

DOI: 10.5455/2320-1770.ijrcog20140933

Research Article

## Vaginal birth after cesarean section (VBAC) versus emergency repeat cesarean section at teaching hospitals in India: an ICMR task force study

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Received: 20 June 2014

Accepted: 5 July 2014

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### ABSTRACT

**Background:** Objective of current study was to study the outcome of trial of vaginal birth after Previous Cesarean Section (PCS) and indications for emergency repeat cesarean section at teaching hospitals in India.

**Methods:** Prospective data was recorded on management practices, associated complications and mortality for a period of 8 months in 2005-2006 at 30 medical colleges/teaching hospitals for delivery.

**Results:** A total of 155863 deliveries occurred during the study duration, there were 28.1% (n=43824) cesarean section and (10.1%) (n=15664) were the number of previous cesarean section. In 84% (n=13151) had repeat cesarean delivery and 2513 (16%) delivered vaginally. A trial of labor was planned in 4035 (25.8%) women. The success rate of VBAC was 62.3% with 2513 women had successful vaginal delivery and 1522 (37.7%) delivered by emergency repeat cesarean section. Major indication of emergency cesarean section was CPD (52.9%), foetal distress (25.8%), severe PIH/eclampsia (5.0%), previous 2 CS (0.7%), APH (1.4%) and others (2.7%). In majority, surgical technique was conventional and in 3.7% the Misgav-Ladach technique was used. Scar dehiscence and surgical complications were observed in 5.4% and 4.0% of cases respectively. Blood transfusion was given in 7.0% and post-operative complications were seen in 6.8%. Perinatal and maternal mortality was 18.0/1000 and 257/100000 deliveries respectively.

**Conclusions:** Safety in childbirth for women with prior cesarean is a major public health concern. Repeat caesarean section and planned vaginal birth after cesarean section are both associated with benefits and harms and correct management represents one of the most significant and challenging issues in obstetric practice.

**Keywords:** Cesarean section, VBAC, Trial of labor, Maternal morbidity

## INTRODUCTION

For many decades, deliveries by cesarean section were considered as indication for cesarean section in the subsequent pregnancies, reflecting a concern that uterine scar tissue might rupture during labor.<sup>1</sup> In 1916 Cragin pronounced "once a cesarean, always a cesarean",<sup>2</sup> was revised in many countries, and a trial of labor in women with history of cesarean section was proposed as an attempt to reduce cesarean section rates.<sup>3-6</sup> Later because of escalating rates of Cesarean Section (CS), Vaginal Birth After CS (VBAC) has been accepted as a way to reduce the overall cesarean section rates. VBAC is a safe option for many women.<sup>7</sup> This is true in several countries, where the reproductive pattern is characterized by a pregnancy starting at an early age and high fertility throughout the reproductive years. Therefore after a caesarean section, many women prefer a vaginal birth in order to reduce the consequences and complications of multiple caesarean sections especially for continuing fertility. However, the proportion of women who opt vaginal delivery globally after a prior caesarean delivery has decreased rapidly because of concern about safety.<sup>8</sup>

VBAC offers distinct advantages over repeat caesarean section, since the operative morbidity and mortality are completely eliminated, the hospital stay is much reduced and the expenses involved are much less. The rate of caesarean section needs to be reduced and this can be achieved to a small extent by avoiding a primary caesarean section done without explicit indications and more importantly, by resorting to a trial of vaginal delivery after previous caesarean section, which is safe for the foetus.<sup>9</sup>

The present study was undertaken to ascertain these facts with the hope that more women will be encouraged to avoid an unnecessary repeat caesarean section by opting for vaginal delivery.

## METHODS

The Indian Council of Medical Research (ICMR) has a network of Human Reproduction Research Centre (HRRC) located in the department of obstetrics and gynecology of 30 medical colleges/teaching hospitals in various parts of the country. Prospective data was recorded through proforma on management practices, associated complications and mortality for a period of 8 months in 2005-2006 on 15664 consecutive cases of previous cesarean section reporting at 30 medical colleges/teaching hospitals for delivery. Information on the patient's characteristics including age, parity, booked, non-booked status, past obstetric medical and surgical history, history of present pregnancy and complication was collected. The mode of delivery was recorded as Elective Repeat Cesarean Section (ERCS) or Emergency Repeat Cesarean Section (EmRCS).

In case of vaginal delivery it was recorded whether it was spontaneous vaginal delivery, forceps or ventouse. Maternal complications developed during or after the labor was noted for example, scar tenderness, scar dehiscence etc. The women were followed up from admission to discharge from the hospital.

### Statistical analysis

Statistical analysis was performed using SPSS 15.0 for windows and various descriptive statistics were used to calculate frequencies, percentages, means and standard deviation. The association of various maternal characteristics with VBAC was assessed by using Chi-square test. Yates correction for continuity was carried out in 2 by 2 tables.

## RESULTS

A total of 155863 deliveries took place in the study duration, out of which 43824 (28.1%) were the number of cesarean section and 15664 (10.1%) were the number of previous cesarean section (Table 1). An overall increase of approximately 2.7% in cesarean section rates was observed during a period of 7 years ago in the same set of hospitals, from 25.4% in 1998-99<sup>10</sup> to 28.1% in 2005-06. The average age of the women delivering by cesarean was  $26.1 \pm 3.9$  years. Majority of women (89.5%) were 2<sup>nd</sup> and 3<sup>rd</sup> gravida and 74.5% of the women were parity two. 42.1% of the women who came for delivery in the hospital were from rural areas and 88.8% of these women were booked cases and among these 73.2% were booked at HRRC.

Of 15664 women with history of cesarean, 2513 (16%) women delivered vaginally and 13151 (84%) underwent repeat cesarean section. Out of the 4035 women who were allowed a trial of labor, 2513 (62.3%) delivered vaginally and 1522 (37.7%) delivered by emergency repeat cesarean section mainly done for abnormal presentations, placenta praevia, and severe intrauterine growth retardation. Thus the success rate of VBAC was 62.3%.

Of those 784 women whose primary cesarean section was done for CPD, 61.0% delivered vaginally, whereas 61.4% and 66.1% of women who underwent primary cesarean section for foetal distress and malpresentation delivered vaginally. (Table 3 P = 0.54 & P = 0.02 respectively).

Among vaginal delivery 587 (23.4%) had spontaneous delivery, 1615 (64.3%) with episiotomy, 256 (10.2%) with forceps and 55 (2.2%) with ventouse. Indications for emergency cesarean section have been analyzed in several broad categories namely: CPD (52.9%), foetal distress (25.8%), severe PIH/eclampsia (5.0%), malpresentation (1.9%), failed induction (6.2%), others (2.7%) (Table 4). The majority of the women had cesarean section for more than one indication was the main indication for emergency cesarean section.

There was no difference in the successful VBAC across age groups. There was a significant association between birth weight and successful VBAC. With low birth weight (birth weight less than 2500 g), VBAC was 73.0%. It was 58.6% for birth weight in the range 2500 to 4000 g. Those with more than 4 kg, VBAC was 44.4% (P value = 0.00). This confirms that increasing birth weight is associated with more cesarean section. In those with 37 or more weeks of gestation, VBAC was 60.5% and in less than 37 weeks VBAC was 67.5% (P value = 0.039) which shows that there is relationship between gestational age and VBAC. With completed 40 weeks and above VBAC rate was 56.4%. It is known that there is a slight increase in failure of VBAC in those after 40 weeks.<sup>11</sup>

83.2% of the women with previous caesarean section, who also had a prior vaginal delivery, delivered vaginally, as compared to 60.3% of the women who did not undergo prior vaginal delivery (P value = 0.000). This difference was statistically significant (Table 2).

Out of the 3452 women who were in spontaneous labor, 63.7% delivered vaginally, whereas out of the 368 who were induced with oxytocin, 54.6% delivered vaginally (P value = 0.0007). This is statistically significant difference. Induction of labor with prostaglandins was attempted in 215 patients (5.3%) and 113 cases delivered by successful VBAC (52.6%).

**Table 1: Rate (%) of cesarean sections & previous cesarean section and current study samples in 30 teaching hospital/medical colleges.**

HRRC	No. of deliveries		No. of caesarean section		No. of previous caesarean section		Trial of labour
	n		n	%	n	%	n
Medical College, Jammu	9781		2690	27.5	712	7.3	489
PGIMER , Chandigarh	2711		780	28.8	367	13.5	158
K.H., New Delhi	7879		1131	14.4	374	4.7	72
S.J.H., New Delhi	14121		2252	15.9	684	4.8	387
A.I.I.M.S., New Delhi	1511		465	30.8	245	16.2	153
S.P. Medical College, Bikaner	4291		862	20.1	256	6.0	35
K.G. Medical College, Lucknow	2222		983	44.2	292	13.1	68
M.L.N. Medical College, Allahabad	383		225	58.7	85	22.2	20
G.S.V.M. Medical College, Kanpur	667		277	41.5	95	14.2	22
L.L.R. Medical College, Meerut	1400		162	11.6	41	2.9	14
S.M.S. Medical College, Jaipur	7924		2300	29.0	525	6.6	286
I.O.G., Chennai	11835		5093	43.0	2007	17.0	248
Kilpauk Medical College, Chennai	5313		1793	33.7	729	13.7	164
K.G.H. Chennai	7415		2774	37.4	1229	16.6	33
Madurai Medical College, Madurai	8442		1372	16.3	1115	13.2	84
S.A.T. Medical College, Thiruvananthapuram	10651		3133	29.4	1404	13.2	357
R.S.R.M., Chennai	8602		2501	29.1	1101	12.8	155
J.L.N. Medical College, Belgaum	2830		663	23.4	297	10.5	152
Patna Medical College, Patna	3478		1000	28.8	317	9.1	1
R.G.Kar, Kolkatta	8932		2705	30.3	921	10.3	109
Eden Hospital, Kolkatta	5510		2404	43.6	441	8.0	32
Medical College, Guwahati	5371		2155	40.1	344	6.4	94
S.C.B.Medical College, Cuttack	4349		1621	37.3	304	7.0	86
S.S.K.M. Hospital, Kolkatta	1003		558	55.6	110	11.0	5
S.S.G.S. Medical College, Baroda	2803		480	17.1	336	12.0	197
K.E.M. Hospital, Mumbai	5373		1139	21.2	512	9.5	281
K.E.M .Hospital, Pune	978		403	41.2	169	17.3	13
J.J. Hospital, Mumbai	1483		307	20.7	88	5.9	46
B.J. Medical College, Pune	5116		747	14.6	320	6.3	165
Goa Medical College, Goa	3489		849	24.3	341	9.8	109
<b>Total</b>	<b>155863</b>		<b>43824</b>	<b>28.1</b>	<b>15664</b>	<b>10.1</b>	<b>4035</b>

Blood loss was more than 1000ml in 8.0% of TOL where as in VBAC it was only (0.3%) as compared to EmRCS 20.6% (P = 0.000 highly significant). Blood transfusion rates was 3.7% and it was 1.8% in VBAC versus 20.6%

in EmRCS (P = 0.000 highly significant). Of those 12 women only 2 cases of uterine rupture was reported in VBAC (P = 0003). Dehiscence of scar in VBAC was 6 (6.8%) as compared to 82 (93.2%) in EmRCS (P = 0.000).

**Table 2: Vaginal birth among women on trial of labour and other maternal characteristics.**

Characteristics	Vaginal birth		Emergency caesarean	Total	$\chi^2$	d.f.	P value
	n	%					
<b>Maternal age at birth in years</b>							
<20	22	64.7	12	34	0.35	4	0.98
21-24	923	62.0	565	1488			
25-29	1098	62.2	667	1765			
30-34	382	63.1	223	605			
≥35	88	61.5	55	143			
<b>Parity</b>							
1	1601	55.8	1267	2868	175.9	1	0.000
>1	912	78.1	255	1167			
<b>Birth weight</b>							
Low (<2.5 Kg.)	721	73.0	266	987	67.9	2	0.000
Normal (2.5-4.0)	1756	58.6	1239	2995			
Overweight (>4.0)	8	44.4	10	18			
Not recorded	28	-	7	35			
<b>Birth interval in months</b>							
≤12	109	62.6	65	174	8.4	3	0.039
13-24	858	63.1	501	1359			
25-36	773	63.5	444	1217			
≥37	641	58.3	459	1100			
Not recorded	44	-	24	68			
<b>Gestational age</b>							
<37 weeks	521	67.5	251	772	12.75	1	0.0003
≥37 weeks	1904	60.5	1242	3146			
Not recorded	88	-	29	117			
<b>Mode of delivery in last viable delivery</b>							
Vaginal birth	307	83.2	62	369	75.63	1	0.000
Caesarean	2206	60.2	1460	3666			
<b>Total</b>	<b>2513</b>	<b>62.3</b>	<b>1522</b>	<b>4035</b>			

**Table 3: Indications for primary caesarean section and outcome of trial of labour.**

Indication for primary caesarean section (multiple response)	VBAC (n=2513)		Emergency caesarean (n=1522)		Total	P value
	n	%	n	%		
Failed induction	105	34.5	199	65.5	304	0.00
CPD	478	61.0	306	39.0	784	0.40
APH	96	73.3	35	26.7	131	0.008
Foetal distress	774	61.4	487	38.6	1261	0.54
Malpresentation	449	66.1	230	33.9	679	0.023
Previous CS	27	77.1	8	22.9	35	0.08
Severe PIH/eclampsia	158	51.6	148	48.4	306	0.000
Others	75	59.1	52	40.9	127	0.446

Post-operative complication was 2.8% cases in TOL where as in VBAC (0.4%) as compared to 6.8% in emergency cesarean section ( $P = 0.000$  highly significant). Maternal death was reported in 6 cases of VBAC as compared to 4 cases in emergency cesarean cases ( $P = 0.85$ ) which was not statistically significant.

The average duration of hospital stay for VBAC was  $4.5 \pm 3.9$  days as compared to emergency cesarean section  $10.6 \pm 5.0$ .

This shows that women who had a successful VBAC had a significantly lesser duration of hospital stay as compared to those had a cesarean section ( $P = 0.000$  highly significant).

**Table 4: Indications for emergency repeat caesarean section.**

Indication for current caesarean section (multiple response)	Caesarean section (n=1522)	
	n	%
Failed induction	94	6.2
CPD	805	52.9
APH	22	1.4
Foetal distress	392	25.8
Malpresentation	29	1.9
Previous 2 CS	10	0.7
Severe PIH/eclampsia	76	5.0
Others	41	2.7

## DISCUSSION

There has been a steady rise in cases with previous cesarean section over the past few decades. However, the rate of caesarean section is rising in many countries over the past 10 years. Miller et al. reported a post caesarean pregnancy rate of 8.1% in 1983 and 14.1% in 1992.<sup>2</sup> Bhat BPR et al. reported post caesarean pregnancy rate of 8.7%.<sup>12</sup> Our study showed a post caesarean pregnancy rate of 10.1%. Published literature shows that there has been 60% to 80% success in attempts at VBAC. Dhall et.al.<sup>13</sup> has reported that around 76% of women with PCS undergoing trial of labor have vaginal delivery. Singh et.al.<sup>14</sup> report 65% VBAC. We had a 62.3% success in those who had trial of labour. McMohan et al.<sup>15</sup> have reported vaginal delivery in 66% of those with dystocia, 84% of those with malpresentation and 75% of those with fetal distress as indication of PCS. Our respective figures are 68%, 38% and 77%. Aisien et al. reported a 48.1% incidence of vaginal delivery in previous caesarean section cases<sup>16</sup>, whereas Chhabra et.al reported an incidence of 32.4%.<sup>17</sup> Our study reported a 16% incidence of vaginal delivery in previous caesarean section.

Many factors have been put forward in international journals for the upward trend of caesarean section, like reduced parity, older primipara, use of electronic foetal

monitoring, delivery of breech by cesarean section, less use of forceps, fear of litigation and high socio-economic status.<sup>18</sup> The recommendation for optimal caesarean section rate of 10-15% was made by WHO in 1985.<sup>19</sup> Even though the successful VBAC is considered safer than routine repeat caesarean section, the enthusiasm for VBAC is found to be decreasing now due to several reasons. Many women demand for repeat elective caesarean section in order to avoid a painful natural birth. This is mainly due to inadequate patient information. Caesarean operation is now considered to be a safe surgery due to safe anesthesia, better surgical technique, and antibiotic and thrombo prophylaxis. Therefore, many doctors also prefer to do caesarean section in order to avoid litigation. A number of factors are associated with successful vaginal birth after previous caesarean section. Previous vaginal birth was the single best predictor for successful VBAC.<sup>20</sup> Success of VBAC is less if the prior indication was non-progression of labour and cephalopelvic disproportion.<sup>21</sup> Literature search showed that maternal age of more than 30 years, male fetus, no prior vaginal delivery, prostaglandin induction, excessive weight gain during pregnancy and maternal body mass index of more than 30 are associated with poor VBAC success rate.<sup>22</sup>

There is a significant reduction in trial of scar globally due to concerns of safety especially attributed to uterine rupture.<sup>8</sup> Patients should be counseled that uterine rupture can occur before labor starts and planning a repeat section is no guarantee of safety. The decline in VBAC is seen in many countries may be due to a reduction in trial of labor attempts and not due to a change in success rate. Maternal satisfaction is more after vaginal delivery.<sup>23</sup>

The average length of stay was 4.5 days in the patients who delivered vaginally as compared to 10.6 days in those who had emergency caesarean section. This was comparable with other studies.

## CONCLUSION

Safety in childbirth for women with prior caesarean is a major public health concern. Repeat caesarean section and planned vaginal birth after caesarean section are both associated with benefits and harms and correct management represents one of the most significant and challenging issues in obstetric practice.

*Funding: The study was funded by Indian council of medical research*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

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DOI: 10.5455/2320-1770.ijrcog20140933

**Cite this article as:** Dhillon BS, Chandhiok N, Bharti S, Bhatia P, Coyaji KJ, Das MC, et al. Vaginal birth after caesarean section (VBAC) versus emergency repeat caesarean section at teaching hospitals in India: an ICMR task force study. *Int J Reprod Contracept Obstet Gynecol* 2014;3:592-7.