



## Determinants of Adverse Maternal and Perinatal Outcomes Following Delivery Among Women with Previous Cesarean Section

### KEYWORDS

Determinants, maternal and fetal complications, previous cesarean section

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**ABSTRACT** *Background:* The rate of cesarean sections performed worldwide are increasing and this rising trend is seen in both developed as well as developing countries. However in the present scenario, the rise in total number of cesarean delivery is partially attributed to the large proportion of repeat cesarean deliveries due to decline in the frequency of VBAC (vaginal birth after cesarean). Therefore it is imperative to know the various determinants of maternal and perinatal complications.

*Methods:* A hospital based prospective observational study was done in the Department of Obstetrics and Gynecology, Pondicherry Institute of Medical Sciences (PIMS). A total of 103 women at  $\geq 34$  weeks period of gestation with singleton pregnancy in cephalic presentation and previous one lower segment caesarean section (LSCS) were enrolled in the study. Women who were eligible were given a trial of labor.

*Results:* Eighteen patients delivered vaginally and 85 by cesarean section. Almost one-fourth of the newborns, (n=25, 24.3%) had one or more complications. There were 10 (9.7%) women who had complications. Co-morbidities in the mother and gestational age at delivery were the single most important determinants of complications among mothers and newborns.

*Conclusions:* It is critical to evaluate maternal and neonatal outcome in patients with prior cesarean delivery, as well as their determinants

### INTRODUCTION

Cesarean section (CS) is a surgical procedure which is performed to benefit both mother and child when vaginal delivery is not possible. The rates of cesarean sections performed worldwide are increasing and this rising trend is seen in both developed as well as developing countries. In United States the current rate of cesarean section is 32.2%.<sup>1</sup> According to the National Family Health Survey (NFHS), in India, the CS rate has increased from 2.9 percent of the childbirths in 1992-93 to 10.2 percent in 2005-06.<sup>2</sup>

Although cesarean deliveries are often performed as life-saving procedures for the fetus, the mother or both in certain cases, but data suggests that the increased rate in cesarean deliveries has not significantly contributed to improved maternal and perinatal outcomes.<sup>3</sup> The most common indications for primary cesarean delivery include, labor dystocia, non-reassuring fetal heart tracing, fetal mal presentation, multiple gestation and suspected fetal macrosomia.<sup>4</sup> However in the present scenario both in India and worldwide, the rise in total number of cesarean delivery is partially attributed to the large proportion of repeat cesarean deliveries due to decline in the frequency of VBAC (vaginal birth after cesarean).<sup>5, 6</sup>

It is difficult to curtail the current rise in repeat cesarean deliveries. Therefore a more comprehensive understanding of the factors responsible for adverse maternal and perinatal outcomes is required. The primary objective therefore was to review the determinants of maternal and perinatal complications among women with previous cesarean delivery.

### METHOD

A hospital based prospective observational study was done in the Department of Obstetrics and Gynecology,

Pondicherry Institute of Medical Sciences (PIMS), Puducherry in India. The study protocol was approved by the Institute Ethics Committee. All pregnant women at  $\geq 34$  weeks period of gestation with singleton pregnancy in cephalic presentation and previous one lower segment caesarean section (LSCS) were enrolled in the study. Detail history was taken by using a predesigned, pretested structured questionnaire. A thorough general, systemic and obstetrical examination was done and findings noted. Pelvic examination was done to know Bishop's Score and adequacy of pelvis for vaginal delivery.<sup>7</sup> Women who were eligible and willing were given trial of labor after cesarean (TOLAC) as per American College of Obstetrician and Gynecologist (ACOG) guidelines.<sup>8</sup> Elective cesarean section was done for those patients who were not eligible for TOLAC. Progress of labor was monitored by Partogram along with continuous electronic fetal heart rate monitoring in active stage of labor.<sup>9</sup>

### Data analysis

Data was entered in Microsoft excel 2010 and was analyzed using SPSS version 20. Means and proportions were calculated for continuous and categorical variables respectively. Chi square test was applied to find the association of various determinants of maternal and neonatal complications. A p-value of  $< 0.05$  was considered as statistically significant.

### RESULTS

During the study period a total of 103 women were enrolled in the study as they fulfilled the inclusion criteria. Among them 18 patients delivered vaginally and 85 by cesarean section. Almost one-fourth of the newborns, (n=25, 24.3%) had one or more complications. Majority of them (21.4%), required NICU admission. Other complications noted were respiratory morbidity (8.7%), birth asphyxia (1.0%), newborns requiring resuscitation (6.8%) and one perinatal death.

There were 10 (9.7%) women who had complications. Hemorrhage (6.8%), was the most common complication followed by infections (1.9%) and surgical injuries (1.0%). There was a single case of scar dehiscence. (Table1)

Fetal Complications	n	%
Respiratory morbidity	9	8.7
Birth asphyxia	1	1.0
Resuscitation done	7	6.8
NICU admission	22	21.4
Perinatal death	1	1.0
Total	25	24.3
Maternal complications		
	n	%
Hemorrhage	7	6.8
Infections	2	1.9
Surgical injuries	1	1.0
Scar dehiscence	1	1.0
Total	10	9.7

\*More than one complication possible

Table 2 shows the various determinants of maternal complications following delivery. Co-morbidities in the mother was the single most determinant. There was no association found between complications in mother and her age group, parity, mode of delivery, gestational age at delivery and birth weight of the baby.

Characteristics	Complications n (%)	Total n	P value
Age group			
19-24	3 (10.3)	29	0.902
25-29	7 (23.1) <sup>3</sup>	41	
30-34	3 (13.0)	23	
35 and above	1 (10.0)	10	
Parity			
1	9 (9.4)	96	0.672
2	1 (14.3)	7	
Co-morbidities in mother			
Yes	9 (14.1)	64	0.056
No	1 (2.6)	39	
Gestational age at delivery			
34wks – 36wks+6 day	3 (23.1)	13	0.348
37wks – 38wks+6day	5 (8.9)	56	
39wks – 40wks+6day	2 (6.1)	33	
41wks and above	0 (0.0)	1	
Mode of delivery			
Spontaneous vaginal	2 (22.2)	9	0.450
Vacuum assisted	0 (0.0)	9	
Elective CS	4 (10.3)	39	
Emergency CS	4 (8.7)	46	
Birth weight of the baby (kg)			
< 2.5	1 (9.1)	11	0.217
2.5 – 3.5	7 (8.2)	85	
>3.5	2 (28.6)	7	

Table 3 shows the various determinants of neonatal complications following delivery. It was seen that gestational age at delivery was the single most important determinant of complications among newborns. Preterm newborns had more complications than those who delivered at 39 weeks of gestational age (p value < 0.05) which is significant. Co morbidities in mother like hypertension, gestational diabetes mellitus, obesity, was another factor which determined whether newborns had complications or not (p value < 0.05) which is significant. However mode of delivery, birth weight of the baby, age of the mother and parity were not significant.

Characteristics	Complications n (%)	Total	P value
Age group			
19-24	7 (24.1)	29	0.983
25-29	10 (24.4)	41	
30-34	6 (26.1)	23	
35 and above	2 (20.0)	10	
Parity			
1	24 (25.0)	96	0.523
2	1 (14.3)	7	
Co-morbidities in mother			
Yes	20 (31.2)	64	0.034
No	5 (12.8)	39	
Gestational age at delivery			
34wks – 36wks+6 day	8 (61.5)	13	0.008
37wks – 38wks+6day	12 (21.4)	56	
39wks – 40wks+6day	5 (15.2)	33	
41wks and above	0 (0.0)	1	
Mode of delivery			
Spontaneous vaginal	4 (44.4)	9	0.134
Vacuum assisted	3 (33.3)	9	
Elective CS	5 (12.8)	39	
Emergency CS	13 (28.3)	46	
Birth weight of the baby (kg)			
< 2.5	5 (45.5)	11	0.202
2.5 – 3.5	18 (21.2)	85	
>3.5	2 (28.6)	7	

## DISCUSSION

The rising cesarean section rates in the different health facilities had been of great concern. It is difficult for both the caregiver and the patient to decide on the mode of delivery after a cesarean section. Both options, either trial of labor or planned cesarean section has potential risks and benefits. The study examined the relevant determinants of maternal and neonatal complications following delivery among women with prior one cesarean section in the coastal city of southern region of India.

Our data indicate that a trial of labor by women is associated with an increased risk of adverse perinatal outcomes and a higher rate of maternal adverse events, as compared with elective repeated cesarean delivery. In a prospective cohort study done by Nakimuli et al at Mulago hospital, Uganda described maternal and neonatal complications among women with prior cesarean section undergoing elective repeat cesarean section.<sup>10</sup> The commonest maternal morbidity was hemorrhage, more than every tenth woman required hospitalization longer than 5 days, and respiratory complications were the commonest neonatal morbidity. Most neonates (60 %) were admitted to neona-

tal ward for observation. In another study done by Landon among women with a singleton gestation and a prior cesarean delivery, maternal and perinatal outcomes were compared between women who underwent a trial of labor and women who had an elective repeat cesarean delivery without labor.<sup>11</sup> They concluded that trial of labor after prior cesarean delivery is associated with a greater perinatal risk than is elective repeated cesarean delivery without labor.

## CONCLUSION

It is critical to evaluate maternal and neonatal outcome in patients with prior cesarean delivery, as well as their determinants. This information is crucial for counseling women about their choices after a cesarean section. Well-designed prospective studies are needed and data generated may be used in designing protocols and interventions to increase maternal and neonatal safety.

## ETHICAL ISSUES

The study protocol was approved by the Institute Ethics Committee of PIMS.

## CONFLICT OF INTEREST

None declared

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