Comparison of Maternal and Neonatal Outcomes in Elective and Emergent Placenta Previa Operations

Elektif ve Acil Plasenta Previa Ameliyatlarında Maternal Ve Neonatal Sonuçların Karşılaştırılması

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ABSTRACT

Objectives: The purpose of this study was to compare maternal and fetal outcomes between planned and emergent placenta previa operations.
Methods: Patients who underwent cesarean section for placenta previa were included in the study between January 2018 and January 2019 at tertiary center, retrospectively. Patients were divided into two groups as planned cesarean delivery and emergent cesarean delivery. Maternal characteristics, maternal and neonatal outcomes were compared.
Results: Of the 84 patients with placenta previa, 36 (43%) were in the planned group, and 48 (57%) were in the emergent cesarean delivery group. There were no significant differences in the transfusion rates, operation time, length of hospital stay, hemostasis procedures, intraoperative complications between planned and emergency deliveries. Lower birth weight and higher neonatal intensive care unit acceptance were detected in the emergent cesarean delivery group due to earlier gestational week of delivery (34±2.4 vs. 36±2.3 $p < 0.001$). There was no statistically significant difference in hysterectomy rates performed due to the placental accreata spectrum between the two groups.
Conclusions: In conclusion, emergency cesarean delivery for women with placenta previa by an experienced multidisciplinary team in a tertiary center with adequate resources is not associated with increased maternal morbidity in terms of transfusion rate, hospital stay, and intraoperative complications. Planned cesarean delivery at 37 0/7 -37 6/7 gestational weeks may be considered in the absence of significant antenatal bleeding or other risk factors.

Keywords: Caesarean section, morbidity, placenta previa, placentation, pregnancy, prenatal care

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ÖZET

Amaç: Çalışmamızın amacı, planlı ve acil plasenta previa ameliyatları arasında maternal ve fetal sonuçları karşılaştırmaktır.
Yöntem: Ocak 2018-Ocak 2019 tarihleri arasında, tersiyer merkezde, plasenta previa nedeniyle sezaryen ile doğum yapan hastalar çalışmaya retrospektif olarak dahil edildi. Hastalar planlı sezaryen ve acil sezaryen olmak üzere iki gruba ayrıldı. Maternal özellikler, maternal ve neonatal sonuçlar karşılaştırıldı.
Bulgular: Plasenta previalı 84 hastanın 36'sı (%43) planlı sezaryen grubunda, 48'i (%57) acil sezaryen grubundaydı. Planlı ve acil doğumlar arasında transfüzyon oranları, operasyon süresi, hastanede kalış süresi, hemostaz prosedürleri, intraoperatif komplikasyonlar açısından anlamlı fark izlenmedi. Acil sezaryen ile doğum yapan grupta, doğum haftasının daha erken olması nedeniyle (34±2.4 - 36±2.3 $p < 0.001$), daha düşük doğum ağırlığı ve daha yüksek oranda yenidoğan yoğun bakım ünitesi kabulü saptandı. İki grup arasında plasental akreata spektrumu nedeniyle yapılan histerektomi oranlarında istatistiksel olarak anlamlı fark saptanmadı.
Sonuç: Sonuç olarak, yeterli imkanlara sahip üçüncü basamak merkezde, deneyimli multidisipliner bir ekip tarafından gerçekleştirilen plasenta previa nedenli acil sezaryen ameliyatlarında, transfüzyon oranı, hastanede kalış süresi ve intraoperatif komplikasyonlar gibi maternal morbiditelerde artış izlenmemektedir. Plasenta previa tanılı hastalarda, ciddi antenatal kanama veya diğer risk faktörlerinin yokluğunda, 37 0/7 -37 6/7 gebelik haftalarında planlı sezaryen düşünülebilir.

Anahtar Sözcükler: Doğum öncesi bakım, gebelik, morbidite, plasenta previa, plasentasyon, sezaryen

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INTRODUCTION

Placenta previa (PP) occurs in approximately 4 to 5 of every 1,000 pregnancies at term (1-3). The main risk factors are a higher number of previous cesarean deliveries, previous abortions, parity, maternal age, cocaine use, and smoking (4-6). Maternal hemorrhage is the most serious maternal complication, while prematurity is the primary fetal complication. Adverse pregnancy outcomes increase in the case of the placenta accreta spectrum (PAS) (7-10).

Most guidelines recommend delivery between 36+0 and 37+0 weeks of gestation to women presenting with uncomplicated placenta previa. However, there was also a recent study suggesting expectant management until 36 weeks of gestation even in the placenta accreata spectrum, for asymptomatic women (11). Women who have placenta previa, a low-lying placenta, a history of vaginal hemorrhage, or other preterm birth risk factors should consider having a late preterm delivery, according to the RCOG (12).

Optimization of delivery time in placenta previa continues to be debated because of its multifactorial components, such as risk of preterm birth, maternal morbidities, or surgeon experience. The aim of this study was to compare maternal and neonatal outcomes between planned and emergent placenta previa operations.

METHODS

This was a retrospective cohort study conducted in Zekai Tahir Burak Women's Health Education and Research Hospital in Ankara, Turkey, from January 2018 to January 2019. Institutional Review Board approved the study (ID: 24/2019). Eighty-four patients who had been diagnosed with placenta previa were analyzed. The placenta previa is defined as the complete or partial covering of the internal os of the cervix with the placenta, using transvaginal ultrasonography (Voluson730 Expert Sonography) (13). Multiple pregnancies, major congenital anomalies, or missing data on delivery timing were excluded from the analyses.

Patients were divided into two groups: 1) planned cesarean delivery (PCD) and 2) emergent cesarean delivery (ECD). The PCD group consisted of 36 patients who were hospitalized and had undergone a cesarean section on a planned date without any vaginal bleeding or before uterine contractions began. Any findings of abnormal invasion were examined using transvaginal ultrasound, and hemoglobin levels were checked to be above 10 mg/dl before the operation. Cases with suspicion of the placenta accreata spectrum were excluded from the study. The birth week was planned according to the American College of Obstetricians and Gynecologists' (ACOG) suggestion at 36^0 to 37^6 weeks of gestation (14). Patients intraoperatively diagnosed with placenta percreta were treated with a fundal vertical uterine incision and no attempt was made to remove the placenta to prevent excessive bleeding from the placental invasion site. The ECD group consisted of 48 patients who underwent cesarean section because of excessive vaginal bleeding or uterine contractions. Patients presenting with other conditions such as preeclampsia and placental abruption that can indicate the need for emergent cesarean delivery were excluded from the study. Bakri balloon, hemostatic square suture procedures, or both were used for hemostasis.

Maternal characteristics, pregnancy outcomes such as gestational age at delivery, transfusion of blood products, intraoperative complications (e.g., bladder injury), maternal postoperative length of hospital stay, and neonatal outcomes were compared between the two groups.

Statistical analysis was performed with SPSS version 21.0 (Chicago, IL, USA). Continuous data were given as mean +/- SD, median, and percentages for categorical data. Normality tests, including visual (histograms, probability plots) and analytical methods (Kolmogorov-Smirnov test), were used to determine whether variables were normally distributed or not. When applicable, the Mann-Whitney U test and the independent t-test were used to compare continuous variables.. Chi-squared analysis and Fisher's exact test were used to compare categoric outcomes as appropriate. A p-value of < 0.05 was considered significant.

RESULTS

Of the 84 patients with placenta previa in our study, 36 (43%) were in the PCD group and 48 (57%) were in the ECD group. Maternal characteristics are presented in Table 1.

Table 1. Comparison of two group characteristic

(N=84)	Elective (n=36)	Emergent (n=48)	P value*
Age	31,2±5,2	32±4,9	p=0,50
Gravida	3 [1-6]	3 [1-9]	p=0,68
Parity	1 [0-4]	1 [0-4]	p=0,44
Abortus	0 [0-2]	0 [0-3]	p=0,50
D&C	0 [0-3]	0 [0-2]	p=0,51
Cesarean	0 [0-4]	0 [0-4]	p=0.75
BMI	30,7±4,8	28,2±4,8	**p=0,02**

BMI; body mass index, D&C; dilation curettage
p-Value < 0.05 indicates significant difference

The ECD group had an earlier gestational age at delivery (34±2.4 vs. 36±2.3 p < 0.001). No significant difference was seen in the number of blood units transfused, fibrinogen levels, operation time, and postoperative length of hospital stay between patients who underwent planned versus emergency delivery. Bakri balloon, hemostatic square suture, or both were used for bleeding control. There were no significant differences in hemostatic procedure between the planned and emergency operation. Comparison of maternal and intraoperative complications compared in Table 2 between elective and emergent cesarean delivery groups. All hysterectomy operations were performed due to placental invasion anomaly (Table 2).

Table 2. Comparison of maternal and intraoperative complications between elective and emergent cesarean delivery groups

(N=84)	Operation groups		p value
	Elective (n=36)	Emergent (n=48)	
Gestational age of delivery (w)	36±2.3	34±2.4	**p<0.001**
Preoperative hb (g/dL)	12.2 ±1.1	11.2 ±1.3	**p=0.001**
Postoperative hb (g/dL)	11.1 ±1.2	10.3 ±1.8	**p=0.012**
Total ES transfusion (U)	0.3 ±0.7	0.4 ±2.1	p=0.26
FFP (U)	0.3 ±0.8	0.5 ±1.6	p=0.34
Post-op fibrinogen (mg/dL)	401±101	361±109	p=0.08
Operation time (min)	74±38	79±42	p=0.53
Post-op hospital stay (day)	3.1±1.5	3.6±2.1	p=0.24
Hemostasis procedure, n (%)	12 (33)	20 (41)	p=0.50
Bakri balloon	7 (58)	10 (50)	
Hemostatic square suture	3 (25)	3 (15)	
Bakri B.+square suture	2 (17)	7 (35)	
Intraoperative comp.			
Bladder injury n(%)	1 (3)	5 (10)	p=0.23
Hysterectomy n(%)	3 (8)	7 (14)	p=0.50

ES, erythrocyte suspension; FFP, fresh frozen plasma
p-Value < 0.05 indicates significant difference

Placenta accreta spectrum rates were 8% and 14% in the planned and emergency delivery groups, respectively, which were identified in the pathology specimens of all hysterectomy cases (Table 3). There was no difference in hysterectomy rates between the two groups (p = 0.50).

Table 3. Analysis of hysterectomy and patology results between elective and emergent cesarean delivery groups

	Operation groups		
	Elective	Emergent	
Hysterectomy. n (%)	3 (%30)	7 (%70)	p=0.50
Pathology			**Total n (%)**
Accreata, n (%)	1 (%34)	0	1 (%10)
Increata, n (%)	0	2 (%29)	2 (%20)
Percreata, n (%)	2 (%66)	5 (%71)	7 (%70)

p-Value < 0.05 indicates significant difference

To compare neonatal outcomes, lower birth weights (3017 vs. 2460, p < 0.001) and higher NICU acceptance rates (16% vs. 48%, p < 0.001) were detected in the ECD group. One- and five-minute Apgar scores were similar between the two groups (p = 0.06, p = 0.08) (Table 4).

Table 4. Comparison of neonatal outcomes between elective and emergent cesarean delivery groups

(N=84)	Operation group		p value
	Elective (n=36)	Emergent (n=48)	
Birth weight (gr)	3017 [430-4220]	2460 [1300-4840]	**p<0.00**
1.mn apgar	7 ±1	6 ±1	p=0.06
5.mn apgar	9 ±1	8 ±2	p=0.08
NICU accp. n (%)	6 (16%)	26 (44%)	**p=0.001**

NICU, neonatal intensive care unit
p-Value < 0.05 indicates significant difference

DISCUSSION

In this study, we demonstrated transfusion rates, severe maternal morbidity, and intraoperative complications for emergent placenta previa operations are not significantly higher than planned previa operations in a tertiary center. Our results also showed planned cesarean delivery at 37 0/7 -37 6/7 gestational weeks may be considered in the absence of significant antenatal bleeding or other risk factors Although more women had lower postoperative hemoglobin levels in the emergency operations group, it may be associated with more severe preoperative anemia compared to the planned cesarean delivery group. However, the time of delivery may vary if there is a suspicion of placental invasion anomaly.

In cases with uncomplicated placenta previa, ACOG and the Society for Maternal-Fetal Medicine recommend cesarean delivery between 36^0 and 37^6 weeks of gestation (14, 15). Delaying a cesarean delivery for placenta previa until 36^0 to 36^6 weeks gestation when risk factors are present and until 37^0 to 37^6 weeks gestation in the absence of risk factors is also safe, according to recent studies (16, 17). Crane et al. demonstrated, referring patients with placenta previa to tertiary centers would be appropriate in the third trimester since previa operations are known to accomplish severe complications such as excessive maternal blood loss and blood bank support, hysterectomy, admission to an intensive care unit, sepsis, and maternal death (1, 18, 19). Preoperative preparation should be organized such as correction of preoperative anemia, since maternal anemia is known to be associated with low birth weight, preterm birth, and postpartum hemorrhage (20, 21).

The Bakri balloon, hemostatic square sutures, and hysterectomy can be used for hemostasis in the case of excessive bleeding in placenta previa, and especially in the placenta accreta spectrum. Hemostatic square sutures and the Bakri balloon were used in 17% of the patients in the PCD group and 35% of the patients in the ECD group. Giambattista et al. analyzed the surgical outcome of 247 women who underwent operations for placenta previa and found that 28% of the patients required additional surgical hemostatic procedures, including hysterectomy, with the most frequent being placental bed stitches (22).

All patients should be especially assessed for invasive placentation if they have placenta previa in the present pregnancy and a history of cesarean section, which increases the risk of placenta accreta spectrum. (23). The previa operation was planned using a multidisciplinary approach and accounting for the availability of an experienced team for the placenta previa operations, the presence of full blood banks, and interventional radiology, which have all been proven to reduce maternal mortality and morbidity in the case of PAS (24-26). We found that the rate of hysterectomy did not significantly different in the ECD group compared to the PCD group (14% vs. 8%). In the pathological examination of the hysterectomy specimens, placenta percreta was detected in 70% of the cases in the ECD group. Durukan et al. examined 137 emergency PP operations, and PAS was detected in 65% of the emergency PP cases; the rate of emergency previa operations on patients who had also undergone hysterectomy was found to be 19%, which is consistent with our study (27). A multidisciplinary approach is associated with better maternal outcomes, especially in patients with increta or percreta, compared to a classic non-multidisciplinary approach (25, 26, 28-30). Nevertheless, our study found lower hemorrhagic complications in planned cesarean section surgeries, as Shamshirsaz et al. concluded in their multicenter study (30).

For adverse neonatal outcomes, the main risk factor is prematurity which is consistent with low birth weights and NICU acceptance rates due to earlier age of delivery in emergency cases. While the NICU admittance rate was much greater in the ECD group, the gestational ages and birth weights were significantly lower. The primary factor causing neonatal morbidity and mortality was prematurity. Moreover, an increased risk of intrauterine fetal growth restriction is detected in fetuses of placenta previa (31). As expected, planned cesarean delivery had better neonatal complications due to delivery at a later gestational time and higher birth weight.

The strength of our study is the inclusion of PP cases delivered due to excessive vaginal bleeding or uterine contractions. Fetal distress without vaginal hemorrhage, ablatio of the placenta, and other reasons for isseminated intravascular coagulation (DIC) were excluded from the study to reduce selection bias. Our study has certain limitations, such as its retrospective design and the fact that it was conducted among a relatively small number of patients. Multicenter cohort studies with a larger sample size are needed.

Emergency cesarean delivery for women with placenta previa by an experienced multidisciplinary team in a tertiary center with adequate resources is not associated with increased maternal morbidity in terms of transfusion rate, hospital stay, and intraoperative complications. These findings suggested deferring cesarean delivery until 37 weeks gestation may be safe in case of uncomplicated placenta previa. The optimal timing of delivery principle is avoiding emergency delivery as far as possible and decreasing prematurity related to earlier delivery. This approach could thus be beneficial to improve neonatal outcomes by preventing prematurity and decreasing neonatal intensive care unit acceptance rates.

Conflict of interest

No conflict of interest was declared by the authors.

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