

A STUDY OF THE OUTCOME OF SUBSEQUENT PREGNANCY FOLLOWING PREVIOUS CESAREAN SECTIONSuman Poddar¹**HOW TO CITE THIS ARTICLE:**

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BACKGROUND: With the world-wide rising trend of caesarean delivery (CD), modern obstetric practice deals with a new group of mothers carrying reproductive performance upon a scarred uterus with obvious risk in fetomaternal outcome. **AIMS:** (1) To analyse the maternal & neonatal outcome in post-caesarean pregnancy. (2) To evaluate the factors influencing outcome in such cases. **Design:** Observational analytical study. **MATERIALS & METHODS:** The present study was carried out over two years (2010-11) taking consecutive 100 post-caesarean cases as admitted on my admission days & delivered in BR Singh Hospital. Data collection was done by interview technique along with hospital records. **ANALYSIS USED:** Percentage analysis was most often done. Categorical variables were compared with chi-square test; P value was calculated with 2012 Graphpad Software. Relative risk (RR) & Odd ratio (OR) were calculated with 1993-2012 Medcalc Software bvba (Version 12.3.0). All statistical tests were evaluated at the 0.05 significance level. **RESULTS:** Post-caesarean pregnancy rate was 26.02%. Vaginal birth after caesarean (VBAC) incidence was 22% whereas VBAC success on trial of labour was 55%. VBAC gave best morbidity outcome (18.18% & 27.27%). But failed VBAC cases result more significant maternal morbidity (RR=3.97, P=0.0037) & NICU admission was also found highest in failed VBAC cases (38.89%). Maternal and neonatal morbidity were significantly high when scar integrity was lost; also significantly co-related with elderly mothers (>35 yrs.), unbooked cases & non-admitted cases undergone repeat CD. **CONCLUSIONS:** Post-caesarean cases need meticulous antenatal check-up & mandatory institutional delivery with proper selection of mode of confinement to have a better maternal & neonatal outcome.

KEYWORDS: Post-caesarean pregnancy, Vaginal birth after caesarean (VBAC), NICU admission, Maternal morbidity, failed VBAC.

INTRODUCTION: Caesarean delivery is defined as the birth of a fetus through incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy)¹. Wide-spread emphasis to the detection of actual & suspected non-reassuring fetal status, over diagnosis of dystocia in primigravida, increased frequency of elderly primigravida with obvious co-morbidity of pregnancy induced hypertension, gestational diabetes mellitus etc. day by day actually increase the rate of primary caesarean section¹, resulting in an increased proportion of a new group of mothers, carrying reproductive performance with a scarred uterus due to previous caesarean section (CS).

Primary CS whether done due to recurrent indication or not, carries risk of abnormal placentation in subsequent pregnancy. Morbid adherence of placenta is a rarer but more severe complication, even more so when number of caesarean delivery increases^{2,3}.

Though classical upper segment caesarean section is obsolete now-a-days, even with lower segment caesarean section (LSCS), in a developing country like ours, where malnutrition, frequent conceptions, post-operative infection & subsequent blood transfusion are more common, the wound-

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healing would not be up to the quality found in developed countries, raising the possibility of scar dehiscence & uterine rupture in next pregnancy.

Now, regarding mode of delivery in women with previous caesarean delivery, primary choice is whether to have elective repeat caesarean section (ERCS) or to attempt vaginal birth after caesarean section (VBAC). Major problem is that lately developed investigational methods like MRI; color Doppler could not assess the scar integrity properly so as to help clinician in decision-making. Therefore, on successful attempt with VBAC in suitable cases makes it "THE CHOICE" but, if failed, it adds up to the significant proportion of maternal and neonatal morbidity, even mortality, as shown by different studies^{4,5}. On the other hand, ERCS, if selected after 39 weeks of gestation, gives significant good fetomaternal outcome¹. Still about ERCS, major obstetric concern lays in severe adverse outcomes in future pregnancies.

Despite extensive work, clear-cut guideline for exact mode of delivery in post caesarean pregnancy is yet to be decided; and associated risks are still uncertain. Few studies^{4,6-10} in India have dealt with outcome of post-caesarean cases. The current study has been done to review the existing facts with the hope that meticulous individualization in management and modification of certain factors would improve maternal & neonatal outcome.

MATERIALS AND METHODS: The present observational analytical study was carried out over two years (2010-11) taking consecutive 100 post-caesarean cases as admitted on my admission days & delivered in BR Singh Hospital. Third trimester antenatal profile was only included & cases with multiple gestation, prior myomectomy or hysterotomy were excluded from study. Data collection was done by interview technique along with hospital records. Percentage analysis was most often done. Categorical variables were compared with chi-square test; P value was calculated with 2012 Graphpad Software. Relative risk (RR) & Odd ratio (OR) were calculated with 1993-2012 Medcalc Software bvba (Version 12.3.0). All statistical tests were evaluated at the 0.05 significance level.

RESULTS AND ANALYSIS: Amongst a total number of 1276 pregnant women, admitted & delivered in B.R. Singh Hospital, as per Railway Register in my study period (Table 1), 26.02% (4.23+13.87+7.92) cases were post-caesarean. Out of 100 cases under study, maternal morbidity was found in 37 cases & neonatal morbidity in 21 cases. No maternal mortality or stillborn occurred relating to my study cases.

Table 2 clearly tells that among 37 cases with maternal morbidity, operation related morbidity was maximum; intra-operative complications & operative interference, related to ERCS, were responsible for the majority.

Table 3 clearly shows 55% success among TOLAC cases. Morbidity association was significant with mode of delivery (For Maternal Morbidity, $X^2=13.28$, $P=0.0013$ & for Neonatal Morbidity, $X^2=6.11$, $P=0.0471$). Comparing with TOLAC cases, ERCS group less likely ($RR=0.78$) shows maternal morbidity; but in TOLAC group, failed VBAC cases result more significant maternal morbidity ($RR=3.97$, $P=0.0037$). Neonatal morbidity was also found highest in failed VBAC cases.

Among cases who had undergone caesarean delivery (table 4), post-partum morbidity was significantly associated ($x^2=7.7$; $P=0.0047$) with scar condition; more significantly morbidity found ($RR=2.47$, $P=0.0001$) when scar integrity was lost, especially in failed VBAC cases.

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Most of the cases (table 5), whether prior history of vaginal delivery was present or not, had received caesarean section. But importantly, maternal and neonatal outcomes were poor (85% & 60% respectively) for cases that had history of vaginal delivery & undergone CD, mainly due to failed trial.

Table 6 clarify that maternal and neonatal morbidity outcomes (100% & 75% respectively) were poor when non-admitted cases had undergone caesarean delivery (CD). Even when admitted cases had undergone CD, maternal outcome was not good (39.19% morbidity). Neonatal morbidity was found to be high in first group (40%) as there were cases operative deliveries.

Most of the study cases (table 7) were from 25-30 yrs. age group, where maternal & neonatal morbidity were found in certain range. Importantly, morbidity association with age was found to be highly significant ($P=0.0029$ & $P<0.0001$) in both group, specially raised in older age group (>35yrs).

In another scenario (table 8), antenatal status co-relation with outcome was found to be highly significant in both groups. Among post-caesarean cases, who were booked, were found to have less maternal (OR=0.12, RR=0.35) and neonatal outcome (OR=0.12, RR=0.24).

Table 9 shows cases, prior CS which were done due to either CPD or non-progress of labor, mostly received ERCS (86.11 % & 55.56% respectively) & rest those given trial for VBAC, found unsuccessful. With all other indications for prior CS, VBAC success rate was good, except in cases with placenta previa & PROM, where abnormal placentation & dystocia recurred & ERCS (87.5% & 77.78% respectively) performed.

DISCUSSION: National United States CS rate was 4.5% in 1965 when it was first measured. But with 2007 rate of 31.8%, about one mother in three now gives birth by caesarean section in States. CS rate is higher in Latin America, even 40% in different countries of this region¹¹. The estimate of CS rate in East Asia also is shown to be well above the 15% mark¹².

The estimate of caesarean section (CS) rate in India is 7.1% in the year 1998 and there is 16.7% change in the rate annually¹², which is one of the highest among the countries. Though high values of CS rate found in southern India, West Bengal is the only state from eastern side with high caesarean section rate. A five year audit from a large teaching hospital in Kolkata showed a CS rate of 49.9%¹³. Studying in urban referral institution, BR Singh Railway Hospital shows high caesarean section rate of 41.77% in my study period.

Miller et al¹⁴ reported a post caesarean pregnancy rate of 8.1% in 1983 and 14.1% in 1992. Bhat et al⁶ showed a post caesarean pregnancy rate of 8.7%. Agarwal et al¹⁵ study gave 13.7% report whereas in my study period, rate was found to be 26.02%.

Though no maternal or neonatal mortality was found in my study, as compared with Bhat et al study⁶, intra-operative complications caused major maternal morbidity.

Vardhan et al¹⁰, Tan et al¹⁶, Shah et al¹⁷, and Dhall et al¹⁸ reported 70 to 80% success in attempts at VBAC. Chhabra et al⁴ & Bhat et al⁶ gave a 71.2% & 64.6% success report respectively in those who had trial of labor. My study had 55% success rate on attempts of VBAC.

Aisien et al¹⁹ reported a 48.1% incidence of vaginal delivery in previous caesarean section cases, whereas Chhabra et al⁴ reported an incidence of 32.4%. Bhat et al⁶ & Agarwal et al¹⁵ study reported a 33.3% & 27.7% incidence of vaginal delivery in previous caesarean section cases. In my study, incidence was 22%.

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With improved antenatal (clinical & gadgetry) care and institutional confinement, VBAC is considered safer than repeat elective CS in a carefully selected population²⁰. However in the event of a failed trial, there was a definite increase in neonatal⁷ and maternal morbidity⁵ which is also reflected in our study.

The most serious adverse outcome of VBAC occurs when uterine scar integrity is lost. In a study of more than 8000 women the rate of scar rupture was 0.5%²¹. Locateli et al²² & Guise et al²³ reported a uterine rupture rate of 0.3% in women with previous caesarean section. Out of 100, one suffered uterine rupture in my study with severe maternal & perinatal morbidity. The incidence of scar dehiscence in my study was 9 in 100 cases.

Any previous vaginal delivery, either before or following a caesarean birth, significantly improves the prognosis for a subsequent vaginal delivery with either spontaneous or induced labour²⁴. My study also reported that cases with prior history of vaginal delivery delivered vaginally in more occasions (41.18%).

Puja P et al⁹ study gave 80.95% success rate in VBAC on admission with Bishop Score >7. My study reported 75% success upon admission in labor with favorable Bishop Score. This statistically significant success was also found in a previous study⁷.

Maternal age appears to be an independent risk factor over pregnancy outcome²⁵, especially in post-CS older women²⁶. My study found both maternal & neonatal morbidity status to be raised in older age group (>35yrs).

Another statistically significant finding was that cases that were booked, regular in antenatal check-up & aware about the risk got admitted as advised & avoided morbidity in more occasions.

Peaceman and associates²⁷ found that those with dystocia as the original indication had a significantly lower success rate (54%). In my study, prior CS cases due to either CPD or non-progress of labor, mostly received ERCS (86.11 % & 55.56% respectively), whereas rest those given trial for VBAC, found unsuccessful.

CONCLUSION:

- All cases with post-caesarean pregnancy should have a regular antenatal check-up & mandatory institutional confinement.
- Awareness regarding symptoms of low-lying placenta (especially with previous history of placenta previa), scar tenderness etc. & timely admission would improve perinatal outcome.
- Trial of labor after caesarean (TOLAC) should only be considered in properly selected cases with meticulous labor monitoring & availability of round the clock emergency caesarean facility in the institution.

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Type of delivery	Total delivery (n = 1276)	%
VBAC*	54	4.23
VB* other than VBAC	689	54.0
CS* in primi-gravida	255	19.98
CS in single prior CS	177	13.87
CS in ≥2 prior CS	101	7.92

TABLE 1: Delivery statistics from Jan'10 to Dec'11

VBAC*: Vaginal Birth (VB*) After Caesarean Section (CS*)

Causes of morbidity	Number of Cases (%)	VBAC	ERCS*	Failed VBAC
Abnormal placentation	5(13.5)	-	5	-
Preterm labor	1(2.7)	1	-	-
Operative interference	10(27.0)	-	6	4
Intra-operative complication	11(29.7)	-	9	2
Peripartum hysterectomy	1(2.7)	-	0	1
Post-partum hemorrhage	3(8.1)	2	0	1
Post-partum wound sepsis	2(5.4)	0	0	2
Post-partum thrombosis	2(5.4)	1	0	1
Puerperal pyrexia	2(5.4)	0	0	2
Total	37(100)	4	20	13

TABLE 2: Analysis of maternal morbidity

ERCS *: Elective Repeat Caesarean Section

Mode of Delivery	Number of cases (n=100)	Maternal Morbidity (n=37)	%	Neonatal Morbidity (n=21)	%
ERCS	60	20	33.33	8	13.33
VBAC	22	4	18.18	6	27.27
Failed VBAC	18	13	72.22	7	38.89

TABLE 3: Mode of delivery co-relating outcome

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Scar integrity	Number of cases (n=78)*	Complication developed	%
Scar dehiscence	9	7	77.78
Scar rupture	1	1	100
Normal scar	68	22	32.35#

TABLE 4: Scar integrity & post-operative complications

*Including those cases undergone caesarean delivery / #excluding 3 cases of abnormal placentation with antepartum morbidity

Mode of present delivery & H/O vaginal delivery	Number of cases	Maternal morbidity	%	Neonatal morbidity	%
VD with (+) history	14	2	14.29	4	28.57
VD with (-) history	8	2	25	2	25
CS with (+) history	20	17	85	12	60
CS with (-) history	58	16	27.59	3	5.17

TABLE 5: Maternal & neonatal outcome in relation to previous history of vaginal delivery & present mode of delivery

Mode of admission & delivery	Number of cases	Maternal morbidity	%	Neonatal morbidity	%
Before labor & VD	10	2	20	4	40
Before labor & CS	74	29	39.19	12	16.22
In-labor & VD	12	2	16.67	2	16.67
In-labor & CS	4	4	100	3	75

TABLE 6: Maternal & neonatal outcome comparing mode of admission & subsequent delivery

Age in years	Number of cases (n=100)	Maternal morbidity (n=37)	%	Neonatal morbidity (n=21)	%
< 25	23	2	8.7	0	0
25-30	43	16	37.21	8	18.6
31-35	27	14	51.85	7	25.93
> 35	7	5	71.43	6	85.71

TABLE 7: Age distribution co-relating outcome

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Antenatal status	Case numbers (n=100)	Maternal morbidity (n=37)	%	Neonatal morbidity (n=21)	%
Booked	77	20	25.97	11	14.29
Un-booked	23	17	73.91	10	43.48

TABLE 8: Antenatal care co-relating morbidity status

Previous indication	Number of cases (n=100)	VBAC* (n=22)	%	ERCS* (n=60)	%	Failed VBAC* (n=18)	%
CPD*	36	0	0	31	86.11	5	13.89
Fetal Distress	5	5	100	0	0	0	0
PROM‡	9	0	0	7	77.78	2	22.22
Mal-presentation	13	9	69.23	3	23.07	1	7.7
Post-dated	5	2	40	0	0	3	60
Placenta previa	8	1	12.5	7	87.5	0	0
PIH§	8	1	12.5	5	62.5	2	25
IUGR	5	3	60	2	40	0	0
Accidental Hge	2	1	50	0	0	1	0
Non-progress	9	0	0	5	55.56	4	44.44

TABLE 9: Previous caesarean indication co-relating mode of present delivery

CPD*: Cephalo-pelvic Disproportion, PROM‡: Premature Rupture of Membrane, PIH§: Pregnancy Induced Hypertension, IUGR||: Intra-uterine Growth Restriction.

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