

Fetomaternal outcome in women undergoing caesarean section in first stage vs second stage of labour

Shailendra V Mangnale^{1*}, Deepak Thakker²

¹Associate Professor, ²Assistant Professor, Department of Obstetrics and Gynecology, Vedanta Institute of Medical Sciences, Vedanta Hospital And Research Center, Village Sasvand, At And Post Dhundalwadi, Dahanu, Palghar, Maharashtra, INDIA.

Email: mangnale@gmail.com

Abstract

Background: Caesarean section is probably the most common surgical procedure carried out in the field of obstetrics. Decision making surrounding caesarean section in the second stage of labour is one of the greatest challenges in current obstetric practice. Present study was aimed to compare fetomaternal outcome in women undergoing caesarean section in first stage vs second stage of labour at a tertiary hospital. **Material and Methods:** Present study was single-center, prospective, comparative, observational study, conducted pregnant women, between 21-35 years of age, Singleton, term pregnancies, low risk and fit for vaginal delivery underwent emergency LSCS. **Results:** 532 patients studied in Group 1 (Caesarean delivery in the first stage of labour) and 48 patients studied in group 2 - Caesarean delivery in the second stage of labour. Common maternal complications were PPH – Atonic PPH (2.07 % vs 6.25 %), Traumatic PPH (0.38 % vs 8.33 %), LUS tear including extensions (0.38 % vs 8.33 %), Blood stained urine (1.69 % vs 22.92 %), Blood transfusion (7.33 % vs 37.50 %) and febrile morbidity with wound sepsis (2.26 % vs 18.75 %). Fresh still birth (0.19 % vs 4.17 %), NICU admission (6.02 % vs 18.75 %), meconium stained liquor (20.86 % vs 6.25 %), neonatal jaundice (9.21 % vs 37.50 %), cephalhematoma (1.69 % vs 14.58 %), neonatal septicemia (2.26 % vs 6.25 %) and neonatal seizure (0.38 % vs 10.42 %) were more in second stage LSCS group as compared to group 2 and difference was statistically highly significant ($p < 0.001$). **Conclusion:** Caesarean section in the 2nd stage of labour is associated with significantly increased maternal and neonatal morbidity such as post-partum hemorrhage, extended hospital stay and NICU admission. **Keywords:** Caesarean section, 2nd stage of labour, post-partum hemorrhage, NICU admission.

*Address for Correspondence:

Dr Shailendra V Mangnale, Associate Professor, Department of Obstetrics And Gynecology, Vedanta Institute of Medical Sciences, Vedanta Hospital And Research Center, Village Sasvand, At And Post Dhundalwadi, Dahanu, Palghar, Maharashtra, INDIA.

Email: mangnale@gmail.com

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INTRODUCTION

Caesarean section is probably the most common surgical procedure carried out in the field of obstetrics in both industrialized and low-income countries.¹ Second stage

caesarean section has been reported as an issue of concern due to its high prevalence with increasing caesarean section rates. Incidence of second stage caesarean section has increased significantly from 0.9 to 2.2%.² The second stage of the labour can be defined as the time elapsed from full dilatation of the cervix to expulsion of the fetus. The extraction of the impacted head of the fetus from the maternal pelvis constitutes the main difficulty of the CS in the second stage of labour and is associated with increased risks such as hemorrhage, prolonged operation time, and other intraoperative complications.³ Caesarean section done in the second stage of labour is a more challenging surgical procedure and has adverse fetomaternal outcomes than performed in the first stage or before labour.⁴ Neonatal morbidities associated with the second stage CS are birth asphyxia, neonatal intensive care unit (NICU) admission,

fetal birth injuries, hypoxic-ischemic encephalopathy, and even neonatal death.⁵ Decision making surrounding cesarean section in the second stage of labour is one of the greatest challenges in current obstetric practice. The increasing trend of caesarean section at second stage is of major concern in modern obstetrics. Present study was aimed to compare fetomaternal outcome in women undergoing caesarean section in first stage vs second stage of labour at a tertiary hospital.

MATERIAL AND METHODS

Present study was single-center, prospective, comparative, observational study, conducted in department of Obstetrics and Gynaecology, at department of Obstetrics and Gynecology, Vedanta Institute Of Medical Sciences, India. Study duration was of 1 year (January 2021 to December 2021). Study was approved by institutional ethical committee.

Inclusion criteria

Pregnant women, between 21-35 years of age, Singleton, term pregnancies, low risk and fit for vaginal delivery underwent emergency LSCS, willing to provide written informed consent for participation.

Exclusion criteria

Age <19 years and >35 years. Pregnant women with preterm labour, antepartum haemorrhage, previous caesarean section OR hysterotomy. With known medical disorders (Chronic Hypertension, Diabetes mellitus, heart

disease) that may need preterm delivery. Gross congenital anomalies, IUGR, Rh incompatibility. Any risk detected either by clinical findings or investigations for normal delivery.

Pregnant women who satisfy inclusion/exclusion criteria were divided into 2 groups.

Group 1 - Caesarean delivery in the first stage of labour

Group 2 - Caesarean delivery in the second stage of labour

Study was explained and a valid informed consent was taken. After enrolment, a thorough history and physical examination was done as per proforma. Maternal age, BMI, gestational age, relevant obstetric data, labour course (induction/ augmentation of labour, oxytocin required), indications for caesarean section, birth weight, and the APGAR score of the new born at the 5th minute, and neonatal intensive care unit admission, duration of hospital stay, postoperative complications, maternal and neonatal morbidities, were recorded. Follow-up was kept till discharge for mothers and for 14 days in neonates. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

In present study, after applying study criteria, total 532 patients studied in Group 1 (Caesarean delivery in the first stage of labour) and 48 patients studied in group 2 - Caesarean delivery in the second stage of labour. General characteristics such as maternal age, gestational age and induction/ augmentation of labour was comparable among both groups and difference was not significant statistically.

Table 1: General characteristics

Characteristics	Group 1 [No. of cases (%)/Mean ± SD]	Group 2 [No. of cases (%)/Mean ± SD]	p value
Age (in years)			0.075
21-25	314 (59.02 %)	29 (60.42 %)	
26-30	201 (37.78 %)	15 (31.25 %)	
31-35	17 (3.20 %)	4 (8.33 %)	
Mean ± SD	24.92 ± 3.41	25.83 ± 3.29	
Gestational Age (Weeks)	39.5 ± 1.1	39.1 ± 1.2	0.061
Induction/ Augmentation of Labour	379 s(71.24 %)	32 (66.67 %)	0.058

In present study, mean dilatation of cervix at LSCS, mean duration of labour, mean duration of surgery and mean duration of hospital stay were less in group 1 as compared to group 2 and difference was statistically highly significant (p<0.001).

Table 2: Distribution of labour characteristics

Labour characteristics	Group 1 [No. of cases (%)/Mean ± SD]	Group 2 [No. of cases (%)/Mean ± SD]	p value
Mean dilatation of cervix at LSCS (cms)	5.8 ± 1.7	9.5 ± 0.6	<0.001
Mean duration of labour (hours)	6.93 ± 2.03	10.83 ± 2.72	<0.001
Mean duration of surgery (minutes)	39.54 ± 12.25	48.91 ± 12.39	<0.001
Mean duration of Hospital Stay (days)	5.2 ± 1.8	8.1 ± 2.9	<0.001

In present study, common maternal complications were PPH – Atonic PPH (2.07 % vs 6.25 %), Traumatic PPH (0.38 % vs 8.33 %), LUS tear including extensions (0.38 % vs 8.33 %), Blood stained urine (1.69 % vs 22.92 %), Blood transfusion

(7.33 % vs 37.50 %) and febrile morbidity with wound sepsis (2.26 % vs 18.75 %). All complications were noted more in second stage LSCS group as compared to group 2 and difference was statistically highly significant ($p < 0.001$).

Table 3: Maternal complications.

Maternal Complications	Group 1 [No. of cases (%)]	Group 2 [No. of cases (%)]	P value
PPH - Atonic	11 (2.07 %)	3 (6.25 %)	<0.001
PPH - Traumatic	2 (0.38 %)	4 (8.33 %)	<0.001
Total	13 (2.44 %)	7 (14.58 %)	<0.001
LUS tear including extensions	2 (0.38 %)	4 (8.33 %)	<0.001
Blood stained urine	9 (1.69 %)	11 (22.92 %)	<0.001
Blood transfusion	39 (7.33 %)	18 (37.50 %)	<0.001
Febrile morbidity with wound sepsis	12 (2.26 %)	9 (18.75 %)	<0.001

In present study less APGAR score (at 1 min and 5 min) was noted in second stage LSCS group as compared to first stage ($p < 0.05$). Fresh still birth (0.19 % vs 4.17 %), NICU admission (6.02 % vs 18.75 %), meconium stained liquor (20.86 % vs 6.25 %), neonatal jaundice (9.21 % vs 37.50 %), cephalhematoma (1.69 % vs 14.58 %), neonatal septicemia (2.26 % vs 6.25 %) and neonatal seizure (0.38 % vs 10.42 %) were more in second stage LSCS group as compared to group 2 and difference was statistically highly significant ($p < 0.001$).

Table 4: Neonatal complications.

Neonatal complications	Group 1 [No. of cases (%) / Mean \pm SD]	Group 2 [No. of cases (%) / Mean \pm SD]	p value
Apgar score			
1 min	8.91 \pm 0.61	7.89 \pm 0.83	0.033
5 mins	9.03 \pm 0.86	8.13 \pm 0.77	0.041
Fresh still birth	1 (0.19 %)	2 (4.17 %)	<0.001
NICU admission	32 (6.02 %)	9 (18.75 %)	<0.001
Meconium stained liquor	111 (20.86 %)	3 (6.25 %)	<0.001
Neonatal jaundice	49 (9.21 %)	18 (37.50 %)	<0.001
Cephalhematoma	9 (1.69 %)	7 (14.58 %)	<0.001
Neonatal septicemia	12 (2.26 %)	3 (6.25 %)	<0.001
Neonatal seizure	2 (0.38 %)	5 (10.42 %)	<0.001

DISCUSSION

With a prolonged second stage of labour, maternal exhaustion may reduce a woman's ability to generate sufficient abdominal pressure to facilitate her baby's birth, leading to second stage LSCS.⁶ One of the most important reasons for increase in emergency cesarean deliveries in the second stage of labor is the hesitation of the doctors to perform vaginal deliveries with intervention in the second phase of labor due to medicolegal issues.^{7,8} Delivery of the impacted fetal head at full cervical dilatation poses technical challenges to the operating surgeon in terms of disengagement of the deeply engaged head by hand due to lack of space between the muscular and bony maternal pelvis and the impacted fetal head which can be further compounded by the presence of molding and caput succedaneum.⁹ Neonatal mortality and morbidity due to hypoxia and fetal trauma remains to be one of the major issues regarding the caesarean section performed in the second stage of labour.¹⁰ Ayhan S *et al.*,¹¹ studied 1389 cesarean sections, 1271 were in the first stage of the labour and 171 were in the second stage of the labour. Urinary injuries, transfusion requirement, and uterine atonia

hysterectomy were significantly more frequent in women who underwent cesarean section in the second stage of the labour compared to women undergoing cesarean section in the first stage of the labour. Cesarean section in the second stage of the labour is associated with increased maternal and neonatal morbidities. Special attention is required to the patients undergoing cesarean section in the second stage of the labour. In study by Gupta N *et al.*,¹² out of 1466 had caesarean section, rate of second stage caesarean section was 3% of total caesarean section and 1% of total deliveries. Second stage caesarean section had higher maternal and perinatal morbidity like atonic PPH (33.3%), lower uterine segment extension (7%), febrile morbidity (10%), and need for blood transfusion (15%). There were 15.5% NICU admission in second stage caesarean group while none in first stage group. Karunanithi PA *et al.*,¹³ compared cesarean delivery in the first stage of labor (cases, n= 303) and second stage LSCS (controls, n= 36). The majority of (n=15, 41.67%) cases and controls (n=162, 53.46%) were in the age group of 21-25 years. There was no significant difference in age between cases and controls. Cesarean delivery performed in the second stage was

associated with increased maternal morbidity such as difficulty in head delivery, haemorrhage, uterine angle extension, and the results were statistically significant between cases and controls ($P < 0.05$). Apgar score < 7 at five minutes was observed in very less proportion of cases ($n=1$, 2.78%) and controls ($n=2$, 0.66%). Rupal S¹⁴ noted that caesarean delivery performed in the second stage were associated with increased maternal morbidity such as hemorrhage, uterine angle extension, blood transfusions, prolonged hospital stay, febrile morbidity, urinary system injury. Similarly neonatal morbidity was much higher in patients who underwent caesarean section in second stage of labour. There was increase in neonatal complications such as APGAR less than 7 at 5 minutes, NICU admissions for more than 24 hours, neonatal septicemia ($p < 0.001$) In study by Khaniya B *et al.*,¹⁵ 36 LSCS were performed in the second stage of labor. Most of the indications were nondescent of head (93.5%) followed by intraoperative maternal complications (hematuria; 38.88%). Postoperative maternal who had complications were prolong catheterization: 14(38.88%), postoperative fever: (27.77%), prolong hospitalization (13.88%) . In perinatal complications meconium stain liquor: (27.77%), NNU admissions (13.88%), Apgar score < 5 at 5 min (13.55%), NICU admission (5.54%), fresh stillbirth (2.77%) were observed. In study by Anusha SR *et al.*,¹⁶ out of 90 cesarean sections 30 were performed in second stage and 60 in first stage. 74 % were primigravida in second stage cs group. Arrest due to malposition was major indication for second stage (76% of cases). The most important complication among second stage cs group was PPH (76.7%) and majority of them needed blood transfusion. These complications were less in first stage cs group. Other Complications like increased duration of surgery (mean=53.3 min), post op fever (36% post op Wound infection (13.3%) was seen in second stage group. Fetal complications like low APGAR scores were seen in 16.7% of cases compared to first stage group and most of them needed resuscitation. A great deal of technical difficulty is faced during the second stage cesarean due to engagement of the fetal head and is the main reason for the associated increased maternal and fetal morbidity.^{17,18} Allen *et al.*,¹⁹ found that maternal operative trauma and perinatal asphyxia were significantly increased in women undergoing caesarean section at full cervical dilatation compared to caesarean section at less than full dilatation. There is a worrying rise in the overall rate of caesarean section at full dilatation. Better training in instrumental delivery may reduce rates of second stage caesarean section. Audit of the second stage caesarean section rate is a useful measure of clinical standards. Strategies for improved care include increased consultant assessment of the patient, more supervision and training of junior

obstetric staff by consultant to ensure safe intrapartum care.

CONCLUSION

Caesarean section in the 2nd stage of labour is associated with significantly increased maternal and neonatal morbidity such as post-partum hemorrhage, extended hospital stay and NICU admission. Early diagnosis of fetal distress, non-descent, proper judgement for instrumental delivery can reduce morbidity associated with second stage LSCS.

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