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ORIGINAL ARTICLE

INDICATIONS AND OUTCOMES OF CAESAREAN SECTION IN THE SECOND STAGE OF LABOUR AT A TERTIARY CARE HOSPITAL IN WEST BENGAL

Running Title:Outcomes in the second stage of labour

Dr Kajal Kumar Patra[1*], Dr Shibram Chattopadhyay[2], Dr Anirban Roy[3], Dr Subir Kumar Bhattacharyya[4]

1. Professor and Head, Dept of Gynae and Obstetrics, Gouri Devi Institute of Medical Science, Durgapur, West Bengal, drmch2000@gmail.com
2. Associate professor, Dept of Gynae and Obstetrics, NRS Medical College and Hospital, Kolkata, West Bengal, India shibramchatt@gmail.com
3. PGT, Dept of Gynae and Obstetrics, NRS Medical College and Hospital, Kolkata, West Bengal, Indiaani_friendz@yahoo.com
4. Professor, Dept of Gynae and Obstetrics, Medical College and Hospital, Kolkata, West Bengal, India drsubir69@yahoo.com

Corresponding Author:
Dr Kajal Kumar Patra
Professor and Head, Dept of Gynae and Obstetrics
Gouri Devi Institute of Medical Science
GT Road, National Highway 2, Rajbandh,
Durgapur, West Bengal 713212
Mobile : +91 9830212433
Email: patrakajal8@gmail.com, drmch2000@gmail.com

ABSTRACT:

Objective : Second stage caesarean section is usually associated with the deeply engaged head, less liquor, and thinned out the lower uterine segment. This can lead to a high risk of maternal morbidities like an extension of the lower uterine segment incision, uterine atony, and injury to urinary bladder as well as neonatal morbidities such as birth asphyxia, NICU admission, and meconium aspiration syndrome. This study aims to observe the maternal and neonatal outcomes of caesarean delivery performed in the second stage of labor.**Methods:** This studywas institutionbasedObservationaldescriptivestudy andwasconductedinNilratanSircarMedicalCollegeand Hospital,Kolkata, West Bengal, Indiafrom

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March 2020- August2021 including 90women who had deliver by caesarean section at second stage oflabour.Thorough history taking and clinical examination was done. Template was generated in MS excel sheet and analysis was done on SPSS software.**Results:** CPDwasthemostcommonindicationofLSCS(53.3%). During the post-operative period, 24.4% had PPH, 15.6% had sepsis and 10% required hospitalizationformorethan5days. Among thebabiesborn52.2%ofthe babyrequired NICU admission. AmongthebabiesadmittedinNICU,29.8%hadBirthasphyxia,25.5%hadMeconiumaspirationsyndrome,Neonataljaundice (23.4%)andNeonatalsepsis(10.6%)**Conclusion:** Caesarean sections during the second stage are increasing in prevalence. From the salient findings of the study, we may conclude that Caesarean section at full cervical dilatation is associated with higher likelihood of adverse outcome for both mother and fetus.

Keywords: Caesarean section,Complication,Labour, Maternal, Neonatal, Second stage of labor

INTRODUCTION:

Caesarean delivery is definedas thebirth of thefetus through incisions in theabdominal walland the uterine wall. Caesarean section (CS) is the most commonly performed major abdominaloperation in women all over the world. Variable rates of caesarean sections are reported betweenand within the countries. The rate of caesarean delivery continues to increase despite efforts toconstrain operative abdominal deliveries. This is a cause for concern because caesarean section isassociated with higher likelihood of adverse outcome for both mother and fetus as compared tovaginaldelivery.A caesarean section at second stage occurs when mother requires delivery at full dilatation of cervix, which poses a risk to mother and the fetus. The increasing trend of CS at second stage is of major concern in modern obstetrics. Incidence of second stage CS has increased from 0.9% to 2.2%.[1]Second stage CS has been reported as a concerning increase trend within the increasing CS rate.[1,2]Literature review suggests that this trend is multi-factorial; probably a combination of lack of training for junior staff in second stage decision making, lack of expertise in assisted vaginal delivery.[2]Increase in primary CS has a great impact on subsequent obstetricoutcome and delivery.CS at full dilatation is a technically more challenging procedure than CS in early labour.[3]

Optimal management of second stage of labour shouldmaximise the probability of vaginaldelivery with minimal risk to mother and fetus. There is no specific guideline whether to attemptfordifficultinstrumentaldeliveryorimmediate caesareansection.[4]

Caesarean section can be performed before labour, during first and second stages of labour. Adecreasein the rates of operative vaginal delivery has been observed with a correspondingincrease in the caesarean deliveries during second stage of labour. Second stage of labour beginswhencervicaldilatationis completedandends withthefetaldelivery.

There is an alarming rise of Caesarean section and increasing trend of performing CS at fulldilatationofcervix.Caesareansectionatsecondstageoflabourmaybeassociatedwithincreased adverse outcomes for both themother andfetus when compared tovaginal deliveryand CS done

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at first stage of labour.[5,6] A caesarean section in second stage is technicallydifficult due to engagement of the fetal head and is associated with increased maternal and fetalmorbidity.[6] The maternal morbidity includes major haemorrhage, uterine incision extensioninto the broad ligamentand prolonged operating time.Neonatal morbidity andmortality ismainlyduetohypoxiaandfetaltrauma.

By keeping in view this study was designed to Assess the indications of Caesarean section done at second stage of labour. Assess the intraoperative complications and postoperative morbidity and mortality if any and to assess the fetal outcome including morbidity and mortality of Caesarean section done at second stage of labour.

MATERIALS AND METHODS:

An institution based Observational descriptive study was conductedat department of Obstetrics &Gynaecology in Nilratan Sircar Medical College and Hospital, Kolkata The study was conducted over one and half year (March 2020- August 2021) after getting permission from Institute's Ethics Committee and approval of The West Bengal University of Health Sciences.

Sample size and sampling:

Taking reference from previous study[7] the prevalence of postpartum haemorrhage is 26% n = 3.84 x P x (1- P) / (d2)

n = minimum sample size

P= prevalence = is 26% for postpartum haemorrhage d = allowable error = 10%

n= 3.84x 0.26 x (1- 0.26) / 0.1x 0.1=73.8

Calculating 10% attrition rate n=73.8+7.3 = 81.1 which is the minimal sample size. So we took 90 as minimal sample size for the study. The list of total number of women who had deliver by caesarean section at second stage of labour at term pregnancy with single fetus with cephalic presentation was obtained. Required sample size of 90 was chosen from this sampling frame by Simple Random Sampling (SRS).

Inclusion Criteria : Singleton pregnancy irrespective of parity. Period of gestation of >37 weeks. Cephalic presentation, women with or without previous LSCSand patients those who have given written and informed consent to participating in this study.

Exclusion Criteria: Multiple pregnancies, preterm deliveries, malpresentations, medical complications associated with pregnancy and women not willing to participate.

Method of statistical analysis: Collected Data were checked for consistency and completeness. Data were entered into MS Excel and analysed using the SPSS version 20. Descriptive analysis was done in the form of proportion for categorical variables, mean or median for continuous variables. Data were checked for normal distribution using tests for normality and non-parametric test was performed accordingly. The difference between proportions was analysed using Chi square test; p value of less than 0.05 was considered statistically significant.

Ethical clearance: Approval was obtained from the Institutional Ethics Committee (IEC) of Nilratan Sircar Medical College & Hospital, Kolkata. Written permission from the institutional

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ethics committee will be obtained prior to beginning of this study. Patients or relatives of patient were explained in their own-language about nature of study and procedures. They were also assured about the confidentiality of information and its anonymity.

RESULTS:

The present study was conducted among 90 women who had deliver by caesarean section at second stage of labour at term pregnancy with single fetus with cephalic presentation in Nilratan Sircar Medical College and Hospital, Kolkata, West Bengal, India.Total no of delivery was 6857 during the study period. Total no of LSCS were 3652. Total no of LSCS in 2nd stage of labour was 146. Required sample Sample size of 90 chosen by SRS.

Table 1: Distribution of study subjects according to age, Gravidity, period of gestation and indication of LSCS (n=90)

Age(years)	Frequency(number)	Percent	P-value
18-24	52	57.8	<0.05 (significant)
25-30	28	31.1	
>30	10	11.1	
Parity			
Primigravida	65	72.2	<0.05 (significant)
Multigravida	25	27.8	
Period ofgestation			
37	23	25.6	<0.05 (significant)
38	33	36.7	
39	14	15.6	
40	16	17.8	
41	04	4.3	
IndicationofLSCS			
CPD	48	53.3	<0.05 (significant)
Fetaldistress	21	23.3	
Deeptransversearrest	19	21.1	
Unsuccessful ventous	02	2.3	

Table 1 shows that 57.8% of the mothers were in the age group of 18-24 years, followed by 31.1% were in between 25-30 years of age. The Mean (SD) age of the study population was 4.32 (4.70) years. 72.2% of the mothers were primigravida. 36.7% of the mothers were having 38 weeks of gestation. CPD was the most common indication of LSCS (53.3%). Out of 21subjects with fetal distress, 12 were having MSL and 9 were having Non-reassuring FHR

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Table 2: Distribution of study subjects according intra-operative maternal complication(n=90)

Intra-operativematernalcomplication	Frequency(number)	Percent	P value
Bloodstainedurine	28	31.1	<0.05 (significant)
Haemorrhage(>1000ml)	23	25.6	
Extensionofuterineincision	15	16.7	
Bladderinjury	01	01.1	
Broadligamenthematoma	01	01.1	
None	22	24.4	

Table 2 shows that Blood stained urine was most common intra-operative maternal complication (31.1%), followed by Haemorrhage (>1000ml) and Extension of uterine incision.

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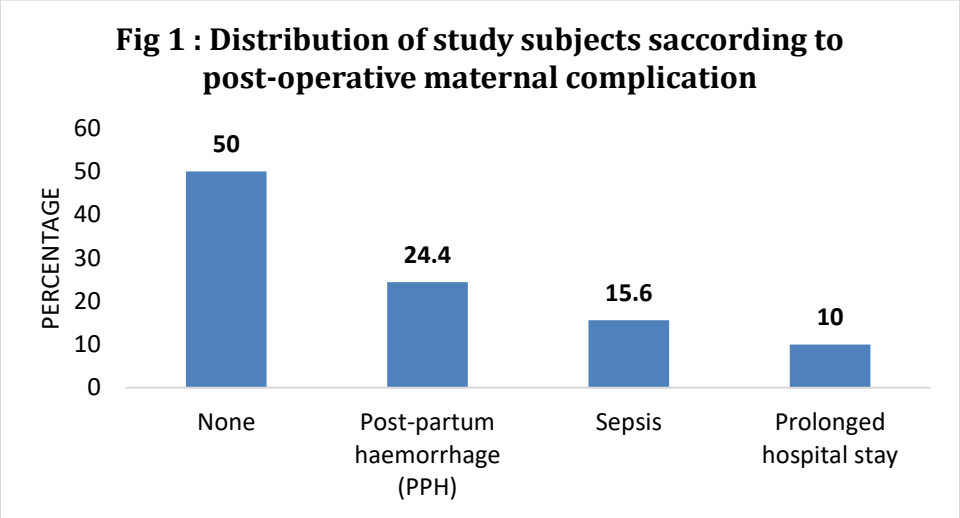

Figure 1 shows that during the post-operative period, 24.4% had PPH, 15.6%had sepsisand 10% had prolonged hospital stay.

Table 3: Distribution of study subjects according reasons of NICU admission (n=47)

ReasonsofNICUadmission	Frequency(number)	Percent	P value
Birthasphyxia	14	29.8	<0.05 (significant)
Meconiumaspirationsyndrome	12	25.5	
Neonatalsepsis	05	10.6	
Cephalhematoma	02	4.3	
Neonataldeath	03	6.4	
Neonataljaundice	11	23.4	
Total	**47**	**100.0**	

Table 2 shows that among the babies admitted in NICU, 29.8% had Birth asphyxia, 25.5% had Meconium aspiration syndrome, Neonatal jaundice (23.4%) and Neonatal sepsis (10.6%).

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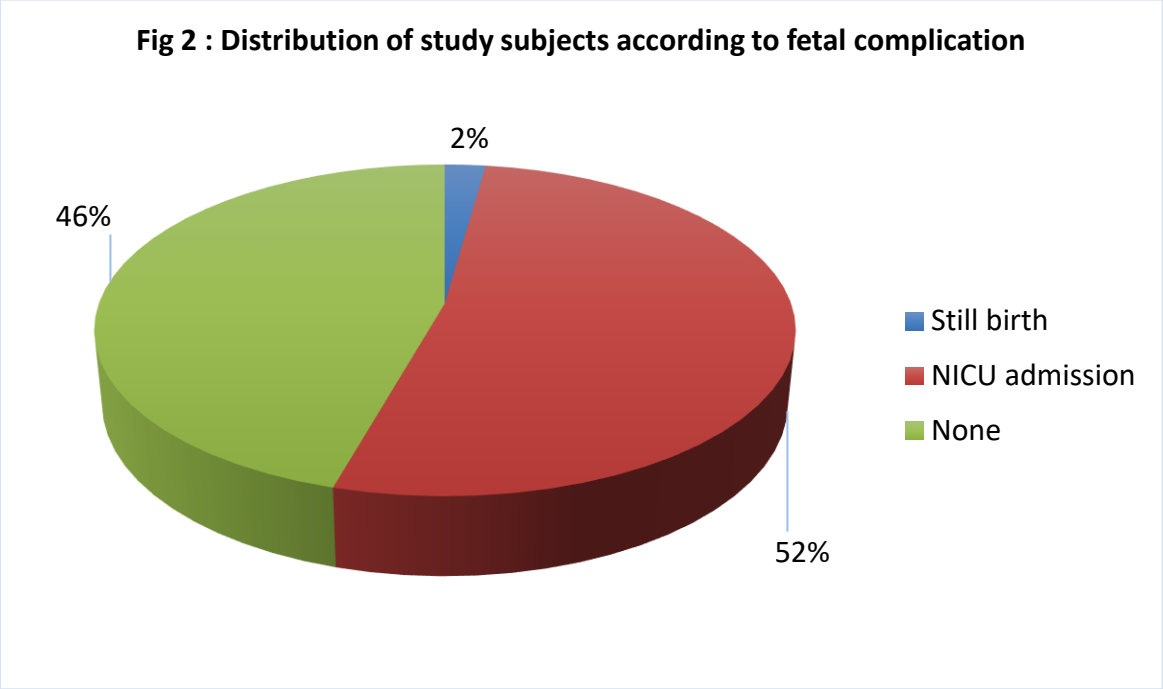

Figure 2 shows that among the babies born, 52.2% required NICU admission and only 2.2% was still birth.

DISCUSSION:

Main Findings

Caesarean sections during the second stage are increasing in prevalence and are associated with significant long-term psychological and physical maternal morbidity. A CS at full dilatation occurs when a mother requires delivery in the second stage of labour, which may pose as a risk to herself or the fetus, and cannot be dealt with by assisted vaginal delivery. This includes prolonged second stage of labour and fetal compromise. The fetal head can be deeply impacted into the pelvis, making the procedure technically difficult and associated with greater maternal and fetal morbidity. Both elective and emergency CS have a higher risk of complications than a vaginal birth. A CS in second stage of labour has additional associated risks for both the mother and fetus due to the nature of this emergency situation. There is considerable heterogeneity in studies assessing maternal and neonatal complications. In this context the current study was conducted to find out the indications of caesarean section in the second stage of labour and to assess its intraoperative and postoperative feto-maternal complications at a tertiary level healthcare facility of West Bengal. The findings of the study are being discussed with studies done elsewhere.

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Interpretation of main findings

The present study observed that the Mean age of the study population was 24.32 (4.70) years and majority (57.8%)ofthe motherswereintheage groupof 18-24years.

JyotiJayarametal.intheirstudyfoundsimilarresult,whereftheyfoundthemeanageofthesepatientswas22.84 years.[8]A study by Dr.Anusha SR on "Our experience of maternal andfoetal outcomesin 2ndstage caesarean deliveries-tertiary care centre study" found thatout of 50 deliveries the incidence of 2ndstagecaesareansections,58%ofthemwereintheagegroupofbetween20-25years.[19]

In a study on frequency of second stage interventions and it`s outcome in relation with instrumental vaginaldelivery versus section by Shahla Baloch et al. 49.25% mother were between 21-30 years of age.[10] In astudy by Malathi J et al. 61% women were in age group 21-30 years, undergoing second stage caesarean section.[11]

In this present study majority of the study population were primigravida (72.2%) and multigravida were 27.8%. Jyoti Jayaram et al. in their study found similar result, where they found 61.53% were primigravida 38.46% were multigravida.[8] A study by Dr. Anusha SR 2nd stage caesarean sections were more seen in primigravida (74%).[9] In a study by Shahla Baloch et al. 45% were primigravida which is contrary to the present study.[10] A study conducted by Malathi J et al. primigravida contributed to 74% of patients undergoing second stage caesarean section.[11]

The increased frequency of second stage cesarean section among primigravida could be because of cephalo-pelvic disproportion, rigid perineum and lack of experience of previous labour.

In this present study majority of the study population were having 38 week of period of gestation (POG) (36.7%) followed by 37 weeks of period of gestation (25.6%). A study by Dr. Anusha SR on "Our experience of maternal and fetal outcomes in 2nd stage caesarean deliveries-tertiary care centre study" 38% of the study population had POG of 37-38 weeks and 42% of the population had POG of 38-39 weeks.[9]

In the present study we found that Cephalo-pelvic disproportion (CPD) was the most common indication of LSCS accounting for 53.3% of cases and others indications of LSCS are Fetal distress and Deep transverse arrest which accounted for 23.3% and 21.1% of cases respectively.

Jyoti Jayaram et al. in their study found Deep transverse arrest was the most common indication (38.46%) for caesarean section in second stage of labor.[8] The study conducted by Malathi et al. on "Comparison of obstetric outcome between first and second stage cesarean sections in rural tertiary hospital" had the rate of second stage cesarean section 4.1%. In the same study deep transverse arrest was the second most common indication (22%) for caesarean section in the second stage.[11]Gurung P et al. in their study observed that the most common indication of second stage CS in their study was cephalo-pelvic disproportion (53.8%) with major caput and moulding formation making the delivery of the fetal head challenging and fetal distress was second most common (34.9%).[12]

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Caesarean section in the second stage of labor is a technically difficult operation with distortion of pelvic anatomy and the fetal head that is often deeply impacted in the maternal pelvis. Women delivered by CS at full dilation have a higher risk of obstetric haemorrhage, bladder injury, extended uterine tear leading to broad ligament hematoma; infection and longer hospital stay. A retrospective study from Canada by Allen VM et al. has shown that women delivered by Caesarean sections at full dilatation of the cervix were 2.6 times likely to have intraoperative traumatic complications.[13]

The present study observed that Blood stained urine was most common intra-operative maternal complication (31.1%), followed by Haemorrhage of more than 1000ml (25.6%) and Extension of uterine incision (16.7%).Estimated blood loss was measured by blood soaked Mop count and blood collected in suction canister.

A study conducted by Smriti Bhargava et al. found most common intra-operative maternal complication was blood stained urine which was due to advanced bladder during second stage of labour, followed by major obstetric haemorrhage of more than 1000 ml (26%).[14] Jyoti Jayaram et al. in their study found blood stained urine 19.23%, LUS tear and angle extension 15.38%.[8]A study conducted by Murphy DJ et al. found maternal hemorrhage (>1000 ml) was reported to occur in between 4.7% and 10% of caesarean sections at full dilatation which increases the need of blood transfusion which is not similar to our study.[15]

In this present study we found PPH is the most common post-operative maternal complication (24.4%), followed by sepsis (15.6%) and prolonged hospital stay (10%).

Cebekulu and Buchmann from Johannesburg, South Africa, reporting on 39 cases and 39 controls, found that second-stage caesarean section was associated with more post-operative fever.[16] In various studies it has been quoted that duration of hospital stay for patients in second stage caesarean section is increased. In the study by Subrata Lall Seal et al. the mean length of stay in the hospital after delivery was higher in second stage caesarean section i.e. Average 6.4day.[17]

The present study found that among the Babies born, 52.2% of the baby required NICU admission and only 2.2% was still birth. Out of the babies who were admitted in NICU 29.8% had Birth asphyxia, 25.5% had Meconium aspiration syndrome (MAS), Neonatal jaundice 23.4% and Neonatal sepsis 10.6%.

A recent study by Das S and Sarkar SK demonstrated a statistically significant increase in admission to NICU, septicaemia, low 5 min Apgar (<3) and neonatal trauma.[18] Dr Anusha SR observed that 56% cases required resuscitation procedures and NICU admission for respiratory distress and there was 12% neonatal mortality in their study.[9]

The study by Gurung P et al. observed that Neonatal Intensive Care Unit admission rate of 3.4% and nursery admission rate of 15.3% seen in their study which much less than our study.[12]. Davis G et al. also found only 14.3 % of the babies required NICU admission which does not corresponds with our study.[19].

Smriti Bhargava et al. in their study found 2.3% babies were stillbirth and 43% babies need

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NICU admission. Most of the common fetal complication was birth asphyxia (19.5%) followed by meconium aspiration syndrome (14%).[14]

Conclusion:

Caesarean section performed during second stage of labour is technically difficult because fetal head engagement in the maternal pelvis has already been completed and maternal uterine muscles are very thin and tense. Additionally, identification of bladder and lower uterine segment of uterus is difficult. These factors contributing to increased duration of surgery and increased intraoperative complications.

Maternal risks of second stage caesarean section include major haemorrhage, longer hospital stay, greater risk of PPH, and extension tears of the uterine angle. We believe that caesarean delivery performed during the second stage of labour increases the incidence of fetal respiratory distress, admission to the neonatal intensive care unit and fetal death due to fetal head impaction into the maternal pelvis and prolonged second stage labour.

Authors' Declaration Statements

Ethical clearance

Ethical clearance was obtained from Institutional Ethics Committee of NRS Medical College and Hospital, Kolkata, West Bengal, Reference Number is NMC/1370, dated 11/03/2020.

Consent to participant

Consent was taken from participants and the objective and details of the study was explained.

Consent for publication

All the authors of the study provide their consent for publication.

Availability data and materials

The data of this study are available and will be provided by the corresponding author on a reasonable request.

Competing interest

None to declare.

Funding statement

There were no funds received for this study

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Author Contributions

Dr Subir Kumar Bhattacharyyaand Dr Anirban Roywere responsible for design and planning of the study,Dr Anirban Royand Dr Shibram Chattopadhyay were responsible forConceptanddesignofthestudy,preparedfirst draft of manuscript; Dr Subir Kumar Bhattacharyya, Dr Anirban Roy and Dr Shibram Chattopadhya were responsible for interpretationof the results; reviewed the literature and manuscript preparation; Dr Anirban Roy and Dr Kajal Kumar Patra were responsible for c Concept, coordination, statistical analysis and interpretation, preparation of manuscript, and revision of the manuscript

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