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Original Research Article

Comparison of foeto-maternal outcomes of planned verses emergency caesarean section

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ABSTRACT

Background: Caesarean section is the most commonly performed obstetrical procedure. Caesarean sections can be divided into either planned or emergent, with the latter accounting for a higher frequency of complications.
Methods: A prospective observational comparative study conducted in the department of obstetrics & gynaecology at MGM Medical College, Navi Mumbai over a period of 1 year. All women with singleton pregnancies undergoing emergency or elective caesarean section were included in the study. 600 patients were included with 300 in each group. Incidences of the various indications for caesarean sections was assessed for both groups. Relevant pre-operative, intra-operative and post-operative findings were noted. Maternal outcome assessed in terms of intraoperative complications, postoperative complications, need for intensive care unit (ICU) stay, maternal mortality rate. Foetal outcome was assessed in terms of APGAR score at birth, birth injuries, admission to neonatal intensive care unit (NICU), and perinatal mortality.
Results: In our study, cases undergoing emergency caesarean sections were seen to have significantly higher rate of maternal as well as foetal complications as compared to those undergoing planned caesarean sections.
Conclusions: Early pregnancy registration and thereby screening high risk patients for managing and planning accordingly for caesarean section, can significantly reduce the incidence of presumed risks, consequences and complications that may result due to emergency caesarean sections.

Keywords: Emergency caesarean section, Elective caesarean section, Planned caesarean section, Maternal mortality, Neonatal mortality

INTRODUCTION

Caesarean section is defined as the procedure of delivery of the fetus by an incision in the abdominal wall (laparotomy) followed by an incision on the uterine wall. In modern-day practice, the incidence of caesarean section varies from 20-25%.[1] Caesarean section is the most commonly performed obstetric surgery today.[2] In today's health system, high caesarean birth rates are an issue of concern. The most frequent indications of perform caesarean sections include foetal distress, dystocia, failure of progress of labour, cephalopelvic disproportion, previous caesarean delivery and breech presentation, maternal requests. Some new indications for caesarean delivery include in all triplet pregnancies, in order to prevent vertical transmission of human immune-deficiency virus (HIV) infection or a transverse lie in the second twin. The commonest indication for emergency caesarean section was foetal distress while that for planned caesarean section was previous caesarean delivery.[3] The complications of caesarean section are observed more commonly in emergency than in planned sections. Perinatal mortality rates have gradually decreased but complication rates remain higher in emergency than

planned caesarean sections.[4] The other factors that play a significant role include emergency caesarean sections in younger mothers, maternal illiteracy, inadequate prenatal care, referral from other hospitals for pregnancy-associated complications, caesarean sections done in general anaesthesia. Irrespective of the fact that planned caesarean sections reduce the risk of injury during labour, intrauterine hypoxia, meconium aspiration, there is significant risk of infant respiratory distress syndrome, pulmonary hypertension leading to respiratory failure, both for term and late preterm infants. As a result, the new-born requires prolonged stay in intensive care unit (ICU) with the need of high frequency ventilation, nitric oxide therapy. The American College of Obstetricians and Gynaecologists recommend that the caesarean sections to be taken after 39 weeks for any medical indications, preferably after onset of uterine contractions; and elective caesarean sections to be taken after 39 weeks, if indicated, after assessment of lung maturity.

Aims and objectives

Aims and objectives of the study were: to compare the maternal outcome of the patient undergoing emergency or elective caesarean section; to compare the fetal outcome of the patient undergoing emergency or elective caesarean section; and to find out incidence of indications for emergency caesarean sections and planned caesarean sections.

METHODS

Prospective comparative study in department of obstetrics and gynecology, MGM Women and Children's Hospital, Kalamboli over a 1-year period from June 2020 to June 2021. A total number of 300 women with singleton pregnancies undergoing planned or emergency caesarean section.

Inclusion criteria

All patients between 18-40 years of age with singleton pregnancy of gestational age 34 weeks or more undergoing planned or emergency caesarean section. Patients giving informed consent were included.

Exclusion criteria

Patients not willing to sign informed consent were excluded from the study.

Methodology

Written informed consent was taken of all patients. Detailed history of all cases was taken and monitored for risk factors. Detailed data regarding Indication of caesarean section-planned or emergency, Complications during intrapartum and postpartum period, maternal and neonatal morbidity and mortality was collected in the study.

Analysis of data in terms of: incidences of the indications for caesarean section; pre-operative, intra-operative and post-operative findings; need for ICU management for mother; APGAR score of the fetus at 5 minutes; birth weight and injuries; resuscitative measures; and NICU admission.

Ethical clearance

Clearance certificate from the institutional ethical committee was obtained.

Data analysis method

Data was entered using secondary data in Microsoft excel and expressed as a proportion. Statistical package for the social sciences (SPSS) statistical package was used for statistical calculation. Data are presented as mean and standard deviation, p value of <0.05 was considered significant and <0.001 was considered highly significant.

RESULTS

97% of the cases in emergency caesarean section group were housewives and 3% were employed, compared to the planned caesarean group, which showed 14.67% were employed (Table 2). This indicated that average literacy rate was higher in elective caesarean group, making the counselling and scheduling of caesarean sections more feasible.

All the patients under planned caesarean section group were booked antenatally at our hospital (100%), whereas the emergency caesarean section group showed only 83% registration and 17% unbooked cases (Table 2).

The gravid status of the cases under both the study groups showed no significant difference (Table 2).

The emergency caesarean section group included more preterm cases (Table 3). However, no statistical significance was noted in the difference between period of gestation between the 2 groups.

It was observed that the commonest risk factor associated in both groups was previous caesarean section, 19.67% in emergency study group and 28.33% in planned caesarean section group (Table 4). The other risk factors that were noted in emergency caesarean section cases were PIH (7.67%), anaemia (7.67%), hypothyroidism (11.67%), Rh negative status (4%), placenta previa (2%), APH (3.33%), sero positive status (6%), seizure disorder (2%), COVID 19 infection (4%), GDM (0.67%), history of myomectomy (0.67%), cardiac diseases (0.33%) and other infections (2%). Those involved in planned caesarean section group included GDM (6.67%), PIH (5.67%), placenta previa (5%), anaemia (2.33%), Rh negative status (4%), seizure disorder (4%), history of myomectomy (4%), hypothyroidism (8.33%), sero positive status (3.67%),

cardiac diseases (2%), and COVID 19 infection (2.33%) (Table 4).

We observed that majority of the emergency caesarean section group involved high risk cases requiring immediate termination. The prepondering indication in emergency study group involved foetal distress (24%) (Table 5). This was followed by non-progression of labour (11.67%), failure of induction (10.33%), eclampsia (8.33%), cephalopelvic disproportion (7%), second stage arrest (7.33%), colour doppler changes with FGR (8.67%), breech presentation (6.67%), previous LSCS with scar tenderness (6.67%), severe pre-eclampsia (5.33%), imminent eclampsia (0.33%), deep transverse arrest (5%), severe oligohydramnios (3.33%), maternal request (2.67%), placenta previa (2%), abruptio placenta (1%), polyhydramnios (0.67%).The indications involved in scheduling planned caesarean sections included previous caesarean section (28.67%), cephalopelvic disproportion (8%), breech presentation (8%), PIH (8%), GDM (6.67%), infertility conception (6%), placenta previa (5%), maternal request (10%), colour doppler changes with FGR (2%), cardiac diseases (2%), bad obstetric history (3.33%), post datism (3.33%), history of myomectomy (2%), and severe oligohydramnios (0.33%) (Table 5).

It was observed that 92.33% emergency cases required induction under spinal anaesthesia and 7.67% under general anaesthesia. In elective caesarean section group, 98.67% were induced under spinal anaesthesia and 1.33% required general anaesthesia. general anaesthesia was required more frequently in emergency caesarean section cases compared to planned group (Table 6).

The rate of breech deliveries in planned caesarean sections (18%) were more compared to emergency sections (7.33%). It was also found that babies requiring delivery by Patwardhan technique were notably more in emergency caesarean section group (4%), while no baby was delivered by this technique in planned caesarean section group.11% of the babies in emergency caesarean section group and 4% in planned caesarean section group did not cry immediately after birth and required some resuscitative measures/NICU admission (Table 6). The post-partum haemorrhage cases were more in emergency (15%) than planned caesarean section (10.67%) The uterus closure in both section groups were done by single/double layers. In case of any signs of PPH, B lynch or Cho sutures were taken over the uterus. The frequency of this was more in emergency caesarean section group (2% and 1.33% respectively) compared to planned cases. In our study group, none of the cases included involvement of bladder/bowel/ surrounding structure injury (Table 6).

It was observed that 15 (5%) cases of emergency caesarean section required ICU management compared to planned caesarean section cases (Table 7). These cases included diagnosis of Acute kidney injury, HELLP syndrome, PRES, COVID and Multiple organ dysfunction syndrome. From emergency caesarean section study group, 2 patients succumbed (maternal mortality) out of 15 ICU admissions, while no mortality was observed in planned caesarean section group. The average period of ICU stay noted in emergency and planned caesarean section group was 11 days and 4 days respectively (Table 7).

Overall NICU admission rate was 16.50%. Out of which, 24.67% were delivered by emergency caesarean section and 8.33% by planned caesarean section (Table 8). The causes contributing to NICU admission included respiratory distress (28.33%), low birth weight (22.97%), meconium aspiration syndrome (2.70%). Neonates admitted under observation and for RBS monitoring were 35.14% and 10.81% respectively. The average period of stay in NICU was observed to be 1-42 days in babies born by emergency caesarean section and around 1-7 days in planned caesarean section group. Perinatal mortality was observed in 2 cases (0.67%) in babies delivered to mothers by emergency caesarean section group, while no mortality was observed in babies delivered in planned caesarean section group (Table 8).

Table 1: Comparison of age between emergency and planned caesarean sections.

Age (years)	Emergency (n=300)	Planned (n=300)	Total	P value
Mean±SD	24.7±3.89	24.87±4.03	24.78±3.96	0.599
Median (25th-75th percentile)	25 (22-26)	25 (22-26)	25 (22-26)	
Range	18-45	18-45	18-45	

Table 2: Comparison of demographic details between emergency and planned caesarean sections.

Variables	Emergency (n=300)		Planned (n=300)		Total		P value
	n	%	n	%	n	%	
Occupation							
Housewife	291	97	256	85.33	547	91.17	<0.0001
Service	9	3	44	14.67	53	8.83	
Registration							
Booked	249	83	300	100	549	91.5	<0.0001
Unbooked	51	17	0	0	51	8.50	
Gravida							

Continued.

Variables	Emergency (n=300)		Planned (n=300)		Total		P value
	n	%	n	%	n	%	
Primigravida	91	30.33	81	27	172	28.67	0.367
Multigravida	209	69.67	219	73	428	71.33	

Table 3: Comparison of period of gestational (weeks) between emergency and planned CS.

Gestational age (weeks)	Emergency (n=300)	Planned (n=300)	Total	P value
Mean±SD	38.28±1.88	38.59±1.12	38.43±1.55	0.013
Median (25th-75th percentile)	38.2 (37.2-39.6)	38.4 (37.6-39.2)	38.4 (37.4-39.4)	
Range	28.2-42.6	35.4-42.3	28.2-42.6	

Table 4: Comparison of risk factors between emergency and elective caesarean sections.

Risk factor	Emergency (n=300)		Planned (n=300)		Total		P value
	n	%	n	%	n	%	
Previous LSCS	59	19.67	85	28.33	144	24	0.013
PIH	23	7.67	17	5.67	40	6.67	0.326
GDM	2	0.67	20	6.67	22	3.67	0.0001
Placenta previa	6	2	15	5	15	2.50	0.0001
Anemia	23	7.67	7	2.33	30	5	0.007
APH	10	3.33	0	0	10	1.67	0.003
Rh negative	12	4	12	4	24	4	1
Hypothyroidism	35	11.67	25	8.33	60	10	0.174
History of myomectomy	2	0.67	12	4	14	2.33	0.012
COVID 19 infection	12	4	7	2.33	19	3.17	0.244
Seizure disorder	6	2	12	4	18	3	0.151
Cardiac disease	1	0.33	6	2	6	1	0.030
Dengue/malaria/typhoid	6	2	0	0	6	1	0.030
HIV/HepB/VDRL	18	6	11	3.67	29	4.83	0.183
History of eclampsia in previous pregnancy	0	0	1	0.33	1	0.17	1
History of perineal tear in previous delivery	0	0	2	0.67	2	0.33	0.499
Others (thrombocytopenia, deranged LFT)	8	2.67	4	1.33	12	2	0.383

Table 5: Comparison of incidence of indications for LSCS between emergency and planned caesarean section.

Indication for LSCS	Emergency (n=300)		Planned (n=300)		Total		P value
	n	%	n	%	n	%	
Foetal distress	71	24	0	0	71	12	<0.0001
Previous LSCS	20	6.67	86	28.67	86	14.33	<0.0001
Cephalo-pelvic disproportion (CPD)	21	7	24	8	45	7.50	0.642
Severe oligohydramnios	10	3.33	1	0.33	11	1.83	0.011
Colour doppler changes with IUGR	26	8.67	6	2	32	5.33	0.0003
Maternal request	8	2.67	30	10	38	6.33	0.0002
Severe pre-eclampsia	16	5.33	0	0	16	2.67	<0.0001
Abruptio placenta	3	1	0	0	3	0.50	0.249
Failure of induction	31	10.33	0	0	31	5.17	<0.0001
Non-progression of labour	35	11.67	0	0	35	5.83	<0.0001
Breech presentation	20	6.67	24	8	44	7.33	0.531
Second stage arrest	22	27.33	0	0	22	3.67	<0.0001
Eclampsia	25	8.33	0	0	25	4.17	<0.0001

Continued.

Indication for LSCS	Emergency (n=300)		Planned (n=300)		Total		P value
	n	%	n	%	n	%	
Deep transverse arrest (DTA)	15	5	0	0	15	2.5	<0.0001
Transverse lie	2	0.67	17	5.67	19	3.17	0.0006
Impending eclampsia	1	0.33	0	0	1	0.17	1
Placenta previa	6	2	15	5	21	3.5	0.046
Polyhydramnios	2	0.67	0	0	2	0.33	0.499
GDM	0	0	20	6.67	20	3.33	<0.0001
Infertility conception	0	0	18	6	18	3	<0.0001
Cardiac disease	1	0.33	6	2	7	1.17	0.123
Oblique lie	0	0	5	1.67	5	0.83	0.061
Postdatism	0	0	10	3.33	10	1.67	0.002
PIH	0	0	24	8	24	4	<0.0001
Bad obstetric history	0	0	10	3.33	10	1.67	0.002
History of myomectomy	0	0	6	2	6	1	0.03

Table 6: Comparison of delivery details between emergency and planned caesarean sections.

Delivery details	Emergency CS		Planned CS		Total		P value
	n	%	n	%	n	%	
Anaesthesia							
General	23	7.67	4	1.33	27	4.5	0.0002
Spinal	277	92.33	296	98.67	573	95.5	
Baby delivered by							
Vertex	266	88.67	246	82	512	85.33	<0.0001
Breech	22	7.33	54	18	76	12.67	
Patwardhan technique	12	4	0	0	12	2	
Neonatal outcome							
Baby cried immediately after birth	267	89	294	98	561	93.5	<0.0001
Baby did not cry at birth	33	11	6	2	39	6.5	
Postpartumhemorrhage	45	15	32	10.67	77	12.83	0.113
Uterus closure							
B lynch	6	2	0	0	6	1	<0.0001
Cho sutures	4	1.33	0	0	4	0.67	
Single layer	248	82.67	216	72	464	77.33	
Double layers	42	14	84	28	126	21	
Tubal ligation							
Not done	287	95.67	250	83.33	537	89.5	<0.0001
TL done	13	4.33	50	16.67	63	10.5	

Table 7: Comparison of medical/surgical/COVID ICU admission between emergency and planned caesarean sections.

Maternal outcome	Emergency CS		Planned CS		Total		P value
	n	%	n	%	n	%	
ICU admission	15	5	1	0.33	16	2.67	0.0004
Maternal mortality	2	0.67	0	0	2	0.33	0.499
Indication for ICU admission							
Acute kidney injury	3	1	1	0.33	4	0.50	0.624
HELLP syndrome	4	1.33	0	0	4	0.67	0.124
MODS	1	0.33	0	0	1	0.17	1
COVID + status	8	2.67	0	0	8	1.33	0.007
Ischaemic ATN	1	0.33	0	0	1	0.17	1
Post-partum eclampsia	1	0.33	0	0	1	0.17	1
PRES syndrome	1	0.33	0	0	1	0.17	1

Continued.

Table 8: Comparison of NICU admission between emergency and planned caesarean sections.

Neonatal outcome	Emergency CS		Planned CS		Total		P value
	n	%	n	%	n	%	
NICU admission	74	24.67	25	8.33	99	16.50	<0.0001
Perinatal mortality	2	0.67	0	0	2	0.33	1
Indication for NICU admission							
Low birth weight	17	22.97	3	12	20	20.2	
MAS	2	2.70	0	0	2	2.02	
Observation	26	35.14	9	36	35	35.35	0.0006
RBS monitoring	8	10.81	12	48	20	20.20	
Respiratory distress	21	28.38	1	4	22	22.22	

DISCUSSION

Caesarean sections now are categorized as a major lifesaving procedure for the mother and the foetus, with considerable rise in incidence over recent years. The rise in caesarean birth rates have become a concern of international public health with the WHO recommending rates between 10-15%. In our hospital, which is also a referral unit for the peripheral remote villages, the caesarean rate is around 32%. This study has attempted to compare maternal and perinatal morbidities between planned and emergency caesarean sections at our tertiary care center.

In our study group, the females were in the range of 18 years to 45 years of age. Women with advancing age showed more tendency of caesarean section in the form of previous caesarean sections, maternal request, infertility conceptions. In this study, emergency caesarean sections were performed on 30.33% primiparous women and 69.67% multiparous women. And planned caesarean sections included 32% of primiparous and 73% multiparous women. The study showed that 17% of patients who underwent emergency caesarean were unregistered, with increased incidence of complications/morbidity, whereas all planned caesarean sections were registered at our centre.

Morbidity and mortality rates are seen to be 12-fold and 8-fold higher in case of emergency as compared to elective sections.[5-7]

A high percentage of the total number of caesarean sections were accounted for by previous caesarean births. The presumed risks associated with breech delivery prompts towards increasing number of planned caesarean sections. In our study, breech presentation accounted for around 24% of planned caesarean sections.

The general indications of emergency caesarean section established in our study were foetal distress, previous caesarean section, non-progression of labour and prolonged second stage of labour. A study conducted by Lakshmi et al showed similar frequency if indications with repeat caesarean (43%), followed by CPD (15%).[8] While in a study done by Chiheriya reported that the most common indication was previous LSCS in both emergency and planned LSCS study groups, 76.87% in planned and 46.44% in emergency group, followed by breech, oligohydramnios, placenta previa, maternal request, conception after primary infertility, transverse lie, in both group respectively and meconium stained liquor (MSL), cephalopelvic disproportion (CPD), non-progression of labour, abruptio placentae, failure of induction respectively in only emergency group.[9-11] This was near consistent with our study as well.

Incidences of preterm caesarean section, high-risk gestation, poor follow up, post-partum haemorrhage (PPH), SOS hysterectomy, MICU/SICU admission, period of hospital stay, lower APGAR score, NICU admissions were significantly higher in emergency caesarean section.

In case of emergency caesarean sections in our study, foetal distress (72%) was found to be the major indication followed by non-progression of labour (35%), failure of induction (31%), second stage arrest (22%).

In our study, overall intraoperative complications, like atonic PPH were found to be more in emergency caesarean sections (15%) than in planned caesarean sections (10.6%). This was consistent with a study conducted by Ghazil et al.[12] Two cases from emergency caesarean section group who went into atonic PPH had undergone obstetric hysterectomy.

In our study, post-operative complication like anaemia secondary to antepartum or post-partum haemorrhage, were found to be higher in emergency compared to planned caesarean sections. Pomela et al conducted a study and reported that the postoperative complications were comparatively more in patients who underwent emergency caesarean sections compared with patients undergoing planned caesarean such as fever (26.0% and 16.1%), wound infection (12.7% and 6.5%) and urinary tract infection (14.3% and 5.4%).[13]

In our present study, patients who underwent emergency caesarean section, 5% showed requirement of ICU management post-operatively, compared to 0.33% in

planned caesarean section group. Majority of the need for ICU admission was in view of COVID (2.67%), this was followed by sequelae of eclampsia/pre-eclampsia such as HELLP syndrome (1.33%), AKI (0.33%), and PRES (0.33%).

Our study showed that the overall foetal complications were higher in emergency caesarean group than in planned caesarean section group. The major attributable cause for foetal morbidity was respiratory distress, low birth weight, preterm delivery was significantly higher in emergency caesarean group compared to planned. A study conducted by De Luca et al also concluded that emergency caesarean section group showed more incidence of foetal morbidity than planned caesarean section group.[14]

Limitations of this study included the high number of referral cases received as a tertiary care center with ICU and NICU facilities, leading to a higher number of emergency caesarean sections as well as ICU and NICU admissions. Furthermore, most referred cases included complications such as deep transverse arrest which would have contributed to planned caesarean section cohort if identified as cephalopelvic disproportion if registered at our center.

CONCLUSION

The indications of caesarean sections are constantly changing with time. Emergency caesarean sections have consistently been associated with higher maternal and foetal complications compared to planned caesarean sections. Early pregnancy registration and thereby screening high risk patients allows for timely management and planning for elective caesarean sections where necessary. This can help significantly reduce the incidence of presumed risks, consequences and complications associated with caesarean sections.

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