



Evaluation of primary caesarean section and neonatal outcomes in a tertiary care hospital and impact on current obstetric practice

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ARTICLE INFO

Keywords:

Caesarean section
Indications
Foetal distress
Respiratory distress
NICU admission

ABSTRACT

Objective: To evaluate the rising rates of primary caesarean section, its indications and neonatal outcomes.

Study design: This was a prospective observational study of 1000 deliveries after 28 weeks gestation. The 312 primary caesarean section (CS) cases were studied with respect to their antepartum and postpartum outcomes. **Results:** The primary caesarean section (PCS) rate was 31.2% which had risen from 17% in 2018–2019 at the institute of study. The most common indication of PCS was found to be foetal distress (34.2%). Out of all PCS 25.64% were preterm deliveries. 57.05% of PCS born babies required NICU admission after birth and 59.93% had 1 min APGAR score < 7. The most common indication for NICU admission was respiratory distress (55.13%). **Conclusion:** The rising trend of CS can be attributed to rising PCS rate. Also the indications should be medically justified whenever a CS is attempted as it has significant adverse maternal as well as neonatal implications and also affects the subsequent pregnancy outcomes. CS delivered babies are more prone for respiratory distress syndrome (RDS) and NICU admissions.

Introduction

Childbirth is a one of the most important milestones in ones life. It is a natural and at the same time a potentially risky procedure for the mother as well as the foetus, regardless of mode of delivery. Over the years, vaginal delivery procedures and techniques have kept evolving and constant attempts have been made to make it even more safer. However, in few obstetrical emergencies, vaginal deliveries are strongly contraindicated and Caesarean section (CS) plays a vital role in determining fetomaternal outcomes. With every passing year, CS rate has been on constant rise. WHO has recommended a threshold of 15% for CS rate, which has already been crossed by India and was 21.5% according to NFHS-5 (2019–2021).[1] This rapid increase in the rate of caesarean births without evidence of simultaneous decrease in maternal or neonatal morbidity and mortality raises concern about the justification of the indications.[2] Also to be borne in mind, the new statement issued by WHO in 2015 “Every effort should be made to provide CS to women in need, rather than striving to achieve a specific rate”.[3].

Despite recommendation from WHO regarding the preferred rate of CS, it is seen to be continuously rising. Multiple studies and researches have been carried out to analyse various reasons for this emerging epidemic. This has also contributed to the increase in NICU admissions

resulting in significant medical, social and financial impacts, which could have been avoided, in the involved families and health care facilities.[4] The increase in primary caesarean section (PCS) leads to increase in repeat CS and thus becomes a vicious cycle of perpetuating rise in overall caesarean deliveries.

Safe reduction of the rate of CS would require deep analysis of indications being advocated as well as practically practised, so as to find a feasible and practical way to reduce it.

Materials and methods

This prospective observational study was carried out at a tertiary care teaching hospital over a period of two years (October 2020 to August 2022). The sample size was 1000 patients and they were selected in continuous manner. The sample size was calculated using Winpepi software. Among these 1000 patients, 312 PCS cases were selected. Written informed consent was obtained. Those willing were included after screening for inclusion and exclusion criteria.

Inclusion criteria

Any pregnant patient who delivered by undergoing PCS at our

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<https://doi.org/10.1016/j.eurox.2023.100213>

Received 13 March 2023; Received in revised form 22 June 2023; Accepted 4 July 2023

Available online 4 July 2023

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institute, with gestational age of 28 weeks or more (confirmed by her last menstrual period and early first trimester ultrasound).

Exclusion criteria

- Patients who had undergone any previous uterine surgery other than CS
- Patient not willing to participate in the study.

The antenatal record including age, parity, of all patients was noted and relevant information was recorded. Important aspects of clinical evaluation of these patients noted were menstrual history (the accuracy of the EDD was confirmed by her first trimester ultrasonography), obstetric history, associated comorbidity, presenting symptoms on admission, general / systemic / obstetric examination findings, relevant investigation reports, mode of delivery, indication for operative delivery where applicable, details of intrapartum and postpartum events, birth weight, APGAR score, morbidity and mortality of neonates.

Recorded data were tabulated and analyzed with particular focus on maternal and neonatal outcomes.

Results

In our study out of the 1000 deliveries, 529 (52.9%) delivered vaginally and 471 (47.1%) delivered by CS. Among all caesarean deliveries, PCS rate was 66.2%. And the overall PCS rate out of 1000 deliveries was 31.2%. (Table 1).

The most common age group in PCS was 25–35 years age group (49%). (Table 2).

Among all cases of PCS, primipara women constituted 65.38% (Tables 3) and 72.5% were registered cases at our institute.

Out of these 312 PCS, 120 (38.46%) were elective and remaining 192 (61.54%) were emergency CS.

25.64% of all PCS were preterm pregnancies. This finding was statistically significant (p value < 0.001). (Table 4) The common indications for these preterm PCS were foetal distress, severe oligohydromnios, severe pre eclampsia, non progress of labour, abruptio placentae and twin gestation with first twin in non cephalic presentation.

The most common indications of PCS was found to be foetal distress (34.29%), followed by cephalopelvic disproportion (CPD) (20.83%) and non progress of labour (NPOL) (17.31%). (Table 5) The foetal distress was diagnosed based on CTG monitoring. CTG monitoring was done intermittent or continuous according to patient and labour requirement. Cephalopelvic disproportion was either due to fetal macrosomia or maternal inadequate/contracted pelvis.

The common post partum complications included Blood transfusion (8.33%), fever (7.37%), surgical site infections (3.53%) and urinary tract infection (UTI) (1.28%). 79.49% cases did not have any of such complications in the post partum period and were uneventful.

Also among all studied cases, 69.23% patients who had more than 1000 ml intrapartum blood loss had PCS. (Table 6).

Of all the deliveries by PCS, 62.82% were of 2.5–3.5 kg birth weight range. However, of all the deliveries of extremes of birth weight (<2.5 kg and >3.5 kg) PCS accounted to be 45.26% and 75% respectively

Table 1

Distribution of cases based on mode of delivery.

MODE OF DELIVERY	
VAGINAL DELIVERY (VD)	CAESAREAN SECTION (CS)
529	471
(52.9%)	(47.1%)
	312
	(PCS 66.2%)
	159
	(RCS 33.8%)
TOTAL = 1000	

Table 2

Age distribution of studied population.

AGE GROUP	PCS	%
Age < 25	134	42.9%
Age 25–35	135	43.2%
Age > 35	43	13.7%
Grand Total	312	100%

Table 3

Distribution of gravida score.

GRAVIDA	PCS	%
1	204	65.38%
2	53	16.99%
3	32	10.26%
4	20	6.41%
5	2	0.64%
6	1	0.32%
Grand Total	312	100%

Table 4

Distribution based on gestational age.

GESTATIONAL AGE	PCS	%
PRETERM	80	25.64%
TERM	232	74.36%
TOTAL	312	100%

Table 5

Indications of PCS.

INDICATIONS OF LSCS	PCS	%
Placenta previa	3	0.96%
BOH	4	1.28%
Twin gestation with first twin in non cephalic presentation	5	1.60%
Abruptio placenta	6	1.92%
IUGR	8	2.56%
Severe oligohydromnios (AFI < 2 cm)	16	5.13%
Severe Pre Eclampsia	22	7.05%
Malpresentation	22	7.05%
NPOL	54	17.31%
CPD	65	20.83%
Foetal distress	107	34.29%
Grand Total	312	100.00%

Table 6

Post partum complications encountered.

POST PARTUM COMPLICATIONS	PCS	%
Blood Transfusion	26	8.33%
Fever	23	7.37%
Surgical Site Infection	11	3.53%
UTI	4	1.28%
Uneventful	248	79.49%
Total	312	100%

suggesting significant correlation between birth weights < 2.5 kg and > 3.5 kg and PCS as mode of delivery. (p value < 0.005) (Table 7).

A total of 57.05% of PCS born babies required NICU admission after

Table 7

Distribution of birth weight.

BIRTH WEIGHT	PCS	%
< 2.5 Kg	86	27.56%
2.5–3.5 Kg	196	62.82%
> 3.5 Kg	30	9.62%

birth and 59.93% had 1 min APGAR score < 7. (Table 8 and Table 9).

The most common indication for NICU admission was respiratory distress (55.13%). (Table 10).

Discussion

The CS rates have risen worldwide from 7% in 1990 to 21% today and are expected to be on rise. It is projected that about 28.5% women by 2030 would deliver by CS. As per the latest data of National Family Health Survey 2019–21 (NFHS-5), the CS rates at population level in India is 21.5% while according to NFHS 4 (2015–16) it was 17.2%. [5].

In our study overall CS rate was 47.1% and PCS rate was 31.2% of all the deliveries done, the numbers are clearly staggering.

Janani S et al. (2020) reported a comparable PCS rate of 36% in their study. [6].

Among all the PCS cases 72.5% were the booked cases of our institute and hence registered cases. Sharfuddin et al., 2022 also reported 97.47% cases undergoing PCS in their study as their registered cases. [7].

Janani S et al. (2020) reported 24.2% of all PCS being preterm which was similar to our finding of 25.64% of all PCS in preterm gestation age. [6].

Foetal distress (34.29%) was the most common indication of PCS in our study. Similarly, Nair et al. (2019), Fahad et al. (2020), Bablad A et al. (2021) and Wilanika Bamon et al., 2021 reported foetal distress to be most common indication of PCS (52%, 32%, 22% and 42.48% respectively). [8–11] As we can see here, foetal distress is one of the very frequent indications of CS in most studies. Today labour is mostly monitored with the help of continuous electronic fetal monitoring. This method was introduced as a means to identify fetuses who are at greatest risk of intrapartum hypoxia. Thus more intensive monitoring by continuous electronic fetal monitoring and/or fetal scalp blood pH analysis led to immediate intervention and expedited birth. The wide spread use of continuous cardiotocography has caused an increase in the number of obstetric interventions, especially CS. The rate of CS also was seen to increase when cardiotocography was performed for low risk pregnancies. National Institute of Clinical Excellence (NICE), in its guidelines for cardiotocography monitoring, recommends intermittent monitoring for low risk labor and continuous cardiotocography monitoring for high risk labor.

In present study, common postpartum complications encountered were blood transfusion, fever, surgical site infection and UTI. Such complications are found to be less in vaginal deliveries. Also these predispose the patient to poor recovery and thus increases morbidity. Wilanika Bamon et al. (2021) also found somewhat similar incidence of post partum complications in PCS cases as blood transfusion (6.2%), fever (10.34%), surgical site infection (4.14%) and UTI (11.03%). [11].

Usually, there is possibility of increased CS for large as well as extremely small babies. This was also reflected by the significant association seen between birthweight and mode of delivery in our study. The birth weight of 2.5–3.5 kg was found to be in 62.82% PCS cases in our study and 37.18% were in extremes of weight (<2.5 kg or >3.5 kg). Similarly, Wilanika Bamon et al. (2021) found that among all babies delivered by PCS, 70.3% were in birth weight range 2.5–3.5 kg and 29.7% were either < 2.5 kg or > 3.5 kg. [11].

When NICU admissions were analysed, it was found that 56.77% babies delivered by PCS required NICU admission. Also among all the NICU admissions, 60.27% babies were delivered by PCS. Even 1 min APGAR score in 59.68% of PCS delivered babies was < 7. Similarly, Cegolon L et al. (2020) found that 41.1% of babies delivered by PCS had 1 min APGAR score < 7. [12].

Of 55.13% NICU admissions, the indication was respiratory distress syndrome. This RDS can be attributed to the increasing number of preterm deliveries and also rising CS rates.

Perinatal stress helps to increase production of catecholamine and cortisol in the infant's blood which is important for the development of pulmonary maturity and the adaptation of the circulatory system to

Table 8
1 min APGAR score distribution.

1 min APGAR	PCS	%
< 7	187	59.93%
> = 7	125	40.07%
Total	312	100%

Table 9
NICU admission of PCS delivered babies.

NICU ADMISSION	PCS	%
N	134	42.94%
Y	178	57.05%
Total	312	100.00%

Table 10
Indications of NICU admission.

INDICATIONS FOR NICU ADMISSION	PCS	%
Congenital diaphragmatic hernia and respiratory distress	1	0.32%
Transient tachypnea of newborn	2	0.64%
Hyperbilirubinemia on day 1	3	0.96%
Respiratory distress	172	55.13%
None	134	42.95%
Total	312	100%

extra-uterine life. It was found that neonates delivered vaginally were found to have higher cortisol levels and presented higher expression of pain compared to children delivered by cesarean section. In infants delivered by cesarean section, the level of cortisol analysed in the umbilical cord blood was significantly lower compared to vaginally delivered neonates, which might lead to increased incidence of adaptation complications, such as respiratory distress syndrome (RDS), persistent tachypnea or pulmonary hypertension which require hospitalization in the neonatal intensive care unit (NICU). [13] Joseph K et al. (2021) also found that CS had a significant impact on transient tachypnea of newborn (TTN) with a relative risk of 3.78 when compared to normal vaginal delivery. [14].

Conclusion

CS has proved to be quite a boon in high risk cases of obstetrics. However, in view of current exponential rise in CS rates, its justification has become questionable. As PCS is the major driver of subsequent CS, it gives rise to this unavoidable vicious cycle. As seen in the findings of our study and other mentioned studies also, the rising PCS rates has not delivered any substantial improvement in maternal and neonatal immediate as well as long term outcomes, its validation is thus not acceptable. The babies delivered by CS have higher chances of RDS and NICU admissions as well as further complications. The subsequent pregnancies are also subjected to a caesarean delivery, so PCS rate must be kept under check to avoid repeat CS. With continued evaluations and proper interventions, this rising pandemic of CS can be well controlled before it turns out to be a cause of major maternal as well as neonatal hazard.

It is high time we try and regulate this procedure to make maternal and child health care delivery safer. At the same time we should not forget the WHO guideline stating that every effort should be made to provide CS to women in need, rather than striving to achieve a specific rate.

Declaration of Competing Interest

None. No COI Provided.

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