

# Maternal and Fetal Outcome in Patients with Vaginal Birth After Caesarean Delivery Comparison to and Elective Caesarean Section with Previous One LSCS

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## ABSTRACT

**Introduction:** Noteworthy improvements in maternal morbidity and mortality have been made possible by Caesarean section. However, vaginal birth after caesarean section (VBAC) is linked with better outcome in certain regards. The present study was aimed to study the maternal and fetal outcome in patients with VBAC and elective caesarean section with previous one LSCS.

**Methodology:** Women with history of previous LSCS were divided in to two groups: Group 1- Women delivered by VBAD in the current pregnancy, and Group 2 - Women delivered by elective LSCS in the current pregnancy. Maternal and foetal outcome were assessed after delivery.

**Results:** Total 90 women in each group were included in the study. The duration of active stage of labour was significantly higher in LSCS group compared VBAC group ( $p < 0.05$ ). Blood Transfusion and Premature rupture of membrane were not associated with any of the two groups. ( $p > 0.05$ ). The mean APGAR score at 1 min and 5 min were significantly better in VBAC group compared to in LSCS group ( $p < 0.01$ ). Mean stay of hospitalization was significantly higher in LSCS group ( $p < 0.01$ ).

**Conclusion:** Better Bisho's score has significantly more chances of successful VBAC. VBAC has better APGAR score at 1 min and at 5 min compared to LSCS group. Birth weight is not affected by the type of delivery after first caesarian delivery.

## INTRODUCTION

Women after delivering their first baby by caesarean section have a choice about mode of delivery for their second baby. Usually, they will be offered the option of trying a vaginal birth after caesarean section (VBAC) or undergoing an elective repeat caesarean section (ERCS). Most of women with an uncomplicated first caesarean

section, in an otherwise uneventful pregnancy, are contenders for attempting VBAC. [1,2]

Use of VBAC in several countries has been declined in recent years. [3,4] In USA, the overall rate of VBAC decreased from 24% in 1996 to 8% in 2010. This descending trend, supplemented by rising rates of primary CS, has been a important component of the overall caesare-

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an section rate, which remains to cause extensive public & professional concern. [5,6]

This decline has been a response to providers' fear of liability and new evidence on the risks associated with VBAC. [7,8] There is lack of randomised controlled trials comparing planned VBAC versus ERCS. Though several observational studies inspecting maternal & neonatal outcomes of failed trial of labour have recognized an amplified risk of various complications. These complications are: uterine rupture during labour, complications of emergency caesarean section and perinatal mortality or morbidity. [9,10] Still, lowest overall morbidity rates are observed with successful VBACs. [11]

Caesarean delivery is an operative procedure to deliver a baby with an incision in the uterus. It is the most regularly done surgical procedure throughout the world. [12] Although disparity exists in rates of caesarean delivery across all the countries; currently the rate ranges from 10% to 40%. [13] High caesarean section rate increases economic burden on the nations and individuals.

Commonest cause of increased caesarean section rate in many parts of the world is previous caesarean section. As there is increased risk of maternal complications with repeat caesarean section and VBAC is proved relative safe, trial of labour (TOL) for particular group of patients with previous LSCS has become a favored strategy. [12] In the absence of a contraindication, ACOG recommended that, a woman with one preceding low-transverse cesarean delivery be advised to have attempted labor in a subsequent pregnancy. [14]

Vaginal birth after cesarean section (VBAC) is linked with less blood loss and fewer transfusions, shorter maternal hospitalizations, fewer thrombo-embolic events & fewer infections than cesarean delivery. Many studies have showed the absolute risk of uterine rupture due to trial of labor is about 1 per 1000. [14]

Success rate of vaginal birth after previous caesarean section has been reported 60 to 80% by most of the authors if the primary caesarean was done due to non-recurring indications. are: Foetal distress, poor labour progress, transverse lie, oblique lie, placenta previa, breech presentation, twins and pregnancy induced hypertension are amongst some of the non-recurring indications for caesarean section. [15]

Noteworthy improvements in maternal morbidity and mortality have been made possible by Caesarean section. [16] However now-a-days the numbers of women delivering by CS has increased abruptly, and repeat CS is often considered as the best method of delivery for optimal maternal and perinatal outcome. [17] But long-term effects of caesarean section on both mother and baby need to be addressed and there is urgent need to reduce caesarean section rates. Eith the help of many recent studies, it is understood that neonatal morbidity linked with elective cesarean delivery at term surges as gestational age at delivery falls from 39 to 37 weeks. [18,19]

With this background, the present study was aimed to study the maternal and fetal outcome in patients with VBAC and elective caesarean section with previous one LSCS.

## METHODOLOGY

This prospective interventional study was conducted in the labour room of the Obstetrics and Gynaecology department of United Institute of Medical Sciences, Prayagraj, Uttar Pradesh, India during year 2021.

This study was conducted among women with full term pregnancy having history of previous LSCS.

Women with history of previous LSCS were divided in to two groups considering inclusion and exclusion criteria: Group 1- Women delivered by VBAC in the current pregnancy, and Group 2 - Women delivered by elective LSCS in the current pregnancy,

**Sample size:** Taking PPH rate of 9.3% in intentional successful VABC[20], two-sided significance level(1-alpha) 95%, Power(1-beta) 80%, Ratio of sample size of two groups 1:1 and OR of 0.03 the calculated sample size for each comparison group using OpenEpi software[21] was 89 which was rounded to 90. So the total sample size was 180. The sample was divided equally among two groups.

### Eligibility Criteria for VBAC group (Group 1)

Pregnant women with full term gestation with previous LSCS fulfilling criteria for VBAC i.e. women with previous one LSCS indication being non-recurrent, sufficient inter delivery interval, and no other uterine scars or previous rupture or scar tenderness were included in this group.

Women with any of the condition like more than one previous LSCS, multiple gestational pregnancy, associated complications during pregnancy, moderate and major degree CPD, baby weight more than 3.5kg, breech presentation, scar thickness less than 2 mm, women having associated complications during pregnancy (Antepartum haemorrhage, gestational hypertension, oligohydramnios, polyhydramnios or any other medical disorders) were excluded from this group.

### Eligibility criteria for Elective LSCS (Group 2)

Those women who had history of previous LSCS and did not want to attempt vaginal birth was included in group 2.

### Procedure

Labour was monitored hourly by recording of vital parameters that is, temperature, pulse, respiration and blood pressure. These women were also be monitored for uterine contractions and closely and watched for early recognition of scar dehiscence by identifying maternal tachycardia in absence of vaginal bleeding, scar tenderness and fetal heart rate alterations.

Progress of labour was observed meticulously by periodically noting with the help of modified WHO partograph that is, progressive descent of fetus, progressive dilatation of cervix and station of the presenting part.

### Outcome variables

**Maternal outcome:** The selected women were evaluated for mode of delivery with respect to Bishop's score ( $\geq 6$  to 9 and 10 to 13). Onset of labour was regarded as spontaneous or induced. Pregnancy outcome was regarded as live birth or fetal death. They were also monitored for complications during the labour, delivery and post-delivery including scar dehiscence, wound sepsis, blood transfusion, prolonged catheterisation, requirement of blood transfusion etc.

**Neonatal outcome:** The neonates were evaluated for birth weight, APGAR score, NICU admission, and hospital stay.

### Ethical Consideration

The study was initiated after approval of institutional ethical committee. All cases were included only after informed written consent. Confidentiality of data was maintained at all stage of the study.

### Data Analysis

Interpretation of the data will be carried out, and analyzed using Microsoft excel and by the software Statistical Package for Social Sciences SPSS version 14.0. Standard formula will be used for data analysis. We will use standard t-test for statistical analysis and  $P \leq 0.05$  would be considered statistically significant.

## RESULTS

The present study was conducted among 180 women

having history of previous LSCS to study the maternal and fetal outcome in patients with vaginal delivery and elective caesarean section.

In both, Successful VABC group and LSCS group, the difference in mean age, height and BMI were statistically non-significant ( $p > 0.05$ ). Overweight and obesity were significantly higher in LSCS group compared VBAC group ( $p < 0.05$ ) (table 1).

Gestational age, inter-delivery interval, abdominally palpability of more than 2/5 Fetal Head, cervical dilatation on admission and Bishop's score were significantly higher in LSCS group compared VBAC group ( $p < 0.05$ ) (table 2).

**Table 1: Comparison of basic profile of women between Successful VABC group and LSCS group**

Variables	Successful VBAC (n=90) (%)	LSCS (n=90) (%)	P value
<b>Age (yrs)</b>			
<25	12 (13.33)	14 (15.56)	
25-30	46 (51.11)	43 (47.78)	
>30	32 (35.56)	33 (36.67)	
Mean $\pm$ SD	28.1 $\pm$ 3.2	27.3 $\pm$ 2.9	0.081
<b>BMI (kg/m<sup>2</sup>)</b>			
>25 kg/m <sup>2</sup>	18 (20)	30 (33.33)	0.043
$\leq$ 25kg/m <sup>2</sup>	72 (80)	60 (66.67)	
<b>Height (cm)</b>			
<150 cm	14 (15.56)	21 (23.33)	0.1876
$\geq$ 150 cm	76 (84.44)	69 (76.67)	
<b>Weight (kg)</b>			
<55kg	6 (6.67)	11 (12.22)	
55 to 65 kg	42 (46.67)	31 (34.44)	
>65 kg	42 (46.67)	48 (53.33)	
Mean $\pm$ SD	65.7 $\pm$ 7.6	68.4 $\pm$ 8.1	0.022

**Table 2: Comparison of Obstetrical profile of women between Successful VABC group and LSCS group**

Variables	Successful VBAC (n=90) (%)	LSCS (n=90) (%)	P value
<b>Gestational Age (wk) on admission</b>			
>40 wks	8 (8.89)	18 (20)	0.018
<40 weeks	82 (1.11)	72 (80)	
<b>Inter-delivery interval</b>			
<2 years	10 (11.11)	21 (23.33)	0.03
$\geq$ 2 years	80 (88.89)	69 (76.67)	
<b>Prior vaginal birth</b>			
Yes	30 (33.3)	18 (20)	0.043
No	60 (66.7)	72 (80)	
<b>Foetal Head palpable abdominally</b>			
$\geq$ 2/5 palpable abdominally	16 (17.78)	28 (31.11)	0.037
<2/5 palpable abdominally	74 (82.22)	62 (68.89)	
Total	90 (100)	90 (100)	
<b>Cervical dilatation on admission (cm)</b>			
<4cm	13 (14.44)	24 (26.67)	0.042
$\geq$ 4cm	77 (85.56)	66 (73.33)	
<b>Bisho's score</b>			
6 to 9	46 (51.11)	81 (90)	<0.001
10 to 13	44 (48.89)	9 (10)	

**Table 3: Comparison of maternal outcome between Successful VBAC group and LSCS group**

Maternal Outcome	Successful VBAC (n=90) (%)	LSCS (n=90) (%)	P value
<b>Premature rupture of membrane (PROM)</b>			
Yes	14 (15.56)	16 (17.78)	0.689
No	76 (84.44)	74 (82.22)	
<b>Duration of active stage of labour (h)</b>			
>7hr	11 (12.22)	22 (24.44)	0.034
<=7hr	79 (87.78)	68 (75.56)	
<b>Blood Transfusion</b>			
Required	8 (8.9)	14 (14.4)	0.172
Not required	82 (91.1)	76 (85.6)	
<b>Complications</b>			
Scar dehiscence	2 (2.22)	3 (3.33)	0.65
Fever	6 (6.67)	8 (8.89)	0.578
PPH	2 (2.22)	1 (1.11)	0.56
Wound infection	-	3 (3.33)	-

**Table 4: Comparison of foetal outcome between Successful VBAC group and LSCS group**

Neonatal Outcome	Successful VBAC (n=90) (%)	LSCS (n=90) (%)	P value
<b>Birth Weight (gm)</b>			
<2500	17 (18.89)	13 (14.44)	0.368
2500-3000	62 (68.89)	56 (62.22)	
>3000	11 (12.22)	21 (23.33)	
Mean ± SD	2832±721	2917±528	
<b>APGAR Score 1 min</b>	7.6±1.7*	7.1±1.6	0.044
<b>APGAR Score 5 min</b>	8.7±1.1*	8.2±0.9	0.001
<b>Delivery Outcome</b>			
Live birth	89 (98.89)	90 (100)	-
Still Birth	1 (1.11)	0 (0)	
<b>Mean hospital stay (days)</b>	2.92 ± 0.69*	6.97±0.76	<0.001

\*Value calculated for 89 newborns only because of 1 still birth.

Duration of active stage of labour more than 7 hours was found in 11 (12.2%) cases in successful VBAC group and 22 (24.4%) cases in LSCS group. The duration of active stage of labour was significantly higher in LSCS group compared VBAC group ( $p<0.05$ ). Blood Transfusion and Premature rupture of membrane were not associated with any of the two groups. ( $p>0.05$ ) (table 3).

Mean birth weight was 2832 gram in successful VBAC group and Mean birth weight was 2917 gram in LSCS group. There is no significant difference in birth weight in both the groups ( $p>0.05$ ). Mean APGAR score at 1 min was 7.6 and 7.1 in successful VBAC group and LSCS group respectively. The difference between both the group was statistically significant ( $p<0.05$ ) which indicates that APGAR score at 1 min was significantly better in VBAC group. Similarly mean APGAR score at 5 min was significantly better in VBAC group compared to in LSCS group ( $p<0.01$ ) (table 4).

Scar dehiscence, fever and PPH were found in 2.2%, 6.7% and 2.2% cases respectively in VBAC group while the same was 3.3%, 8.9% and 1.1% respectively in LSCS group. Wound infection was not found in any case in VBAC group while it was found in 3 cases in LASC

group. However, occurrence in individual complication was statistically not significant ( $p>0.05$ ) between both groups.

## DISCUSSION

Caesarean section is one of the most frequently executed major surgical technique. [12] In last three decades, there is increase in caesarean section (CS) rate worldwide. Due to increasing rates of caesarean section, many recommendations were made that vaginal birth after caesarean section (VBAC) might help in decreasing the rates of CS. [22]

Gestational age, inter-delivery interval, abdominally palpability of more than 2/5 Fetal Head, cervical dilatation on admission and Bishop's score were significantly higher in LSCS group compared VBAC group ( $p<0.05$ ). In the study done by Smith et al [23], they concluded that VBAC is likely to be failed at 41–42 gestational weeks compared with VBAC at 40 weeks. While Coassolo et al [24] described 31.3% VBAC failure at 40 gestational weeks or beyond against 22% in less than 40 gestational weeks.

Abdelazim et al [25] concluded that the women admitted with cervical dilatation <4 cm and head station  $\geq -2$  are at high risk of unsuccessful trial of labor after previous CS. In a study done by Sakiyeva KZ et al, [26] they concluded that number of unsuccessful VBACs were significantly higher among women with  $\geq 2/5$  of foetal head palpable abdominally, foetal head station  $\geq -2$  and inter-delivery interval <2 years in comparison to unsuccessful group. Bangal et al [27] concluded in their study that the rate of vaginal delivery was significantly higher in women having Bishop's score between 10 to 13 (94.64%) in comparison to 6 to 9 (61.25%) Raja et al. [28] included 100 women in their study and they were studied according to gestational age, Bishop's score, vaginal birth history, indication of the previous cesarean and BMI.

Duration of active stage of labour more than 7 hours was found in 11 (12.2%) cases in successful VBAC group and 22 (24.4%) cases in LSCS group. The duration of active stage of labour was significantly higher in LSCS group compared VBAC group ( $p < 0.05$ ). Blood Transfusion and Premature rupture of membrane were not associated with any of the two groups. ( $p > 0.05$ ). In a study done by Bangal et al. [27], most common maternal complication was fever (7.35%). Other maternal complications were scar dehiscence (3.68%), wound infection (2.21%) and PPH (1.47%). In the study done by Sakiyeva KZ et al [26], impending rupture of uterus and scar dehiscence was found in 0.38% (1/258) case each among unsuccessful VBAC group in comparison to successful group (P value 0.08).

In a study done by Sakiyeva KZ et al [26], the number of women admitted with duration of active phase of labor >7 hours and cervical dilatation <4 cm was statistically significant on higher side in failed VBAC group compared with successful group. Additionally, Odds ratio and logistic analysis of the study participant women showed that the duration of labor  $\leq 7$  hours and cervical dilatation  $\geq 4$  cm were significantly associated with successful VBAC. While Durnwald et al [29] reported increased chances of successful VBAC in women admitted with cervical dilatation >1 cm. Across the globe [30] obstetricians found that the requirement of blood during and after delivery is increasing. Postpartum hemorrhage (PPH) [31] is the main reason for blood transfusion. Previous cesarean section is one of the important risk factors for blood transfusion. [32]

In this study there is no significant difference in birth weight in both the groups ( $p > 0.05$ ). However, the mean APGAR score at 1 min and 5 min were significantly better in VBAC group compared to in LSCS group ( $p < 0.01$ ). Occurrence of complication was statistically not significant ( $p > 0.05$ ) between both groups. Mean stay of hospitalization was significantly higher in LSCS group ( $p < 0.01$ ). In a study done by Bangal et al [27], maximum number of the babies' weight were between 2.500 to 2.999 Kg (60.29%).

Belihu et al [33] found that there are differences in successful VBAC between Australian-born women and East-

ern African origin women. Failed VBAC attempt is more common among Eastern African immigrants in comparison to Australian immigrants, signifying the necessity for enhanced strategies to choose and maintain probable contenders for vaginal birth after CS amid these immigrants. There is also need to diminish possible complications related with unsuccessful VBAC attempt. Minsart et al [34] studied the Australian and North American women's cohort who delivered in Shanghai. They concluded that they have lesser rates of trial of labour after LSCS and VBAC, whereas the European origin women had the maximum rate of trial of labour after LSCS, trailed by Chinese origin women. Seffah and Adu-Bonsaffoh from Ghana recommended that satisfactory education and counseling to pregnant women and his family with appropriate choice of patient for labour trial after CS remains the keystone to attain higher VBAC achievement rate with minimal antagonistic outcomes in low-resource settings. [35] Mu et al [36] recommended that national guidelines and policies on VBAC are desired to safeguard the protection of the mothers and their newborns. Torigoe et al [37] concluded that the official policies and practices for VBAC differ broadly in Japan and established that approaches as well as health care providers to pregnant women should support women to consider VBAC as a conceivable birth option after LSCS.

## CONCLUSION

From this study we conclude that Inter-delivery interval, fetal head palpability, cervical dilatation are significantly lower in women LSCS group compared VBAC group while duration of active stage of labour is significantly higher in LSCS group compared VBAC group. Successful VBAC was associated with prior history of vaginal birth. Better Bishop's score has significantly more chances of successful VBAC. VBAC has better APGAR score at 1 min and at 5 min compared to LSCS group. Birth weight is not affected by the type of delivery after first caesarian delivery. PROM and requirement of augmentation are similar in both type of delivery, VBAC as well as LSCS. Occurrence in individual complication is also not associated with type of delivery, VBAC as well as LSCS.

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