

Comparison of Postpartum Hemoglobin Decrease Levels In Patients Who Had Normal Vaginal Delivery Versus Cesarean Section

Sezaryen ile Normal Vajinal Doğum Yapmış Hastaların Postpartum Hemoglobin Düşüşü Seviyelerinin Karşılaştırılması

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Özet

Amaç: Sezaryen kanama açısından normal vajinal doğuma kıyasla daha fazla risk taşıyan bir operasyondur. Bu çalışmada normal vajinal doğum ile sezaryenle doğum yapan gebelerdeki hemoglobin düşüşlerini karşılaştırmayı amaçladık.

Gereç ve Yöntemler: Bu çalışmada bir üniversite hastanesinde 01.01.2021-30.06.2022 tarihleri arasında, normal vajinal doğum ve sezaryen ile doğum yapan gebeler retrospektif olarak analiz edilmiştir. Çalışmaya alınan gebeler, 18-45 yaş arasında, sistemik hastalığı bulunmayan 37-41 gebelik haftasında 2000-4000 gr arasında bebek doğurmuş olanlar şeklinde standardize edildi. Çalışmaya alınan hastalar normal vajinal doğum ve sezaryen doğum yapanlar, sezaryenle doğum yapanlar da kendi aralarında primer sezaryen ve geçirilmiş sezaryen olarak iki gruba ayrılarak doğum öncesi ve doğum sonrası 6. saatte alınmış hemoglobin seviyelerindeki düşüşleri istatistiksel olarak değerlendirildi.

Bulgular: Çalışmaya alınan toplam 473 gebenin 199'unun normal doğum, 274'ünün sezaryenle doğum yaptığı (119'u geçirilmiş sezaryen 155'i primer sezaryen) belirlendi. Çalışmaya alınan gebelerden normal doğum yapan gebelerin doğum sonrası Hb düşüşü ortalamaları $0,73 \pm 0,90$ gr/dl, sezaryenle doğum yapanların $1,41 \pm 0,93$ gr/dl olarak tespit edildi, fark istatistiksel olarak anlamlı bulundu ($p < 0,001$). Geçirilmiş sezaryen endikasyonu ile sezaryen yapılanların postpartum Hb düşüşü ortalamaları $1,30 \pm 0,73$ gr/dl, primer sezaryenlerin $1,49 \pm 0,9$ gr/dl olarak tespit edildi, fark istatistiksel olarak anlamlı bulundu ($p = 0,045$).

Sonuç: Literatürle uyumlu olarak saptanan bu sonuçlarla sezaryen kararı alırken bu bulgular göz önüne alınarak gerekli tedbirlerin alınması uygun olacaktır.

Anahtar Kelimeler: Hemoglobin, sezaryen, vajinal doğum

Abstract

Objective: Cesarean section is an operation that carries a higher risk compared to normal vaginal delivery in terms of bleeding. In this study, we aimed to compare hemoglobin decreases in pregnant women who had normal vaginal delivery and cesarean section.

Material and Methods: In this study, pregnant women who had normal vaginal delivery and cesarean section between 01.01.2021 and 30.06.2022 in a university hospital were analyzed retrospectively. The pregnant women included in the study were standardized as those between the ages of 18-45, who did not have any systemic disease, and who gave birth to a baby between 2000-4000 gr at 37-41 weeks of gestation. The patients included in the study were divided into two groups as those who had a normal vaginal delivery and cesarean section, and those who delivered by cesarean section were divided into two groups as primary cesarean section and previous cesarean section, and the decreases in hemoglobin levels taken before and at the 6th hour after delivery were statistically evaluated.

Results: It was determined that 199 of the 473 pregnant women included in the study had a normal delivery and 274 had a cesarean section (119 had a previous cesarean section and 155 had a primary cesarean section). Among the pregnant women included in the study, the mean postpartum Hb decrease was 0.73 ± 0.90 g/dl in the pregnant women who had a normal delivery, and 1.41 ± 0.93 g/dl in those who delivered by cesarean section, the difference was found to be statistically significant ($p < 0.001$). The mean postpartum Hb decrease in those who underwent cesarean section with a previous cesarean indication was 1.30 ± 0.73 g/dl and 1.49 ± 0.9 g/dl in primary cesarean sections, the difference was statistically significant ($p = 0.045$).

Conclusion: With these results determined by the literature, it would be appropriate to take the necessary precautions by taking these findings into account when making a cesarean section decision.

Keywords: Cesarean section, hemoglobin, vaginal delivery

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INTRODUCTION

Postpartum hemorrhage (PPH) is a serious complication that threatens the life of pregnant women. It is estimated that 14 million cases are seen every year all over the world (1). When all maternal deaths are examined, it is seen that they are associated with PPH at a rate of 19% (2). In our country, it has been reported that 19.2% of maternal deaths occur due to bleeding (3). PPH is a preventable condition that all obstetricians face from time to time. In cases where it cannot be prevented, early diagnosis and correct management are of great importance in determining the prognosis of the patient. For this reason, obstetricians need to identify patients at risk of bleeding, administer medications with anti-bleeding interventions, and rapidly administer the necessary blood and blood product treatment if bleeding occurs.

Cesarean section is a very common operation all over the world. It has been reported that 18.6% of deliveries occur by cesarean section all over the world. This rate varies between 6% and 27.2% according to the countries (4). It can be expected that such a widely performed operation will bring complications. Complications of cesarean-section operations include postpartum bleeding, pelvic pain, uterine rupture, abnormal placentation, and irregular bleeding (5).

Although the definition of PPH is not clear, it is defined as a blood loss of more than 500 ml in normal delivery and more than 1000 ml in cesarean section (6). Even this definition shows that cesarean section alone carries a higher risk of bleeding compared to normal delivery. The development of more blood loss due to cesarean section will result in an earlier aggravation in case of decreased maternal blood reserve and life-threatening bleeding such as uterine atony.

In this study, the hemoglobin decreases of both pregnant women who had normal vaginal delivery and cesarean delivery, and those who had surgery with the indication of primary cesarean section and previous cesarean section were compared.

MATERIALS AND METHODS

Subject

In this study, pregnant women who gave normal vaginal delivery and delivered by cesarean section between 01.01.2021 and 30.06.2022 at Recep Tayyip Erdogan University Medical Faculty Training and Research Hospital, which were standardized according to the criteria described below, were analyzed

retrospectively. This study was conducted with the permission of the Recep Tayyip Erdogan University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee (Date: 14/12/2022; Decision number: 2022/223). Age, mode of delivery, birth weight, and gestational week of the pregnant women included in the study were recorded for each patient. The pregnant women included in the study were standardized as those who gave birth to a baby between the ages of 18-45, who did not have any maternal systemic disease, who used iron and/or multivitamin preparations during pregnancy, and who had a birth weight of 2000-4000 g at 37-41 weeks of gestation.

The patients included in the study were divided into two groups as those who had a normal vaginal delivery and those who had a cesarean section. Prenatal and postnatal hemoglobin levels of all patients in both groups were recorded at 6 hours. Decreases in hemoglobin levels between both groups were evaluated statistically.

Pregnant women who gave birth by cesarean section were divided into two groups primary cesarean section and those who were operated on with the indication of previous cesarean section history. The difference between the preoperative and postoperative 6th-hour hemoglobin levels of both groups was statistically evaluated.

Patients to be excluded from the study: operative vaginal delivery with forceps or vacuum, postpartum vaginal tear or collum repair, uterine atony developing; Cases that may increase blood loss such as placenta previa, ablatio placentae, preeclampsia, HELLP syndrome, prolonged labor, multiple pregnancies, in utero mort fetus and cases with diagnosed hematological disorders were excluded from the study.

Statistical Analysis

The SPSS 20.0 ("Statistical Package for the Social Sciences") program was used for statistical analysis. While evaluating study data, normal distribution was used for comparison of quantitative data as well as descriptive statistical methods (Mean, Standard Deviation, Median, Frequency, Ratio, Minimum, and Maximum). Student T Test was used for two-group comparisons of parameters showing a normal distribution, and the Mann-Whitney U test was used for two-group comparisons of parameters that did not show a normal distribution. Significance was evaluated at $p < 0.05$.

RESULTS

It was determined that 199 of the 473 pregnant women included in the study had normal delivery and 274 had a cesarean section. The mean age of pregnant women who had a normal delivery was 29.53 ± 5.81 and the mean age of those who had a cesarean delivery was 30.79 ± 5.61 . The difference between the mean ages of both groups was statistically significant ($p=0.011$). The mean gestational age at birth was 277.21 ± 7.63 days for the pregnant women who had a normal delivery, and 271.52 ± 7.02 days for those who had a cesarean section. The difference between the mean gestational age at birth of both groups was statistically significant ($p<0.001$). The average birth weight of the babies of the pregnant women who had a normal delivery was 3361.61 ± 388.53 g, and the average of the babies who had a cesarean delivery was 3401.98 ± 449.97 g. The difference between the mean birth weights of the babies of both groups was not statistically significant ($p=0.735$). Demographic data of pregnant women included in the study are shown in Table 1.

Considering the cesarean section indications among the pregnant women included in the study, it was found that the most common indication was previous cesarean section history ($n=119$ (43.4%). Other indications were breech presentation, Cephalopelvic disproportion, fetal distress, placental anomalies, non-progressed labor, and maternal diseases that would hinder normal delivery. The cesarean section indications of the patients included in the study are given in Table 2.

Prepartum hemoglobin (Hb) averages of the pregnant women included in the study who had a normal delivery were 11.82 ± 1.28 g/dl, and the prepartum Hb averages of those who delivered by cesarean section were 11.66 ± 1.18 g/dl. The difference between the mean prepartum Hb levels of both groups was not statistically significant ($p=0.121$). Among the pregnant women included in the study, the postpartum Hb averages of the pregnant women who had a normal delivery were 11.09 ± 1.41 g/dl, and the postpartum Hb averages of those who gave birth by cesarean

Table 1. Demographic data of pregnant women included in the study (Data are given as mean standard deviation)

	Normal Vaginal Birth	Cesarean Section	p
Type of Birth (n)	199	274	
Gravida	2.59 ± 1.18	2.21 ± 0.98	<0.001
Parity	1.45 ± 1.09	1.16 ± 0.939	0.005
Average age (years)	29.53 ± 5.81	30.79 ± 5.61	0.011
Gestational age at birth (days)	277.21 ± 7.63	271.52 ± 7.02	<0.001
Baby birth weight (grams)	3361.61 ± 388.53	3401.98 ± 449.97	0.735

Table 2. Cesarean section indications of the patients included in the study (n=number of patients)

	n (%)
History of previous cesarean section	119 (43.4)
Breech presentation	16 (5.8)
Cephalopelvic disproportion	19 (6.9)
Fetal distress	43 (15.7)
Placental anomalies	20 (7.3)
Non-progressing labor	36 (13.1)
Maternal diseases	21 (7.7)

section were determined as 10.23 ± 1.25 g/dl. The difference between the mean postpartum Hb levels of both groups was statistically significant ($p < 0.001$). Among the pregnant women included in the study, the mean Hb decrease at birth was found to be 0.73 ± 0.90 g/dl in the pregnant women who had a normal delivery and 1.41 ± 0.93 g/dl at the delivery in those who gave birth by cesarean section. The difference between the mean Hb decrease in both groups at birth was found to be statistically significant ($p < 0.001$). The hemoglobin values of the pregnant women included in the study are shown in Table 3.

It was determined that 119 of 274 pregnant women who gave birth by cesarean section among the pregnant women included in the study gave birth by previous cesarean section and 155 pregnant women gave birth by primary cesarean section with any indication. Prepartum Hb averages of the pregnant women who gave birth by cesarean section included in the study were 11.82 ± 1.28 g/dl for those who had a previous cesarean section indication, and 11.75 ± 1.20 g/dl for those who delivered by primary cesarean section with any indication. The difference between the mean prepartum Hb levels of both groups was not statistically significant ($p = 0.152$). The postpartum Hb averages of the pregnant women who gave birth by cesarean section included in the study were 10.21 ± 1.17 g/dl for those who had a previous cesarean section indication, and 10.24 ± 1.32 g/dl for those who delivered

by primary cesarean section with any indication. The difference between the mean postpartum Hb levels of both groups was not statistically significant ($p = 0.988$). Among the pregnant women included in the study who gave birth by cesarean section, the mean postpartum Hb decrease of those who had a cesarean section with the indication of history of previous cesarean section was 1.30 ± 0.73 g/dl, and the mean postpartum Hb decrease of those who gave birth by primary cesarean section with any indication was 1.49 ± 0.9 g/dl. The difference between the mean postpartum Hb reductions of both groups was found to be statistically significant ($p = 0.045$). The Hb values of the pregnant women who gave birth by cesarean section and those who had a previous cesarean section and primary cesarean section are shown in Table 4.

DISCUSSION

Cesarean section is an operation that has been increasingly performed all over the world in the last 20 years (4). Despite all the efforts to reduce cesarean rates, this rate remains quite high. Timely cesarean section is a safe procedure that can be life-saving in many indications such as placental anomalies such as placenta previa, fetal malpresentations such as transverse presentation, head-pelvis incompatibility, and fetal distress. However, cesarean section can be performed outside such absolute indications. It is reported that six million

Table 3. Hemoglobin values of pregnant women who had normal vaginal delivery and cesarean section (Data are given as mean standard deviation)

	Normal vaginal delivery	Cesarean section	p
Prepartum Hb (gr/dl)	11.82 ± 1.28	11.66 ± 1.18	0.121
Postpartum Hb (gr/dl)	11.09 ± 1.41	10.23 ± 1.25	<0.001
Hb decrease (gr/dl)	0.73 ± 0.90	1.41 ± 0.93	<0.001

Table 4. Hemoglobin values of patients who underwent cesarean section with the indication of primary cesarean section and previous cesarean section (Data are given as mean \pm standard deviation)

	Primary cesarean section	Previous cesarean section history	p
Number of pregnant (n)	155	119	
Prepartum Hb (gr/dl)	11.75 ± 1.20	11.54 ± 1.15	0.152
Postpartum Hb (gr/dl)	10.24 ± 1.32	10.21 ± 1.17	0.988
Hb decrease (gr/dl)	1.49 ± 0.9	1.30 ± 0.73	0.045

off-label cesarean section operations are performed annually (7). Among the reasons for these high rates are medicolegal concerns, fear of pain in pregnant women, and fetal risks can be detected thanks to developing imaging methods. It may be appropriate for obstetricians to consider the greater blood loss before deciding on cesarean section, except for absolute indications.

In a study comparing blood loss in cesarean section and normal delivery in our country, it was shown that blood loss is higher in cesarean section (8). In another study, it was reported that the rate of PPH after cesarean section was 3.15% and 5 postpartum hysterectomies were performed in 475 cesarean section patients (9). In a study conducted in our country in which 19535 deliveries were evaluated, it was reported that 88% of PPH cases developed after cesarean section and 12% after normal delivery (10). The data we obtained in our study show that blood loss is higher in cesarean section than in normal vaginal delivery, even outside of PPH.

When we look at the literature, it has been shown that blood loss is higher in cesarean sections performed for emergency indications (11). In another study, it was reported that a history of previous cesarean section was not associated with perioperative blood loss (12). In our study, it was found that blood loss was higher in primary cesarean sections compared to pregnant women who were operated on with a previous cesarean section indication. The reason for this difference may be the low blood supply of the scar tissue formed at the incision site in patients with previous cesarean sections. At the same time, the elective operation of pregnant women with a history of cesarean section in our hospital may have contributed to this difference. In addition, since primary cesarean sections are operated under more urgent conditions and indications, the amount of bleeding may be higher.

Approximately 900-1100 cc blood loss in hemorrhages occurring during delivery causes a decrease in hemoglobin level of around 2 g/dl (13). In this case, hemoglobin levels before delivery are important for pregnant women to tolerate the blood loss they experience at birth. In some studies investigating the prevalence of anemia in pregnant women in our country, this rate was reported as 27.1%-29.8% (14,15). Since anemia is still a common health problem in pregnant women, it may be appropriate to consider the hemoglobin levels of the pregnant woman before making a cesarean section decision apart from absolute indications.

Although cesarean section is a widely performed life-saving and safe operation, blood loss is higher

than normal delivery. The risk is even higher in primary cesarean sections. For this reason, it would be appropriate for clinicians to consider that the patient will be at risk for blood loss, in addition to other risks, while making a cesarean section decision. Preoperative blood preparation, intervention to reduce bleeding, and prophylactic use of drugs may improve the prognosis of pregnant women.

Ethical Approval: The study was conducted in accordance with the Declaration of Helsinki and the protocol was approved by the Ethics Committee of the Recep Tayyip Erdogan University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee (Date: 14/12/2022; Decision number: 2022/223).

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