

# Evaluation of Blood Transfusions Performed for Obstetric and Gynecological Reasons in the Tertiary Hospital

## Üçüncü Basamak Hastanede Obstetrik ve Jinekolojik Nedenlerle Yapılan Kan Transfüzyonlarının Değerlendirilmesi

Mehmet Ferdi KINCI<sup>1</sup>, Ezgi KARAKAŞ PASKAL<sup>2</sup>, Farida HAJIBAYLI<sup>1</sup>, Ercan SARUHAN<sup>3</sup>, Gökhan PEKTAŞ<sup>4</sup>, Ahmet Akın SİVASLIOĞLU<sup>1</sup>

<sup>1</sup>Muğla Sıtkı Koçman University Education and Research Hospital, Obstetrics and Gynecology Department, Muğla

<sup>2</sup>Department Başakşehir Cam ve Sakura Hastanesi, Obstetrics and Gynecology Department, İstanbul

<sup>3</sup>Muğla Sıtkı Koçman University Education and Research Hospital, Biochemistry Department, Muğla

<sup>4</sup>Muğla Sıtkı Koçman University Education and Research Hospital, Hematology Department, Muğla

### Öz

Kan transfüzyonu; kan bileşenlerinin ve koagülasyon faktör konsantrasyonlarının hastaya verilmesi olarak tanımlanmaktadır. 20 ile 35 yaşları arasındaki transfüzyonların yaklaşık yarısı, Obstetri ve Jinekoloji kliniklerinde yapılmaktadır. Muğla Eğitim ve Araştırma Hastanesi Kadın Hastalıkları ve Doğum Kliniği'nde, Ocak 2014-Aralık 2018 tarihleri arasında hastanemizde kan transfüzyonu yapılan 137 hastanın elektronik dosya kayıtları incelendi. Demografik bilgileri, Hemoglobin ve Hematokrit (transfüzyon öncesi ve sonrası) değerleri, uygulanan kan ürünleri ve miktarı kaydedildi. Kan transfüzyonu uygulanan hastaların 79'u obstetrik, 58'i jinekolojik hastadır. Obstetrik vakalarda en sık sezaryen sonrası kan transfüzyonu uygulanmıştır (%56.6). Transfüzyon nedenleri arasında en sık rastlanan anemi nedeni demir eksikliği anemisi 43 (%54) dir. Sonraki nedenler ise; 10 (%12.6)'unda Dilatasyon/Küretaj (D/C) sonrası gelişen anemi, 5 (%6.32)'inde uterin atoni sonrası gelişen anemi şeklinde sıralanmaktadır. Jinekolojik nedenler ile transfüzyon uygulanan 58 hastanın; 12 (%20.68)'sine menometroraji tanısı ile tanısız amaçlı D/C, total abdominal histerektomi, 10 (%17.24)'u myomektomi, 9 (%15.51)'u total laparoskopik histerektomi, 5 (%8.62)'i ürojinekolojik cerrahi, laparoskopik kistektomi yapılmış, menometroraji tanısı ile medikal tedavi almıştır. Kan ve kan ürünlerinin hazırlanması ve kullanılması, Kadın Hastalıkları ve Doğum Uzmanı ve Hematolog başta olmak üzere birçok branşı kapsayacak şekilde multidisipliner yaklaşılmalıdır. Gebelere ve cerrahi geçirecek hastalara, anemi profilaksisi önceden başlanarak post-operatif transfüzyon azaltılmalıdır. Transfüzyon sırasında ve sonrasında oluşabilecek komplikasyonlardan kaçınmak için gereksiz transfüzyonlardan kaçınılmalıdır.

**Anahtar Kelimeler:** Eritrosit Süspansiyonu, Hemoraji, Kan Transfüzyonu, Postpartum Kanama, Transfüzyon

### Introduction

Blood transfusion is defined as the delivery of blood components (whole blood, erythrocyte

	ORCID No
Mehmet Ferdi KINCI	0000-0002-6798-4281
Ezgi KARAKAŞ PASKAL	0000-0002-9714-3686
Farida HAJIBAYLI	0000-0001-7760-0088
Ercan SARUHAN	0000-0001-6416-1442
Gökhan PEKTAŞ	0000-0001-6590-6469
Ahmet Akın SİVASLIOĞLU	0000-0003-3711-0118

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Adres / Correspondence : Mehmet Ferdi KINCI  
Muğla Sıtkı Koçman University Education and Research Hospital, Obstetrics and Gynecology Department, Muğla  
e-posta / e-mail : drferdikinci@gmail.com

### Abstract

Blood transfusion is defined as the delivery of blood components and coagulation factor concentrates to a patient. About half of transfusions between the ages of 20 and 35 are performed in Obstetrics and Gynecology Clinics. Electronic file records of 137 patients who underwent blood transfusion in Muğla Training and Research Hospital, Gynecology and Obstetrics Clinic between January 2014 and December 2018 were reviewed retrospectively. The demographic information of the patients, Hgb and Hct (before and after transfusion) values, and applied blood products and their amount were recorded. Of the patients who received blood transfusion, 79 were obstetric and 58 were gynecological patients. In obstetric cases, blood transfusion was most frequently performed after cesarean section (56.6%). Among the causes of transfusion, 43 (54%) patients had iron deficiency anemia, 10 (12.6%) patients had anemia after Dilatation/Curettage (D/C), and 5 (6.32%) patients had uterine atony. Diagnostic D/C and total abdominal hysterectomy were performed in 12 (20.68%) of 58 patients, who were transfused for gynecological reasons, with the diagnosis of menometrorrhagia, while myomectomy was performed in 10 of these patients (17.24%), total laparoscopic hysterectomy was performed in 9 (15.51%) patients, urogynecological surgery and laparoscopic cystectomy were performed in 5 (8.62%) patients, and medical treatment was given with the diagnosis of menometrorrhagia. The preparation and use of blood and blood products should be approached in a multidisciplinary manner, covering many branches, especially Gynecology and Obstetrics and Hematology. Anemia prophylaxis should be initiated beforehand and post-operative transfusion should be reduced in pregnant women and patients who will undergo surgery. Unnecessary transfusions should be avoided in order to avoid complications that may occur during and after transfusion.

**Keywords:** Erythrocyte Suspensions, Hemorrhage, Blood Transfusion, Postpartum Hemorrhages, Transfusion

concentrate, fresh frozen plasma, etc.) and coagulation factor concentrates to a patient (1). The first successful human-to-human blood transfusion was performed in 1818 by James Blundell, an obstetrician in London (2). Today, the most common cause of transfusion is surgical interventions in developed countries and obstetrics in developing countries (3). About half of transfusions between the ages of 20 and 35 are performed in obstetrics and gynecology clinics (4).

Obstetric hemorrhages are the leading cause of maternal mortality and morbidity. These hemorrhages are responsible for 17.9% of maternal deaths in our country (5). The most common postpartum hemorrhages in obstetric cases are bleeding due to uterine atony. Massive bleeding may occur in approximately 7% of cesarean section cases,

and this risk is especially prevalent in placenta previa, ablatio placentae, and severe preeclampsia (6). The main purpose of blood transfusion applied in obstetric cases is to stabilize hemodynamics and to prevent bleeding. The average risk of transfusion is variable in gynecology and ranges from 0.01% for operative hysteroscopy, 2-5% for operative laparoscopy, 0.3% to 11% for hysterectomy, up to 21% for myomectomy (7). The main purpose of blood transfusion applied before and/or after gynecological cases is to provide hemostasis and tissue oxygenation.

In the current study, obstetric and gynecological cases who underwent blood transfusion in the Obstetrics and Gynecology clinic of our hospital, which is the only tertiary center of Muğla province, were examined. By means of this study, it is aimed to avoid unnecessary and inappropriate blood transfusions by examining the surgical procedures, the reason for the transfusion and other demographic data of the people who have undergone blood transfusion.

## Material and Method

The present study was designed as a retrospective observational study in which the file records of obstetric and gynecological patients who were treated at Muğla Training and Research Hospital, Department of Obstetrics and Gynecology and received blood transfusion were examined. Ethics committee approval was obtained from Muğla Sıtkı Koçman University Human Research Ethics Committee (02.07.2020/140) for the study. Demographic information (age, parity, gestational week if pregnant, surgical procedures performed during hospitalization), Hemoglobin (Hgb) and Hematocrit (Hct) (before and after transfusion) values, applied blood products and their amount were recorded. Patients who had gynecologic oncologic surgery were excluded from the study. The collected data were analyzed and tabulated. Hemoglobin and hematocrit values were studied on a Sysmex XN-1000 blood counter (Sysmex, Kobe, Japan). Erythrocyte suspensions (ES), fresh frozen

plasmas (FFP) and platelet suspensions (TS) and fibrinogen concentrates given during blood transfusion were evaluated.

SPSS program (IBM SPSS Statistics, Version 22.0. Armonk, NY: IBM Corp) was used for statistical evaluation of demographic, obstetric and transfusion data. The data obtained in the study were expressed as mean, standard deviation, median, frequency, ratio, minimum and maximum values.

## Results

In the study, electronic file records of 137 patients who underwent blood transfusion in our hospital between January 2014 and December 2018 were reviewed retrospectively. While 79 of these patients were obstetric patients, 58 were gynecological patients. A total of 79 patients who needed and received blood transfusion (plasmas, FFP, fibrinogen, and TS) in antepartum, peripartum and postpartum periods for obstetric reasons (Tables 1 and 2), and 58 patients who were hospitalized in our clinic for gynecological reasons and received blood product transfusion and treated pre-operatively, intra-operatively, post-operatively, and medically were included in this study (Table 3).

Demographic data of patients who underwent blood transfusion for obstetric reasons, timing of transfusion, operation undergone by patients, type, and amount of transfused blood product, Hgb and Hct values before and after transfusion are given in Tables 1 and 2. When the early pregnancy period and obstetric cases were examined, it was found that 79 (1.28%) out of 6125 cases underwent blood transfusion. In obstetric cases, blood transfusion was most frequently performed after cesarean section (56.6%). There was iron deficiency anemia in 43 (54%) patients, anemia after dilatation/curettage (D/C) in 10 (12.6%) patients, uterine atony in 5 (6.32%) patients, placenta previa, preeclampsia, ectopic pregnancy, vaginal laceration after normal delivery in 4 (5.06%) patients, had ablation, cesarean hysterectomy in 2 (2.53%) patients, and placenta percreta in 1 (1.26%) patient.

**Table 1.** Demographic data of obstetric cases who underwent blood transfusion and blood products used

	Mean	SD	Median	Max	Min
Age (years)	26.75	5.08	29.3	44	17
Parity (n)	2	1	2	5	1
BMI (kg/m <sup>2</sup> )	29.75	5.51	29.55	44.2	20.2
ES (n)	2.7	2.7	1	19	0
TDP (n)	1.6	1.8	1	10	0
Fibrinojen (n)	0.1	0.5	0	2	0
Platelet (n)	0.2	0.6	0	4	0
Pre-transfusion Hgb (g/dL)	7.8	1.3	7.7	12.5	4.9
Pre-transfusion Hct (%)	24.5	3.8	24.6	36.2	16.5
Post-transfusion Hgb (g/dL)	11.1	1.6	11	15.4	7.9
Post-transfusion Hct (%)	33.8	4.1	33.7	43.7	25.8

**Table 2.** The procedure and time of transfusion of obstetric cases undergoing blood transfusion

	Number (n)	Percent (%)
Treatment		
Vaginal Delivery	17	21.5
Cesarean Section	43	54.4
R/C	10	12.6
Ectopic Pregnancy	4	5
Medical Treatment	5	6.3
Transfusion Time		
Pre-operative	1	1.3
Intra-operative	5	6.3
Post-operative	68	86
Medical Treatment	5	6.3

**Table 3.** Demographic data of gynecological cases who underwent blood transfusion and blood

	Mean	SD	Median	Max	Min
Age (years)	51.8	13.4	52	70	23
Parity (n)	3	1	3	3	2
BMI (kg/m <sup>2</sup> )	30.3	5.8	31.4	41.1	20.5
ES (n)	2.3	1.3	2	7	0
TDP (n)	0.9	1.1	1	6	0
Fibrinojen (n)	0	0.1	0	2	0
Platelet (n)	0.1	0.4	0	2	0
Pre-transfusion Hgb (g/dL)	8.5	1.8	8.4	14	4.6
Pre-transfusion Hct (%)	27.7	5.1	27	42.5	16.3
Post-transfusion Hgb (g/dL)	11.1	1.4	10.9	14.6	8.4
Post-transfusion Hct (%)	34.9	4.1	34.2	43.5	28.4

## Discussion

There are many factors affecting blood transfusion before, during and after delivery in gynecological surgery. In this study, blood transfusions administered in our clinic for 4 years were examined. The study aims to reduce the amount of transfusion by predetermining the factors that cause blood transfusion.

Pre-operative anemia is associated with increased mortality, morbidity, and risk of blood transfusion. The prevalence of anemia was reported as 21.95% in the study by Kınıcı et al. Iron prophylaxis is applied to pregnant women in all centers of our province, especially in our clinic, and if this is insufficient, I.V. iron therapy is applied. Thus, only 5 pregnant women needed prenatal blood transfusion during the study period. This rate is 6.3% of all obstetric blood transfusions. Richards et al. reported that the pre-operative prevalence of anemia was 23.9% in 12836 female patients who had undergone gynecological surgery (9). In the study by Günaydın et al., conducted in our county, this rate was found to be 29% (10). In the current study, transfusion was applied to patients in cases where abnormal uterine bleeding and myoma uteri were the leading diagnoses. Of all transfusions for gynecological reasons, 20.68% were performed as medical treatment with the diagnosis of anemia, and 18.96% were performed for pre-operative preparation (Table 4). This rate was associated with the presence of a tertiary center. Our aim is to make pre-operative blood transfusion to reduce post-operative complications.

**Table 4.** Transfusion time of gynecological cases that received blood transfusion

	Number (n)	Percent (%)
Transfusion Time		
Pre-operative	11	18.96
Intra-operative	5	8.62
Post-operative	30	51.72
Medical Treatment	12	20.68

Obstetric hemorrhage is responsible for a quarter of annual maternal deaths (11). In the literature, when pregnancy and delivery process are included, the need for blood and blood product transfusion varies between 0.3% and 6% (12). The blood transfusion rate was found to be 1.28% in the management of obstetric cases in our clinic. This rate shows that 1.71% (43/2510) of cesarean deliveries and 0.62% (17/2762) of vaginal deliveries receive blood transfusion. While this rate was 2.65% in the study of Seçen et al. (cesarean section 5.41%, vaginal delivery 1.56%) (5), Yüksel et al. found these rates to be 5.7% and 7.9%, respectively, in their study involving two hospitals (13). It is considered that the reason for this low rate in our hospital is the oral iron treatment administered to all pregnant women in our city. Although there are publications reporting the frequency of massive and life-threatening obstetric hemorrhage as 1-2% (14), there are also publications reporting this rate as very low as 5.3/10000 (15). In the current study, the frequency of massive transfusion in obstetric cases was 6/10000 (4/6125). The obstetric case who received the highest amount of transfusion was the patient who had retroperitoneal hematoma evacuation after cesarean section with 19 ES and 10 FFP.

Many studies have been carried out on obstetric blood transfusions. In the study by Madhushree et al., in which transfusions performed by 204 women for obstetric reasons were examined, it was found that 78.9% of transfusions were antenatal, 13.7% intra-operative, and 7.3% postpartum (16). In the current study, it was applied postpartum at a rate of 86%. This rate is similar to the study conducted by Seçen et al. in our country. In the study by Seçen et al., it was seen that transfusions were pre-partum in 2.1%, intra-partum in 16.8%, and post-partum in 81% of patients (5). In the study by Madhushree et al., transfusion indications were found to be 58.4% anemia, 19.3% obstetric hemorrhage, and 3.8% thrombocytopenia (16). In the current study, however, postpartum anemia was seen at a rate of 54%.

Studies on blood transfusion in benign gynecological cases are not as frequent as in obstetric cases. Studies are generally related to transfusions during hysterectomy and are from previous years (17, 18). The blood transfusion rate in these studies ranged from 2.2% to 8.6%. Between the dates of the study in our clinic, 485 abdominal hysterectomies were performed for benign reasons and blood transfusion was applied to 12 (2.47%) patients. This rate was found to be consistent with the literature. About half of the transfusions performed for all gynecological surgeries were performed post-operatively. The most common cause of this condition is anemia due to intra-operative blood loss. It is considered that anemia treatments to be applied pre-operatively can reduce this condition.

Immediate onset or delayed reactions may occur in approximately 1% of all transfusions. Allergic reactions, hemolytic reactions, blood-borne infections, transfusion-related acute lung injury, electrolyte disorders (hypocalcemia, hypomagnesemia, hyperkalemia), massive transfusion-related complications (hypothermia, metabolic acidosis, and coagulation disorders) are seen in the use of blood products (19). In the current study, an allergic reaction developed in 2 (1.45%) of 137 transfused cases and the transfusion was terminated. As a result of the evaluations made in recent years, I.V. iron therapy to reduce blood transfusion and treatments such as tranexamic acid, fibrinogen, and a coagulation factor concentrate-based have been used to reduce bleeding (20).

In conclusion, the preparation and use of blood and blood products requires a multidisciplinary approach, covering many branches such as Family Medicine and Anesthesia, especially Gynecology and Obstetrics Specialist and Hematologist. Post-operative transfusion should be reduced by starting anemia prophylaxis in pregnant women and patients who will undergo surgery. Unnecessary transfusions should be avoided to prevent complications that may occur during and after transfusion.

**Ethics Committee Approval:** Ethics committee approval was obtained from Muğla Sıtkı Koçman University Human Research Ethics Committee (02.07.2020/140) for the study.

## References

1. Ayoğlu H. Bir Üniversite Hastanesinde Peroperatif Kan Transfüzyon Uygulamalarını Etkileyen Faktörler. *GKDA Derg.* 2019;25(4):229-41.
2. Atamer T. Kan transfüzyonunun tarihçesi. 35. Ulusal Hematoloji Kongresi. Antalya.2009;35:7-10.
3. Schantz-Dunn J, Nawal M. The use of blood in obstetrics and gynecology in the developing world. *Rev Obstet Gynecol.* 2011;4:86.
4. Wells A, Mounter P, Chapman C, et al. Where does blood go? Prospective observational study of red cell transfusion in north England. *Bmj.* 2002;325:803.
5. Seçen Eİ, Sargın MA, Çamurşen E, et al. Peripartum ve Postpartum Kan Transfüzyonu Yapılan Hastalarda Klinik Deneyimlerimiz. *Zeynep Kamil Tıp Bült.* 2020;51:31-4.
6. Çakmak B, Güllüci S, Nacar MC, et al. Obstetrikte Kan Transfüzyonu: Bir Üniversite Hastanesi Klinik Deneyimi. *Gaziosmanpaşa Üni Tıp Fak Derg.* 2013;5:140-4.
7. Stanhisler J, Chagin K, Jelovsek JE. A model to predict risk of blood transfusion after gynecologic surgery. *Am J Obstet Gynecol.* 2017;216:506. e501-506. e514.
8. Kıncı MF, Paskal EK, Saruhan E, et al. Prevalence of Anemia: Figures at the Time of Pregnancy Detection in Our Hospital. *J Clin Obstet Gynecol.* 2020;30:141-5.
9. Richards T, Musallam KM, Nassif J, et al. Impact of preoperative anaemia and blood transfusion on postoperative outcomes in gynaecological surgery. *PloS one.* 2015;10:e0130861.
10. Günaydın B, Işık G, Bağcaz S, et al. Jinekolojik ve Obstetrik Cerrahi Hastalarında Preoperatif Anemi Tedavisinin Etkilerinin Retrospektif Değerlendirmesi. *Türk J Anaesthesiol Reanim.*2020. 10.5152/TJAR2020.484.
11. Obstetricians ACo, Gynecologists. ACOG practice bulletin: clinical management guidelines for obstetrician-gynecologists number 76, October 2006: postpartum hemorrhage. *Obstet Gynecol* 2006;108:1039-47.
12. Balki M, Dhumne S, Kasodekar S, et al. Blood transfusion for primary postpartum hemorrhage: a tertiary care hospital review. *J Obstet Gynaecol Can.* 2008;30:1002-7.
13. Yüksel H, Odabaşı AR, Kafkas S, et al. Kadın hastalıkları ve doğum servislerinde kan kullanımı. *ADÜ Tıp Fak Derg.* 2006;7(3):7-11.
14. Stones RW, Paterson CM, Saunders NJS. Risk factors for major obstetric haemorrhage. *Eur J Obstet Gynecol Reprod Biol.* 1993;48:15-8.
15. Thurn L, Wikman A, Westgren M, et al. Massive blood transfusion in relation to delivery: incidence, trends and risk factors: a population-based cohort study. *BJOG.* 2019;126:1577-86.
16. Madhushree D, Metgud MC, Patil K. Retrospective analysis of all patients undergoing blood transfusion in obstetrics at a Tertiary Care Hospital, Belgaum: A cross-sectional study. *Indian J Health Sci Biomed Res (KLEU).* 2018;11(2):116-20.
17. Otton G, Mandapati S, Streatfeild K, et al. Transfusion rate associated with hysterectomy for benign disease. *Aust N Z J Obstet Gynaecol.* 2001;41:439-42.
18. Ng SP. Blood transfusion requirements for abdominal hysterectomy: 3-year experience in a district hospital (1993–1995). *Aust N Z J Obstet Gynaecol.* 1997;37:452-7.
19. Vasudev R, Sawhney V, Dogra M, et al. Transfusion-related adverse reactions: From institutional hemovigilance effort to National Hemovigilance program. *Asian J Transfus Sci.* 2016;10(1):31-6.
20. Neb H, Zacharowski K, Meybohm P. Strategies to reduce blood product utilization in obstetric practice. *Curr Opin Anaesthesiol.* 2017;30:294-9.