

## Maternal and Foetal Outcomes in Full dilatation Caesarean Section (FDCS) in A Teaching Institution in North Kerala, India

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Received: 18-04-2021 / Revised: 06-06-2021 / Accepted: 28-07-2021

### Abstract

**Background:** Caesarean section (CS) is the most commonly performed abdominal operation in women in both industrialised and low-income countries. CS at full cervical dilatation is a technically more challenging procedure than CS in early labour. **Methods:** This prospective case-control study was conducted at a tertiary care teaching institute from Aug 1 2019 to July 31 2020. It included all women (N = 90) delivered by caesarean section. There were 103 caesareans out of which 37 were FDCS and 66 were first stage caesareans. Primary maternal outcomes measured included intraoperative surgical complications, surgery duration, need for blood transfusion, puerperal sepsis, requirement for hysterectomy, unintended extension, and length of hospital stay. Intraoperative complications were unintended extensions, visceral injury and associated with longer operation time and hospital stay. Neonatal outcomes include a 5 min Apgar score and extended NICU stay were measured. **Results:** Maternal morbidities: Women underwent second stage caesarean section had statistically significant uterine tear extension and Urinary tract infection. More women in FDCS group required blood transfusion due to associated PPH. There was extended SICU stay due to post-operative morbidities like haematuria and postoperative fever which caused prolonged hospital stay. Neonatal morbidities: Babies born to FDCS group had lower Apgar scores and needed resuscitation and is statistically significant. More number of babies in second stage had hyperbilirubinemia and needed extended NICU and hospital stay thereby resulting in neonatal morbidity. **Conclusion:** Decision making in second stage caesarean section is often challenging and involvement of senior obstetrician is desired for decision making and for performing second stage CS. Special attention should be provided to the patients undergoing FDCS.

**Keywords:** Full dilatation Caesarean section (FDCS), second stage CS, Maternal outcome, Foetal outcome.

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### Introduction

One of the main goals of every medical team dealing with childbirth, is performing a safe delivery[1].Caesarean section (CS) is the most commonly performed abdominal operation in women in both industrialised and low-income countries.. Globally, at least one in five women deliver by caesarean section. When done ethically, they prove to be lifesaving procedures that benefit both mothers and babies. The rate of caesarean deliveries varies substantially between nations and healthcare facilities but continues to rise worldwide[2,3]. According to WHO the ideal rate for caesarean sections is to be between 10-15%.An emergency caesarean done at second stage has a parturient at full cervical dilatation. Incidence of second stage CS has increased from 0.9% to 2.2% [4].Second stage CS have been reported to cause increase in trend of primary caesareans[5].Royal College of Obstetricians and Gynaecologists (RCOG) reports that 6% of primary CS occurs at full dilatation and in 50% of these patients there was no attempt of instrumental vaginal delivery[6]. CS at full cervical dilatation is a technically more challenging procedure than CS in early labour[7]. There was also difficulty in delivery of deeply engaged head which was delivered by Patwardhan method or

by push method[8].The maternal morbidity is also higher in FDCS[9]. Maternal morbidity in second stage CS is in the form of extension of uterine angles, postpartum haemorrhage and prolonged surgical time[10,11].Bladder injury, postpartum pyrexia, increased need for blood transfusion are also among the complications reported during second stage CS[12,13]. It is also suggested that compromise of the integrity of the cervix due to cervical injury can predispose to subsequent preterm birth[14,15] . Neonatal morbidity in terms of NICU admissions, hypoxemia, foetal acidemia, prolonged NICU stay is reportedly higher in second stage CS[16,17]

#### Complications of Caesarean Section During Second Stage

There has been disproportionate increase in caesarean section performed in second stage of labour in last few years. Caesarean section at full cervical dilatation (FDCS) with an impacted foetal head (IFH) can be technically difficult and associated with increased trauma to the lower uterine segment and adjacent structures, as well as increased haemorrhage and infection [18].Delivery of the foetus will be difficult due to deeply impacted head in the pelvis, particularly when instrumental delivery is attempted and failed[19]. FDCS is associated with obstetric haemorrhage, bladder injury, extended uterine tear leading to broad ligament haematoma, infection and longer hospital stay[20].Decision making for CS in the second stage of labour is one of the greatest challenges in current obstetric practice. Involvement of a skilled obstetrician in the management of second stage CS aids in minimising the maternal and foetal morbidity and mortality. In the current scenario of increasing

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caesarean section rates, this hospital based comparative cross-sectional study is taken to compare the maternal and neonatal outcomes of caesarean delivery in second stage of labour versus caesarean delivery in the first stage of labour.

**Methodology**

This was done as a case control study.

A caesarean section in full dilatation is referred to as **Full Dilatation Caesarean Section (FDSC)** and was taken as the case and designated as Group 1. A control was defined as one who has undergone primary caesarean section in the first stage of labour. And designated as Group 2.

There were 66 cases of first stage caesarean section (5.7%) and 37 cases of second stage CS (3.2%). This study was conducted in Department of Obstetrics and Gynaecology, KMCT Medical College, Calicut over a period of 1 year (from Aug 1 2019 to July 31 2020).

**Sample size**

$N = Z^2 \frac{p \times (1 - p)}{E^2} = \text{Normal deviate for two tailed hypothesis} = 1.96$

P = Proportion or Prevalence (From Previous Studies)

(Anusha SR, Deepak AV, Jacob KJ. Maternal and neonatal outcome in second stage caesarean section versus first stage: a comparative study. Int J Reprod Contracept Obstet Gynecol 2018;7:4640-5.)  $D = \text{Design effect} = 1$   $E = \text{Margin of error} = 20\%$

$N = 90$  (sample size) (21)

**Selection criteria**

**Inclusion criteria**

- Women with singleton foetus with vertex presentation including Primi-gravidas and multigravidas with previous vaginal delivery
- Gestational age > 37 weeks of gestation.
- Women with spontaneous and induced onset of labour pains.

**Exclusion criteria**

- Women with associated obstetric complications (preeclampsia and diabetes mellitus).
- Women with major foetal structural or chromosomal abnormalities.
- Pregnancies with placenta previa, malpresentations and abruptio placentae
- Pregnancies <37 weeks of gestation

KMCT Medical College is a tertiary care centre. The precise catchments are difficult to delineate, as women attending KMCT virtually come from all over Calicut, Malappuram and Wayanad. 85-90% of these women are booked in the antenatal clinic of KMCT, while 5-10% are booked outside and less than 3% seek un-booked 'emergency delivery'. The number of KMCT antenatal care seekers who have domiciliary delivery is nil or considerably negligible.. KMCT has a 24hour blood bank facilities and excellent emergency obstetric services and round the clock anaesthetic services. Our

hospital has an excellent NICU which has a survival rate of 100% for gestational age >34 weeks. Relatively small percentage of affluent women come to our hospital. It mainly caters to the need of mainly lower and lower middle, mid middle classes of the population. In addition, private hospitals also refer many complicated cases to our hospital. The literacy rate attending KMCT is over 90%, majority of them having secondary or higher level education and are aware of their rights to health. The sampling frame for the study was maternal register maintained in the labour room, which consists of all the deliveries conducted in a tertiary care hospital. The cases and controls are interviewed by a structured questionnaire before discharge in wards. Maternal variables included intra operative complications including difficulty in delivery of baby, extension of uterine incision, uterine artery injury, PPH, need for blood transfusion, bladder injury, cervical laceration, duration of surgery, number of days in SICU, blood stained urine, puerperal sepsis, wound infection, other complications like paralytic ileus, wound suturing and length of hospital stay. Neonatal variables include birth weight(kg), Apgar score of the new-born at 5mins, foetal injury, respiratory distress, need for resuscitation, meconium aspiration syndrome, hyperbilirubinemia, admission NICU and extended hospital stay.

**Data Management**

Data was coded and entered into excel sheets. All statistical procedures were performed using Statistical Package for Social Sciences (SPSS) 20.0. Calculations for power (80%) of study will be performed before commencement of the study. All quantitative variables expressed in mean and standard Deviation. Qualitative variables were expressed in percentages. Shapiro-Wilk test was used for testing the normality assumption of the data. Chi square test was used to test the associations.  $g$  the normality assumption of the data. P value <0.05 was considered significant.

**Results**

Total number of deliveries during the study period was 1151. Among these, 608 cases were normal delivery and 543 cases delivered by caesarean section. Total emergency cases were 271 and primary caesarean section rate was 103 (33%). There were 66 cases of first stage caesarean section (5.7%) and 37 cases of second stage CS (3.2%). Maternal morbidities: Women underwent second stage caesarean section had statistically significant uterine tear extension and Urinary tract infection. More women in FDSC group required blood transfusion due to associated PPH. There was extended SICU stay due to post-operative morbidities like haematuria and postoperative fever which caused prolonged hospital stay. Neonatal morbidities: Babies born to FDSC group had lower Apgar scores and needed resuscitation and is statistically significant. More number of babies in second stage had hyperbilirubinemia and needed extended NICU and hospital stay thereby resulting in neonatal morbidity.

**Table 1: Maternal Complications -Comparison Between Both The Groups**

Variable	Full dilatation Caesarean section (FDSC)	(First stage CS)	Chi-Square	Significance* P-value
Uterine tear	5	0	9.37	0.005*
Haematuria	6	1	8.08	0.008
Postpartum Haemorrhage	9	4	7.17	0.01*
Urinary tract infection	8	3	7.24	0.01*
Post-operative fever	12	10	4.21	0.03*

p value <0.001 is highly significant

**Table 2: Maternal Morbidities In Both The Groups**

Maternal Complications	Full dilatation Caesarean section(FDSC)	First stage Caesarean Section	Significance* P-value
Uterine artery ligation	3(8.1%)	1(1.5%)	0.13
Blood transfusion	5(13.5%)	2(3%)	0.06*
Surgical site infection	8(21.6%)	8(12.1%)	0.16
Paralytic Ileus	1(1%)	0	-
Wound re-suturing	2(1.9%)	0	-

p value <0.001 is highly significant

Women underwent second stage caesarean section had statistically significant uterine tear extension and Urinary tract infection. More women in FDSC group required blood transfusion due to associated

PPH. There was extended SICU stay due to post-operative morbidities like haematuria and postoperative fever which caused prolonged hospital stay.

**Table 3: Neonatal Morbidities In Both The Groups**

Foetal Complications	Full dilatation Caesarean section	First stage CS	Chi-Square	Significance* P-value
Need to resuscitate	06(16.2%)	02(3.0%)	5.75	0.02*
Five minute Apgar <3	05(13.5%)	02(3%)	4.11	0.04*
Hyperbilirubinemia	13(35.1%)	9(13.6%)	6.52	0.01*
Respiratory distress	05(13.5%)	03(4.5%)	-	0.11
Meconium Stained Amniotic Fluid	9(24.3%)	08(12.1%)	-	0.09

p value <0.001 is highly significant

Babies born to FDSC group had lower Apgar scores and needed resuscitation and is statistically significant. More number of babies in second stage had hyperbilirubinemia and needed extended NICU and hospital stay thereby resulting in neonatal morbidity.

**Table 4: Duration of Stay In SICU in Mother**

hospital stay in days	Full dilatation Caesarean section	First stage CS	Chi-Square	Significance* P-value
SICU 1 Day	27(73%)	63 (93.5%)	10.86	0.002*
SICU 2 Days	10(27.0)	03		

p value <0.001 is highly significant

There was extended SICU stay due to post-operative morbidities like haematuria and postoperative fever which also caused prolonged hospital stay.

**Table 5: Duration of Stay in Hospital -Mother**

Hospital stay in days	Full dilatation Caesarean section	First stage CS	Chi-Square	Significance* P-value
< 10 Days	28(75.7%)	63(95.5%)	9.01	0.004*
>10 Days	09(24.3%)	03 (4.5%)		

p value <0.001 is highly significant

**Table 6: Duration of Stay in NICU**

Hospital NICU stay in days	Full dilatation Caesarean section	First stage CS	Chi-Square	Significance* P-value
< 05 Days	10(27%)	07(10.6%)	7.18	0.02*
>05 Days	05(13.5%)	04(6.1%)		

p value <0.001 is highly significant

More number of babies in second stage had hyperbilirubinemia and needed extended NICU and hospital stay thereby resulting in neonatal morbidity

#### Discussion

Total number of deliveries during the study period was 1151. Among these, 608 cases normal delivery and 543 cases delivered by caesarean section. Total emergency cases were 271 and primary caesarean section rate was 103 (33%). There were 66 cases of first stage caesarean section (5.7%) and 37 cases of second stage CS (3.2%).

**Maternal Morbidity:** Both first stage and second stage caesarean sections were done under Spinal anaesthesia. In the present research, 5 (13%) women had uterine tear in the form of unintended extension of uterine incision and all these belonged to FDSC group. A total of 4(3.9%) patients needed uterine artery ligation of which 3 were in second stage. 13(12.6%) had postpartum haemorrhage. 7 (6.8%) patients received blood transfusion of which 13.5% vs 3% were in second stage. 7(6.8%) had blood stained urine out of which majority patients belonged to second group and they needed prolonged catheterisation. 7% women in second stage had SICU stay for more than 48 hours. Urinary tract infection and postoperative fever in second stage caesareans when compared to first stage was statistically significant. Incidence of postoperative wound infection was comparable in two groups. One patient in second stage had postoperative paralytic ileus and 2 women needed wound suturing. The mean hospital days was more in second stage when compared to first stage (7.08 vs 6.3). Our study is supported by Nidhi Jain et al [21]. Among post-operative complications second stage had prolonged bladder catheterisation in 90% of women and 38% of them had postpartum fever. Wound sepsis occurred in 28 out of which 15% underwent secondary suturing and 20% had to stay in hospital

for prolonged time. In first stage, prolonged bladder catheterisation, postpartum fever and wound sepsis was observed in 38%, 19% and 19% of women respectively. Secondary suturing was done in 11% cases and 13% women had prolonged hospital stay. A significant difference was found in incidence of all of the postoperative maternal complications except secondary suturing among the two groups. To summarise, incidence of PPH, blood transfusion and ICU admission was significantly higher in FDSC than in first stage caesarean in the present research in accordance with Nidhi Jain et al [22]. In Gupta K et al [22] 41% patient had high coloured urine. Atonic uterus was encountered in 35% of patients, most of which were treated by medical management, out of which 13% required uterine artery ligation and 8% required blood transfusion. Gupta K et al [23] noticed uterine incision extension in 28% and bladder injury in 1% in concordance with Kumaresan S et al [24] where atonic uterus was seen in 33.2% and haematuria in 34.8% similar to Sandhya MR et al [25]. Sucack A et al [26] demonstrated that bladder injury was escalated by 4 times in the Caesarean done in the second stage of the labour which suggests these operations are technically more difficult. Development of uterine atony and the requirement for blood transfusion in cases of severe haemorrhage are also found to be more frequent in the second stage caesarean group [FDSC] and can be attributed to longer labour resulting in uterine fatigue. Our study is also supported by Goswami et al [27]. Intra-operative complications were extension of uterine angles 8 cases [16%], atonic PPH 4 cases (8%), bladder injuries 3 cases [6%] and obstetric hysterectomy in 2 cases (4%). They had post-operative complications like paralytic ileus in 7(14%), febrile illness in 7(14%) and wound infection in 4 cases [8%]. The most common maternal operative complications seen in our study was blood stained urine in 27(18.8%), febrile illness in 27(18.8%), and wound infection in seven (13.9%) cases. Atonic

postpartum haemorrhage was seen in 7(4.8%) cases, which is slightly less than in the previous studies by Babre VM et al [ 28 ], Baloch S et al [29] . In study by Alexander et al [ 12], maternal composite index (including uterine atony, extension of uterine incision and bladder injury) was significantly high in woman undergoing caesarean section in second stage (odds ratio 1.21, 95% confidence interval 1.07-1.37). However in study by Malathi et al [30], no significant difference was found among two groups for PPH and extension of uterine incision.

#### Neonatal outcome

In our study 8 babies had respiratory distress out of which 5 babies were under second stage Apgar Babies born to FDCS group had lower Apgar scores and needed resuscitation and is statistically significant. 8 babies needed resuscitation of which majority belong to second stage. 17 babies have meconium aspiration out of which 9 (24.3%) are under second stage and 8(12.1%) and the results are comparable in two groups. Our study had 22 babies with hyperbilirubinemia and they were 13(35.1%) and 9 (13.6%) in second stage and first stage accordingly. We have a total of 26 NICU admission of which babies born in second stage have more NICU stay when compared to babies born in first stage CS. There is no neonatal death or fresh still birth in our study. Our study is in contrast with the study done by Goswami KD et al[27]where 44% babies were admitted to neonatal intensive care unit and had 9 caes(18%) of NND. Another study done by Unterscheider J et al[5] where 13.2% of babies were admitted to neonatal intensive care unit. Rami et al [31] found that babies born by caesarean section at full cervical dilatation are 1.5 times more likely to have perinatal asphyxia than those born by caesarean section during the first stage of labour. Similar studies done by Sucak A et al[26] and Ascioglu et al[32] noted that there is adverse prognostic impact on foetal outcome in second stage CS. However this was contradicted by other studies conducted by Selo- Ojeme D et al[13]and Alexander JM et al [29] . The most common foetal complication was meconium stained amniotic fluid, seen in 34.2% cases in PadmaGurung et al (33). Nidhi Jain [22]found that neonatal complications including cord blood acidosis, low Apgar score, need of resuscitation and perinatal deaths was found significantly higher in second stage caesarean section. Cebekulu et al [34] also found more babies with hypoxic ischemic encephalopathy (p value -0.013), subaponeurotic haemorrhage (p value 0.012) . However in study by Alexander et al[12] neonatal composite index was not found to be significantly different among first stage and second stage caesarean section.

#### Conclusion

Mean number of days(SICU and hospital stay) spent in the hospital was statically significant in FDCS and intraoperative complications-uterine tear extension and Urinary tract infection. More women in FDCS group required blood transfusion due to associated PPH. There was extended SICU stay due to post -operative morbidities like haematuria and postoperative fever. Babies born to FDCS group had lower Apgar scores and needed resuscitation. Considerable number of babies in second stage had hyperbilirubinemia and needed extended NICU and hospital stay contributing to neonatal morbidity. Women undergoing caesarean section in the second stage of labour had increased maternal and foetal morbidity. We concluded that selection of birthing method should be carefully made in FDCS group.

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**Conflict of Interest: Nil**

**Source of support:Nil**