RESEARCH

Use Of Blood And Blood Products In Gynecological Cases: A Tertiary Care Center Experience

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Abstract: The primary aim of our study is to determine the frequency of peroperative transfusion in gynecological surgeries performed in our clinic, as well as to reveal the difference between preoperatively prepared and used blood products. The second aim is to investigate whether the preoperative hemoglobin levels, the surgical procedure and previous surgical procedures have an effect on the use of blood products. The file data of patients who had undergone gynecological surgery, including hysterectomy, myomectomy, adnexal surgery, laparoscopy and radical gynecological oncological operations, between January 2017 and August 2021 at Sivas Cumhuriyet University Hospital, Department of Obstetrics and Gynecology were retrospectively analyzed. The patients' age, preoperative hemoglobin levels, indication for surgery, history of surgical operation and/or previous abdominal surgery, postoperative diagnosis, preoperatively prepared and peroperatively used blood products were evaluated. A total of 508 women were included in the study. In the preoperative period, one unit of erythrocyte suspension (ES) was prepared in 353 patients (69.5%), and two units of ES and preoperative fresh frozen plasma (FFP) were prepared in 155 patients (30.5%). It was determined that the ES prepared in 76.2% of the patients and the FFP prepared in 77.8% of the patients were not used. The rate of peroperative ES and FFP transfusion was higher in patients who underwent total abdominal hysterectomy and pelvic paraaortic lymph node dissection. There was a relationship between the pathological diagnoses of the patients and peroperative ES and FFP transfusion (p=0.002). There was no significant difference between preoperative hemoglobin levels and peroperatively replaced ES and FFP transfusions. We have concluded that more than necessary blood preparation was done in the preoperative period. While preparing blood products in the preoperative period, preparation according to the patient's age, pathology and the type of the planned operation will provide significant reductions in perioperative transfusion and costs without any significant change in morbidity and mortality.

INTRODUCTION

Blood transfusion is a life-saving treatment that is equivalent to tissue transplantation and carries many risks. The need for blood and blood components increases for reasons such as the aging of the society and the spread of successful treatment options in many fields such as organ transplantation and cancer treatments. When blood transfusion is administered with the correct indication, along with its beneficial effects, many risks of side effects arise [1]. It may cause complications such as acute hemolytic reaction, transfusion reaction, febrile reaction, and septic reaction. However, it can also cause transfusion-related infections such as HIV, hepatitis, syphilis, and malaria [2]. The most important issue regarding the clinical use of blood is the application of blood transfusion in the appropriate indication, with correctly selected blood components, in the least amount that will meet the need [3]. On the other hand, transfusion of blood products has an important place in health expenditures. Despite the efforts to reduce the use of blood products, there are still institutional and personal differences in transfusion practices [2,3]. It is important to determine the data of our clinics on the use of blood products so that blood products can be used efficiently and obtained when necessary [4].

The fact that the pelvic organs have very bloody tissues and contain important vascular neighborhoods necessitates taking precautions in terms of serious blood loss in gynecological surgical interventions. Especially in cases where fertility should be preserved, blood loss may be excessive in surgical interventions of the uterus and ovaries.

The primary aim of our study is to determine the frequency of peroperative transfusion in gynecological surgeries performed in our clinic, as well as to reveal the difference between preoperatively prepared and perioperatively used blood products. The second aim of our study is to investigate whether the preoperative hemoglobin levels, the surgical procedure and previous surgical procedures have an effect on the use of blood products.

MATERIAL and METHODS

The necessary ethics committee approval was obtained for the study from the Non-Invasive Clinical Research Ethics Committee with the date 26.05.2021 and decision number 2021-05/43.

In this study, the file data of the patients who had undergone gynecological surgery, including hysterectomy, myomectomy, adnexal surgery, laparoscopy and radical gynecological oncological operations, between January 2017 and August 2021 at Sivas Cumhuriyet University Hospital, Department of Obstetrics and Gynecology were retrospectively analyzed. The patients' age,

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preoperative hemoglobin values, indications for surgery, presence of surgical operation and/or previous abdominal surgery, postoperative diagnoses, preoperatively prepared and peroperatively used blood products were evaluated.

Exclusion criteria for the study include presence of existing hematological pathology and preoperative use of anticoagulants.

The data was analyzed with Kolmogorov-Smirnov test for normality. The data was presented as mean (± standard deviation, SD) and median (interquartile range, IQR) as appropriate. To compare non -normally distributed continuous variables, Independent samples T test was used. Categorical variables were compared using Chi-Square test. A multivariate analysis was performed to determine the independent factors associated with blood product use.

RESULTS

A total of 508 women were included in the study. The mean age (± SD) of the patients was 52.42 ± 11.64, and the median (IQR) was 51 (45-59).

FFP and ES were prepared for all patients included in the study. In the preoperative period, one unit of ES was prepared in 353 patients (69.5%), and two units of ES and FFP were prepared in 155 patients (30.5%). It was determined that the ES prepared in 76.2% of the patients and the FFP prepared in 77.8% of the patients were not used (Table 2).

A series of statistical analyzes were performed to evaluate the factors that may be associated with the replacement of blood products in the perioperative period.

he median ages (IQR) of the patients who received ES transfusion in the perioperative period and of the patients who did not ,were 50 (44-57) and 49 (46-60) years, respectively, and there was no significant difference between them (p=0.112).

The median ages (IQR) of the patients who received ES transfusion in the perioperative period and of the patients who did not were 54 (47-63) and 50 (45-57), respectively. The median ages of the patients who replaced FFP transfusion in the perioperative period were statistically significantly higher than those who did not (p=0.007).

The analysis of the effect of age on ES and FFP prepared in the preoperative period revealed that the median age of the patients for whom two units of ES and FFP were prepared in the preoperative period was higher (p=0.000 for both ES and FFP). While the median (IQR) ages of the patients for whom 1 unit of ES and FFP were prepared in the preoperative period were 49 (44-54), the median (IQR) ages of the patients for whom two units of ES and FFP were prepared in the preoperative period was 60 (51-66).

A statistically significant effect of the types of the operations performed on perioperative ES and FFP replacement was found (p=0.000). In bilateral comparisons, it was determined that there were differences between the patients who underwent total abdominal hysterectomy and pelvic paraaortic lymph node dissection, and the patients who underwent myomectomy, total abdominal hysterectomy (with or without bilateral salpingoophorectomy), unilateral salpingoophorectomy, vaginal hysterectomy, and total laparoscopic hysterectomy (p<0.005). It was determined that the rates of perioperative ES and FFP transfusion were higher in the patients who underwent total abdominal hysterectomy and pelvic paraaortic lymph node dissection.

There was no difference between the patients with and without history of previous abdominal surgery in terms of perioperative ES and FFP transfusion (p=0.890 and p=0.847, respectively).

A significant relationship between the pathological diagnoses and peroperative ES and FFP transfusions was found (p=0.002). In paired comparisons, it was determined that there was a statistically higher need for ES transfusion between patients with ovarian cancer and patients with benign endometrial pathology, uterine leiomyoma, adenomyosis, benign adnexal mass and endometrial cancer (p<0.005). In addition, a statistically significant difference was found between the patients with endometrial cancer and the patients with adenomyosis (p<0.005) (Table 3).

There was a significant difference between the patients with benign endometrial pathology and the patients with endometrial hyperplasia in terms of FFP transfusion. It was observed that there was a statistically significantly higher need for transfusion between patients with ovarian cancer and patients with benign endometrial pathology, uterine leiomyoma, endometrial hyperplasia, adenomyosis, benign adnexal mass and endometrial cancer. Similarly, a difference was found between the patients with endometrial cancer and the patients with benign endometrial pathology, uterine leiomyoma, adenomyosis, and benign adnexal mass (p<0.005) (Table 3).

When the relationship between preoperative hemoglobin levels and perioperative ES and FFP transfusion was investigated, no correlation was found for ES transfusion. It was determined that 16.3% of the patients with hemoglobin levels below 12 mg/dl and 41.7% of the patients with hemoglobin levels above 12 mg/dl were given FFP transfusion (p=0.000).

A multivariate analysis was performed to identify independent risk factors for ES and FFP transfusions. For ES transfusion, operation type and the pathological diagnosis, and for FFP transfusion, age, operation type, the pathological diagnosis and preoperative hemoglobin levels were found to be independent predictors.

Table 1. Preoperative diagnosis, operation, pathological diagnosis and history of previous abdominal surgery of the patients

	n (%)
Preoperative diagnosis	
Uterine leimyoma	183 (36)
Pelvic mass	129 (25,4)
Dysfunctional uterine bleeding	43 (8,5)
Endometrial hyperplasia	16 (3,1)
Pelvic organ prolapse	29 (5,7)
Endometrial cancer	108 (21,3)
Operation type	
Myomectomy	62 (12,2)
TAH (with or without BSO)	234 (46,1)
USO	16 (3,1)
Vaginal hysterectomy	25 (4,9)
Laparoskopik myomectomy	3 (0,6)
Total laparoscopic hysterectomy	13 (2,6)
TAH + BSO + PPLND	155 (30,5)
Pathological diagnosis	
Benign endometrial pathology	46 (9,1)
Uterine leiomyoma	232 (45,7)
Endometrial hyperplasia	3 (0,6)
Adenomyosis	19 (3,7)
Benign adnexal mass	51 (10)
Ovarian cancer	48 (9,4)
Endometrial cancer	109 (21,5)
History of previous abdominal surgery	
+	183 (36,1)
-	325 (63,9)

TAH=Total abdominal hysterectomy, BSO=Bilateral salpingo-ophorectomy, USO=Unilateral salpingo-oopherectomy, PPLND=Pelvic paraaortic lymph node dissection).

Table 2. Used as replacement of blood products in patients included in the study

	n (%)
Erythrocyte suspension replacement rates	
None	387 (76,2)
1 unit	59 (11,6)
2 unit	39 (7,7)
3 unit	12 (2,4)
4 unit	7 (1,4)
5 unit	4 (0,8)
Fresh frozen replacement rates	
None	395 (77,8)
1 unit	43 (8,5)
2 unit	26 (5,1)
3 unit	20 (3,9)
4 unit	9 (1,8)
5 unit	6 (1,2)
6 unit	4 (0,8)
7 unit	1 (0,2)
8 unit	1 (0,2)
9 unit	1 (0,2)
10 unit	2 (0,4)

Table 3. Blood product transfusion rates according to pathological diagnosis

Pathological diagnosis	ES replacement, n (%)	FFP replacement, n (%)
Benign endometrial patology	10 (21,7)	2 (4,3)
Uterine leiomyom	46 (19,8)	19 (8,2)
Endometrial hiperplasia	1 (33,3)	1 (33,3)
Adenomiyosis	1 (5,3)	1 (5,3)
Benign adnexal mass	10 (19,6)	4 (7,8)
Overian cancer	22 (45,8)	41 (85,4)
Endometrial cancer	31 (28,4)	45 (41,3)

DISCUSSION

In our study, considering the possibility of experiencing complications related to bleeding in surgery, it was observed that more than anticipated transfusions were planned, but these planned blood products were not used to a large extent. (76.2% of ES and 77.8% of FFP). As a result, it has been determined that it causes economically unnecessary financial losses. The presence of a blood product at the ready makes the surgeon feel safer in the operation, but it can also lead to a more comfortable decision on the transfusion indication. Most of the time, one unit of ES and/or FFP was replaced in patients with borderline hemoglobin levels in the peroperative period.

With a better understanding of the negative effects of transfusion on early and late mortality and morbidity, the fact that clinicians should be more careful about transfusion indications has emerged [5].

Many generalizations have been made to apply appropriate transfusion therapies in acute blood loss. One of the most important rules is that there is no need for replacement therapy in blood losses of 15% or less of the total blood volume. When blood loss is between 15-30%, the majority is replaced with crystalloid solutions, transfusion is only indicated if there is pre-existing anemia or cardiopulmonary disease. When blood loss is 30-40%, previously healthy individuals also need transfusion [6,7].

The World Health Organization defined anemia as <13 g dL hemoglobin in men and <12 g dL hemoglobin in women [8]. For years, hemoglobin levels of 10 g has been used as a transfusion threshold in erythrocyte transfusion in the perioperative period. This approach is no longer accepted. Each case should be evaluated individually with clinical signs and symptoms rather than laboratory values. In individuals with healthy cardiovascular system, much lower hemoglobin levels can provide good tissue oxygenation. It has been reported that most of the surgical patients do not need transfusion unless the hemoglobin level falls below 7 g/dl. However, it has been suggested that low hemoglobin levels also delay wound healing and increase the risk in general anesthesia [9]. The clinical status of the patient should be evaluated in patients with a hemoglobin concentration of 7-10 g/dL [10]. In our study, no statistically significant relationship was found between preoperative hemoglobin levels and blood transfusion in patients. Only 16.3% of patients with hemoglobin levels below 12mg/dl needed ES.

Some drugs taken for the patient's use of anticoagulants or for other indications may alter hemostasis and should be questioned in detail before surgery. During the perioperative period, normovolaemia should be maintained with appropriate crystalloid solutions. Attention should be paid to normothermia throughout the surgery. Hypothermia causes coagulopathy due to impaired platelet aggregation and decreased activity of enzymes in the coagulation cascade [11, 12]. This combination of platelet and enzyme dysfunction typically reduces clot formation and increases perioperative blood loss and the need for transfusion [13, 14].

Prescott et al. [15] in a prospective study in which they evaluated 1281 patients who had undergone gynecological surgery, they evaluated patients who were transfused according to the protocol of the American Society of Hematology, which was compatible with the "Choosing Wisely compaign". In the study, it was determined that they reduced the perioperative transfusion rate from 65% to 23%, and there was no difference between the non-protocol group in terms of mortality, venous thromboembolism or readmission. In addition, significant economic savings have been reported. The risk of peroperative blood transfusion is high in patients with gynecological cancer (41-77%). Boriboonhirunsarn et al. [16] evaluated 260 patients in their study in which they investigated the rates of blood use and factors associated with blood transfusion in gynecological surgery. In their study, 42.7% of the patients had benign uterine pathology and 27.3% had gynecological cancer. The blood usage rate was determined as 11.5%. The need for blood transfusion was found to be significantly higher in cases with gynecological cancer. In their study, it was determined that more than necessary blood was ordered for the operation in parallel with our study. Among the patients included in our study, those who underwent surgery for ovarian cancer and endometrial cancer had the highest need for peroperative blood transfusion. One of the reasons for this may be that paraaortic lymph node dissections are often added together with cancerous tissue in oncological surgery applied to cancer cases. This may be related to both the extent of the surgery performed and the prolongation of the operation time.

In line with all these findings, we have concluded that more than necessary blood preparation was done in the preoperative period. While preparing blood products in the preoperative period, preparation according to the patient's age, pathology and the type of the planned operation will provide significant reductions in perioperative transfusion and costs without any significant change in morbidity and mortality.

Consequently, judicious application of guidelines for the use of various blood products can help reduce the inappropriate use of blood and its components. Transfusion should be avoided in asymptomatic patients with hemoglobin levels equal to or greater than 7 gm/dL, and if it is to be done, it should be preferred at a minimum level in cases such as acute or serious bleeding, acute myocardial infarction, coronary syndrome or symptomatic anemia. Reducing unnecessary transfusions will also reduce the financial burden.

Conflict of interest

The authors declare that there are no conflict of interests.

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