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Original Research Article

Determinants and outcomes of caesarean delivery: elective versus emergency in a tertiary care teaching institute in Kerala, India

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ABSTRACT

Background: Globally, the caesarean delivery rate is rising continuously, making caesarean one of the most common surgical procedures. The purpose was to analyse the determinants and maternofetal outcomes in elective versus emergency caesarean sections in a tertiary care centre.

Methods: All women, who gave birth by Caesarean deliveries done over a period of 1 year (January 2018-December 2018), were studied in Travancore Medical College in Kerala, India. Indications of caesarean, whether emergency or elective, medical morbidities, Gestational age at decision, birthweights and extended hospital stay and new-borns needed to resuscitate were looked into. The data was collected and analysed from the hospital registry.

Results: Out of the 378 selected patients, 95 patients in group of elective and 283 emergency caesarean section were studied. The indications of emergency caesarean sections were failed induction, non-progression of labour, CPD, Previous caesarean in labour, foetal distress. The most frequent indicator for elective lower segment caesarean section (LSCS) was patient with previous LSCS not willing for vaginal birth, followed by breech presentation and high risk pregnancy (BOH and ART). Younger mothers, gestational age remote from term, low-birth weight, and extended hospital stay were statistically significant in mothers undergoing emergency caesarean delivery. Fever, urinary tract infections, need for maternal and neonatal ventilation, blood transfusion, scar dehiscence were more common in the emergency caesarean group.

Conclusions: The antenatal morbidity, low birth weights, decision taken preterm for salvaging the baby, postoperative complications and extended stay were more in the emergency caesarean when compared to elective caesarean.

Keywords: Caesarean delivery, Emergency, Elective, Indication, Kerala, Morbidity, Primary, Previous caesarean

INTRODUCTION

Globally, the caesarean delivery rate is rising continuously, making caesarean one of the most common surgical procedures. One in five pregnant women undergoes caesarean delivery.¹ Caesarean rates vary between countries and even between hospitals within the

same country.² Caesarean delivery is defined as the birth of the foetus through an incision in the abdominal wall (i.e. laparotomy) and the uterine wall (hysterotomy). Caesarean delivery is the surgical intervention in case of serious delivery complications and has been life saving for a long period of time and is one of the most commonly performed surgical procedures in today's

obstetric practice, and is associated with a great deal of maternal morbidity.³ The World Health Organization (WHO) stated, there is no justification for any region to have a caesarean section rate higher than 10-15%.⁴ The rate of caesarean delivery below 5% seems to be associated with gaps in obstetric care leading to poor health outcomes for mothers and child, whereas rates over 15% don't seem to improve either maternal or infant health. Caesarean rates continue to increase worldwide and have become a major public health concern in both developed and developing countries. Proportion of CS to the total births is considered as one of the important indicators of emergency obstetric care (World Health Organization, 2009). According to the latest data from the National Family Health Survey 2015-16 (NFHS-4), caesareans have doubled over the last decade across India. There is 16.7% rise in Caesarean delivery cases annually in India. The proportion of women who have undergone caesarean deliveries is the highest in Kerala (31.8 per cent) followed by Andhra Pradesh (29.3 per cent).⁵

The nature of the caesarean section performed as elective or emergency is predicted depending on the indication of the caesarean section and each case should be managed according to the clinical evidence of urgency, with every single case being considered on its merits. Elective caesarean is when the procedure is done at a prearranged time and hence ensures better teamwork for managing complicated obstetric cases.⁶ Emergency caesarean birth in labour has been associated with an increased chance of infection, increasing the need of blood transfusion and deep venous thrombosis when compared with both vaginal birth and elective caesarean birth.⁷ The complications arising from elective caesarean are much less as compared to emergency caesareans. However, in spite of all the measures taken to electively deliver the pregnancy by caesarean delivery, many times emergency caesarean may have to be resorted to for foetal or maternal salvage, though there are many problems associated with it. The present study was therefore undertaken to study the maternal and foetal morbidities in women delivered by elective caesarean as compared to that by emergency caesarean delivery.

METHODS

This study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care centre in January 2018 -December 2018. Pregnancy irrespective of gestation age undergoing caesarean delivery at our tertiary referral centre was enrolled. The study commenced after the approval of institutional ethics committee. In this study two groups of pregnant women were studied.

Group 1: Women undergoing elective caesarean delivery

Group 2: Women undergoing emergency caesarean delivery.

Maternal and perinatal outcome of 378 pregnant women in each group was studied. Patients fulfilling inclusion criteria were enrolled in the study. Complete history of the patient along with relevant investigations was reviewed from the medical records.

Inclusion criteria

- All pregnant women irrespective of parity status, with or without pregnancy associated complications, with or without medical or surgical high risk, with any gestational age undergoing lower segment caesarean delivery at our tertiary referral centre, irrespective of their registration status (patients who are referred at the time of delivery and those registered in the antenatal period) were included.

Exclusion criteria

- Incomplete case record files were excluded from the study.

The Indications for caesarean delivery and maternal and foetal outcome in women who underwent elective and emergency caesarean delivery were studied and the following parameters were assessed and compared in the two groups.

- Socioeconomic details
- Mode of previous delivery
- Indications for caesarean delivery
- Gestational age at delivery
 - ✓ Repeat caesarean, malpresentation, antepartum haemorrhage, cephalopelvic disproportion, foetal distress, pre-eclampsia., eclampsia, failed induction, non-progression of labour, multifetal gestation, FGR
 - ✓ Robson TGCS.
- Obstetric complications
- Maternal complications
 - ✓ Intraoperative maternal complications
 - ✓ Postpartum haemorrhage
 - ✓ Caesarean hysterectomy
- Postoperative maternal complications
 - a. Wound infection
 - b. Fever
 - c. UTI
 - d. Need for maternal ventilation
 - e. Eclampsia
 - f. Need for blood transfusion.
- Neonatal birth weight
- Need for resuscitation
- Duration of hospital stay-mother and Neonate.

Statistical analysis

After data collection, data entry was done in excel sheet. Data analysis was done with the help of SPSS Software version 23 with the help of frequency and percentage table.

RESULTS

In this study pregnant women who had undergone elective caesarean were compared with women who had undergone emergency caesarean and maternal and perinatal outcomes in each group were studied. During this period of one year, total no of deliveries were 655, of which 277 were vaginal deliveries. Out of 378 caesarean cases, 95 elective and 283 emergency cases were recruited. Here, two groups of pregnant women were analysed.

Group 1: Women undergoing elective caesarean sections (n=95) {25.13% }.

Group 2: Women undergoing emergency caesarean sections (n=283) {74.87}.

In Group 1, (n=95), 75.29% (n=72) constituted previous caesarean. Multigravida with primary elective caesarean for high-risk obstetric care made up 24.21% (n=23).

In Group 2, (n=283), 70% (n=200) underwent primary caesarean and remaining 30% included multi gravida with previous caesarean, PPRM, APH, NRFHR and hypertensive emergency. Referred cases (n=20) constituted 5.29% of our caesarean deliveries. In labour referrals and FGR babies, premature babies in need of level 3 NICU care.

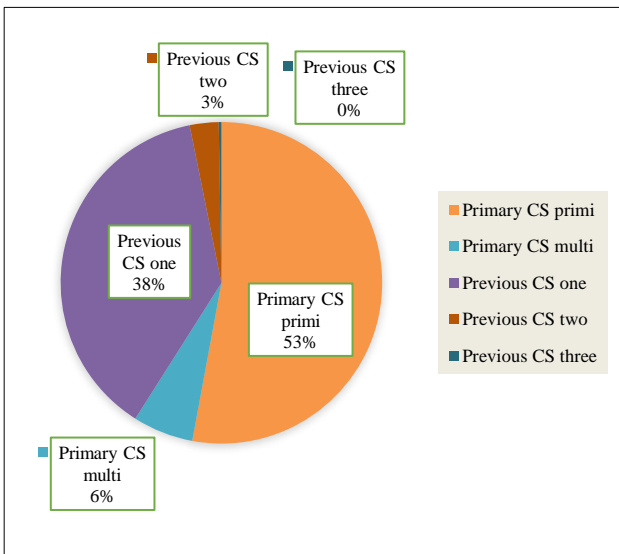


Figure 1: Distribution of caesarean delivery-primary versus previous caesarean.

Group 1: Women undergoing elective caesarean sections (n=95) {25.13% }.

Group 2: Women undergoing emergency caesarean sections (n=283) {74.87}.

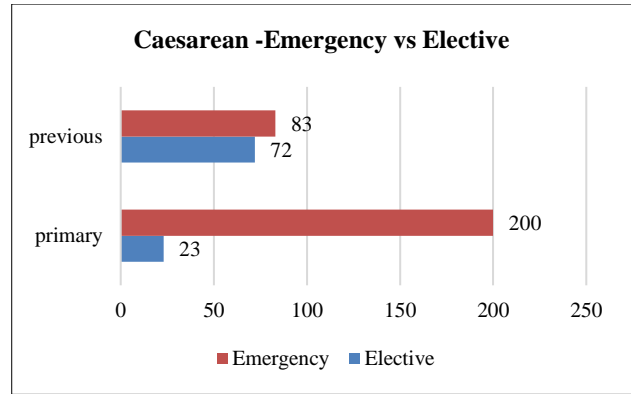


Figure 2: Caesarean delivery-elective versus emergency.

Emergency obstetric interventions were done in 75% of mothers younger than 30 years. They have 2.56 times increased chance to undergo emergency caesarean delivery and it was statistically significant (p value- 0.005).

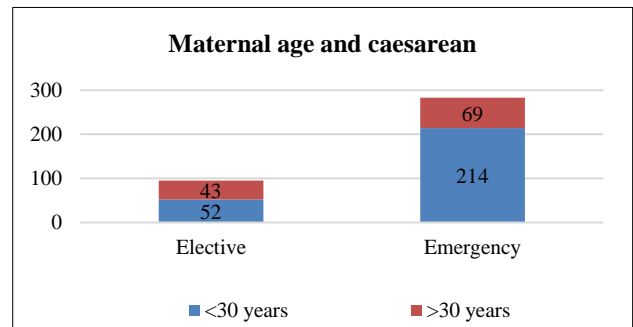


Figure 3: Maternal age and type of caesarean delivery.

Medical co-morbidities like anaemia, hypertension. Disease of pregnancy HDP (non-severe and severe) gestational diabetes, hypothyroidism were distributed in both the groups.

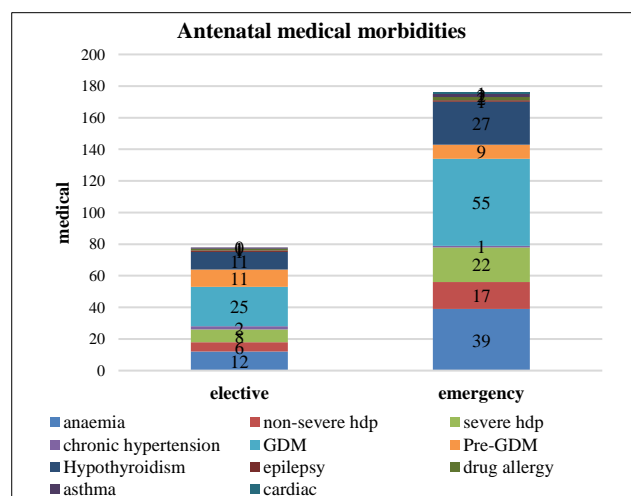


Figure 4: Obstetric medical co-morbidities and caesarean delivery.

52.29% of emergency caesareans were done <37.6 weeks which was 34.7% in Group 2 which needed preterm elective caesareans (P value -0.005) and it was statistically significant.

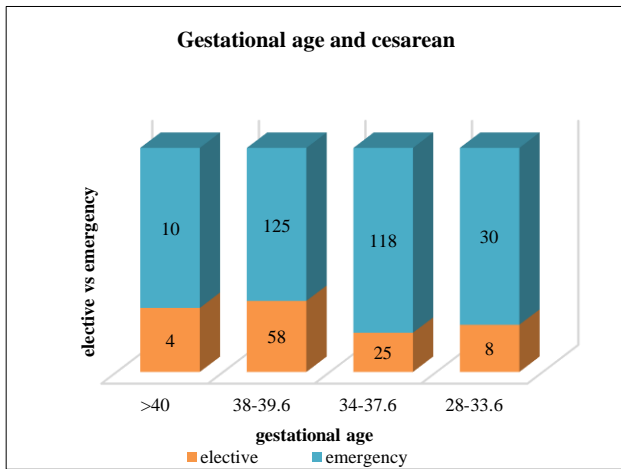


Figure 5: Gestational age at delivery and caesarean delivery.

Elective caesareans were done for previous caesareans and APH -placenta praevia, AIP (abnormally invasive placenta), malpresentation, macrosomia, abnormal doppler with FGR .Emergency caesarean were done for failed induction non progression of labour, Abruptio, NRFHR and, severe pre-eclampsia-eclampsia, PPRM, PTL, unfavourable cervix.

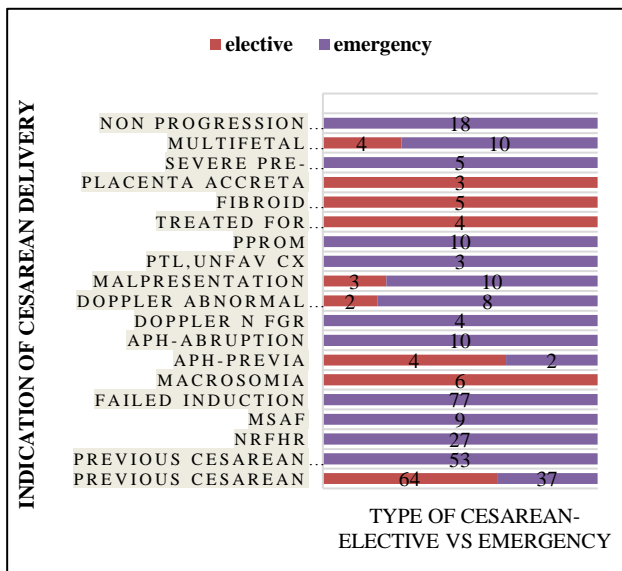


Figure 6: Indications of caesarean delivery-elective versus emergency.

Multipara underwent caesarean for the first time due to malpresentation, multiple pregnancy severe pre-eclampsia, FGR, NRFHR and APH.

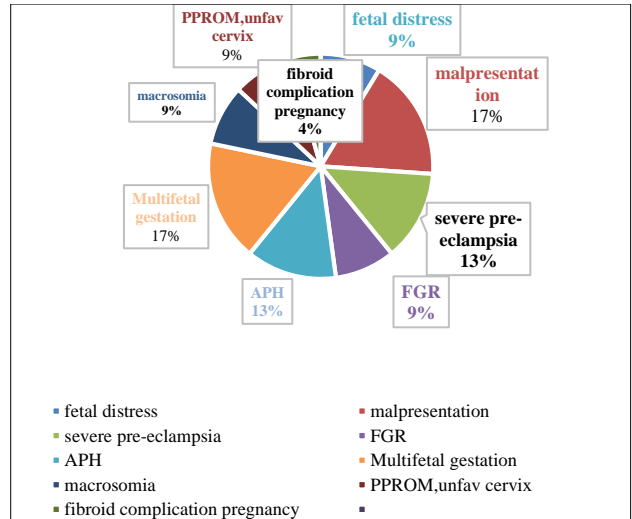


Figure 7: Indications of primary caesarean delivery in multipara.

There were more low birth weight babies (birth weight <2499grams) in emergency group (P value- 0.001) and mothers with gestational age <37.6 weeks contributed to 52.29% and was statistically significant.

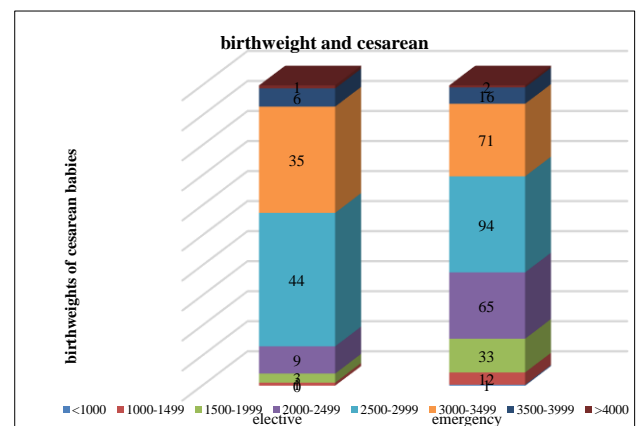


Figure 8: Distribution of babies according to birth weight in caesarean delivery.

Morbidities in both emergency and elective caesareans were noted such as UTI, Scar dehiscence SSI, Blood transfusions, Maternal and neonatal ventilation.

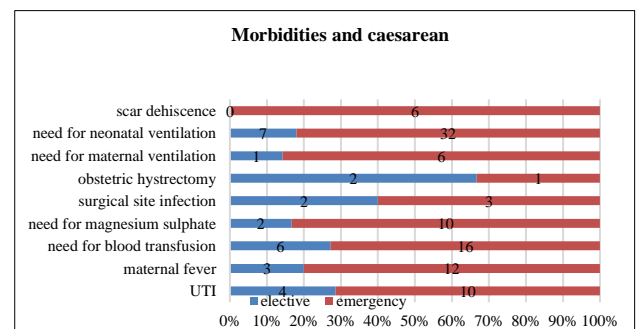


Figure 9: Morbidities and caesarean delivery.

Duration of hospital stay in both the groups was compared. Mothers with emergency caesarean had extended hospital stay 1.72 times (p value-0.024) than elective caesareans and it was statistically significant.

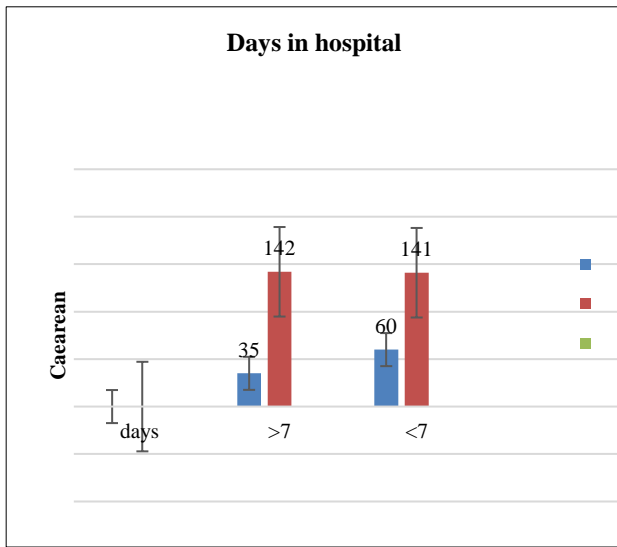


Figure 10: Duration of hospitalisation and type of caesarean delivery.

Both emergency and elective caesareans are distributed among RTGCS 1-10 as follows.

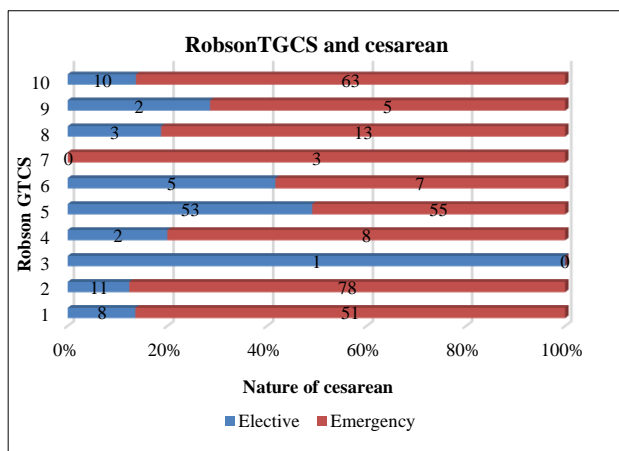


Figure 11: Robson GTCS and caesarean delivery.

DISCUSSION

In this retrospective study from January 1st 2018 to December 31st 2018 we have compared maternal and foetal outcome in elective versus emergency LSCS in 378 cases, 95 elective LSCS and 283 emergency LSCS done at a tertiary care teaching institute in Kerala, India. Total, primary and repeat caesarean deliveries were calculated. The primary caesarean rate was calculated as the number of caesarean births excluding previous caesareans in a year divided by total number of deliveries in that year. The primary caesarean rate was 34%. During the study period, there were 383 (56.94%) Caesarean deliveries out

of 655 total deliveries Primary caesarean rate was 29.9% and 28.7% in various Indian studies.⁸⁻⁹

In this index study, 74.87% of caesareans were done as emergency while only 25.13% were elective caesareans. 79% were emergency caesarean section and 21% were elective caesarean section in another study.¹⁰ Patil P et al in their study also reported 71.1% emergency caesarean section and 28.9% elective caesarean section.¹¹ Dasari et al, also reported emergency caesarean section rate of 62.5% which is higher than elective caesarean section rate of 37.5%.¹²

In our study we observed that, among cases that 70% of first time mothers underwent emergency caesareans and 25% had elective primary caesareans and it was 75% and 30% respectively in a similar study in Karnataka.¹³ In the index study, most multigravida women underwent elective caesarean section for PRCD (Planned repeat caesarean delivery 75%) which was 78% in a study at Thiruvananthapuram, South Kerala.⁹

52.29% of emergency caesareans were done at <37.6 weeks and was 34.7% for elective sections. (P value - 0.005) and it was statistically significant. Emergency caesareans was more as there were in- utero referrals for FGR with doppler abnormality, multifetal gestations (triplets and twins), preterm labours (PPROM, PTL) and associated medical co-morbidities in our tertiary care centre. 65.2% were elective term caesareans and 48.56% delivered babies by term emergency sections in the index study. (P value - 0.005) and it was statistically significant.

Study conducted in a similar study at Thiruvananthapuram showed 97.4% term elective caesarean sections and 82% term emergency caesarean sections which was 76.92% and 71.38% respectively in an Indian study.^{9,10} Maximum caesareans were done at 38-42weeks (91.4%) followed by preterm (<37)in another study.¹⁰

75% of mothers in group 2 were aged <30 years and they are 2.56 times more likely to undergo emergency procedures and it was statistically significant (p value - 0.005). The mean age in elective and emergency group was 28 years and 25 years respectively in another study.⁹ In another study 77.7% patients were in the age group of 20-30 years.⁸

In this research study, among elective caesarean group 82% had antenatal complications, 37.88% GDM and pre-DM, 16.83% hypertensive disease of pregnancy, 12.63 anaemia, 11.57% thyroid diseases and 3.15% other medical morbidities. In the emergency caesarean group 62% had antenatal complications, 22.61% GDM and Pre-DM, 15.01% hypertensive disorders of pregnancy, 13.78% anaemia 9.54% Thyroid diseases and 8.74 % other medical morbidities. In a similar study 9 elective caesarean group, 48.7% had antenatal complications, those complications being 21.1% GDM and 11.8%

gestational hypertension. In the emergency caesarean section group 48.3% had antenatal complications, the complications being 16.9% GDM and 4.5% gestational hypertension.

Coming to the indications for elective caesareans, previous caesareans (67%) topped the list followed by antepartum haemorrhage (4.21%), AIP (abnormally-invasive placenta) (3.16%), malpresentation (3.15%) multifetal gestation (4.21%) including one set of triplets, macrosomia (6.31%), abnormal doppler with FGR (2.1%) and fibroid complicating pregnancy (9.453%).

Emergency caesarean were done for failed induction and non-progression of labour (34%), abruption (4.31%), NRFHR and MSAF (12.9%), severe pre-eclampsia-eclampsia (1.79%), multifetal gestation (3.59%), PPROM, PTL (4.67%), previous caesarean in labour/unfavourable cervix (32%) FGR (4.31%) malpresentation with PROM (3.59%) in our index study. The increased incidence of repeat caesarean section (67%) is due to the absence of patients opting for vaginal birth after caesarean section.

Cook et al, observed that multiple repeat caesarean (MRCS) is associated with greater maternal and neonatal morbidity (placenta praevia and abnormally invasive placenta) than fewer Caesarean Section.¹⁴ In present study the incidence of LSCS for APH was more in the elective LSCS group than in the emergency LSCS group and is similar to an Indian study.¹⁵ Maternal indications like failed induction (21%), dystocia (16%), medical (15%), foetal (14%) and IUGR (13%) made up majority of primary caesareans in a similar study.¹⁶

In the study conducted by Lulu et al, elective LSCS were done in view of previous LSCS, non-progress of labour, breech, foetal distress and antepartum haemorrhage (APH) were 69.5%, 0%, 14.6%, 0.4%, 2.8% respectively and the emergency LSCS were 0%, 41.5%, 16.0%, 15.9%, 9.3% respectively.¹⁷

In a study by Gurunule AA et al regarding indications, elective LSCS were done in view of previous LSCS, non-progress of labour, breech, foetal distress and APH 44.2%, 0%, 19.3%, 4.0%, 7.6% respectively and emergency LSCS done for the same indications were 9.3%, 7.3%, 6.3%, 32.3%, 4.7% respectively.¹⁵ Foetal distress was the most common indication in the emergency LSCS group (32.3%), followed by meconium stained amniotic fluid (20%) and CPD (12.7%) in that study.

In the study conducted by Vesna E-G et al, elective LSCS done in view of previous LSCS, non-progress of labour, breech, foetal distress and APH were 48.32%, 0%, 33.7%, 0% respectively and the emergency LSCS were 0%, 7.45%, 12.76%, 7.45% respectively.¹⁸

In the study conducted by Najam R et al, LSCS done in view of previous LSCS, non-progress of labour, breech,

foetal distress and APH electively was 42.5%, 22.2%, 45.5%, 23.07%, 28.5% respectively and that of emergency LSCS was 57.5%, 77.7%, 54.5%, 76.9%, 71.4% respectively.¹⁹ Non reassuring fetal heart rate (NRFHR) as most common indication for emergency CS (46.80%) followed by previous caesarean section (24.23%), CPD (17.27%), failure to progress/ obstructed labour (9.68%)⁸. Most of the elective CS was done for CPD (44.07%), previous caesarean section (24.52%), malpresentation (17.47%) and oligohydramnios (11.38%). Caesarean section for single indication was more in emergency group and CS for multiple indications was more in elective group. An emergency versus elective caesarean study in North Kerala analysed and found that the previous LSCS with CPD was the most common indication in both the groups.²⁰ 73.3% and 44.6% underwent repeat caesarean in Group A and Group B respectively. 10% in elective and 20.6% in emergency group had NRFHR as the indication. Dystocia constituted 18% in elective and 20% in emergency group.

Primary caesarean done in multigravida were done for multifetal gestation and malpresentation equally (17%) followed by antepartum haemorrhage and severe pre-eclampsia/eclampsia (13%). PPROM (9%), FGR (9%), NRFHR (9%), and macrosomia (9%). Fibroid complicating pregnancy (4%) at 39 weeks with a previous normal delivery needed an elective caesarean sterilisation with myomectomy. Malpresentation (29%), fetal distress (24%), FGR (16%), APH (16%), severe pre-eclampsia (10%) and multifetal gestation (5%) were the indications of primary caesarean delivery in multigravida in another study in South Kerala.¹⁶ The most common indication of LSCS in a similar study on Primary caesarean in multigravida were foetal distress (40.8%) followed by malpresentations (23.1%), severe pre-eclampsia (18.5%). (15.4%) had FGR with oligohydramnios and (13.8%) showed non-progress of labour (NPOL), CPD (6.2%), (3.1%) had BOH.²¹

There were more low birth weight babies in Group 1 as there were more mothers remote from term with comorbidities necessitating early decisions. 4.04% were less than 2kg in electives which was 4.42% in emergency caesarean group. Only 9.09% babies were between 2-2999 in Group 1 which was 22.20% in Group 2 There were more low birth weight babies (birth weight <2499grams) in emergency group (P value- 0.001) as mothers with gestational age <37.6 weeks comprised 52.29% and it was statistically significant. Elective caesarean had 79% babies with 2.5-3.5kg which was only 56% in emergency cs group. 7.07% were 3.5-4.5kg in group 1 while it was 6.12% in emergency caesareans and was comparable. 75% of babies had birthweight between 2.5-4kg in a similar study on caesarean determinants in South Kerala.¹⁶

6 mothers who underwent emergency caesarean were ventilated while only one mother in the other group needed the same. There were need for more blood

transfusions and magnesium sulphate in Group 1. The incidence of post-operative morbidity like fever, wound infection and UTI in a study by Lulu et al was more in the emergency LSCS group being 22.9%, 6.5%, 15.5% respectively.¹⁶ Najam R et al, also had similar results.¹⁹ Gurunule AA et al had similar results as compared to other studies in case of post-operative morbidity like fever (6.3%), wound infection (3.0%) and UTI (3.7%).¹⁵ A similar study had maternal fever (11.5%) as the most common morbidity followed by postpartum haemorrhage necessitating blood transfusions, UTI, SSI, respiratory problems and prolonged hospital stay.⁹

Another study noted that more number of subjects in emergency CS group required blood transfusion (4.87%) had scar dehiscence, respiratory complications (3.69%), febrile morbidity (4.18%) and mortality in 6 subjects.⁸ Santhanalekshmi et al stated that intra operative complications were mainly primary haemorrhage and bladder injury (8.7%) and SSI was 38%.²² Burshan et al, stated that morbidity in emergency CS was higher than elective CS group (46.9% versus 24.4%) and this difference was statistically significant $p=0.0001$.²³ Regarding duration of hospital stay, only 36.8% of mothers who had elective caesareans had extended hospital stay while 50.2% had longer hospital stay in emergency group. Similar results were noted in the index study where extended hospital stay is found more in emergency caesarean section group when compared to elective caesarean section group (OR -1.72) due to the increased post-operative morbidity associated with emergency caesarean section.⁹ Das RK et al, showed morbidity in 12.02% where surgical site infection (4.35%) was the commonest complication followed by atonic PPH (2.43%).²⁴

Regarding neonatal outcomes, APGAR score at 5 minutes was above 8 in 97.96% (n=96) of babies born by elective caesareans as to 95.89% (n=280) of babies born by emergency caesarean delivery. Among 96 babies born via emergency caesareans, 64 (21.91%) needed neonatal intensive care and 32 (10.95%) needed ventilatory services. There were two neonatal deaths due to prematurity, respiratory distress and intraventricular haemorrhage. 12 (12.24%) babies born through elective caesareans needed NICU admissions and 6 (6.12%) were ventilated and there was one neonatal loss. Rehana et al and Onkapa B noted that higher rate of birth asphyxia in babies born by caesarean delivery.^{25,26} NICU admissions and babies needing neonatal ventilation were significantly higher in emergency caesarean delivery group than elective caesarean group. Respiratory distress soon after birth and prematurity was the most common indication for NICU admissions similar to Najam and Al Nuaim L et al, and in contrast to Daniel et al.^{9,20,27}

CONCLUSION

The antenatal morbidity, low birth weights, decision taken preterm for salvaging the baby, post-operative

complications and extended stay were more in the emergency caesarean when compared to elective caesarean. By efficient labour protocols and partograph implementations, unnecessary inductions and hence emergency primary caesareans can be restricted.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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