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Risk Factors and Outcomes of Placental Abruption: Evaluation of 53 Cases

Plasenta Dekolmanının Risk Faktörleri ve Sonuçları: 53 Olgunun Değerlendirmesi

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Abstract

Aim: The aim of this study was to evaluate the risk factors and maternal-perinatal outcomes in patients with placental abruption attending a non-tertiary center.

Methods: Fifty-three patients with placental abruption and 147 individuals with non-placental abruption were compared retrospectively. Age, gravidity, parity, concomitant medical problems (preeclampsia, hypertension, and diabetes), previous history of cesarean section and presence of proteinuria were compared between the groups. Multiple regression analysis was performed to determine risk factors for placental abruption. A p value of less than 0.05 was considered statistically significant.

Results: The incidence of preterm delivery, need for intensive care unit for the newborn, peripartum mortality and low Apgar score was higher in the group with placental abruption (p<0.05). The incidence of preeclampsia, longer length of hospital stay, complications (especially disseminate intravascular coagulation), proteinuria and blood product transfusion was higher in the placental abruption group (p<0.05). Previous cesarean delivery, preeclampsia, concomitant medical problems and proteinuria were the risk factors for placental abruption (p<0.05).

Conclusion: Pregnancy-related hypertensive disorders and previous cesarean section increase the risk of placental abruption. Placental abruption is associated with serious maternal and perinatal morbidity.

Keywords: Complications, morbidity, perinatal morbidities, placental abruption

Öz

Amaç: Bu çalışmanın amacı non-tersiyer bir merkezdeki plasental dekolman olgularını inceleyerek risk faktörleri ile maternal ve perinatal sonuçları araştırmaktır.

Yöntemler: Retrospektif olarak 53 olgu ile plasental dekolman olmayan 147 olgu incelendi. Yaş, gravida, parite, eşlik eden medikal durumlar (preeklampsi, hipertansiyon, diabetes mellitus), önceki sezaryen öyküsü, proteinüri oranları iki grup arasında karşılaştırıldı. Yine maternal ve perinatal sonuçlar iki grup arasında karşılaştırıldı. Multipl regresyon analizi ile risk faktörleri araştırıldı. İstatistiksel olarak p değerinin 0,05 altında olması anlamlı kabul edildi.

Bulgular: Plasental dekolman olan grupta prematürite, yenidoğan yoğun bakım ihtiyacı, peripartum mortalite ve düşük Apgar skoru oranı daha fazla idi (p<0,05). Yine dekolman olan grupta eski sezaryen oranı, preeklampsi, hastanede yatış süresi, özellikle dissemine intravasküler koagülopati başta olmak üzere komplikasyon oranları, idrarda proteinüri oranı ile transfüzyon oranları daha fazla idi (p<0,05). Eski sezaryen olması, preeklampsi ve ek morbiditenin olması ile proteinüri varlığının preeklampsi riskini artırdığı görüldü (p<0,05).

Sonuç: Gebeliğin hipertansif hastalıkları ve eski sezaryenlı olmak plasental dekolman riskini artırmaktadır. Plasenta dekolmanı ciddi perinatal ve maternal morbidite ile ilişkilidir.

Anahtar Sözcükler: Komplikasyon, morbidite, perinatal morbidite, plasental ablasyon

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Introduction

Placental abruption is the early detachment of the placenta from the uterine wall and is associated with serious maternal and perinatal morbidity and mortality (1). Virtually, 50% of perinatal mortalities occur due to placental abruption and associated preterm deliveries (2). In addition, 20-25% of them is related to antepartum hemorrhage and is associated with disseminated intravascular coagulopathy, renal failure, postpartum hemorrhage and hysterectomy, shock and maternal mortality (3-6). Among adverse fetal outcomes, low birth weight, premature birth, intrauterine growth retardation, birth asphyxia, fetal distress, low Apgar score, congenital anomalies, need for newborn intensive care and perinatal mortality are associated with placental abruption (3,5-9).

Many factors associated with placental abruption have been described, including history of placental abruption, advanced maternal age, history of cesarean section (C/S), chronic hypertension, smoking, short interpregnancy interval, multiple pregnancy and abdominal trauma (1,10-13). Furthermore, several factors, such as low socioeconomic status and irregular antenatal care visits have been reported to be associated with placental abruption (8).

Our aim was to evaluate the risk factors and maternal-perinatal outcomes in patients with placental abruption attending a non-tertiary center.

Methods

In this study, records of 53 placental abruption cases in the Gynecology and Obstetrics Clinic at Batman Maternity and Child Hospital between September 2014 and October 2015 were retrospectively evaluated. The diagnosis of placental abruption was made with ultrasound and examination of the patients. This study was conducted with the permission of local committee of Batman Maternity and Child Hospital with number of 87823073/929 dated February 18, 2016.

A total of 147 patients who gave birth in the same period but had no placental abruption were randomly selected as the contro group. The two groups were compared in terms of age, gravidity, parity, diagnosis, previous C/S, additional morbidity (chronic hypertension and diabetes mellitus), mode of delivery, length of hospital stay, rates of referral to an advanced center, complications, antenatal follow-up duration, induction, infant weight, Apgar score, rate of admission and length of stay in the newborn intensive care unit, difference between preoperative and postoperative hemoglobin levels, protein levels in the urine and the transfusion need. In addition, factors increasing the risk of placental abruption were investigated.

Statistical Analysis

Statistical analysis was performed using the SPSS for Windows v.11.5 software. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to determine whether the normality of our data was appropriate. A chi-square test was used for comparison of the two groups in terms of the mode of delivery, additional morbidity, previous C/S, preterm delivery, transfusion, rate of newborn intensive care unit admission, and perinatal mortality and protein level in the urine. Age, length of hospital stay, complications, infant weight, difference between preoperative and postoperative hemoglobin values were compared between the groups using the Student's t-test, antenatal care follow-up duration, gravidity and parity, Apgar scores and mean transfusion amount were compared using the Mann-Whitney U test. Univariate logistic regression analysis was used to investigate the factors increasing the risk of placental abruption. A p value of less than 0.05 was considered statistically significant.

Results

Between September 2014 and October 2015, there were 7973 deliveries, including 5813 vaginal deliveries and 2160 C/Ss in our center. The incidence of placental abruption was 0.66% during this period. Comparisons between the two groups are given in Table 1. The mean age of patients was 27.92 years in the control and 31.66 years in the abruption groups ($p<0.001$). The mean number of gravidity and parity was higher in the abruption group, although the difference was not statistically significant ($p>0.05$). The rates of preterm delivery and previous C/S were higher in the group with placental abruption ($p<0.05$). The rate of clinical circumstances causing additional morbidity, in particular preeclampsia, was higher in the abruption group ($p<0.05$). When additional morbidities were examined, hypertension was seen in seven patients and diabetes mellitus in three patients in the abruption group, while hypertension was found in seven patients, diabetes mellitus in one patient and cardiac pathology in one patient in the control group. All the patients in the abruption group had undergone delivery by C/S and the length of hospital stay was longer in this group ($p<0.05$). Seven patients in the abruption group had complications whereas no complication was seen in the control group ($p<0.001$). The complications included disseminated intravascular coagulopathy in three patients, eclamptic attack in one patient, cervical rupture in one patient, hematoma in the wound site in one patient and uterine torsion in one patient. In addition, it was seen that infant weight and Apgar scores both at 1st and 5th minutes were lower, the rate of hemoglobin decrease, protein leakage into the urine and transfusion rate and amount

were higher in the abruption group (p<0.05). Fourteen infants were admitted to the newborn intensive care unit and perinatal mortality occurred in three patients in the abruption group, while perinatal mortality and newborn intensive care unit admission were not observed in the control group (p<0.05). One patient in the abruption group was referred to an advanced center and developed abruption and disseminated intravascular coagulopathy following severe preeclampsia.

One unit increase in age increased the risk of abruption by 7.8%, while previous C/S increased the risk of abruption by 3.619 fold, history of preeclampsia by 14.541 compared to those who had no additional morbidity, presence of additional disease by 2.721 fold and presence of proteinuria by 5.924 fold (p<0.05). However, no statistically significant effect of gravidity and parity was found on the presence of abruption (p>0.05). Premature delivery was associated with increased risk of placental abruption by 26.476 fold (p<0.05) (Table 2).

Discussion

This retrospective study indicated that placental abruption is a clinical entity leading to perinatal and maternal morbidity and mortality with catastrophic

Table 1. Comparison of control and abruption groups

	Control (n=147)	Abruption (n=53)	p
Age (year), (mean ± SD)	27.92±6.52	31.66±8.00	0.00[a]
Gravida, [median (IQR)]	3.18±2.29	3.25±2.59	0.825[b]
Parity, [median (IQR)]	2.05±2.17	2.25±2.59	0.988[b]
Term gestation, n (%) Preterm gestation, n (%)	139 (94.6%) 8 (5.4%)	21 (39.6%) 32 (60.4%)	0.001[c]
Number of previous cesarean sections, n (%)	11 (7.5%)	12 (22.6%)	0.003[c]
Additional morbidity, n (%)			
No	127 (86.4%)	28 (52.8%)	0.001[c]
Preeclampsia	5 (3.4%)	16 (30.2%)	
Other	15 (10.2%)	9 (17.0%)	
Cesarean rate, n (%)	27 (18.4%)	53 (100.0%)	0.001[c]
Duration in hospital (days), (mean ± SD)	1.18±0.39	2.43±0.89	0.001[a]
Rate of referral to advanced center (%)	0 (0.0%)	1 (1.9%)	-
Complication rate n (%)	0 (0.0%)	7 (13.2%)	0.001[d]
Number of antenatal visits, [mean ± SD (median)]	2.25±1.91 (2)	2.98±2.95 (2)	0.370[b]
Healthy newborn, n (%)	147 (100.0%)	36 (67.9%)	0.001[c]
NBIC rate, n (%)	0 (0.0%)	14 (26.4%)	
Perinatal mortality, n (%)	0 (0.0%)	3 (5.7%)	
Duration in NBIC (days), (mean ± SD)	-	13.64±8.42	-
Infant weight (gr), (mean ± SD)	3358±414	2558±962	0.001[a]
Apgar 1, [median (min.-max.)]	7.82±0.58	5.53±3.06	0.001[b]
Apgar 5, [median (min.-max.)]	8.920.34	7.21±3.33	0.009[b]
Hemoglobin difference, (mean ± SD)	0.99±0.62	1.75±0.92	0.001[a]
Proteinuria, n (%)			
No	137 (93.2%)	37 (69.8%)	0.001[c]
Yes	10 (6.8%)	16 (30.2%)	
1+	5 (3.4%)	4 (7.5%)	
2+	3 (2.0%)	6 (11.3%)	
3+	2 (1.4%)	6 (11.3%)	
Transfusion amount (unit), [median (min-max)]	0 (0-2)	0 (0-10)	0.001[b]
No transfusion, n (%) Transfusion, n (%)	143 (97.3%) 4 (2.7%)	29 (54.7%) 24 (45.5%)	0.001[c]

[a]t-test, [b]Mann-Whitney U test, [c]Chi-squared test , [d]Fisher-exact test, NBIC: Newborn intensive care, IQR: Interquartile range, SD: Standard deviation, min: Minimum, max: Maksimum

Table 2. Factors increasing risk of abruption

	OR	95% CI	p	Logistic regression p
Age	1.078	1.030-1.129	0.001	0.001
Gravida	1.011	0.886-1.154	0.871	0.871
Parity	1.037	0.906-1.187	0.601	0.603
Previous cesarean	3.619	1.487-8.808	0.005	0.008
Additional morbidity	-	-	-	0.00
Preeclampsia	14.514	4.908-42.926	0.001	-
Other	2.721	1.082-6.844	0.033	-
Proteinuria	5.924	2.483-14.134	0.001	0.00

Univariate logistic regression analysis, OR: Odds ratio, CI: Confidence interval Previous cesarian variable, the reference category is "0 - NO". Additional morbidity variable, the reference category is "0 - NO". The reference category of the proteinuria variable is "0 - NO"

outcomes. Especially hypertensive diseases of gestation, additional morbidities, previous history of C/S and advanced maternal age increased the risk of abruption and there was a significant correlation between premature delivery and placental abruption.

The reported incidence of placental abruption varies between 0.3% and 1% in the literature (10-12). In our study, this rate was 0.66%. Different rates in the studies may result from the populations, study design and diagnostic criteria (8). The population living in this region where this study was conducted is known to have a relatively low socio-economic status. Home birth is common in this region due to insistence of persons on vaginal birth and even labor induction or augmentation at home is performed by non-medical persons (14,15). As a result, women may present to clinics with several obstetric complications such as abruption or uterine rupture (15). The association between hypertensive disease and placental abruption is known. Correlation of placental abruption with both chronic hypertension and preeclampsia has been clearly established (8,16-19). Similarly, in our study an association of both chronic hypertension and preeclampsia with abruption was seen, consistent with the literature ($p<0.05$).

In the present study, a relationship was found between proteinuria and abruption ($p<0.05$). However, the correlation of the degree of hypertension, preeclampsia or proteinuria with abruption was not investigated. In our study, we observed that preeclampsia, other morbidities (chronic hypertension and diabetes mellitus) and proteinuria were associated with about 14 fold, 3 fold and 6 fold increased risk of abruption, respectively.

In this study, we found that another factor associated with placental abruption was a history of C/S. The incidence of placental abruption was increased by 3.6 fold in patients who previously underwent cesarean delivery ($p<0.05$). In the literature, the risk ratio is generally lower than the risk found in our study (8,13). However, there are publications reporting that previous C/S increased this risk by 7 to 10 fold (8). It is noteworthy that unlike the studies reporting low risk, studies reporting higher risk are those conducted among populations of lower socio-economic status. The risk of placental abruption in patients with a history of C/S has been argued to result from the dehiscence of the scar line and thinning of the scar area (8).

It is known that the risk of placental abruption increases with parity (8,17,20,21). However, in the present study, the risk of placental abruption was not correlated with increased parity ($p>0.05$). Similarly, in their study, Sanchez et al. (16) reported no association between high parity and placental abruption. Lack of a relationship between parity and abruption could be explained by several factors. First, the small number of placental abruption cases in that study might have affected the results. On the other hand, fertility is high in the society where this study was performed and the number of people who give birth at an advanced age is also great. Supporting this, we found that age did not increase the risk of abruption ($p<0.05$).

Previous studies have reported that placental abruption was associated with severe perinatal maternal complications (3,22,23). These complications may include postpartum hemorrhage, disseminated intravascular coagulopathy, blood product transfusion, uterine atonia, increased need for newborn intensive care, and maternal and perinatal mortality (8). Macheku et al. (8) reported that women with placental abruption were at 12 fold increased risk of postpartum hemorrhage. Although in the present study the amount of bleeding was not fully stated, it was seen to be markedly greater in the placental abruption group, considering the rate of decrease in mean hemoglobin values ($p<0.05$). In addition, blood product transfusion was performed in four patients in the control group, while 24 patients in the abruption group received transfusion ($p<0.05$). Especially, complications associated with massive transfusion may contribute to the total rate of complications in patients with placental abruption. Seven (13.2%) patients with placental abruption developed complications while no complication was observed in the control group. These complications included eclampsia attacts, cervical rupture, hematoma in the wound site, uterine torsion and disseminated intravascular coagulopathy. Uterine torsion was considered to develop secondary to atony. In the present study, one patient was referred to a tertiary center due to disseminated intravascular coagulopathy and no maternal mortality occurred. The highest rate of maternal

mortality due to placental abruption has been reported to be 1% in the literature (8). However, various rates from 3.6% to 4.7% have also been reported (2,8). Besides these short-term complications, placental abruption may also be associated with long-term maternal morbidity. The rate of cardiovascular disease in the early period has been reported to be 2 to 6 fold higher in patients with a history of placental abruption. The risk of cardiovascular disease becomes prominent especially as the severity of placental abruption increases (24).

Placental abruption is associated with perinatal morbidity and mortality. The most common perinatal morbidity in patients with placental abruption is premature delivery which is associated with increase in need for newborn intensive care admission. Again, accompanying preeclampsia and intrauterine growth retardation also contribute to morbidity. The risk of delivering a low-weight infant is increased about 6 fold in patients with placental abruption (8). In the present study, 14 infants were admitted to the intensive care unit, while newborn intensive care was not required among the controls ($p<0.001$). The rate of perinatal mortality was also increased in patients with placental abruption. Perinatal mortalities may be in the form of intrauterine mortality or postnatal mortality. In this study, perinatal mortality occurred in three (5.7%) patients.

The patients with placental abruption delivered infants with lower Apgar scores at 1st and 5th minutes ($p>0.05$). Low Apgar scores are in general related to premature birth. On the other hand, lack of equipment and insufficiencies in newborn care might be associated with low Apgar scores, especially in underdeveloped regions (8).

Study Limitations

This study has several limitations. The number of cases is limited and data on clinical and laboratory features such as patient fibrinogen levels or blood loss volume could not be found in the records. However, this study is important for demonstrating risk factors for placental abruption as well as maternal and perinatal outcomes.

Conclusion

According to the results of this study, the risk of placental abruption is increased in patients with a history of previous C/S and particularly in persons with hypertensive disease. Furthermore, placental abruption increases the risk of maternal complications and especially life-threatening disseminated intravascular coagulopathy. Intensive care facilities must definitely be present in the treatment and care of these patients and multidisciplinary approaches should be used together with intensive care services.

Authorship Contributions

Concept: M.Ş.B., M.B.Ş. Design: Y.Ç., M.P., O.D., Ç.P. Data Collection or Processing: M.Ş.B., M.B.Ş., Y.Ç. Analysis or Interpretation: O.D., Ç.P. Literature Search: M.P., O.D., Ç.P. Writing: Mehmet B.Ş., O.D.

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