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EVALUATION OF INTRAOPERATIVE AND POSTOPERATIVE COMPLICATIONS IN CESAREAN SECTION: ELECTIVE VERSUS EMERGENCY

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ABSTRACT

Background: Cesarean section (CS) is one of the most frequently carried out surgical operations in the world. Complications may be associated with the surgery, either during or after the procedure – emergency CS is likely to have a higher risk than elective CS. The knowledge of the pattern of intraoperative and postoperative complications is important to create an ideal maternal and neonatal outcome

Objective: To assess and compare the perioperative morbidity associated with elective and emergency CS.

Methods: A cross-sectional study was carried out in Obstetrics and Gynecology Department of Sir Ganag ram Hospital, Lahore from January 2025 to June 2025, including 288 women who underwent cesarean section, the number of subjects was determined based on the World Health Organization (WHO) formula. The patients were divided into two groups: elective CS group and emergency CS group. A structured proforma was used to collect data relating to the demographic characteristics, obstetric history and surgical outcome. Intraoperative complications evaluated were haemorrhage, adjacent organ injury and anesthetic-related events; and postoperative complications were wound infection, febrile morbidity, thromboembolic events and length of hospital stay. Comparisons of complication rates between the two groups were done using statistical analysis (descriptive and inferential tests).

Results: There were significant more complications during and after the cesarean section in the emergency group than during and after elective cesarean section. Common complications seen were bleeding and wound infection. Advanced maternal age, multiparity and indications for surgery were considered as risk factors for the occurrence of complications.

Conclusion: Emergency cesarean sections have a greater risk of complications than elective cesarean sections. Better pre-operative evaluation, prompt decision-making and following the surgical procedure could minimise the risk of complications and protect the mother.

KEYWORDS: Cesarean section, Elective cesarean, Emergency cesarean, Intraoperative complications, Postoperative complications, Maternal outcomes, Surgical risk, Wound infection

INTRODUCTION

Caesarean section (CS) is considered one of the most common surgery operations performed in obstetrics that is used for mother and child when vaginal delivery is associated with high risk for the mother or child [1].The overall figures of caesarean sections have increased greatly in the last decades worldwide, including elective and emergency caesarean sections, which have an impact on the health of both mothers and newborns [2]. Elective caesareans are scheduled beforehand when there are medical indications or maternal preference, while emergency caesareans are performed that are necessary when unexpected complications arise during Labor, like obstructed Labor, fatal distress, or maternal medical conditions [3].

Although advances in surgical technique, anaesthesia and peri-operative management have occurred, caesarean sections still have their own risks of intra and peri-operative complications [4]. Possible complications during surgery include excessive bleeding, risk of injury to neighbouring organs (bladder or bowel), anesthetic-related problems, and technical issues due to previous surgery or the presence of adhesions [5]. Wound infection, febrile morbidity, and thromboembolic events are some of the postoperative complications, which can be followed by delayed healing and hospital stay [6]. There is evidence that emergency cesarean sections are more likely to be complicated than elective procedures, possibly because of insufficient preparation for surgery, hemodynamic instability or prolonged Labor in the hours leading up to surgery [7].

The awareness of the incidence and nature of complications after caesarean section is essential for informed clinical decision making, best management of the perioperative care and better safety for mother. A comparative analysis of elective and emergency cesarean section can give insight into possible risk factors, surgical outcome and the use of resources [8]. Furthermore, assessment of these can guide strategies to minimize preventable complications, such as prompt surgical intervention, better anaesthesia techniques, and uniform postoperative care [9].

There are several studies that have been reported which have documented the relationship of type of caesarean section and complications, finding that emergency caesareans are much more likely to be associated with complications [10]. Advanced maternal age, high parity, comorbidities like hypertension or diabetes and late presentation to health facilities contribute to increased risk. Further, the level of surgical and aesthetic services, the availability of skilled staff and the infrastructure of the hospital are all critical factors that impact on outcome Cesarean section is still one of the main causes of maternal morbidity and mortality in the developing world, where there may be a shortage of timely obstetric care. To ensure patient safety and to maximize surgical outcomes, it is important to monitor the process of surgery continually, as well as to provide evidence-based interventions during and after surgery. The purpose of this study is to compare the post-operative complications of elective cesarean section with emergency cesarean section and show whether there are clinical implications for the management of pregnancy and cesarean section.

This study gives a good overview of the risks involved with caesarean delivery, as both intraoperative and postoperative results were examined on a representative patient population [11]. The outcomes of this study can help in better surgical planning, risk stratification and maternal care strategies, thus minimizing morbidity and optimizing maternal safety during caesarean sections [12].

Objective

The main aim of this study was to compare the number and nature of the complications that may occur during and after an elective and emergency cesarean section. The objectives of the study were to define the risk patterns for each procedure type, assess the maternal outcomes and offer evidence-based recommendations to optimize surgical planning, perioperative management, and patient counselling to reduce maternal risks when undergoing cesarean delivery.

METHODOLOGY

The study was descriptive cross sectional, which has involved 288 women who had cesarean section in Obstetrics and Gynecology Department of Sir Ganag ram Hospital, Lahore during January 2025 to June 2025, The sample size was determined by the World Health Organization (WHO) formula to ensure the sample size is enough for statistical power. Participants were divided into two categories: cesarean section (planned and non-urgent) and emergency cesarean section (urgent for the mother or fetus). Medical records were used to gather data on demographics, obstetric history and perioperative outcomes. Intraoperative complications that were evaluated were bleeding, bladder or bowel damage and surgical difficulties, and postoperative complications evaluated were wound infection, febrile morbidity, urinary retention, thromboembolic events, and delayed recovery.

Data were summarized using descriptive statistical methods. Chi-square or Fisher's exact test was used to compare categorical variables between elective and emergency groups and independent t-tests were used for continuous variables. A p-value less than 0.05 was deemed as statistically significant. IRB approval was given for the study.

Inclusion Criteria: The inclusion criteria are women of reproductive age (18-45 years) who had cesarean section in the study hospital during the study period. All women, both primiparous and multiparous, were considered. Only patients with full medical information (pre-operative, intra-operative and post-operative information) were included. Eligible were elective, and emergency cesarean deliveries of all indications, with informed consent for data use.

Exclusion Criteria: Incomplete or missing medical records were an exclusion criterion. Women who had cesarean section for obstetric emergencies, including those requiring other major surgeries like hysterectomy were not included. Patients having known infections that might adversely influence surgical results or severe or systemic diseases were excluded. In addition, those patients who refused consent for data use and those lost to follow-up during the postoperative period were excluded.

Data Collection: The data were collected on patients who had cesarean section from medical records for the specific period of study. The demographic information, obstetric history and clinical parameters such as maternal age, parity, gestational age and indication of cesarean section were recorded using a structured form of data extraction. Intraoperative data recorded included the length of the surgery, bleeding, blood transfusion, and complications of surgery (bladder or bowel injury). The parameters recorded postoperatively were the occurrence of wound infection, febrile morbidity, urinary retention, occurrence of thromboembolic events, need for reoperation and length of hospital stay up to 7 days after surgery. Training research personnel conducted data collection to ensure the data was consistent and accurate. Patient confidentiality was assured by the anonymisation of all information. Completeness of records was checked, and any discrepancies were checked against the attending obstetrician. The institutional review board approved the access to patient records, and all protocols used to secure patient records and information be followed in the hospital.

Data Analysis: All data collected were put into a Microsoft Excel spreadsheet and then analyzed with SPSS version [specify version]. Demographic and clinical data were summarized using descriptive statistics, mean and standard deviation for continuous variables and frequencies and percentages for categorical variables. The

difference between the elective and the emergency cesarean section groups was analysed and only differences in the intra and post-operative complications were found. The chi-square test or Fisher's exact test were used to compare categorical variables (incidence of haemorrhage, wound infection or urinary retention). Continuous variables, such as, operative time and estimated blood loss were analysed by independent t-tests or Mann-Whitney U tests depending on the normality of the data. P value < 0.05 was taken as significant. Results were reported in tables and graphs for better understanding and to point out the difference in the risk of complications between emergency and elective cesarean sections. The aim of this analysis was to offer evidence-based inputs for clinical decision and risk management.

RESULTS

288 patients were included and 152 (52.8%) had elective cesarean sections, and 136 (47.2%) had emergency cesarean sections. The intra- and post-operative complications were more common in the emergency group: excessive haemorrhage (12.5% vs. 4.6%) and bladder injury (2.9% vs. 0.7%). There were also higher rates of the postoperative complications wound infection (9.6% vs. 3.3%) and febrile morbidity (7.3% vs. 2.6%) in emergency CS. The operative time and length of hospital stay was significantly longer in emergencies ($p < 0.05$). The results show a higher risk of motherhood to emergency cesarean section than to elective.

Table 1: Demographic Characteristics of Study Participants

Variable	Elective CS (n=152)	Emergency CS (n=136)
Mean Age (years)	29.4 ± 4.6	28.7 ± 5.1
Primiparous (%)	65 (42.8%)	58 (42.6%)
Multiparous (%)	87 (57.2%)	78 (57.4%)
Mean Gestational Age (weeks)	38.5 ± 1.2	37.8 ± 1.5

Table 1: Both elective cesarean and emergency cesarean groups were matched for age, parity and gestational age (G.A.), providing for the base line comparison of characteristics. The similarity lends credence to the notion that differences in complication rates are due to the nature and urgency of cesarean section, and not due to the demographic factors, thus allowing comparison between elective and emergency cesareans.

Table 2: Intraoperative Complications

Complication	Elective CS (n=152)	Emergency CS (n=136)
Excessive Hemorrhage (%)	7 (4.6%)	17 (12.5%)
Bladder Injury (%)	1 (0.7%)	4 (2.9%)
Surgical Difficulty (%)	5 (3.3%)	9 (6.6%)

Table 2: Emergency CS was more likely to have high rates of haemorrhage, bladder injury and surgical problems, which was probably a consequence of the urgent procedure and the lack of pre-operative preparation. The results show higher risk of surgical complications in emergency cesarean section and highlight the need for advanced surgical expertise and swift surgical responses.

Table 3: Postoperative Complications

Complication	Elective CS (n=152)	Emergency CS (n=136)
Wound Infection (%)	5 (3.3%)	13 (9.6%)
Febrile Morbidity (%)	4 (2.6%)	10 (7.3%)
Urinary Retention (%)	3 (2.0%)	6 (4.4%)
Thromboembolic Events (%)	1 (0.7%)	2 (1.5%)

Table 3: where emergency CS patients were more likely to develop wound infections, febrile morbidity, urinary retention and Tees. This increased incidence is due to the stress of emergency surgery, a longer operating room time and poorer peri-operative care. The results highlight the importance of close postoperative observation, particularly following emergency cesarean surgery.

Table 4: Operative Time and Estimated Blood Loss

Variable	Elective CS (n=152)	Emergency CS (n=136)	p-value
Mean Operative Time (minutes)	55.2 ± 12.4	68.5 ± 15.1	<0.05
Mean Blood Loss (ml)	350 ± 85	480 ± 110	<0.05

Table 4: the operative time and blood loss were significantly more in emergency CS. The complexity and urgency of the surgeries are reflected in the longer surgeries and higher blood loss in emergency surgeries. These metrics are linked to increased intra and postoperative complications, emphasising the importance of surgical planning, transfusion preparation and quick intervention procedures in emergency cesarean sections.

Table 5: Length of Hospital Stay

Length of Stay (days)	Elective CS (n=152)	Emergency CS (n=136)	p-value

Mean ± SD	3.2 ± 0.8	4.5 ± 1.2	<0.05
>5 days (%)	6 (3.9%)	15 (11.0%)	<0.05

Table 5: The mean length of stay in the hospital was significantly longer in patients with emergency CS. The longer time is due to greater complication rates, prolonged recovery time and postoperative monitoring requirements. This further confirms the importance of emergency cesarean delivery on maternal recovery and resource utilisation and underscores the need for preoperative assessment and careful post-surgical management to cut down hospitalisation and enhance outcomes**.**

DISCUSSION

Cesarean section (CS) is a common obstetric procedure, and the risk profile of elective and emergency CS is different . The study of 288 patients showed that the intraoperative and postoperative complications were significantly higher in emergency cesarean sections than in elective cesarean sections, and the operative time, blood loss, and hospital stay were longer in emergency cesarean section [14]. The results are in line with the literature and are of interest due to the influence of the surgical urgency and the maternal-fatal condition on the outcome.

Excessive hemorrhage, bladder injury were the intraoperative complications that were significantly increased in emergency CS. Surgical procedures are frequently done under time constraints, thus, there is less preparation time and more risks for challenges during surgery [15]. Intraoperative risk may also be further complicated by adhesions from previous surgery, malpresentation or unexpected maternal or fetal complications [13]. Table 2 shows that in cases that occurred by accident, there was also an excess of cases with excessive bleeding (12.5% as opposed to 4.6% in cases that were chosen for elective surgery), making preparation for dealing with bleeding and the availability of blood transfusion support very important. Injuries to the bladder were also more common in emergency CS (although not seen in every case), probably because of the urgent nature of the surgical dissection and less controlled operative field of emergency CS during which bladder injuries occurred [16].

The rate of postoperative complications was also found to be higher for the emergency cesarean sections. Higher rates of wound infection (9.6% vs. 3.3%) and febrile morbidity (7.3% vs. 2.6%) were found, probably because of the extended operative time, increased trauma to tissues and surgical emergencies. Emergency procedures also had a higher rate of urinary retention and thromboembolism, highlighting the importance of having careful postoperative management and early mobilisation plans in place [17]. The results of Table 3 show that some of these risks can be reduced by early infection prophylaxis and the careful postoperative management but cannot be completely compensated by the additional stress and complexity associated with emergency CS [18].

Additionally, the fatality rates were higher in emergency cases (Table 4) which further supports the link between the urgency of the procedure and the risk to the mother [19]. Extended operative time indicates increased surgical manipulations for dealing with complications and/or difficult anatomy, and increased blood loss is associated with increased postoperative morbidity and hemodynamic instability [20]. Extended hospital stays (Table 5) also reflect the clinical impacts of emergency cesarean sections, impacting mother recovery, healthcare resources, and hospital planning [21].

Demographic data of the study groups were similar (Table 1) and this indicates that any differences in complications are likely to be due to the type and urgency of surgery and not due to differences in baseline patient characteristics . This further validates the comparison and argument that emergency CS is, by its nature, riskier.

In conclusion, these results highlight the crucial role of early detection of maternal and fetal factors for cesarean section, prompt decision making and experienced surgical teams. Increased prenatal monitoring, risk stratification, and patient counselling are examples of strategies that can be implemented to lower emergency CS rates, which may lower maternal morbidity (Zedan & Eid, 2023)[22]. Also, optimizing peri-operative care, such as prompt access to blood products, infection control and carefully monitoring the post-operative period, can help minimize negative outcomes with emergency cesarean section delivery [23].

CONCLUSION

This study shows that increased in- and post-operative complications are seen in emergency cesarean section (CS) in comparison to elective cesarean section. The emergency cases had significantly higher rates of excessive bleeding, wound infection, febrile morbidity, and longer operative time, which led to a longer hospital stay and higher maternal risk. The results emphasize the need for early obstetric intervention, careful surgical planning, and careful postoperative monitoring to reduce surgical complications. Minimizing the number of emergency cesarean delivery, along with optimizing periop care, can lead to better outcomes for mom. There is a need to do further investigation to come up with specific strategies for risk reduction in cesarean delivery.

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