

# Maternal and Foetal Outcomes in Patients with Previous Caesarean Section Undergoing Trial of Vaginal Birth at a Tertiary Care Centre in North India

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## Abstract

**Objective:** The objective of this study is to evaluate clinical criteria conventionally known to affect mode of delivery in previous caesarean section cases. We also aim to study the maternal and neonatal outcome in vaginal birth after Caesarean section and repeat Caesarean Section.

**Study Design:** This is a prospective longitudinal study.

**Patients and Methods:** Pregnant women with previous caesarean section presenting in antenatal clinic were recruited in the study. A detailed history was taken and routine antenatal care given. Mode of delivery decided as per the protocol followed in routine. Maternal and neonatal outcome were noted.

**Result:** The VBAC rate was 67.6%. Foetal distress and meconium stained liquor were the most common indications of repeat Caesarean section. Interval between previous Caesarean and current pregnancy was significantly more in the vaginal delivery group (p value <0.001). The number of prior vaginal deliveries after Caesarean section was significantly more in the vaginal delivery group (p value <0.001). Incidence of Caesarean hysterectomy and infectious morbidity were significantly more in emergency repeat Caesarean section group. There was no significant difference in the neonatal outcome in the two groups.

**Conclusion:** Successful trial of labour in previous caesarean is associated with better outcomes than emergency caesarean section and hence appropriate selection of patients for trial of VBAC is necessary, especially in low resource settings where facilities of foeto-maternal monitoring are limited.

**Keywords:** Vaginal birth after caesarean; Previous caesarean section; Scar dehiscence; Scar rupture

## Introduction

Caesarean section is the most commonly performed surgery in obstetrics. Due to the rise in Caesarean section rate in past few years, the number of pregnancies with previous Caesarean section has also increased. There is no consensus regarding decision of mode of delivery in patients with previous Caesarean section. In recent years, there has been increasing concern about the increase in morbidity associated with trial of labour after previous Caesarean, particularly the risk of uterine rupture [1]. Despite many studies being conducted regarding factors affecting the outcome of VBAC like interval between previous Caesarean and current pregnancy, indication of previous caesarean, previous successful vaginal deliveries, postoperative wound sepsis etc., there are no standard guidelines for patients of previous caesarean section to attempt VBAC. There is insufficient evidence to recommend the mode of delivery in pregnancies with previous Caesarean [2] and this subject continues to be a matter of debate at present. Studies now prove that VBAC is a safer alternative to repeat elective Caesarean section for the mother and baby [3,4]. Data regarding this issue are still lacking in India which prompted this study.

## Methodology

142 pregnant women with previous one caesarean section before 36 weeks of gestation presenting in antenatal clinic of tertiary care hospital in North India were included in the study. Prevalence of VBAC is 40% in previous caesarean section patients. Keeping a 10% margin of error at 95% confidence interval, estimated number of patients required for this study was 100. Patients with more than one previous Caesarean section, grossly contracted pelvis, previous vesico-vaginal fistula repair

or other universally accepted indication of elective LSCS were excluded from study. The study recruited 168 patients with previous one lower segment caesarean section attending antenatal clinic of tertiary care hospital, however, 26 were lost to follow-up. Patients' history were taken including a detailed obstetric history with special reference to indication of previous caesarean, preoperative, intraoperative and postoperative complication, wound sepsis and delayed stitch removal. Patients received routine antenatal care. Patients were followed till term and the mode of delivery was decided according to the routine hospital protocol. Only two women had to undergo elective Caesarean section due to placenta previa and contracted pelvis. The remaining 140 women opted for vaginal delivery. At term gestation vaginal examination was performed by the consultant for pelvic assessment to decide the mode of delivery. Maternal and foetal monitoring was done as per labour protocol followed in the department. Decision for repeat emergency Caesarean was taken by registrars or consultants who were blinded to the study. If the patients had to undergo emergency repeat caesarean section, all operative findings were noted including integrity

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of previous caesarean scar and other intraoperative problems. Scar rupture was defined as complete disruption of myometrium along with the serosa and the foetal membranes whereas uterine dehiscence is defined as asymptomatic disruption of myometrium only. Primary outcome measures were the foetal outcomes in terms of Apgar score, birth weight, period or gestation at delivery, admission in neonatal intensive care unit, neonatal morbidity and mortality. Secondary outcome measures were maternal outcomes in terms of intrapartum and postpartum complications, febrile morbidity, need for blood transfusion, wound sepsis and need for hysterectomy. Study protocol is shown in Figure 1. All quantitative normally distributed data were analysed by Student T Test and all quantitative non-normally distributed data by Mann Whitney U Test. All Quantitative data were analysed by Chi Square Test. Probability of 5% for the level of significance was used.

## Results

The study was conducted over a period of two years from July, 2010 to August, 2012. Patients were recruited till March, 2012. Demographic details of the study population are depicted in Table 1 and mode of delivery is depicted in Table 2. Religious and socio-economic details

were also included as we wanted to study their effect on decision making among pregnant women. The Caesarean section rate was 32.4 % and the rate of successful VBAC was 67.6%. Two patients had elective repeat Caesarean section in view of placenta previa and contracted pelvis. 44 patients had to undergo emergency repeat caesarean section in view of non-reassuring foetal heart rate pattern (48%), meconium stained liquor (24%), scar tenderness and dehiscence (11%), failed induction (6%) or cephalo-pelvic disproportion (11%). Cephalo-pelvic disproportion was identified by digital pelvic examination. In 39.5% cases, the indications of previous caesarean section were elective and emergency in the rest of the cases. Repeat Caesarean section was significantly more common in patients who had cephalo-pelvic disproportion as the indication of previous caesarean. The maternal characteristics known to affect the mode of delivery are depicted in Table 3. Intrapartum & postpartum complications among patients who delivered vaginally and by caesarean section are depicted in Table 4. Unintended harms were seen in few patients undergoing trial of labour. One patient who was taken for emergency Caesarean section in view of foetal bradycardia had to undergo Caesarean hysterectomy due to atonic postpartum haemorrhage which could not be controlled by other medical and surgical approaches. Intra-operatively one case

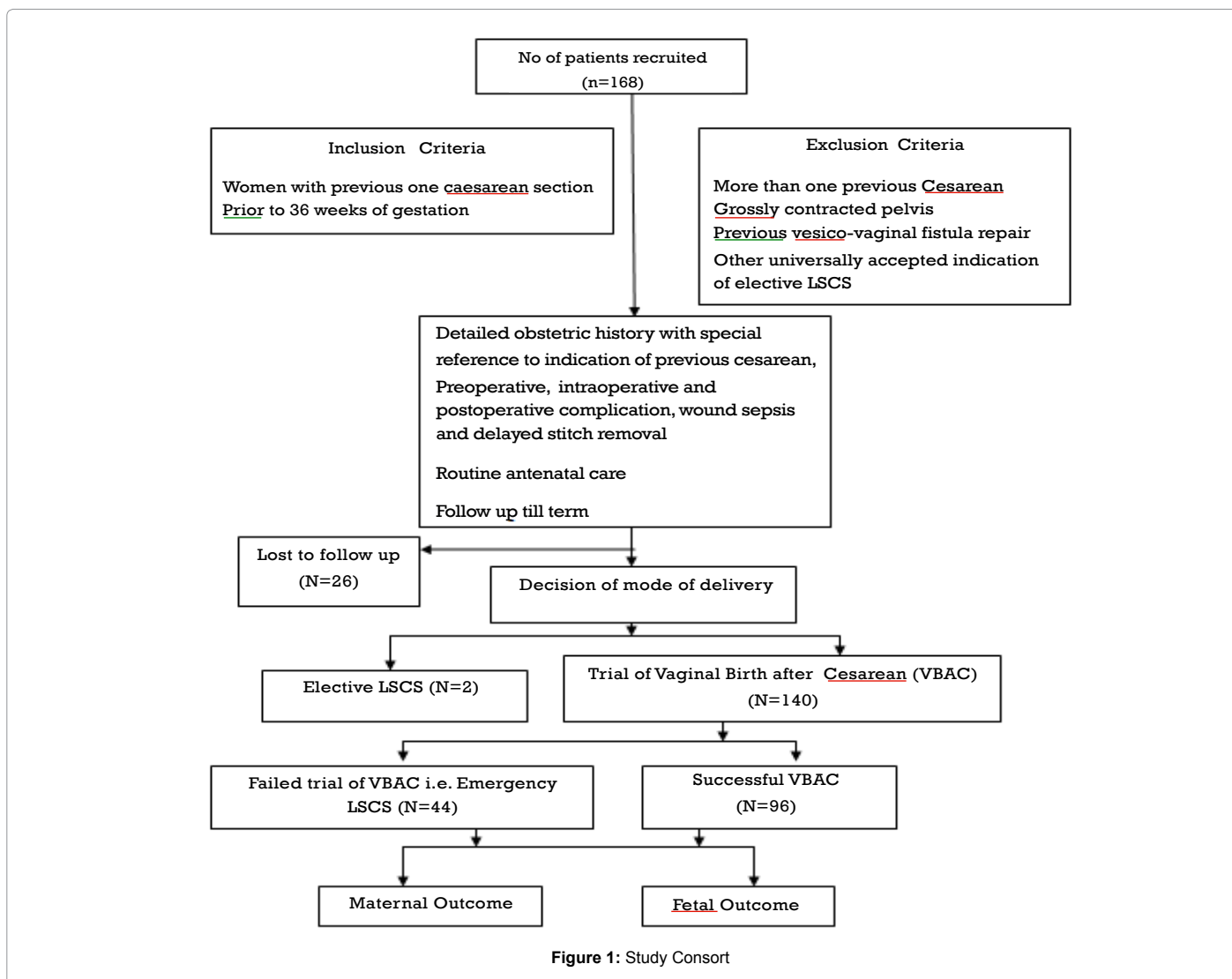


Figure 1: Study Consort

Characteristics	Vaginal Delivery (n=96)	Operative Delivery (n=46)	P value
<b>Age (in years)</b>			
<20	0	0	0.17
20 – 24	19	11	
25 – 29	65	30	
29 – 30	12	5	
≥ 30	26.79 ± 2.56	26.24 ± 2.24	
<b>Mean age (years)</b>			
<b>Religion</b>			Not Significant
Muslim	53	20	
Hindu	40	22	
Christian	2	2	
Sikh	2	1	
<b>Educational status</b>			0.21
Illiterate (group 1)	7	4	
Primary (group 2)	45	20	
Secondary and senior secondary (group 3)	31	18	
Graduate( group 4)	12	2	
Post graduate( group 5)	1	2	
<b>Socioeconomic status</b>			0.15
Upper class	–	1	
Upper middle class	1	1	
Lower middle class	23	12	
Upper lower class	38	19	
Lower class	30	9	

Table 1: Distribution on the basis of demographic details

Mode of delivery	Number (n=142)	Percentage (%)
<b>Vaginal delivery</b>	96	<b>67.6</b>
Normal vaginal delivery	91	64.1
Instrumental	5	3.5
<b>LSCS</b>	46	<b>32.4</b>
Elective	2	2.8
Emergency	44	29.6

Table 2: Mode of delivery in study population

of scar rupture and two cases of scar dehiscence were seen. The rate of scar rupture in this study was 0.7% and that of asymptomatic uterine dehiscence diagnosed per-operatively was 1.4%. Neonatal outcome in both the groups is depicted in Table 5.

## Discussion

The success rate of VBAC in this study was 67.6%. According to guidelines of ACOG regarding VBAC in 1999 [5], the success rate of VBAC ranges between 60 to 80%. In a study conducted in a tertiary care hospital in south India by George et al. [6], the success rate of VBAC was 60%. Sen et al. [7] conducted a study in North India and reported the rate of successful VBAC to be 63.5%. Western literature reports comparable rates of successful VBAC, with the success rate ranging between 70% to 80% [8-10]. Thus, the rate of successful VBAC is reported to be in the lower range in Indian literature as compared to western literature. This difference may be due to the lack of resources for emergency Caesarean section in India, giving rise to increase number of elective Caesarean section in such cases. Moreover, due to better facilities of electronic foetal monitoring in the West, the patients are allowed for trial of vaginal delivery till significant indication for

Caesarean section is there, whereas patients are taken up for Caesarean section at the slightest indication in low resource settings.

The indication of repeat emergency Caesarean section was foetal distress (47.9%) in maximum number of patients in our study. Lydon-Rochelle et al. [11] reported failure to progress as the most common indication (60.1%). Foetal indications were less common (5.8%). The rate of scar rupture in our study was 0.7% and that of asymptomatic uterine dehiscence diagnosed per-operatively was 1.4%. The risk of uterine rupture as reported in various studies ranges from 0.3% to 4% [12,13]. Cephalo-pelvic disproportion was the indication of previous Caesarean in 20% cases and was associated with higher risks of Caesarean Section (p value of 0.03). Peaceman et al. [14] reported that cephalo-pelvic disproportion was the indication of prior Caesarean delivery in 44.9% cases. He also reported that successful VBAC occurred in 54% patients who had previous Caesarean for cephalo-pelvic disproportion and in 67% patients who had other indications.

The variables associated with success of trial of labour in previous caesarean patients were evaluated in this study. The interval between previous Caesarean and current pregnancy is one such variable. In our study, 14 patients with an interdelivery interval of less than 19 months had Caesarean section whereas only 5 patients with this interval of less than 19 months had vaginal delivery (p value < 0.0006). Huang et al. [15] had earlier concluded in their study that interdelivery interval of less than 19 months were associated with a decreased rate of VBAC success in those who had induction but not in those who went into spontaneous labour. Shipp et al. [16] reported an increased rate of uterine rupture during a trial of labour in VBAC patients with interdelivery interval of less than 18 months. Esposito et al. [17] also observed an increase in the rate of uterine rupture with short interpregnancy interval of less than 6 months. A short interdelivery interval allows inadequate time for post-partum healing of the previous Caesarean scar.

The presence of prior vaginal delivery is associated with increased success of trial of VBAC as seen in this study (p value < 0.001). Zelop et al. [18] found that having a previous vaginal delivery is associated with a decreased risk of uterine rupture. Leung et al. [19] reported a protective effect of having a prior vaginal delivery (Odd's ratio = 0.5) but did not report a statistically significant difference in the rate of uterine rupture among the two groups. Cahill et al. [3] reported that the maternal morbidities including uterine rupture were less in those previous Caesarean patients who also had a prior vaginal delivery. Due to small number of uterine rupture cases, we could not find a significant association between these variables. The association of postoperative complications (wound sepsis and febrile morbidity) during previous caesarean with mode of delivery in current pregnancy was not statistically significant in our study unlike other studies [2,20].

Maternal outcome in this study was noted in terms of mode of delivery as well as operative and postoperative complications. The main operative complication was of uterine atony leading to excessive blood loss in 3.5% and Caesarean hysterectomy in 0.7% of the study population. Durnwald et al. [4] reported uterine atony in 4.1% of the study population and according to their study Caesarean hysterectomy was done in 0.1% of patients undergoing trial of labour. Bailit et al. [21] reported the hysterectomy rate of 0.4%. In our study, 1.1% patients with vaginal delivery and 10.8% patients with operative delivery, wound sepsis was seen and this difference was statistically significant. Bailit et al. [21] reported the wound sepsis rate of 0.6% in patients having repeat Caesarean and 0.3% patients. Durnwald et al. [4] reported the maternal sepsis in 0.09% patients undergoing trial of labour and 0.1% patients with elective Caesarean section. Other maternal complications like

Characteristics	Vaginal delivery	Cesarean delivery	p value
<b>Interval between previous cesarean and current pregnancy (in months)</b>			
<12 (N=6)	-	6	-
13 – 18 (N=13)	5	8	<0.011
19 – 24 (N=23)	15	8	<0.001
25 – 36 (N=46)	32	14	<0.001
37 – 48 (N=16)	14	2	<0.001
>48 (N=38)	30	8	<0.001
<b>No. of vaginal deliveries after cesarean</b>			
None (N=116)	77 (66.4)	39 (33.6)	0.13
One (N=24)	18 (75)	6 (25)	<0.001
Two (N=2)	1 (50)	1 (50)	-
<b>Post operative complications in previous Cesarean</b>			
Wound sepsis (N=5) (conservative management)	2(40)	3(60)	0.163
Wound sepsis (N=4) (requiring resuturing)	2(50)	2(50)	0.163
Febrile morbidity (N=4)	2(50)	2(50)	0.525
Blood transfusion	2(2.2)	1(2.2)	0.962
<b>Cephalo-pelvic Disproportion as indication of previous Cesarean</b>	3	18	<b>0.03</b>
<b>Gestational Age (Mean ± SD) in weeks</b>	38.03 ± 1.25	38.44 ± 1.22	<b>0.047</b>
<b>Birth Weight (Mean ± SD) in grams</b>	2704.13 ± 322.10	2769.17 ± 243.18	0.189

Table 3: Comparison of various characteristics among patients with vaginal and cesarean delivery

Operative and postpartum Complications	Vaginal Delivery (n=96)	Operative Delivery (n=46)	p value
	No. (%)	No. (%)	
<b>Cesarean hysterectomy</b>	-	1 (2.1)	-
<b>Wound sepsis</b>	1(1.1)	5(10.8)	<b>0.048</b>
Resuturing	-	1(2.2)	
Conservative management	1(1.1)	4(8.6)	
<b>Blood Transfusion</b>	-	5(10.8)	-
<b>Prolonged catheterization</b>	-	3(6.5)	-

Table 4: Intrapartum & post partum complications in both modes of delivery

Neonatal outcome	Vaginal delivery (n=96)		Operative delivery (n=46)		p value
	No.	%	No.	%	
<b>Low birth weight</b>	11	11.4	3	6.5	0.666
<b>Admission to NICU</b>	2	2.1	1	2.2	0.962
<b>Apgar score &lt; 7 at 5 minutes</b>	-	-	1	2.2	
<b>Neonatal sepsis</b>	-	-	1	2.2	
<b>Transient tachypnea of newborn</b>	-	-	1	1.1	
<b>Macerated still birth</b>	1	1.1	-	-	

Table 5: Neonatal outcome

blood transfusion and prolonged catheterization were more common with repeat emergency Caesarean section as compared to vaginal delivery both in our study as well as previous studies. Hence, there is increased morbidity associated with repeat Caesarean section (elective or emergency) than vaginal delivery [22,23]. Failed trial of VBAC leading to emergency Caesarean section is associated with even more morbidity than elective repeat Caesarean section.

Neonatal outcomes in vaginal and caesarean deliveries were documented in terms of low birth weight (11.4% vs. 2.5%), admission to NICU (2.1% vs. 2.2%), Apgar score of less than 7 at 5 minutes (none vs. 2.2%), transient tachypnea of newborn (none vs. 1.04%), neonatal sepsis (none vs. 2.2%) and still birth (1.04% vs. none). No neonatal death was seen in any of the groups. No statistically significant difference was seen in neonatal outcome in both groups. Bailit et al. [21] reported NICU admission and neonatal death in 19.3% and 0.3% patients respectively with emergency repeat Caesarean which was significantly higher than vaginal delivery. Due to smaller sample size probably, our study could not prove this difference.

The limitation of this study is small sample size. Due to small sample size, the correlation of the factors affecting success of VBAC trial with scar rupture could not be made.

## Conclusion

In our study, the factors which affect success of trial of labour in previous caesarean patients are interdelivery interval, previous successful VBAC and cephalo-pelvic disproportion as an indication of previous Caesarean section. Better maternal outcomes are associated with successful vaginal birth after Caesarean section. Infectious morbidity is more in those having emergency repeat caesarean section than those having vaginal delivery in these patients. Other complications like prolonged catheterization, blood transfusion and hysterectomy were also more common in those who had repeat caesarean section than those having vaginal delivery. Neonatal outcomes were not significantly different. Hence we conclude that successful trial of labour in previous caesarean is associated with better outcomes than emergency caesarean section. Appropriate selection of patients for trial of VBAC, keeping the above-mentioned factors into account is necessary and can decrease the associated morbidity, especially in low resource settings.

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