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Comparing Early Postoperative Maternal Complications in Elective and Emergency Cesarean Sections

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ABSTRACT

Background & aim: Scientifically, cesarean section (C-section) should be performed in case of emergency; however, the frequency of C-sections that are elective and without medical indication is high. This study aimed to compare the early postoperative maternal complications of elective and emergency C-sections.

Methods: This descriptive study was carried out on a total of 120 patients undergoing elective and emergency C-sections at Fatemieh Hospital in Hamadan, Iran, between May to July 2019. The study participants were selected through convenient sampling from two groups of elective (N=60) and emergency C-sections (N=60). The data were collected using self-structured questionnaire on early maternal complications and were analyzed by SPSS software (version 23) using Chi-square and independent t-test.

Results: A significant difference was observed between the two groups regarding the mean amount of intraoperative bleeding (P<0.05). During 24 h after the surgery, the emergency cesarean group received significantly more analgesics than the elective cesarean group (P<0.05). However, the two groups were not significantly different in terms of operative time, ileus, pain 6 h after surgery, and incidence of infection (P>0.05).

Conclusion: The incidence rates of some maternal complications were relatively higher in the emergency C-section than those reported for elective C-section. Therefore, in order to prevent postoperative complications related to emergency C-section, gynecologists should be encouraged to decide timely for cesarean section if there is a particular indication. Also, it is required to provide considerable care to decrease the rate of maternal morbidity and mortality in these cases.

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Introduction

One of the global concerns is cesarean delivery (C-section) (1, 2). A C-section refers to the removal of the fetus, placenta, and membranes through the abdominal wall and uterine wall (3, 4), as the most important and common surgical procedure in women (5). Although the rate of C-section has steadily incremented which is usually life-saving, the procedure by itself carries risks and may increase the mortality and morbidity of mothers and newborns, compared to vaginal delivery (6, 7).

Despite the increasing rate of C-section, this operation is more dangerous than normal delivery due to complications, such as bleeding, wound infection, endometritis, pulmonary embolism, aspiration, atelectasis, and thrombophlebitis (8, 9). Due to the inherent risks, the World Health Organization stated that there is no explanation for any region with a C-

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section rate of higher than 10-15% (10). Therefore, many efforts are currently being made to reduce the prevalence rate of C-section in countries within the range of 24-34% (11). However, there is a significant difference between the rates of C-section worldwide (10-20%) and in Iran (50-60 %) (12).

The prevalence of C-section worldwide has been partly due to an increase in primary C-sections and drop in the number of women attempting vaginal birth after a previous C-section (13). Primary C-section refers to the C-section irrespective of the type or indication, including C-section in maternal request or absence of strong obstetric indication. There are many indications for C-section, and C-section often warrants the prevention from fetal and/or maternal morbidity and mortality (14). Nevertheless, the indications for C-sections are to some extent subjective, and C-sections are mainly divided into two types, namely emergency and elective (15).

Emergency C-section is a type of C-section conducted in an emergency with the indications, including fetal distress, failure to induce labor, no progress of labor, placenta previa, placental abruption, cord prolapse, and severe preeclampsia (16). The elective C-section is a procedure commonly carried out around 39 weeks in case the occurrence of a newborn with tachypnoea is much less. Several above-mentioned indications are also observed for elective C-section, and another main indication is a prior C-section (17). Elective C-section is a scheduled delivery that may not have medical and midwifery indications or can be performed at the mother's request (18).

Although the types of complications in elective and emergency C-sections were similar, various studies have reported that the rates of postoperative complications of elective and emergency C-sections were different (19). Despite the proven complications of all types of C-sections for the mother, there are differences between the findings of studies that have accurately compared the early maternal complications of emergency and elective C-sections. In addition, a limited number of studies investigated these complications in primary C-sections. With this background in mind, the present study aimed to compare the early maternal complications of primary elective and emergency C-sections.

Materials and Methods

This descriptive-analytical cross-sectional study was carried out within May to July 2019. The study population consisted of all primiparous mothers (n=180) who referred to Fatemieh Hospital in Hamadan, Iran, during the study period.

Cochran formula was used for the calculation of the sample size in the present study, in which N was the community size equal to 180; Z was the coefficient equal to 1.96; d was the degree of confidence equal to 0.05; p and q were the ratio equal to 0.5. The sample size was determined as 120 subjects, who were selected using convenient sampling from primiparous women undergoing elective or emergency C-sections.

Finally, 60 elective and 60 emergency C-sections were investigated in the current study.

In this study, C-sections were considered elective in which labor pain does not start, such as the cases of fetal macrosomia, breech presentation, transverse presentation, and multiple pregnancies. However, C-sections were considered emergency in which labor pain starts or the patient is brought to the operating room from the maternity ward, such as the cases of meconium, fetal distress, preeclampsia, and placenta previa. The inclusion criteria were primiparity, no chronic diseases, gestational age of 38-40 weeks, no sedative medications, and willingness to cooperate with the researcher. The exclusion criteria were previous C-section, maternal hypertension, severe anemia, renal disease, heart disease, and coagulation disorders.

The data were collected by a two-part checklist the first part of which was related to demographic characteristics, such as age, height, weight, educational level, occupational status, and type of C-section. The second part related to the recording of the studied variables included bleeding during the operation, surgical time, postoperative pain, ileus duration after the operation, number of diclofenac suppositories, and prevalence of postoperative infection. Content validation was used to determine the validity of the checklist; therefore, the checklist was provided for eight experts in this field, and

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the content validity was calculated at 0.75, which was acceptable.

Before entering the operating room, the study subjects were informed of the objective of the study and, if agreed, their demographic characteristics were recorded. In addition, during surgery, the bleeding rate was measured based on the number of counts of blood-stained gases and amount of blood in suction (cc). The bleeding rate was calculated based on visual acuity (20) according to the following method:

The number of 4-inch by 4-inch blood-stained gases and amount of suctioned blood volume were recorded separately for each surgery. Each 4×4 blood-stained glass contains 10 ml of blood; accordingly, the number of gases stained with blood was multiplied by 10 ml, and the result was multiplied by the amount of suctioned blood volume. Since this volume included the volume of washings in the surgical area, it also reduced the volume of consumed fluid and resulted in the patient's actual blood loss.

After that the patient was admitted to the inpatient ward, pain levels were assessed at 6, 12, and 24 h after the surgery based on the visual analog scale (VAS) criterion, which is one of the well-known and psychometric methods of pain assessment or visual comparative scoring. The VAS is the use of a 100-mm line at the end of which 0 means complete pain relief and 100 at the other end indicates the most severe imaginable pain. In addition, the patient marks the severity of the pain on the line (21, 22). In this way, using a 100-mm line printed on a checklist with markers at each end, "painless" at one end and "most severe pain imaginable" at the other end, the patient was asked to show the pain on the line. Then, the pain level was determined using a ruler based on marked points.

The number of received diclofenac suppositories 24 h after the surgery and first intestinal discharge (based on the time) were also recorded in the checklist. For the variable of infection, three symptoms of inflammation, redness, and discharge from the surgical wound were evaluated a week after the operation. According to the National Nosocomial Surveillance definition, at least one of the criteria for purulent discharge and positive culture of wound discharge and at least one of the symptoms of inflammation, such as pain or induration, localized warmth of the wound, discoloration of the wound position, and diagnosis of a surgeon, should be established (23).

Descriptive and inferential statistics were used to analyze the data. Distribution and central indices were used in the descriptive analysis, and the independent t-test and Chi-square test were utilized in the inferential analysis. Furthermore, for statistical analysis, SPSS software (version 23) was used with a significant level of 0.05. The Kolmogorov-Smirnov test was employed to evaluate the normality of the frequency distribution of quantitative variables with a significance level of 0.76 indicating the normality.

Results

The present study compared the early maternal complications of 60 elective and 60 emergency C-sections. Demographic characteristics, including age, body mass index (BMI; kg/m^2), educational level, and occupational status, were homogeneous in both groups (Table 1).

Table 2 tabulates the comparison of the early maternal complications in the two emergency and elective C-section groups. According to the obtained results, the rate of intraoperative bleeding was higher in the emergency C-section group than that reported for the elective C-section group, and the difference was statistically significant ($P<0.05$). Moreover, 12 and 24 h after the surgery, the pain levels were higher in the emergency C-section group than those reported for the elective C-section group, which was statistically significant ($P<0.05$). In addition, during 24 h after the operation, the emergency C-section group received significantly more analgesics than the elective C-section group ($P<0.05$). However, no significant difference was observed between the two groups in terms of operative time, first intestinal discharge (ileus), and pain during 6 h after the surgery (Table 2).

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Table 1. Demographic characteristics of two emergency and elective cesarean section groups

Variable		Elective group	Emergency group	Test
		Mean±standard deviation	Mean±standard deviation	Independent t-test
Age (year)		28.1±5.1	28.7±4.5	0.455*
Body mass index		28.5±3.83	28.83±3.41	0.612
		N (%)	N (%)	Chi-square test
Educational level	Illiterate	1 (1.6)	3 (5)	0.760*
	Primary school only	32 (53.4)	29 (48.4)	
	Diploma	23 (38.4)	24 (40)	
	College education	4 (6.6)	4 (6.6)	
Occupational status	Housewife	56 (93.3)	55 (91.6)	0.729
	Employee	4 (6.7)	5 (8.4)	

* Significance level

Table 2. Early complications in emergency and elective cesarean section groups

Variable	Emergency group Mean±standard deviation	Elective group Mean±standard deviation	Independent t-test
Operative time (min)	43.58±5.6	44.35±5.2	0.441*
Bleeding rate (ml)	800±109.69	753.33±111.9	0.023
Time of ileus (at 24 h)	17.24±2.66	16.8±2.68	0.379
Received analgesics (number)	1.83±0.66	1.50±0.66	0.008
Pain rate after 6 h (Visual analog scale [cm])	5.80±2.49	5.36±1.95	0.286
Pain rate after 12 h (Visual analog scale [cm])	5.65±1.84	4.94±1.61	0.027
Pain rate after 24 h (Visual analog scale [cm])	3.93±1.79	3.26±1.41	0.026

* Significance level

Table 3 shows a comparison of the symptoms of infection in two elective and emergency C-section groups. There was no significant difference between the two groups in terms of inflammation, redness, and secretion of surgical wounds a week after the surgery (Table 3).

Table 3. Symptoms of surgical wound infection in two elective and emergency cesarean section groups

Variable		Elective group N (%)	Emergency group N (%)	Chi-square test
Surgical wound inflammation	Yes	1 (1.66)	2 (3.33)	0.559*
	No	59 (98.33)	58 (96.66)	
Surgical wound discharge	Yes	1 (1.66)	2 (3.33)	0.559
	No	59 (98.33)	58 (96.66)	
Surgical redness	Yes	3 (5)	2 (3.33)	0.648
	No	57 (95)	58 (96.66)	

Discussion

The present study investigated the early maternal complications of elective and emergency C-sections in primiparous mothers. A total of 120 primiparous mothers were studied, including 60 cases with elective and 60

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subjects with emergency C-sections. In the present study, the mean bleeding rate in elective C-section was lower than that reported for emergency C-section. In this regard, the findings of the present study are in line with the findings of a study carried out by Priyadarshini et al. indicating that the rate of hemorrhage in emergency C-section was higher than that reported for elective C-section. In addition, the rates of need for emergency blood transfusion were 37% and 10% in emergency and elective C-sections, respectively (24).

In the study conducted by Priyadarshini et al., increased bleeding in the emergency C-section group was due to the C-sections carried out after prolonged labor with stretched and edematous lower segments and impacted presented part causing the extension of incision laterally into the uterine vessels. Furthermore, in a study performed by Staboulidou et al., there was a higher rate of blood loss and increased rate of anemia in emergency C-section (25).

In another study carried out by Mehnaz Raees et al. in 2006-2007, hemorrhage was observed in 58% and 4% of the emergency and elective groups, respectively (26). Intraoperative hemorrhage was the most common complication in C-section responsible for two maternal deaths in that series. Although hemorrhage is common even in low-risk planned C-section, hemorrhage volume increased in emergency C-section due to the onset of labor or placental-associated problems.
According to the obtained results of the current study, within 6 h after the surgery, there was no significant difference in the level of pain between the emergency and elective C-sections; nevertheless, the lower levels of pain were reported in the elective C-section group 12 and 24 h after the operation. Therefore, the use of diclofenac suppository was less in the emergency C-section group. This finding is consistent with the results of a study carried out by Noura et al. indicating that the pain increased in the emergency group, compared to that reported for the elective group (27).

In addition, Tapar et al. showed that total tramadol intake was higher in emergency patients under general anesthesia than that observed for elective patients (28). According to the results of the present study, 6 h after the operation, there was no difference between the levels of pain between the two groups. This finding was due to the fact that in the current study, C-sections were performed using spinal anesthesia. In this method of anesthesia, the effects of pain last for several hours after the surgery. Moreover, the occurrence of higher pain in emergency C-section can be due to the fact that in this group, labor pain started before C-section.

The mean operative time was similar in elective and emergency C-sections. This finding is inconsistent with the results of a study carried out by Pallasmaa et al. in which the mean surgical time was longer in the elective group than that of the emergency group (29). This paradox may be due to differences in the study design and sample size. The present cross-sectional study was performed to compare the early maternal complications of elective and emergency C-sections in primiparous mothers. However, Pallasmaa et al. conducted a prospective cohort study in which the study participants were not merely primiparous mothers. Furthermore, in the current study, all emergency and elective C-sections were performed by a surgeon that can affect the surgical time.

In the present study, the time of the first intestinal discharge was similar in both emergency and elective C-section groups, and the difference between the two groups was not statistically significant. Chanrachakul et al. also showed that the duration of intestinal motility was similar in both groups (30). Based on the obtained findings of the current study, it was shown that there was no significant difference in the incidence of inflammation, redness, and surgical wound discharge between the two groups after elective and emergency C-sections.
Zahid et al. in their study showed that the rates of wound infection were 38.4% and 15.3% in the emergency and elective C-sections, respectively (31). The results of the aforementioned study are not in line with the findings of the current study. In the aforementioned study, the higher incidence of wound infection in emergency C-section was due to patients' poor hygiene, higher incidence of anemia, and postoperative health conditions.

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In addition, Suwal et al. reported that the rates of wound infection were 6.58% and 3.44% in the emergency and elective cases, respectively, which is inconsistent with the results of the current study (32). This paradox may be due to the fact that in the present study, only the primary C-sections were investigated; however, in the study conducted by Suwal et al., primary C-section was not an inclusion criterion. Moreover, in the study carried out by Suwal et al., the sample size was larger than that of the present study. Furthermore, in the current study, the ratio of elective to emergency C-sections is equal; nevertheless, this was not observed in the study by Suwal et al.

Conclusion

According to the obtained results of the current study, the rates of complications were higher in emergency C-section than those reported for elective C-section. Therefore, choosing the right type of delivery and timely planning for C-section can prevent these complications in emergency C-section. However, for better decision-making, it is recommended to carry out further prospective studies with a longer follow-up on the late complications of both emergency and elective C-sections.

One of the strengths of this study was the elimination of the confounding variable of previous C-section through the inclusion criterion of primiparity only. Moreover, in this study, unlike most previous studies, the numbers of emergency and elective C-section cases were equal, and all the operations were performed by one surgeon. This controls several factors affecting the outcome of the surgery, such as the skill and accuracy of the surgeon. In addition, the limitations of this study were the restriction of early complications of C-sections and short follow-up time. Therefore, it is suggested to carry out further prospective studies to compare the late complications of these two types of C-sections.

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This study was conducted after receiving the Ethics code (IR.UMSHA.REC.1397.962) from the Ethics Committee of Hamadan University of Medical Sciences, Hamadan, Iran. Written informed consent was obtained from the patients after a thorough explanation before any measures. In addition, the participants were free to withdraw from the study at any time.

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Conflicts of interest

Authors declared no conflicts of interest.

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