

Indications and Fetomaternal Outcomes of Preterm Cesarean SectionsJisal Saji¹, Sathi M. S.², Divya Sara Raju³¹Junior Resident, Department of OBG, Govt. Medical College, Kottayam, Kerala²Professor (CAP), Department of OBG, Govt. Medical College, Kottayam, Kerala³Assistant professor, Department of OBG, Govt Medical College, Kottayam, Kerala

Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 26-07-2024

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Conflict of interest: Nil

Abstract:

Background: Cesarean section has been postulated to have a theoretical advantage over vaginal delivery in premature infants. This benefit may be the result of the avoidance of prolonged labour, allowing a less traumatic birth, but preterm cesarean section can be technically difficult and may require performing a classical Cesarean section with adverse risks like scar dehiscence and increased bleeding and adhesions in future pregnancy.

Objectives: To estimate the maternal and fetal outcomes of preterm cesarean sections. To determine the indications of preterm cesarean sections.

Methods: This was an observational study conducted among 410 study subjects who were admitted to the department of Obstetrics and Gynecology during the study period of 12 months (January 2022 – December 2022) and underwent preterm cesarean section (gestational age <37 weeks). Data regarding the mothers and newborns were collected from patient case sheets, labour room registers, NICU registers.

Results: A total of 410 mothers and 453 newborns were recruited in our study. Most common indication for preterm cesarean section was found to be previous cesarean section (in labour or PPRM) followed by fetal distress. Most common maternal and fetal outcomes were intraoperative hemorrhage and respiratory distress respectively.

Conclusion: Preterm cesarean sections definitely increase the maternal morbidities. But as per our study it is very difficult to interpret whether the fetal complications are due to prematurity per se or conditions like comorbidities/complications leading to the preterm cesarean sections.

Keywords: Preterm, Cesarean Section, Maternal Outcome, Fetal Outcome.

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Introduction

Preterm birth, defined as birth occurring before 37 weeks or 259 days of gestation, is the main determinant of neonatal morbidity and mortality, with severe short and long-term consequences that deteriorate the quality of life, leading to physical, psychological and financial cost for both the individual and the family. [1] 17th November is observed as the world prematurity day. It is time to rethink and raise awareness for the challenges of preterm birth. [2] Premature infants are at greater risk for short and long-term complications, including disabilities and impediments in growth and mental development.

Most mortality and morbidity affect very preterm infants (those born before 32 weeks of gestation) and especially extremely preterm infants those born before 28 weeks of gestation. [3] Late preterm birth (32 to 36 + 6 weeks of gestation) is associated with less risk than very preterm birth, but there is a growing recognition that even in this group there is increased risk of infant death. [4] The risk of death or neurosensory disability increases with decreasing

gestational age. Preterm birth is a major cause of neonatal deaths and a significant cause of long term loss of human potential among survivors all around the world. Complications of preterm birth are the single largest direct cause of neonatal deaths, responsible for the 35% of the world's 3.1 million deaths a year and the second most common cause of under 5 deaths after pneumonia. [5]

The optimal mode of delivery for women thought to be in preterm is controversial. Claims that preterm caesarean delivery reduces the chances of fetal or neonatal death and birth trauma have been met by counter claims that such a policy leads to risk of serious morbidity for both mother and baby. [6] Cesarean section (CS) is significantly becoming more common in the birth of preterm neonates than full-term neonates. Non-reassuring fetal status in premature pregnancies is the most common indication for performing a CS. [7] Nevertheless, any clear association between fetal outcome and Cesarean section in preterm delivery has yet to be established. Cesarean

section constitutes a significant economic burden and is associated with a high maternal morbidity rate. These facts should be acknowledged when opting for Cesarean section as the preferred route of delivery and thus this intervention should be reserved for cases where it can confer an unambiguous advantage for either the mother or the child. [8]

Mothers who give birth via cesarean section are at increased risk of developing short- and long-term risks; these include excessive bleeding, formation of adhesions, increased risk of adverse surgical outcomes in the future, postoperative infections, and increased risk of preterm cesarean section in following deliveries. [9] Cesarean section also leads to greater economic losses in contrast to vaginal deliveries and thus adds to the economic burden. [10] Thus, like all surgical interventions, Cesarean section needs to be justified by showing clear benefits to maternal and neonatal outcomes in relation to the costs of procedure and post-procedure care.

Newborn outcomes, in turn, include: perinatal or neonatal death (excluding cases of death related to fatal fetal abnormalities), neonatal morbidity, such as seizures (occurring within the first 24 hours of birth or that require two or more drugs to control), Apgar score, birth asphyxia, respiratory complications, infection, need for admission into neonatal intensive care unit, neonatal encephalopathy, trauma at birth (bone fractures, subdural hematoma, cerebral or intraventricular hemorrhage), spinal cord injury, peripheral nerve injury (e.g., brachial plexus injury), disabilities in childhood.

A clear understanding of indications, maternal and newborn outcomes of preterm caesarean section could guide clinicians and others in making appropriate decisions. Therefore this study is done to estimate the fetal and maternal outcomes in preterm caesarean sections and to determine the indications for the preterm caesarean sections conducted in Government Medical College, Kottayam.

Methodology

This study was conducted as a hospital based Observational study. Consists of subjects with gestational age <37 weeks admitted to labour ward in the department of Obstetrics and Gynecology, Government Medical College, Kottayam during the study period of 12 months and have underwent cesarean section. The sample will be satisfying the inclusion and exclusion criteria.

Inclusion Criteria:

1. Preterm pregnancies (<37 weeks)
2. Singleton/multiple pregnancies
3. All presentations
4. Primi/multigravida

Exclusion Criteria: Subjects who delivered by preterm cesarean section in another hospital.

Sample Size: According to the study "Indication of cesarean section operation in preterm pregnancy and its outcome" by Wazed F and et al [11], fetal outcome - asphyxia accounts 19%, Based on that $p = 19\%$

Sample size is calculated using the formula $N = \frac{(Z\alpha)^2}{p q/d^2}$

Where,

N = Sample size, P = prevalence according to study

$q = 100 - p$

$Z\alpha$ = Z score of α error (i.e. 1.96 with an α error of 5%), d = clinically allowable error of 20% & power of 80% at a significance level of 0.05 $d = (p \times 20/100)$.

$Z = 1.96$ at 95% CI

$P = 0.31$

$N = (3.8 \times 19 \times 81) / (3.8)^2 = 408$

Minimum sample size required for the study is 408. I will be taking into account all the cases that meet the study criteria.

Data Collection Tools: Includes proforma, patient case sheets, labour room registers, NICU registers,

Study Procedure: After getting institutional board clearance, All the subjects with gestational age <37 weeks admitted to labour ward and underwent cesarean section are taken into study. Data regarding age of mother, parity, gestational age and associated comorbidities, addictions are noted from the patient case sheets. The indications for preterm caesarean section, fetal and maternal outcomes are documented from the patient case sheets, labour room registers, NICU registers and statistically analysed.

Maternal intraoperative and postoperative complications like haemorrhage need for transfusion, adhesions, bowel and bladder injury, sepsis, renal, respiratory complications, ICU admission, deep vein thrombosis, wound infection, sepsis are looked for. Neonatal outcomes like NICU admission, length of hospital stay, respiratory distress, hyperbilirubinemia, sepsis, deaths, hypoxic brain injury, necrotising enterocolitis, deaths are documented from the NICU register.

Data Management and Analysis: All pregnant women admitted to labour ward and underwent caesarean section before 37 weeks are taken into the study. Data regarding the mother – age, gestational age, comorbidities, indications, postoperative complications if any are obtained from the labour room registers, patient case sheets. Data regarding the baby such as birth weight and fetal outcomes are

documented from the NICU register. Data was properly coded and entered into Microsoft Excel sheet and analysed by IBM statistical software SPSS 20.

Results

The present study was conducted in the department of Obstetrics and Gynecology, Government medical college hospital, Kottayam. Data regarding preterm caesarean sections conducted during 12 months (January 2022 to december 2022) were collected,

entered into excel sheet and analysed by SPSS software version 20. A total of 410 cases were taken in to the study. Out of 410 pregnancies, 43 were multiple pregnancies of which 39 were twin pregnancies and 4 were triplets. Out of 410 previous caesarean sections, only (n=26) 6.34% were done on elective basis while remaining were done as emergency cases. Majority (56.8%, n=233) of the cases belonged to the gestational age 34 - <37 weeks followed by 32 – 34 weeks (28%, n=115).

Table 1: Distribution of Indications for the preterm caesarean sections among the study subjects

Indications for preterm caesarian section	Frequency	Percentage
Previous CS	129	31.5
Fetal distress	126	30.7
Preeclampsia	33	8.0
Ante partum hemorrhage	32	7.8
Abnormal lie	31	7.6
Others	31	7.6
Placenta accreta spectrum	11	2.7
Multiple pregnancies	10	2.4
PROM	6	1.5
Eclampsia	1	.2
Total	410	100.0

Out of 410 cases, most common indication for preterm caesarean section is previous caesarean section (in labour with contraction/ PPRM) constituting 31.5% followed by fetal distress (IUGR with abnormal Doppler, Abnormal Doppler alone, non-reassuring fetal heart rate) constituting 30.7%.

Table 2: Maternal Outcome of Preterm CS

Maternal Outcome	Frequency	Percentage
Haemorrhage	53	12.2%
Blood Transfusion	40	9.8%
Wound Infection	10	2%
Sepsis	3	0.7%
Hysterectomy	3	0.7%
Organ injury	2	0.5%
DVT	1	0.2%

Out of 410 cases, 2% (n=10) cases were detected to have wound infection postoperatively. 3 (0.7%) cases were diagnosed with sepsis which is a life threatening complication and 1 case was diagnosed with deep vein thrombosis. There were 2 cases of bladder injury. 3 cases underwent hysterectomy due to placenta accreta spectrum.

Table 3: Fetal outcomes in preterm caesarean sections

Fetal outcomes	Frequency	Percentage
Respiratory Distress	136	30%
Hyperbilirubinemia	75	16.6%
Sepsis	20	4.4%
Necrotising enterocolitis	13	2.9%
Hypoxic brain injury	7	1.5%
Fetal death	25	5.5%
Symptomatic hypoglycaemia	52	11.5%
IVH	8	2%

Out of 453 newborns, n = 169 (37.3%) newborns got admitted to NICU due to low birth weight and other preterm complications

Discussion

Cesarean section rates are increasing day by day both in developed and developing countries. Rate of

preterm caesarean sections also show an increasing trend. Preterm caesarean sections are done for fetal or maternal sake and sometimes both. Studies

suggest that cesarean section is associated with improved neonatal outcomes for subgroups of mothers or infants with major comorbidities while some other studies contradict the same. This study was done to find out the indications of preterm cesarean sections and to find out the fetal and maternal outcomes.

In our study, there were 410 study subjects who underwent preterm cesarean sections at different gestational ages for different indications. In our institution, preterm cesarean section constitute one third of the total cesarean sections. Majority of them are done on emergency basis either for maternal sake or fetal sake which is similar to many other studies.

In our study, most of the study subjects, 233 (56%) underwent cesarean section at late preterm (34-<37 weeks) followed by 32 -34 weeks (28%). According to our study, Majority, 93.6% (n=384) cases were done as emergency preterm cesarean sections. This is because preterm cesarean sections are done only if needed, either for maternal or fetal sake as there is high risk of prematurity associated complications to the newborn.

As per our study, most common indication for preterm cesarean section is previous cesarean section cases presenting either with contractions or PPRM constituting 31.5% contrary to the study conducted by Sundus Rahman et al [12] which had nonreassuring fetal heart rate as the most common indication and the study conducted by L Rai et.al [13] which showed preeclampsia as the most common indication. This finding is very important as the present increasing trend of cesarean section both preterm or term may lead to increasing preterm cesarean sections in the future. The second most common indication is fetal distress which included IUGR with abnormal Doppler cases, abnormal Doppler alone, non-reassuring fetal heart rate constituting 30.7% which also explains the high rate of NICU admissions.

According to our study, most common maternal outcome is hemorrhage constituting 12% and 9.8% study subjects required blood transfusion. The high rate of maternal hemorrhage may be because; large number of cases of cesarean section was done for previous cesarean section cases and severe preeclampsia in which we usually anticipate hemorrhage as a complication. These findings are worse than that of a systemic review by Chang Lu et.al in which hemorrhage is seen in 7% cases and 6.6% cases required transfusion. [14] 24 study subjects constituting 5.5% required intensive care unit admission. 3 study subjects underwent cesarean hysterectomy in view uncontrolled hemorrhage and all the 3 of them were the cases done for placenta accreta spectrum. Other maternal complications like wound infection, sepsis, deep vein thrombosis were 2.4%, 0.7% and 0.2% respectively which were

similar to term cesarean sections as described in study by Malloy et.al [15]. Luckily, there were no maternal deaths. Only 2 cases of organ injury found and both were bladder injuries due to previous cesarean section adhesions and placenta accreta spectrum. Most common fetal complication as expected is respiratory distress constituting 30%. Respiratory distress may be due to prematurity perse rather than complication of preterm cesarean section and it is very difficult to differentiate. 37% newborns required ICU admission which is a higher rate than that for vaginal preterm births (23%) as mentioned in the study by Kaushik Mahajan et.al [16] In our study large number of cases are done for fetal distress, hence it may contribute higher rate of NICU admission. 17% newborns developed hyperbilirubinemia. 12% newborns were reported to have symptomatic hypoglycemia. Incidence of sepsis, necrotising enterocolitis, hypoxic brain injury less constituted 4.4%, 3% and 1.5% respectively. In spite of good NICU facilities, there were 25 fetal deaths constituting to 5.5%.as per as our study, which is less than the 8.8% found in study by Kaushik mahajan et.al [16].

As per our study, neonatal outcomes can't be commented upon whereas maternal complications are more with preterm cesarean section than normal vaginal delivery.

Conclusion

Preterm cesarean section is reported to have adverse fetal and neonatal outcome in many studies. Incidence of preterm cesarean section is raising day by day both in developed and developing countries. Sometimes, it is mandatory to do preterm cesarean section in order to save mothers or fetus life. But in some situations like preeclampsia, eclampsia, early detection and management can prevent preterm cesarean section. Increasing cesarean trend for unwanted causes such as cesarean section on demand may lead to preterm cesarean section in following pregnancy which could have prevented. Most of the maternal complications are seen in previous cesarean section cases, hence there is a need to decrease the overall cesarean section rate.

In the current era, due to advancement in the field of medical science, an extreme preterm newborn weighing less than 1 kg can be nursed to good health. But the long term complications of prematurity may have to be dealt with by the child and family adding to mental and financial burden. Maternal complications have to be anticipated in the previous cesarean section cases and have to deal with experienced obstetrician. Preterm cesarean sections should be done in tertiary care centers with ICU and blood bank facilities for mother and NICU facilities for the newborn.

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