and fetal weight was between 2.6 to 3 kgs (49.7%).

The benefits and drawbacks of each delivery technique are different.[11] The obstetrician is ultimately in charge of making sure that the delivery plan is suitable in each specific circumstance.[12] The gradual increase in the CS rate is likely what sparked interest in vaginal birth after CS.[13] According to the literature, CS have higher rates of morbidity and mortality than vaginal deliveries.[14,15] This fact, along with the reduced reported rate of uterine rupture and the resulting maternal and foetal impairment, strongly supports the attempt at labour in carefully chosen patients who have had prior CS.[16]

In our study, vaginal deliveries successfully occurred in 70.6% females who had a previous one CS. In a study by Taj *et al*., it was revealed that successful VBAC occurred in 70% females.[8] Landon *et al*., revealed the rates of successful VBAC as 73.6%.[18] Abdelazim *et al*., revealed that successful VBAC occurred in 72.13% females.[19] These findings support

our study findings of higher rates of success vaginal birth in females who had a history of previous one CS.

Table-III: Association between various obstetrical factors and successful VBAC (n=340)

Obstetrical factors	VBAC		p Value
	Successful (n=240)	Unsuccessful (n=100)	
Reason of previous CS:			
Breech presentation	46 (13.5%)	20 (5.9%)	
Dystocia	161 (47.4%)	69 (20.3%)	0.788
Cephalopelvic disproportion	33 (9.7%)	11 (3.2%)	
Interval between pregnancies:			
0 to <3 months	33 (9.7%)	4 (1.2%)	
3 to 6 months	25 (7.4%)	4 (1.2%)	0.01
7 to 12 months	75 (22.1%)	36 (10.6%)	
13 to 24 months	91 (26.8%)	51 (15%)	
>24 months	16 (4.7%)	5 (1.5%)	
Augmentation of labor:			
Yes	66 (19.4%)	27 (7.9%)	0.925
No	174 (51.2%)	73 (21.5%)	
Induction of labor:			
Yes	22 (6.5%)	13 (3.8%)	0.289
No	218 (64.1%)	87 (25.6%)	
Method of induction:			
Prostin	13 (3.8%)	5 (1.5%)	
Foleys	7 (2.1%)	8 (2.4%)	0.164
Both	2 (0.6%)	0 (0%)	
PROM:			
Yes	39 (11.5%)	18 (5.3%)	0.694
No	201 (59.1%)	82 (24.1%)	
Cervical dilatation at admission:			
≤3cm			
>3cm	49 (14.4%)	33 (9.7%)	0.013
Cervical effacement:	191 (56.2%)	67 (19.7%)	
<50%			
>50%	63 (18.5%)	39 (11.5%)	0.019
	177 (52.1%)	61 (17.9%)	
Onset of labor:			
Induced			
Spontaneous	22 (6.5%)	13 (3.8%)	
Duration of passive phase of labor:	218 (64.1%)	87 (25.6%)	0.289
<12 hours			
12 to 23 hours			
24 to 48 hours	141 (41.5%)	65 (19.1%)	
>48 hours	68 (20%)	27 (7.9%)	
Duration of active phase of labor:	19 (5.6%)	2 (0.6%)	0.201
<5 hours	12 (3.5%)	6 (1.8%)	
5 to 8 hours			
>8 hours			
Bishop score:	172 (50.6%)	58 (17.1%)	
0 to 3	59 (17.4%)	35 (10.3%)	
4 to 7	9 (2.6%)	7 (2.1%)	0.043
>7			
Gestational age:	14 (4.1%)	7 (2.1%)	
36 to 39 weeks	109 (32.1%)	47 (13.8%)	
39.1 to 40 weeks	117 (34.4%)	46 (13.5%)	0.858
Fetal weight:			
2 to 2.5 Kgs	161 (47.4%)	58 (17.1%)	
2.6 to 3 Kgs	79 (23.2%)	42 (12.4%)	0.111
3.1 to 3.5 Kgs			
	42 (12.4%)	10 (2.9%)	
	169 (49.7%)	81 (23.8%)	0.118
	29 (8.5%)	9 (2.6%)	

In a systematic review, it was revealed that bishop score, induction of labor, dystocia were among the few obstetrical factors that were associated with successful VBAC.[17] Landon *et al*., revealed that females who had successful VBAC were most likely to have greater dilation of cervix at the time of admission

(≥4cm), were in spontaneous labor, were of lesser gestational age (between 37 to 40 weeks), had fetal birth weight between 2.5 to 3.9 Kgs and had a history of dystocia for previous one CS.[18] In another study, Abdelazim *et al*., revealed that the obstetrical factors that were significantly associated with unsuccessful VBAC were fetal weight of >3 Kgs, cervical dilatation was less than 4cm at admission, had a duration of labor of >7 hours and in which labor was augmented.[19] These studies support our study findings that duration of labor and cervical dilatation are significant factors that can predict whether a successful trial of vaginal delivery can occur after previous one CS or not.

Care is needed in terms of augmentation of labor in patients undergoing a trial of labor after previous CS.[20] This study would help in guiding the obstetricians about obstetrical factors that can guide them in terms of giving a trial of labor to females who had a history of previous one CS. This can help in reducing the rates of CS among pregnant females and thus can improve overall morbidity and reduce the rates of complications associated with CS.

ACKNOWLEDGEMENT

We would like to take this opportunity to express our gratitude to the department of Obstetrics and Gynecology faculty, fellows, postgraduates and staff for their unwavering support in making this study a success.

LIMITATIONS OF STUDY

The current study had few limitations. Firstly, only obstetrical factors were considered in this study and the demographic and fetal factors were not assessed which could have affected the results.

Secondly, the outcome of the trial of labor after one CS was not assessed.

CONCLUSION

The current study concluded that successful vaginal delivery was frequently seen in females who had previous one cesarean section i.e. in 70.6% females. The obstetrical factors that were significantly associated with successful VBAC were inter pregnancy interval, cervical dilatation, cervical effacement and duration of active phase of labor.

Conflict of Interest: None.

Funding Source: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

HS & AC: Data acquisition, data analysis, critical review, approval of the final version to be published.

FM & TR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SS & Z: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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