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Research Article

COMPARISON OF THE MATERNAL, FETAL, AND NEONATAL OUTCOME OF ELECTIVE AND EMERGENCY CESAREAN SECTION AT A TERTIARY CENTER

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ABSTRACT

Objective: Cesarean section is one of the most performed surgical procedures in the world and it carries high morbidity and mortality in comparison to vaginal delivery. The present study was conducted for evaluating the maternal and neonatal outcomes and complications in pregnant women who underwent elective versus emergency cesarean section so that appropriate measures can be taken to decrease morbidity and mortality soon.

Methods: Cross-sectional comparative hospital-based study carried out at Zanana Hospital Jaipur from January 2022 to December 2022. There were 400 patients enrolled in the study 200 in elective and 200 in emergency cesareans selected randomly. Ethical approval was obtained from the ethical committee and informed consent was taken from the patients.

Results: The emergency cesarean section was significantly more as compared to an elective cesarean section in women in the age group 19–25 years and >35 years. Most of the cesarean sections in multipara were elective as compared to the relatively more emergency cesarean sections in nullipara. It was observed that 26.5% (52/200) of women had fetal complications. Out of them, 92.4% of underwent emergency cesarean section. About 65.5% (131/200) of participants had intra-operative complications. Out of these 62.5% (82/131) had adhesions, 17.5% (23/131) had difficult extraction, and 18.3% (24/131) had postpartum hemorrhage. Out of them, 83.3%% (20/24) occurred during emergency cesarean as compared to 16.7% (4/24) in elective cesarean.

Conclusions: Maternal and fetal complications were significantly higher in the emergency cesarean section as compared to the elective cesarean section group.

Keywords: Fetal outcome, Emergency cesarean section, Elective cesarean section, Maternal outcome.

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INTRODUCTION

Cesarean delivery is defined as the birth of the fetus through an incision in the abdominal wall (laparotomy) and the uterine wall (hysterotomy) [1]. Cesarean section is a safe operation, and in many countries around the world, there has been a dramatic increase in its frequency [2-4]. With the use of an aseptic technique, proper sterilization method, antibiotic therapy, improved anesthesia, and the use of blood transfusion, the mortality and morbidity of this surgery have decreased dramatically. Furthermore, the incidence of birth trauma, meconium aspiration syndrome, and birth asphyxia is reduced by this mode of delivery as compared to vaginal delivery.

The incidence of elective induction, i.e., induction of labor when there is no medical reason, appears to be increasing at a greater rate than medically indicated inductions and can form up to one-third of the total delivery population. Elective inductions can lead to unnecessary CS, which in turn increases the risk of maternal and fetal complications, and also increases the cost of health-care provision and utilization.

The disadvantages of cesarean section are much more as compared to normal vaginal delivery. This is not only in terms of pain and trauma associated with an abdominal operation but also because of the complications that may be associated with it [5,6]. It is also expensive in terms of the cost of the procedure and duration of postpartum stay in the hospital that is required [7].

In recent years, however, the use of cesarean section has become increasingly controversial, and uncertainty exists about the relative risk and benefit of the patient [8]. The increased rate of cesarean section in the present scenario is due to increasing maternal age, reduced parity, breech presentation, and extensive use of electronic fetal monitoring [9].

Elective cesarean delivery is usually performed under controlled conditions. The maternal intra-operative and post-operative complications in elective cesarean are comparatively less than in emergency cesarean sections. Postpartum hemorrhage is a more frequent intra-operative complication in emergency cesarean sections when compared to elective cesarean sections. Although indication for elective cesarean delivery may predispose the patients to subsequent complications, with better-prepared conditions, the level of predisposition would be lower than in the emergency situation [10-17].

Poor neonatal outcomes post-cesarean delivery have been defined as mortality, low APGAR scores, or admission to the neonatal intensive care unit [18,19]. Neonatal complications are more common in emergency cesarean section as compared to elective cesarean section [20]. Sepsis is the most common neonatal complication in emergency cesarean section and hyperbilirubinemia is the most common complication in elective cesarean section.

Many studies have demonstrated that the maternal and fetal complications of emergency LSCS are significantly higher as compared to elective LSCS. Still, some of the studies have shown conflicting results [20-23]. Moreover, such a study has not been conducted in our institute earlier. We have, therefore, conducted a study to compare the maternal and fetal outcomes of elective and emergency cesarean sections.

Aims and objectives

To compare the maternal, fetal, and neonatal outcomes of elective and emergency cesarean section.

METHODS

Cross-sectional comparative hospital-based study conducted at Zanana Hospital, Department of Obstetrics and Gynecology, SMS Medical College Jaipur between January 2022 and December 2022 on 200 consecutive participants undergoing cesarean section (100 consenting consecutive participants undergoing elective cesarean section and 100 consenting consecutive participants undergoing emergency cesarean section).

Inclusion criteria

200 participants with singleton pregnancy (irrespective of booking status and parity) at the period of gestation 30–40 weeks undergoing cesarean section at our tertiary care center were enrolled for the study after ruling out the following exclusion criteria.

Exclusion criteria

1. Gestation <30 weeks and >40 weeks
2. Multiple pregnancies
3. Pregnancy with congenital malformations in the fetus
4. Pregnancy with uterine malformations
5. Pregnancy with uterine fibroid
6. Pregnancy with coagulopathy
7. Pregnancy with jaundice.

RESULTS

Maternal age significantly influenced the choice of cesarean section, with higher percentages of younger mothers (19-25 years) opting for emergency cesarean sections (Table 1).

Parity also played a role in mode of delivery, as emergency cesarean sections were more common among nulliparous women (Table 2).

Fetal complications were more prevalent in emergency cesarean sections, particularly fetal distress, oligohydroamnios, and decreased fetal movements (Table 3).

Intra-operative complications were observed in both elective and emergency cesarean sections, with adhesions being a common occurrence (Table 4).

Post-operative complications varied between the two modes, with infectious morbidity and wound complications more frequent in emergency cesarean sections, while elective sections had higher rates of certain complications such as urinary tract infections (Table 5).

Neonatal complications were more pronounced in neonates delivered via emergency cesarean sections, with higher rates of NICU admissions, respiratory distress syndrome, and hypothermia (Table 6).

These findings shed light on the intricate relationship between mode of delivery and maternal as well as neonatal outcomes, providing valuable insights for healthcare practitioners and policymakers.

DISCUSSION

The mean age of the 200 participants in the present study was 27.63±4.3 years, with a range 19–40 years. The mean age of 100 participants in emergency C-sections was 23.5±3.4 years, whereas the mean age of 100 participants in elective C-sections was 27.5±5.3 years. The maximum number of cesareans was done in women with age in the range 26–35 years. Out of these, 43.7% were emergency cesarean sections whereas, 56.2% were elective cesarean sections. However, the difference in number of elective and emergency cesarean sections was not significant in this age group. On the contrary, in a study conducted by Herstad *et al.* [24], 91% of cesareans done in an emergency were in the age group of 26–35 years and only 9% of women underwent elective cesarean section in this age group. Similar were the observations in a study conducted by Darnal and Dangal [25] where, 64.7% of cesarean sections were done in emergency whereas, only 29.4% of women underwent emergency cesarean section in the age group of 26–35 years. In relatively young women i.e., women with the age in range of 19–25years, 64.8% of cesareans were done in emergency due to more number of women with severe pre-eclampsia with failed induction in the present study.

In the present study, a majority (60.2%) of multiparous women underwent elective cesarean section and 39% of multipara had emergency cesarean section. Most of the elective cesareans done in multipara were done for the indications like refusal for TOLAC in a previous cesarean. We had 37.5% (75/200) of women with prior cesarean delivery. Out of these 18.6% (14/75) had a pregnancy after prior two cesareans. Therefore, most of the elective cesareans in multipara were done electively. Similar were the findings of many studies done in the past i.e., 55.2%, 58.5%, 86.6%, and 60% of cesareans done electively in multiparous women in the studies conducted by Nag *et al*. [26], Sharma *et al*. [27], Erdem *et al*. [28] and Singh *et al*. [29], respectively. The majority of nulliparous women underwent emergency cesarean and the difference in elective and emergency sections in relation to parity was significant (p=0.004).

In our study, we observed less number of fetal complications in elective cases, as compared to emergency cases. We had only four women with fetal complications in elective, whereas 49 women with fetal complications were operated in an emergency. Similarly, a study done by Patel *et al*., observed more fetal complications in emergency cesarean (36%) as compared to elective (5.8%) cesarean section. In the present study, 25% (2/8) of women with oligohydramnios underwent elective cesarean section, and 75% (6/8) had an emergency cesarean section. Similarly, 12.6% (12/95) of women with oligohydramnios had an elective cesarean section, and 87.4% (83/95) underwent emergency cesarean section in a study conducted by Patel *et al*. [30].

The intra-operative complications other than adhesions were maximum in the emergency cesarean group. The majority of women with prior cesarean section had intra-operative adhesions i.e., 53.6% in elective cesarean sections and 46.3% in emergency cesarean sections. The similar results were reported in a study conducted by Nag *et al*. [26], who observed intra-operative adhesions in 44.8% of elective cesarean sections and 37.6% of emergency cesarean sections. On the contrary, in a study done by Renuka and Suguna [31], complications other than intra-operative adhesions were not reported. About 12% (24/200) of women had PPH which is similar to the percentage of women with PPH i.e., 8.3% (13/300) in a study conducted by Renuka and Suguna [31] and 12.6% (43/340) cases of PPH in a study by Darnal and Dangal. Out of 24 cases of PPH, 83.3% (20/24) were in emergency cesarean section and 16.7% (4/24) were in elective cesarean section. Similarly, Renuka and Suguna [31] and Darnal and Dangal [25] observed 92.3% (12/13) and 74.4% (32/43) cases of PPH in emergency cesarean section, respectively. Difficult extraction was reported in 11.5% (23/200) of all cases, out of which 78.2% (18/23) had emergency cesarean section and 21.7% (5/23) had elective cesarean section. Bladder injury was reported in 4% (8/200) cases, out of which 75% (6/8) had emergency cesarean section and 25% (2/8) underwent elective cesarean section.

Infectious morbidity was reported following 3% of cesarean deliveries in our study. Similarly, Renuka and Suguna [31] reported infectious morbidity in 5.3% of cesareans. About 2% of women in the present study and 2.2% of women in a study by Nag *et al*. reported wound discharge which was comparable. Pain score (visual analog scale) >4 was observed in 48.5% in the present study as compared to 11.8% in a study by Nag *et al*. [26]. Fever was reported in 2.5% (5/200) in the present study. Similarly, 4.7%, 4.2% and 7.7% of women who had cesarean delivery had a fever in studies conducted by Renuka and Suguna [31], Nag *et al*. [26], and Darnal and Dangal [25], respectively. Most of these studies have been conducted in India where women are advised post-operative antibiotics for a minimum duration of 5 days. UTI was a post-operative complication in 4%, 3.5%, 9.4% and 11.5% of women undergoing cesarean delivery in studies conducted by Renuka and Suguna [31], Nag *et al*. [26], Darnal and Dangal [25], and present study, respectively. A higher number of UTI cases in the post-operative period in the present study could be due to the prolonged catheterization (for 24 h) in our setup. About 0.6% of women undergoing cesarean delivery had ICU admission which is similar

Table 1: Maternal age in relation to elective and emergency cesarean section

Age	Number of women (%)		Total "n"
	Elective C-section (n=100)	Emergency C-section (n=100)	
19–25	15 (35.7)	27 (64.8)	42
26–35	77 (56.2)	60 (43.7)	137
>35	8 (38)	13 (61.9)	21
χ^2 statistics (p)	6.7285 (0.0345587)		

Table 2: Parity in relation to emergency and elective cesarean section

Parity	Number of women (%)		Total "n"
	Elective C-section (n=100)	Emergency C-section (n=100)	
Nulliparous	41 (40.1)	61 (59.8)	102
Multiparous	59 (60.2)	39 (39.7)	98
χ^2 statistics (p)	8.0032 (0.004669)		

Table 3: Fetal complications in relation to elective and emergency cesarean section

Fetal complication	Elective C-section (n=100), n (%)	Emergency C-section (n=100), n (%)	Total "n"
Fetal distress	0	36 (100)	36
Oligohydramnios	2 (25)	6 (75)	8
Decreased fetal movements	0	3 (100)	3
IUGR	2 (33.3)	4 (66.6)	6

to the percentage of ICU admission in a study by Nag *et al*. [26], 1.5% of women needed blood transfusion which is significantly less as compared to a study by Darnal and Dangal [25]. The less number of women in the present study required blood transfusion as all cases with severe anemia was excluded from the study.

In a study by Renuka and Suguna [31] 87.5% (14/16) of women with infectious morbidity had undergone emergency cesarean section. All four women with wound discharge had emergency cesarean section in the present study. Similarly, in a study by Nag *et al*. [26], 58.3% (7/12) of women with wound discharge had undergone emergency cesarean section. Pain score >4 was observed in 47% (94/200) of cesarean deliveries. Of these, 52.1% (49/94) were elective cesareans and 47.8% (45/94) were emergency cesareans. Similarly, Nag *et al*. [26] observed that 57.8% (37/64) of women with pain score >4 had emergency cesarean section and the rest 42.1% (27/64) had an elective cesarean section.

In the present study, 23% (46/200) of neonates were admitted to NICU. Of these 69.5% (32/46) were born by emergency cesarean section and the rest 30.4% (14/46) were born by elective cesarean section. Similarly, in a study by Patel *et al*. [30], out of 3725 cesarean deliveries 19% (708/3725) were admitted to NICU. Out of these, 66.6% (472/708) were born by emergency cesarean section and the rest 33.3% (236/708) were born by elective cesarean section. Similarly, in a study by Renuka and Suguna [31], there were 50 (16.6% i.e., 50/300) NICU admissions. Of these 66% (33/50) of neonates were born by emergency cesarean section and 34% (17/50) were born by elective cesarean section. In the present study, 5.5% (11/200) of neonates born by cesarean delivery had respiratory distress syndrome (RDS). Of these 63.6% (7/11) were born by emergency cesarean section and 36.3% (4/11) were born by

Table 4: Intra-operative complications in relation to elective and emergency cesarean section

Intra-operative complications	Number of women (%)		Total "n"
	Elective C-section (n=100)	Emergency C-section (n=100)	
Adhesions	44 (53.6)	38 (46.3)	82
Bladder injury	2 (25)	6 (75)	8
Post-partum hemorrhage (intra-operative approximate blood loss >1 L)	4 (16.7)	20 (83.3)	24
Injury to viscera	0	2 (100)	2
Difficult extraction	5 (21.7)	18 (78.2)	23
Extension of incision	0	6 (100)	6

Table 5: Post-operative complications in relation to elective and emergency cesarean section

Post-operative complications	Number of women (%)		Total "n"
	Elective C-section (n=100)	Emergency C-section (n=100)	
Infectious morbidity	0	11 (100)	11
Wound complication	0	7 (100)	7
Resuturing	0	3 (100)	3
Pain score >4	49 (52.1)	45 (47.8)	94
Urinary tract infection	7 (30.4)	16 (69.5)	23
Admission to ICU	0	1 (100)	1
Blood transfusion	0	3 (100)	3
Spinal headache	2 (40)	3 (60)	5

ICU: Intensive care unit

Table 6: Neonatal complications in relation to elective and emergency cesarean section

Neonatal complications	Number of women (%)		Total "n"
	Elective C-section (n=100)	Emergency C-section (n=100)	
Admission to NICU	14 (30.4)	32 (69.5)	46
TTNB	6 (60)	4 (40)	10
Respiratory distress syndrome	4 (36.3)	7 (63.6)	11
Septicemia	0	4 (100)	4
Seizures	0	3 (100)	3
Hypothermia	12 (63.1)	7 (36.8)	19
Need for resuscitation	0	7 (100)	7
Early neonatal deaths	0	1 (100)	1
Meconium aspiration	1 (20)	4 (80)	5

NICU: Neonatal intensive care unit

elective cesarean section. Similarly, 69.3% (43/62) of neonates born by emergency cesarean section had RDS and 30.6% (19/62) of neonates born by elective cesarean section had RDS in a study conducted by Patel *et al*. [30] Four neonates (4/200 i.e., 2%) had septicemia in present study and all of them were born by emergency cesarean section. Similarly, Renuka and Suguna [31] and Patel *et al*. [30] observed that 72.4% and 83.6% of neonates with septicemia were born by emergency cesarean section, respectively. Hypothermia was observed in 19 (9.5%) neonates in the present study, out of them 63.1% (12/19) of neonates were born by elective cesarean section and 36.8% (7/19) were born by emergency cesarean section. On the contrary, 23 neonates had hypothermia in a study done by Patel *et al*. [30]. Of these 56.5% (13/23) were born by emergency cesarean section and 43.7% (10/23) were born by elective cesarean section. Meconium aspiration was observed in five neonates (2.5% i.e., 5/200) in our study. Out of them, 80% (4/5) neonates were

born by emergency cesarean section and 20% (1/5) neonates were born by elective cesarean section. Similar results were obtained in a study done by Patel *et al*. [30] who also observed that 80% of neonates with meconium aspiration were born by emergency cesarean section and 20% were born by elective cesarean section.

CONCLUSION

Complications of an emergency cesarean are more as compared to a planned elective cesarean. An elective cesarean conducted well in time will prevent an emergency cesarean delivery in those who have contraindications. Primary health providers and traditional birth attendants need to be educated about the signs and symptoms of high-risk pregnancies and timely referral to tertiary care center. Public health education is equally important and people should be aware of the health facilities provided by the government. The outcome of emergency versus elective CS varies depending on the context. The fetal outcomes were worse in emergency CS patients. The NICU admissions, septicemia, RDS and meconium aspiration were more in neonates born by elective cesarean section. Whether this is due to fetal distress or complication as an indication for emergency CS or the result of emergency CS is not clear and could be evaluated in future studies.

Limitations of the study

The drawback of our study was a small sample size, not comparing the maternal BMI in relation to elective and emergency cesareans which itself is an independent risk factor for adverse pregnancy outcome.

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