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

Plasenta Dekolmanının Risk Faktörleri ve Sonuçları: Elli Üç Olgunun Değerlendirmesi

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Abstract

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

Methods: Fifty-three cases with placental abruption and 147 cases of non-placental abruption were compared retrospectively. Age, gravida, parity, concomitant medical problems (preeclampsia, hypertension, and diabetes), previous cesarean rate and proteinuria rate were compared between groups. Multiple regression analysis was performed to determine risk factors for placental abruption. A p value under 0.05 was considered as meaningful.

Results: Prematurity, need for intensive care unit for the newborn, peripartum mortality and low Apgar score were higher in the group with placental abruption ($p<0.05$). Preeclampsia, duration in the hospital, complications (especially disseminate intravascular coagulation), proteinuria and blood product transfusion rate was higher in the placental abruption group ($p<0.05$). Previous cesarean, preeclampsia, concomitant medical problems and proteinuria were risk factors for placental abruption ($p<0.05$).

Conclusion: Pregnancy related hypertensive disorders and previous cesarean 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-terciyer 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 sezeryan 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 sezeryan oranı, preeklampsi, hastanede yatış süresi, özellikle dissemine intravasküler koagülopati başta olmak üzere komplikasyon oranları, idararda proteinüri oranı ile transfüzyon oranları daha fazla idi ($p<0,05$). Eski sezeryan olması, preeklampsi ve ek morbiditenin olması ile proteinüri varlığı preeklampsi riskini artırmaktadır ($p<0,05$).

Sonuç: Gebeliğin hipertansif hastalıkları ve eski sezeryanlı 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 ablation and associated prenatal 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). Whereas among adverse fetal outcomes, low birth weight, prematurity, 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, chronic hypertension, smoking, short gestation interval, multiple gestation and abdominal trauma (1,10-13). Furthermore, several factors such as low socioeconomic status and antenatal visit inadequacy have been reported to be associated with placental abruption (8).

In this study, 53 placental abruption cases in the Batman province of Turkey, which has relatively low socioeconomic conditions, were retrospectively investigated.

Methods

In this study, 53 placental abruption cases in the Batman Gynecology and Obstetrics Clinic were retrospectively evaluated. The diagnosis of placental abruption had made with the ultrasound and examination of the patients. Institutional review board has been received from study center.

Patient information was obtained from the patient files. Age, gravida, parity, whether they were preterm at the time of hospitalization, previous cesarean section (C/S) rate, mode of delivery, antenatal follow-up duration, additional morbidity (preeclampsia, eclampsia, chronic hypertension, etc.), rate of referral to an advanced center, complications, rate of hospitalization in newborn intensive care unit, perinatal mortality, Apgar scores, infant weight, transfusion rate and protein levels in spot urine specimen were recorded. A total of 147 patient files that gave birth in the same period but had no placental abruption were randomly selected as the control group. The two groups were compared in terms of age, gravida, parity, diagnosis, previous cesarean rate, additional morbidity (chronic hypertension and diabetes mellitus), mode of delivery, duration in hospital, rates of referral to an advanced center, complications, antenatal follow-up duration, induction, infant weight, Apgar score, rate and

duration of hospitalization in newborn intensive care unit, preoperative and postoperative hemoglobin difference, protein levels in the urine and the transfusion need. In addition, factors increasing the risk of placental abruption were investigated.

Statistical analysis was performed using SPSS Widows v.11.5 software. Kolmogorov-Smirnov and Shapiro-Wilk tests were applied to determine whether the normality of our data was appropriate. Chi-square test was used in comparison of the two groups in terms of the mode of delivery, additional morbidity, previous cesarean rate, preterm rate, transfusion rate, newborn intensive care unit admission rate, perinatal mortality and protein level in the urine. Whereas age, duration in hospital, complications, infants weight, preoperative and postoperative hemoglobin difference were compared between the groups using t test, antenatal follow-up duration, gravida and parity, Apgar scores and mean transfusion amount were compared using Mann Whitney U test. Univariate logistic regression analysis was used to investigate the factors increasing the risk of placental abruption. P values less than 0.05 were considered statistically significant.

Results

Patient files examined in the study included the data between September 2014 and October 2015. In this period, there were 7973 deliveries in this center, including 5813 vaginal deliveries and 2160 cesarean sections. The incidence of placental abruption was 0.66% during this period. Comparisons between 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 group ($p<0.001$). Mean numbers of gravida and parity were higher in the abruption group, although the difference was not statistically significant ($p>0.05$). Rates of preterm cases and previous cesarean were higher in the group with placental abruption ($p<0.05$). Again the rate of clinical situations producing additional morbidity, in particular preeclampsia, was higher in the abruption group ($p<0.05$). When additional morbidities were examined, hypertension was seen in 7 patients and diabetes mellitus in 3 patients in the abruption group, while hypertension was found in 7 patients, diabetes mellitus in 1 patient and cardiac pathology in 1 patient in the control group. All of the cases in the abruption group had undergone delivery by cesarean section and duration in the hospital was longer in this group ($p<0.05$). Whereas no complication was seen in the control group, 7 patients in the abruption group had complications ($p<0.001$). The complications included disseminated intravascular coagulopathy in 3 patients, eclamptic crisis in 1 patient, cervical rupture in 1 patient,

hematoma in the wound site in 1 patient and uterine torsion in 1 patient. Again it was seen that infant weight was lower, both Apgar 1 and 5 scores were lower, rate of hemoglobin decrease was higher, protein leakage in the urine was higher and transfusion rate and amount were higher in the abruption group ($p<0.05$). Fourteen infants had been admitted to the newborn intensive care unit and perinatal mortality had occurred in 3 patients in the abruption group, while perinatal mortality and hospitalization in the newborn intensive care unit were not observed in the control group ($p<0.05$). One patient in the abruption group had been 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 gravida and parity was found on the presence of abruption ($p>0.05$). Prematurity was associated with 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 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 prematurity and placental abruption.

Table 1. Comparison of Control and Abruption Groups

	Control (n=147)	Abruption (n=53)	p
Age (year), [mean $\pm$ SD]	27.92 $\pm$ 6.52	31.66 $\pm$ 8.00	0.001a
Gravida, [median (IQR)]	3.18 $\pm$ 2.29	3.25 $\pm$ 2.59	0.825b
Parity, [median (IQR)]	2.05 $\pm$ 2.17	2.25 $\pm$ 2.59	0.988 b
Term gestation, n (%)	139 (94.6%)	21 (39.6%)	0.001c
Preterm gestation, n (%)	8 (5.4%)	32 (60.4%)	
Number of previous cesarean sections, n (%)	11 (7.5%)	12 (22.6%)	0.003c
Additional morbidity, n (%)			0.001c
No	127 (86.4%)	28 (52.8%)	
Preeclampsia	5 (3.4%)	16 (30.2%)	
Other	15 (10.2%)	9 (17.0%)	
Cesarean rate, n(%)	27 (18.4%)	53 (100.0%)	0.001c
Duration in hospital (days), [mean $\pm$ SD]	1.18 $\pm$ 0.39	2.43 $\pm$ 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%)	0.001d
Number of antenatal visits, [mean $\pm$ SD (median)]	2.25 $\pm$ 1.91 (2)	2.98 $\pm$ 2.95 (2)	0.370 b
Healthy newborn, n (%)	147 (100.0%)	36 (67.9%)	0.001c
NBIC rate, n (%)	0 (0.0%)	14 (26.4%)	
Perinatal mortality, n (%)	0 (0.0%)	3 (5.7%)	
Duration in NBIC (days), [mean $\pm$ SD]	—	13.64 $\pm$ 8.42	—
Infant Weight (gr), [mean $\pm$ SD]	3358 $\pm$ 414	2558 $\pm$ 962	0.001 a
Apgar 1, [median (min.-max.)]	7.82 $\pm$ 0.58	5.53 $\pm$ 3.06	0.001 b
Apgar 5, [median (min.-max.)]	8.92 $\pm$ 0.34	7.21 $\pm$ 3.33	0.009 b
Hemoglobin difference, [mean $\pm$ SD]	0.99 $\pm$ 0.62	1.75 $\pm$ 0.92	0.001 a
Proteinuria, n (%)			0.001 c
No	137 (93.2%)	37 (69.8%)	
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 (%)	143 (97.3%)	29 (54.7%)	0.001 c
Transfusion, n (%)	4 (2.7%)	24 (45.5%)	

a: t test b: Mann-Whitney U test, c: Chi-Squared test, d: Fisher-exact test, NBIC: Newborn Intensive Care

Table 2. Factors increasing risk of abruption

	OR	95% CI	p	Logistic regression p-value
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	14.514 2.721	4.908-42.926 1.082-6.844	0.001 0.033	0.00
Preeclampsia				
Other				
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".

The rate of a history of placental ablation 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 region where this study was conducted is known as a relatively low socioeconomic region. Again, delivery at home is common in this region due to insistence of persons on vaginal birth and even labor induction or augmentation at home is performed in a medically unconscientious way (14,15). As a result, persons may present to clinics with several obstetric complications such as ablation or uterine rupture (15). In turn, these conditions may contribute to the incidence of placental abruption.

Association between hypertensive disease and placental abruption is classically 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 ($p < 0.05$). However, no correlation is reported between the severity of preeclampsia and hypertension, and abruption (8). In the present study, again a relationship was found between proteinuria in the urine 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 increased the risk for abruption by about 14 fold, other morbidities (chronic hypertension and diabetes mellitus) by about 3 fold and proteinuria in the urine by about 6 fold.

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 socioeconomic status. The risk of placental abruption in patients with a history of cesarean section has been argued to result from the dehiscence of the scar line and again from 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. reported no association between high parity and placental abruption (16). 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 affect this result. 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. This might affect the risk rate of parity. Supporting this, we found that age did not increase the risk of abruption ($p < 0.05$).

Previous studies have reported that placental abruption is 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). Macheke et al. reported that postpartum hemorrhage is increased 12 fold (8). 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 4 patients in the control group, while 24 patients in the abruption group received transfusion ($p < 0.05$). Especially complications brought on by massive transfusion may contribute to the total rate

of complications in patients with placental abruption. Whereas 7(13.2%) patients with placental abruption developed complications, no complication was observed in the control group. These complications included eclampsia crisis, 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 is accepted as 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 higher by 2 to 6 fold in patients with a history of placental abruption. This 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 perinatal morbidity most increased in patients with placental abruption is prematurity and an associated increase in need for newborn intensive care. Again, associated accompanying preeclampsia and intrauterine growth retardation also contribute to morbidity. The rate of low weight infants 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 no need for newborn intensive care was observed 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. The risk of intrapartum mortality has been reported to significantly increase, especially where the area of decollement is higher than 50% (8). In this study, perinatal mortality occurred in 3 (5.7%) patients. Again, Apgar 1 and 5 scores were seen to be lower in the placental abruption group ($p > 0.05$). Low Apgar scores are in general related to prematurity. On the other hand, lack of equipment and insufficiencies in newborn care might be associated with low Apgar scores, especially in underdeveloped regions (8).

This study has several limitations. The number of cases is limited and clinical and laboratory features such as patient fibrinogen levels or blood loss volume could not be found in the record details. However, this study is important in demonstrating risk factors of 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 specialists.

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