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ARAŞTIRMA YAZISI / RESEARCH ARTICLE

ACİL VE ELEKTİF SEZARYEN AMELİYATLARINDA MATERNAL VE NEONATAL SONUÇLARIN KARŞILAŞTIRILMASI: RETROSPEKTİF BİR ÇALIŞMA

COMPARISON OF MATERNAL AND FETAL OUTCOMES IN EMERGENCY AND ELECTIVE CESAREAN SECTIONS: A RETROSPECTIVE STUDY

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ÖZET

AMAÇ: Acil sezaryen, morbidite ve hatta mortalite ile ilişkili, yüksek riskli bir ameliyattır. Bu çalışma, elektif ve acil sezaryen doğumlarını anne ve yenidoğan sonuçları açısından karşılaştırmak amacıyla tasarlandı.

GEREÇ VE YÖNTEM: Bu, altı aylık bir süre boyunca miadında sezaryen ile canlı doğum yapan 1337 kadının kesitsel retrospektif bir incelemesidir. Acil ve elektif olarak iki gruba ayrıldı. Kadınların yaş, parite, sezaryen endikasyonları, sezaryen komplikasyonları ve kan transfüzyon ihtiyaçları karşılaştırıldı. Yenidoğanlar ise birinci ve beşinci dakika APGAR skorları, doğum ağırlıkları ve yenidoğan yoğum bakım ihtiyacı açısından karşılaştırıldı.

BULGULAR: Çalışma süresi boyunca 297 acil (%22,2) ve 1040 planlı (%77,8) sezaryenle doğum gerçekleşti. Acil sezaryen ile doğum yapan kadınların yaşı, gravidası ve paritesi anlamlı olarak daha azdı (sırasıyla p=0,001, p=0,023 ve p=0,001). Acil sezaryenle doğum yapan kadınlarda fetal distres ve kordon sarkması anlamlı olarak daha sık görülürken, daha önce sezaryen geçirmiş olma ve baş-pelvis uyumsuzluğu anlamlı olarak daha azdı (tümü için p=0,001). Acil sezaryen yapılan kadınlarda transfüzyon ihtiyacı, mesane yaralanması ve yara yeri enfeksiyonu anlamlı olarak daha yüksekti (sırasıyla p=0,001, p=0,001 ve p=0,014). Acil sezaryenle doğurtulan yenidoğanların doğum ağırlığı ve birinci dakika APGAR skoru anlamlı derecede düşük, yoğun bakım ihtiyacı ise anlamlı derecede yüksekti (sırasıyla p=0,002, p=0,009 ve p=0,001).

SONUÇ: Acil sezaryenler maternal ve yenidoğan komplikasyonlarını arttırmaktadır. Bu nedenle acil sezaryen gerektirecek durumlar mümkün olduğunca öngörülmeli ve spontan doğum eylemi başlamadan mümkün olduğunca erken yapılmalıdır.

ANAHTAR KELİMELER: Sezaryen, Acil, Elektif, Fetal, Maternal.

ABSTRACT

OBJECTIVE: Emergency cesarean section is a high-risk operation which is associated with morbidity and even mortality. This study has been designed to compare elective and emergency cesarean deliveries in aspect of maternal and neonatal outcomes.

MATERIAL AND METHODS: This is a retrospective cross-sectional review of 1337 women who had a live birth by cesarean section at term during a six-month-long period. Two groups were determined: emergency and elective. Women were compared in terms of age, parity, cesarean indications, cesarean complications, and blood transfusion needs. Newborns were compared in terms of APGAR score at first and fifth minute, birth weights, and neonatal intensive care needs.

RESULTS: There were 297 emergency (22.2%) and 1040 planned (77.8%) cesarean sections over the study period. The women who delivered by emergency cesarean section had significantly younger ages and lower gravidity and parity (p=0.001, p=0.023 and p=0.001, respectively). Fetal distress and umbilical cord prolapsus were significantly more frequent, while previous cesarean section and cephalopelvic disproportion were significantly less frequent in women who delivered by emergency cesarean delivery (p=0.001 for all). The need for transfusion, bladder injury, and wound infection was significantly higher in women who underwent emergency cesarean delivery (p=0.001, p=0.001 and p=0.014 respectively). The neonates delivered by emergency cesarean section had significantly lower birth weight and APGAR score at the first minute but a significantly higher need for an intensive care unit (p=0.002, p=0.009 and p=0.001, respectively).

CONCLUSIONS: Emergency cesareans increase maternal and neonatal complications. That is why , elective cesarean section should be performed as early as possible to avoid the onset of spontaneous labor which would require emergency cesarean delivery.

KEYWORDS: Cesarean Section, Emergency, Elective, Fetal, Maternal.

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INTRODUCTION

Cesarean section refers to the birth of a fetus by means of an incision on the abdominal wall which is then followed by an incision on the uterine wall (1). Currently, this combination of laparotomy and hysterotomy is the most commonly conducted surgery worldwide (2). That is, 20 million women undergo cesarean section every year (2, 3).

A Caesarean section can be classified as either "elective" or "emergency" (1, 2). An "elective" cesarean section refers to planned cesarean delivery which can be planned due to several indications including malpresentation, multiple pregnancies, maternal chronic diseases, fetal compromise, placenta previa, fetal macrosomia, previous shoulder dystocia and 3rd to 4th degree perineal trauma (4). Another indication for planned cesarean section is maternal request which can be due to a variety of reasons from previous traumatic birth to "maternal choice" (5).

On the other hand, an emergency cesarean section is usually carried out to overcome the failure in labor progression and/or fetal distress (6). Based on their urgency, emergency cesarean sections are categorized into three groups. Category 1 describes an immediate threat to maternal and/or fetal life whereas category 2 is defined as an impairment which is not immediately life-threatening for the mother and/or fetus. Category 3 prompts the need for an early cesarean section despite the absence of maternal and/ fetal compromise (7, 8).

In fact, emergency laparotomy is a dangerous operation which leads to morbidity in more than half of the patients. It has been reported that 30% to 50% of the patients who have emergency laparotomy experience inflammatory complications afterwards (9, 10). Compared with planned operations, emergency laparotomy is five times more likely to result in mortality within the first postoperative month. Sepsis, multi-organ failure, malignancy, cardiopulmonary diseases, and operative complications have been designated as the most common causes of morbidity (11, 12). Therefore, this study has been designed to compare elective and emergency cesarean deliveries in aspect of maternal and neonatal outcomes.

MATERIALS AND METHODS

The present study was approved by the Institutional Review Board and Ethical Committee of Umraniye Training and Research Hospital where it was undertaken between 01.04.2017 and 30.09.2017. Women who had birth by cesarean section at term in our clinic were included in the study. Women who had multiple pregnancies, placental insertion abnormalities and preterm births were excluded from the study.

A previous cesarean delivery group was selected. We performed a power of analysis with G Power® to define the minimum number of participants included in the study and 113 women were found to be necessary with a power of 80% according to the study published by Benzouina et all (13).

This is a retrospective cross-sectional review of 1428 women who had a live birth by cesarean section at term during the study period except those who were prenatally diagnosed with complications that would definitely result in adverse maternal and neonatal outcomes. After the exclusion of 46 women with multiple pregnancies, 13 women with placental insertion abnormalities, and 32 women who had preterm birth, a total of 1337 women were eligible. Elective cesarean section was the cesarean delivery which was performed before labor begins with regular contractions and cervical effacement and dilatation occur. It was made sure that preoperative preparations for a planned cesarean section had been completed at a previously determined time during the official workday. Any other cesarean delivery which was done after the beginning of labor and/or without pre-arrangement was considered an emergency.

Data related to age, gravidity, parity, gestational diseases, cesarean indications, intraoperative and postoperative complications were obtained from medical files. Data about gestational age at the time of cesarean section, birth weight, birth length, APGAR scores and need for neonatal intensive care unit were acquired from hospital records.

This study was produced from the thesis that I have formed during my residency in gynecology and obstetrics.

Ethical Committee

This study was approved by the Umraniye Training and Research Hospital Ethics Committee with decision number 114 dated 28.09.2017.

Statistical Analysis

Collected data were analyzed by Statistical Package for Social Sciences version 22.0 (SPSS IBM, Armonk, NY, USA). Continuous data were expressed as mean ± standard deviation whereas categorical data were denoted as numbers and percentages where appropriate. Kolmogorov-Smirnov test was adopted to test the normality of data distribution. Student t-test and chi square test were used for the comparisons. Two-tailed p values less than 0.05 were accepted as statistically significant.

RESULTS

There were 297 emergency (22.2%) and 1040 elective (77.8%) cesarean deliveries. The women who delivered by emergency cesarean section had significantly younger age, gravidity and parity (p=0.001, p=0.023 and p=0.001 respectively). Preeclampsia was significantly more frequent in women who had emergency cesarean birth (p=0.001). The women who underwent emergency and planned cesarean section were statistically similar with respect to gestational diabetes and gestational cholestasis (p=0.660 and p=0.552 respectively) **(Table1)**.

Table 1: Prenatal characteristics of the participants

	Emergency cesarean delivery (n=297)	Elective cesarean delivery (n=1040)	p
Age (years)	28.3±5.2	29.7±5.7	0.001*
Gravidity	2.3±1.1	2.7±1.5	0.023*
Parity	1.1±0.9	1.4±1.1	0.001*
Chronic disease	32 (10.8%)	86 (8.3%)	0.179
Preeclampsia	16 (5.4%)	2 (0.2%)	0.001*
Gestational diabetes	13 (4.4%)	52 (5.0%)	0.660
Gestational cholestasis	3 (1.0%)	7 (0.7%)	0.552

*p<0.05 was accepted to be statistically significant.

Fetal distress and umbilical cord prolapsus were significantly more frequent while previous cesarean section and cephalopelvic disproportion were significantly less frequent in women who delivered by emergency cesarean delivery (p=0.001 for all). General anesthesia was significantly more frequent and regional anesthesia was significantly less frequent in women who had emergency cesarean section (p=0.001 for both). Postoperative hemoglobin was significantly lower (p=0.005). The need for transfusion, bladder injury and wound infection were significantly higher in women who underwent emergency cesarean birth (p=0.001, p=0.001 and p=0.014 respectively). The women who had an emergency or planned cesarean section were statistically similar in aspects of malpresentation, preoperative hemoglobin, postoperative fever, atelectasis and paralytic ileus (p=0.060, p=0.760, p=0.629, p=0.629 and p=0.150 respectively) **(Table 2)**.

Table 2: Operative characteristics of the participants

	Emergency cesarean delivery (n=297)	Elective cesarean delivery (n=1040)	p
Fetal distress	227 (76.5%)	0 (0.0%)	0.001*
Previous cesarean delivery	49 (16.5%)	722 (69.4%)	0.001*
Malpresentation	16 (5.4%)	91 (8.8%)	0.060
Umbilical cord prolapsus	5 (1.7%)	0 (0.0%)	0.001*
Cephalopelvic disproportion	0 (0.0%)	227 (21.8%)	0.001*
General antesthesia	272 (91.6%)	683 (65.7%)	0.001*
Regional antesthesia	25 (8.4%)	357 (34.3%)	0.001*
Preoperative hemoglobin (g/dl)	11.5±1.2	11.5±1.3	0.760
Postoperative hemoglobin (g/dl)	10.3±1.2	10.6±1.3	0.005*
Need for transfusion	7 (2.4%)	4 (0.4%)	0.001*
Bladder injury	5 (1.6%)	1 (0.1%)	0.001*
Postoperative fever	2 (0.7%)	7 (0.7%)	0.629
Postoperative atelectasis	2 (0.7%)	7 (0.7%)	0.629
Paralytic ileus	11 (3.7%)	23 (2.2%)	0.150
Wound infection	17 (5.7%)	29 (2.8%)	0.014*

*p<0.05 was accepted to be statistically significant.

The neonates delivered by emergency cesarean section had significantly lower birth weight and APGAR score at the first minute but significantly higher need for intensive care (p=0.002, p=0.009 and p=0.001 respectively). The neonates delivered by emergency and elective cesarean section were statistically similar with respect to gestational age at cesarean section, birth length and APGAR score at the fifth minute (p=0.510, p=0.102 and p=0.162 respectively) **(Table 3)**.

Table 3: Postnatal characteristics of the participants

	Emergency cesarean delivery (n=297)	Elective cesarean delivery (n=1040)	p
Gestational age at delivery (weeks)	38.5±1.3	38.6±1.1	0.510
Birth weight (grams)	3247.8±438.2	3332.5±411.6	0.002*
Birth length (cm)	50.4±2.0	50.6±2.0	0.102
Apgar score at first minute	8.2±1.1	8.4±1.0	0.009*
Apgar score at fifth minute	9.6±0.7	9.6±0.7	0.162
Need for neonatal intensive care unit	45 (15.2%)	54 (5.2%)	0.001*

*p<0.05 was accepted to be statistically significant.

DISCUSSION

Cesarean section is a frequently used procedure today. Emergency cesarean delivery appears to be associated with complications such as bladder injury, wound infection, need for transfusion and referral to neonatal intensive care. The aim of the study is to evaluate possible complications in emergency cesarean sections.

Cesarean section has been traditionally regarded as an obstetric intervention which helps to overcome maternal and fetal complications

(2). Despite its advantages, cesarean section is a major surgery which might cause significant morbidity (2, 3). Nevertheless, the incidence of cesarean section has considerably increased worldwide during the last two decades (14). Thus, various guidelines have been put forward to specify the optimal timing for cesarean birth. These guidelines recommend that the timing of elective cesarean birth should correspond to 39th to 40th weeks of gestation (8, 15). If there is any obstetric or medical necessity for earlier delivery, an emergency cesarean section is performed. However, the urgency of cesarean birth has been designated as a significant risk factor for operation-related morbidity (16).

A Moroccan study revealed that 24.2% of the cesarean deliveries were elective and 75.8% of them were emergency sections (13). Similarly, a Nigerian study reported that 19.4% of the cesarean deliveries were planned and 80.6% of them were emergency procedures (17). In contrast, the rate of elective cesarean section was 77.8% and the rate of emergency cesarean section was 22.2% in this study. This finding resembles that of a Crotian study which found out that 48% of the cesarean deliveries were planned and 52% of them were emergency sections (18). Another Australian study indicated that 35.8% of cesarean deliveries were elective and 64.2% of them were emergency procedures (19). In our study, previous cesareans were included in the elective group unless there were regular contractions and cervical dilatation. For this reason, previous cesareans were found at a rate of 16.5% in our emergency group and 69.4% in our elective group. This may explain why our emergency cesarean section rate is lower compared to the literature.

It can be hypothesized that the rate of planned cesarean section increases as prenatal follow-up becomes more prevalent. That is, pregnant women who are keener on keeping up with their prenatal follow-up are more likely to accept planned cesarean section (13). A body of evidence for this hypothesis is the significant relationship between younger age and emergency cesarean delivery as demonstrated by previously published studies (13, 20). Accordingly, the women who delivered by emergency cesarean section were significantly younger than the women who had elective cesarean section in this study.

Preeclampsia is a hypertensive disorder of pregnancy which is definitively treated by delivery. Preeclampsia has not been conventionally labeled as an indication for cesarean birth, but emergency cesarean delivery is preferred in case preeclampsia occurs before term pregnancy which is usually accompanied with an unfavorable cervix. Consequently, it would be prudent to expect significantly higher frequency of hypertensive disorders of pregnancy in women undergoing emergency cesarean section (21). As for the present study, the rate of preeclampsia was significantly higher in women who had emergency cesarean birth.

Emergency cesarean section is carried out whenever proceeding with pregnancy could impair maternal and neonatal well-being. Therefore; fetal distress, dystocia and previous cesarean birth in labor have been addressed as the most frequent indications for emergency cesarean delivery (13, 22). On the contrary, Elvedi-Gasparovic et al. (18) highlighted the most common indication of emergency cesarean section as preeclampsia. As for the present study, fetal distress and umbilical cord prolapsus were significantly more frequent in women who underwent emergency cesarean section. Elective cesarean section is planned in case better maternal or fetal outcomes are anticipated by avoiding vaginal delivery. The most common indications for planned cesarean section consist of prior cesarean birth, fetal malpresentation, and macrosomia (13, 18, 23). In this study, previous cesarean delivery and cephalopelvic disproportion were significantly more frequent in those had elective cesarean birth.

Women who have emergency cesarean section are more likely to experience more severe morbidity and higher mortality rates than those who are to undergo either planned vaginal delivery or elective cesarean section (24). A case-control study identified emergency cesarean birth as a risk factor for bladder injury. That is, the risk for bladder injury nearly tripled in emergency cesarean birth when compared to elective section (25). In literature, emergency cesarean section has been associated with pel-

vic organ injury, bleeding, need for blood transfusions, wound site problems, and longer hospitalization (24, 26). Complyingly, bladder injury, wound infection and the need for transfusion were significantly higher in women who underwent emergency cesarean birth in this study.

Adverse neonatal outcomes that have been identified in relation with emergency cesarean birth include asphyxia, respiratory disorders, persistent pulmonary hypertension, need for intensive care and delayed adaptation to breastfeeding (21, 27). Newborns delivered by emergency cesarean section are more likely to have first-minute APGAR score <7 and admission to an intensive care unit (21). A significant increase in mortality rate has also been observed in neonates born through emergency cesarean section (16, 27). Similarly, the neonates delivered by emergency cesarean section in this study had significantly lower APGAR scores at the first minute but significantly higher need for intensive care.

In conclusion, emergency cesarean delivery appears to be associated with perinatal complications such as bladder injury, wound infection, need for transfusion and referral to neonatal intensive care. That's why, elective cesarean section should be carried out as early as possible to avoid the onset of spontaneous labor which would require emergency cesarean delivery. The obstetrician should balance the potential risks and benefits during the decision-making process for the timing of cesarean delivery. Moreover, pregnant women should be encouraged to maintain their pregnancy follow up visits regularly as meticulous prenatal care can provide an opportunity for reducing pregnancy complications which may require emergency cesarean section.

The findings of the present study should be interpreted carefully as their power is limited by retrospective study design, relatively small cohort size, lack of longitudinal data and selection bias caused by the inclusion and exclusion criteria for patients. The strengths of the study are that it was conducted in a tertiary center and many maternal and fetal parameters were evaluated. Further research has been warranted to clarify how the urgency of cesarean delivery affects maternal and neonatal outcomes.

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