

Maternal and Perinatal Outcomes in Second Stage versus First Stage Caesarean Section: A Comparative Study at a Tertiary Care Hospital

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Abstract

Introduction: Caesarean Section (CS) is the most performed intra peritoneal peritoneal surgical procedure in women all over the world. At the same time delay and avoidance in decision of caesarean may also lead to increase in second stage caesarean sections.

Aim: To compare maternal and perinatal outcome in second stage vs firststage caesarean section.

Methods: hospital based prospective study, comprised of 300 women enrolled by convenient sampling, after fulfilling the inclusion and exclusion criteria and written consent. Pregnant adult women aged ≥ 18 years with POG ≥ 37 weeks with singleton fetus in vertex presentation admitted in the labour room of obstetrics and gynaecology department, S.P. medical college and associated group of hospitals, Bikaner, Rajasthan and undergoing caesarean delivery in first or second stage of labour were screened. Women with Caesarean delivery in second stage of labour were enrolled in group A and those with Cesarean delivery in first stage of labour into group B. Both groups were closely followed, observed data collected and systematically analysed.

Results: Mean age in group A was 23.56 ± 3.11 yrs and 24.12 ± 3.51 years in group B. 69.33% subjects in group A were unbooked whereas in group B 56.67% were unbooked. Mean operating time was 30.56 ± 7.81 minutes in group A and 22.14 ± 3.24 minutes in group B. The incidence of uterine atonia, PPH, prolong catheterization and post op complications and neonatal complications was significantly higher in group A.

Conclusion: Caesarean section in second stage of labour is associated with higher maternal and perinatal morbidity along with increased neonatal mortality. Hance casual procrastination in decision making should be avoided and surgical expertise in 2nd stage caesarean should be ensured.

Keywords: Caesarean Section, Maternal Outcome, Perinatal Morbidity.

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Introduction

The World Health Organization (WHO) recommends that the caesarean section (CS) delivery rate should not exceed 15% of all births in any region, and should only be used

in medically indicated circumstances in order to minimize risks to the infant or the mother.[1,2] By 2020 it was estimated that one in every five babies was born by

caesarean section. It has been observed that significant increase in the caesarean section rate in last few decades has taken place in middle and high income countries although there has been little change in most low income countries. Still the global caesarean section rate has continued to increase and it is estimated that by 2030 almost one in three babies will be born by caesarean section.[3]

Data obtained from national family health survey mentions that the incidence of caesarean section in India has modestly increased over the past 25 years and the rate has increased from 2.6% in 1992-93 to 17.2% in 2015-16 with a variation at state level. Overall rate of caesarean section deliveries in Indian medical colleges and teaching hospitals is 24.4% with variable caesarean section rate in public, charitable and private sector hospitals that is 20%,38% and 47% respectively.[4,5]

First stage of labour starts from the onset of true labour pains and ends with full dilation of cervix. Second stage of labour starts from full dilation of cervix (not from rupture of membrane) and ends with expulsion of fetus from birth canal. In last three decades there has been a disproportionate rise in the second stage caesarean sections due to decrease in assisted vaginal deliveries like forceps and vacuum extraction, traditionally used for arrest of descent which have been replaced by caesarean section deliveries in second stage of labour. Injudicious use of oxytocin and improper monitoring in second stage of labour also leads to increased caesarean section deliveries in second stage of labour.[6]

Recent data suggested that one fourth of primary cesarean sections are reported to be performed in the second stage of labour. Caesarean section in second stage of labour can be technically difficult due to impaction of fetal head in maternal pelvis and may carry higher maternal morbidity and may be

associated with intraoperative complications like increased trauma to the lower uterine segment and adjacent structures, urinary bladder injury, uterine atonia, haemorrhage, need for blood transfusion and the requirement for hysterectomy in cases of severe haemorrhage. Among all postoperative complications, most common reported is prolonged catheterisation due to haematuria followed by post operative fever and prolonged hospital stay. Among perinatal complications, second stage caesarean sections may be associated with higher incidence of meconium-stained amniotic fluid which might be due to fetal hypoxia caused by strong uterine contractions with deeply impacted fetal head. Furthermore the delay in the decision to perform an emergency caesarean section for reasons of fetal distress puts at increased risk of developing hypoxia, which increases risk of brain damage that leads to varying forms of disability in later life. Other perinatal complications like NICU admission, nursery admission, fresh stillbirth and perinatal death have also been reported.[7,8]

The debate still continues whether early surgical intervention should be performed or will it lead to unnecessary increased caesarean rates with associated morbidity and mortality. This specially implies in cases of occipitoposterior positions, borderline CPD and protracted labour. So, this institution based prospective study was designed to observe fetomaternal outcomes in second stage vs first stage caesarean sections at a tertiary care centre and have a comparative analysis of the observations with a motive to guide our decision making which is very critical in modern obstetric care.

Aim

To compare maternal and perinatal outcome in second stage vs first stage caesarean section.

Methods

Hospital based prospective study, comprised of 300 women enrolled by convenient sampling, after fulfilling the inclusion and exclusion criteria and written consent. Pregnant adult women aged ≥ 18 years with POG ≥ 37 weeks with singleton fetus in vertex presentation admitted in the labour room of obstetrics and gynaecology department, S.P. medical college and associated group of hospitals, Bikaner, Rajasthan and undergoing caesarean delivery in first or second stage of labour were screened. Patients with co-existing obstetric risk factor for PPH (multiple pregnancy, large baby, polyhydramnios, anaemia etc.), Patients with co-existing medical or surgical illness (like hypertension, cardiac diseases, coagulation disorders, preeclampsia etc.), Patients with IUD fetus, Patients with fetus in breech presentation or in transverse lie, Patients who underwent repeat Caesarean section, Patients who underwent elective Caesarean section were excluded from study. Women with Caesarean delivery in second stage of labour were enrolled in group A and those with Caesarean delivery in first stage of labour into group B. Both groups. Care was taken to spread the data collection throughout the week and during both day and night shifts of labour room. Detailed history and clinical

examination of all participants was taken and indication of Caesarean section and stage of labour was noted down. Intraoperatively uterine atonia, trauma to the lower uterine segment, urinary bladder injury, unintended extension of uterine incision, haemorrhage, need of blood transfusion and requirement for hysterectomy in case of severe haemorrhage was noted, operating time was noted. Postoperative fever, infection, catheterisation duration, hospital stay time was noted, and the patient was followed till discharge from the hospital. Fetal birth weight, APGAR score, duration of nursery stays, meconium stained liquor, fresh stillbirths and perinatal deaths was noted.

All data collected was entered into Microsoft Excel and was analysed with help of appropriate software and tests of significance considering level of significance as $p < 0.05$

Results

The mean age in group A was 23.56 ± 3.11 yrs and in group B, it was 24.12 ± 3.51 years. 63.33% subjects in group A were rural and 36.67% were urban whereas in group B, 52% were rural and 48% were urban. 69.33% subjects in group A were unbooked and 30.67% were booked whereas in group B 56.67% were unbooked and 43.33% were booked.

Table 1: Sociodemography

Age Distribution (Years)	Group A		Group B		P value
	N	(%)	N	(%)	
≤ 20	22	14.67	20	13.33	0.145
21-25	79	52.67	87	58.00	
26-30	44	29.33	35	23.33	
31- 35	5	3.33	8	5.33	
Residence					
Rural	95	63.33	78	52.00	0.062
Urban	55	36.67	72	48.00	
ANC status					
Booked	46	30.67	65	43.33	0.0312*
Unbooked	104	69.33	85	56.67	

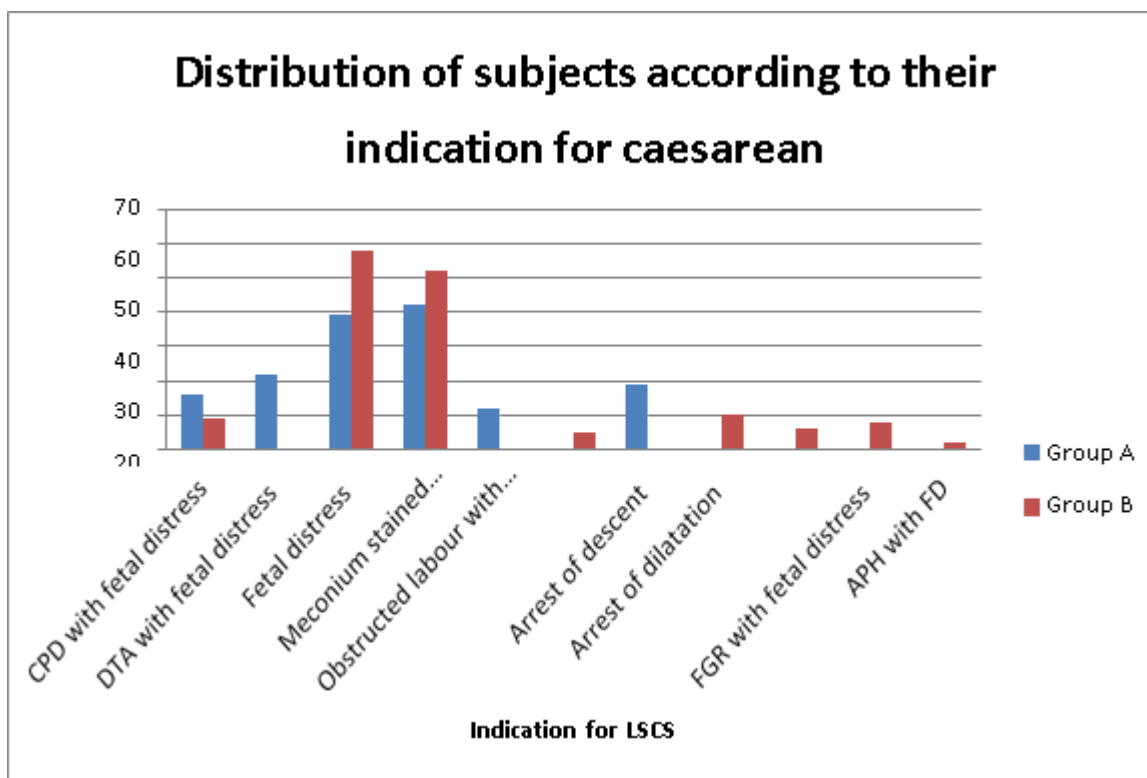


Figure 1: Indication in both groups

The most common indication for caesarean section in both the groups was fetal distress with / without meconium stained liquor. Failed induction, FGR, CPD, arrest of dilatation APH, were more common in group B and deep transverse arrest, obstructed labour, arrest of descent obviously were exclusive to group B cases. Mean operating time in group A was 30.56 ± 7.81 min. and 22.14 ± 3.24 min. in group B. The difference between the two groups with regard to operating time was found statistically significant. ($p=0.0001^*$)

4% subjects in group A had urinary bladder injury whereas no case of bladder injury was reported in group B. 10% subjects in group A had unintended extension of uterine incision whereas in group B, 0.67% cases of uterine incision extension was reported. 14.67% subjects in group A developed uterine atonia whereas in group B, 5.33% cases of uterine atonia were reported. 16.67% subjects in group A developed PPH whereas in group B, 6.0% cases of PPH were reported.

Table 2: Intra op events

Events	Group A		Group B		P value
	N	(%)	N	(%)	
Urinary bladder injury	6	4.0	0	0.00	0.039*
Uterine incision extension	15	10.00	1	0.67	0.003*
Uterine atonia	22	14.67	8	5.33	0.023*
PPH	25	16.67	9	6.00	0.003*

Mean difference in mean pre and post operative haemoglobin level in group A was 0.95 ± 0.38 g/dl. and 0.78 ± 0.25 g/dl. in group B. The difference between the two groups with regard to fall in haemoglobin levels was found statistically significant. ($p=0.0001^*$) also 13.33% subjects in

group A needed blood transfusion whereas in group B, 5.33% cases needed blood transfusion. (p=0.008)

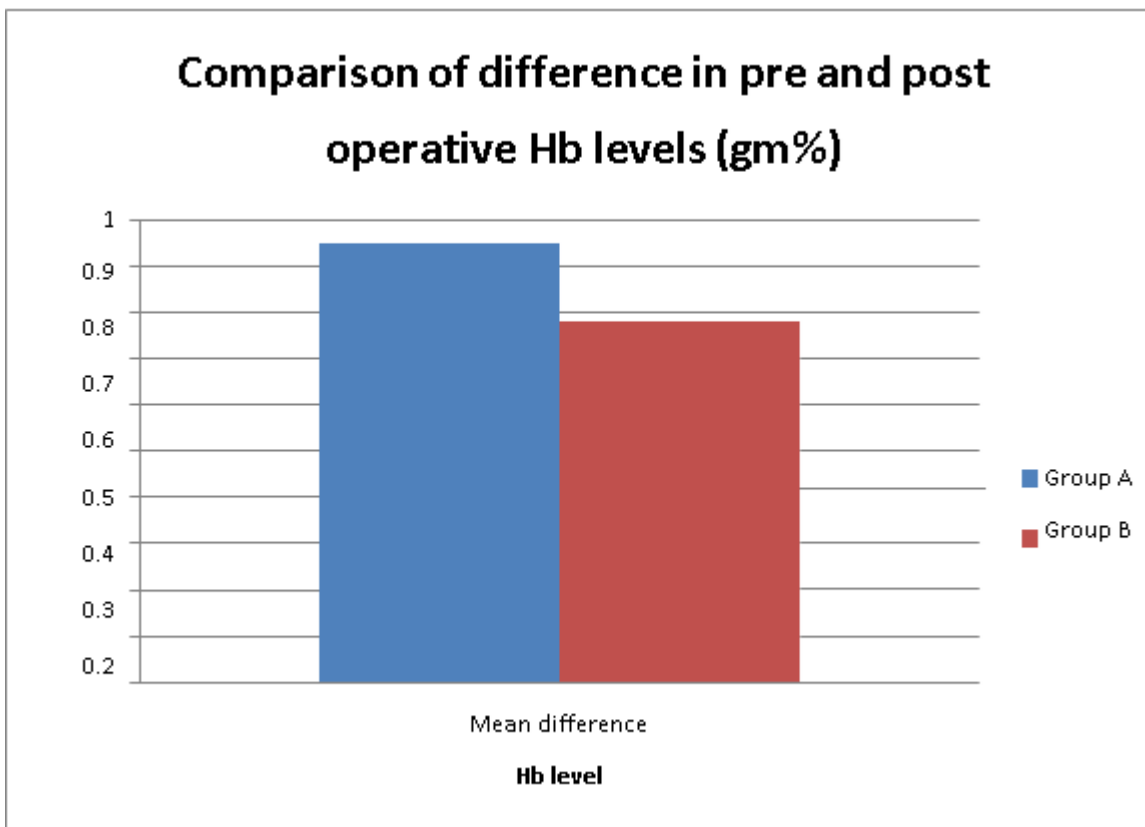


Figure 2: Mean Hb difference pre and post

6.00% subjects in group A needed prolonged catheterisation whereas in group B, 1.33% cases needed prolonged catheterisation. 8% subjects in group A developed infection on surgical incision site whereas in group B, 2% cases developed surgical site infection. 5.33% subjects in group A developed post operative fever whereas in group B, 0.67% cases developed post operative fever. 10% subjects in group A had prolonged hospitalisation whereas in group B, 2.67% cases had prolonged hospitalisation.

Table 3: Post op maternal complication

Complications	Group A		Group B		P value
	N	(%)	N	(%)	
Prolonged catheterisation	9	6.00	2	1.33	0.0001*
Surgical site infection	12	8.00	3	2.00	0.034*
Post operative fever	8	5.33	1	0.67	0.042*
Hospitalisation (≥ 7 days)	15	10.00	4	2.67	0.018*

13.33% neonates in group A developed respiratory distress, 10.67% had meconium aspiration syndrome, 8.67% had septicaemia, 8% had seizures and 5.33% neonates developed jaundice whereas in group B, 5.33% neonates had respiratory distress, 3.33% had meconium aspiration syndrome 2.67% had septicaemia, 2% had seizures and 1.33% had jaundice. Incidence of complications was higher in group A as compared to group B. The difference between the two

groups was found to be statistically significant in complications like respiratory distress ($p=0.029$), septicaemia ($p=0.046$), seizures ($p=0.034$) and meconium aspiration syndrome ($p=0.024$).

Table 4: Post op neonatal complication

Neonatal complications	Group A		Group B		P value
	N	(%)	N	(%)	
Meconium aspiration syndrome	16	10.67	5	3.33	0.024*
Jaundice	8	5.33	2	1.33	0.108
Respiratory distress	20	13.33	8	5.33	0.029*
Septicemia	13	8.67	4	2.67	0.046*
Seizures	12	8.00	3	2.00	0.034*

17.33% neonates in group A had nursery admission for neonatal complications whereas in group B, 7.33% neonate had nursery admission. 5.33% neonates in group A died whereas in group B, 0.67% neonatal mortality was reported. The incidence of neonatal mortality was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.042$)

Discussion

In our study, the most common indication for caesarean section in both groups was fetal distress with / without *meconium-stained* liquor. Arrest of descent, obstructed labour and deep transverse arrest were associated with second stage caesarean deliveries whereas arrest of dilatation, antepartum hemorrhage and oligohydramnios were associated with first stage caesarean deliveries. Similarly Anusha SR *et al.* (2018)[8] found that arrest due to malposition was major indication for second stage (76% of cases). Dahiya P *et al.* found that most common indication for the Caesarean was arrest in the second stage of labour (56.1%). Terefayehu Belay *et al.* (2018)[9] found that non reassuring fetal heart rate was the most common indication in first stage (37.8%) and CPD was the most common indication for second stage caesarean sections.

In our study, 4% subjects in group A had urinary bladder injury whereas no case of bladder injury was reported in group B. There was higher incidence of bladder injury in group A and the difference between the two groups was found statistically significant. ($p=0.039^*$). Jency C *et al.* (2021)[10] found that bladder injury was more common in

second stage than first stage C- sections.

In our study, 10% subjects in group A had unintended extension of uterine incision whereas in group B, 0.67% cases of unintended uterine incision extension were reported. The incidence of unintended extension of uterine incision was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.003$). similarly Dahiya P *et al.* (2022)[11] found that 16% cases had extension of uterine incision. Also Jency C *et al.* (2021)[10] reported that women who underwent second stage caesarean section had statistically significant number of uterine incision extension in comparison to first stage C- section group.

In our study, 14.67% subjects in group A developed uterine atonia whereas in group B, 5.33% cases of uterine atonia were reported. The incidence of uterine atonia was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.023$). Similarly Gupta N *et al.* (2018)[12] reported that second stage caesarean sections had higher maternal morbidity like atonic PPH (33.3%).

In our study 16.67% subjects in group A developed PPH whereas in group B, 6.0% cases of PPH were reported. The incidence of PPH was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.003$). 13.33% subjects in group A needed blood transfusion whereas in group B, 5.33% cases needed blood transfusion. The incidence of blood transfusion was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.008$) This could be due to higher incidence of uterine atonia and PPH in group A. Jency C *et al.* (2021)[10] also reported that women who underwent second stage caesarean section had statistically significantly higher need of blood transfusion due to associated PPH.

6.00% subjects in group A needed prolonged catheterisation whereas in group B, 1.33% cases needed prolonged catheterisation. The incidence of prolonged catheterisation was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.0001$) This may be due to higher incidence complications like urinary bladder injury and unintended extension of uterine incision in second stage caesarean deliveries. Hemant D *et al.*(2021)[13] reported higher incidence of prolonged catheterisation in second stage C- section group as compared to first stage C -section group.

In our study, 8% subjects in group A developed infection on surgical incision site whereas in group B, 2% cases developed surgical site infection. The incidence of surgical site infection was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.034^*$) This could be due to surgery in advanced labour, prolonged operating time and higher incidence of complications during surgery, similar results were found by Kumari P *et al.*

(2020).[14]

In our study, 5.33% subjects in group A developed post operative fever whereas in group B, 0.67% cases developed post operative fever. The incidence of post operative fever was higher in group A as compared to group B and the difference between the two groups was found statistically significant. ($p=0.042$) This may be related to longer operating duration and higher per operative complications. Dahiya P *et al.* (2022)[11] found postoperative febrile illness in 14.1% cases of second stage C-sections. Also Jency C *et al.* (2021),[10] and Anusha SR *et al.* (2018)[8] reported that women who underwent second stage caesarean sections had higher incidence of postoperative fever.

10% subjects in group A had prolonged hospitalisation whereas in group B, 2.67% cases had prolonged hospitalisation. Cases of prolonged hospitalisation were higher in group A as compared to group B and the difference between the two groups was statistically significant. This could be because second stage caesarean sections were associated with higher incidence of per operative complications like urinary bladder injury, unintended uterine incision extension, prolonged catheterisation and post operative complications like febrile illness and surgical site infection. Jency C *et al.*(2021)[10] reported that women who underwent second stage caesarean section had statistically significant increase in post-operative morbidities like postoperative fever and surgical site infection which necessitated prolonged hospital stay as compared to first stage cesarean sections.

13.33% neonates in group A developed respiratory distress, 10.67% had meconium aspiration syndrome, 8.67% had septicaemia, 8% had seizures and 5.33% neonates developed jaundice whereas in group B, 5.33% neonates had respiratory distress,

3.33% had meconium aspiration syndrome 2.67% had septicaemia, 2% had seizures and 1.33% had jaundice. All complications were higher in group A as compared to group B. The difference between the two groups was found to be statistically significant in complications like, respiratory distress ($p=0.029$), septicaemia ($p=0.046$), seizures ($p=0.034$) and meconium aspiration syndrome ($p=0.024$). This may be due to fetal hypoxia caused by strong uterine contractions with deeply impacted fetal head in second stage of labour. Delay in decision-making of emergency caesarean section also increases the risk of fetal distress and fetal hypoxia which increases the risk of respiratory distress syndrome, meconium aspiration syndrome, seizures and other neonatal complications. Dahiya P *et al.* (2022)[11] reported neonatal complications that required NICU admission were birth asphyxia (16%), meconium aspiration (14.1%), neonatal jaundice (4.7%), respiratory distress syndrome (11.3%), and fresh stillbirth (5.6%) in second stage caesarean sections. Kumari P *et al.* (2020)[14] found that respiratory distress was seen in 23 neonates of group A (first stage) and in 29 neonates of group B (second stage). ($p<0.05$)

In our study, 5.33% neonates in group A died whereas in group B, 0.67% neonatal mortality was reported. The incidence of neonatal mortality was higher in group A as compare to group B and the difference between the two groups was found statistically significant. This can be related as higher number of neonates who delivered by second stage caesarean sections suffered from severe illness like respiratory distress syndrome, meconium aspiration syndrome, seizures, septicaemia, jaundice etc. at birth. Kumari P *et al.* (2020) [14] found that no mortality was seen in group A (first stage) while 4 neonates died in group B (second stage).

Conclusion

Caesarean section in second stage of labour is associated with higher maternal and perinatal morbidity along with increased neonatal mortality. We recommend that casual procrastination of decision making should be avoided and experienced, skilled obstetrician should be involved so as to minimize complications as well as avoid unnecessary interventions. Multicentric studies with larger sample sizes can further elucidate this important topic.

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