

Research Article

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The effect of iv tranexamic acid on blood loss during myomectomy

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Abstract

Uterine leiomyomas are benign gynecological tumors of the uterus which are commonly seen in women under 50 years of age and they are one of the common reasons of abnormal uterine bleeding. Myomectomy is the most common treatment method among women who want to remain fertile and/or to protect the uterus. Approximately 1-4% of myomectomy operations end up with hysterectomy due to uncontrollable bleeding. Many different methods are used in order to reduce the incidence of uncontrollable bleeding and minimize blood loss. In this study, we have examined the effect of intraoperative intravenous tranexamic acid on blood loss on type 3, 4, 5, and 6 myomas during myomectomy according to FIGO grading and its postoperative results.

Keywords: tranexamic acid, myomectomy, blood loss, uterus

1. Introduction

Regarding myomas presenting with clinical symptoms the rate is about 33% according to literature with the remaining population being incidentally detected. These symptoms may range from variable amounts of uterine bleeding to clinically significant anemia, persistent pelvic pressure, pain, urinary dysfunction and infertility (1-7).

Symptomatic myomas should be treated or followed according to the individual but when concerning treatment options, there is a wide spectrum available from hormonal or nonhormonal medical alternatives to surgical procedures (8). The suitable treatment method is usually determined by considering several factors such as, patient age, number of myomas, fertility preference and the symptoms of the patient. Myomectomy is the most common treatment method among women who want to remain fertile and/or to protect their uterus. Approximately 1-4% of myomectomy operations end up with hysterectomy due to uncontrollable bleeding (9). Many different methods are used in order to reduce the incidence of uncontrollable bleeding and minimize blood loss (10,11).

The use of intraoperative iv tranexamic acid (TXA) is more common than ever in recent years. The fundamental mechanism of action is to reduce bleeding by inhibiting plasminogen activity (12). There are studies in literature suggesting that the use of TXA reduces blood loss during cardiovascular surgery, orthopedic operations, and organ transplantation (13-15).

In this study, we have examined the effect of intraoperative

intravenous tranexamic acid on blood loss on type 3, 4, 5, and 6 myomas during myomectomy according to FIGO grading (16) and its postoperative results. Our secondary purpose was to determine whether TXA use changes the need for blood products.

2. Material and Methods

Eighty patients with type 3, 4, 5, and 6 myomas (FIGO) planned to undergo myomectomy were included in this study. Patients were sequentially enrolled from July 2018 to January 2020 at two tertiary centers. Eighty patients were allocated to study and control groups in a 1:1 ratio design, respectively. The 1st group was injected 10 mg/kg bolus iv TXA within 10 minutes (maximum 1 gr), 15 minutes before the incision. Then infusion was applied continuously for 10 hours within 1 liter of saline as 1 mg/kg/hour. The 2nd group was also given the same amount fluid in the same manner without TXA.

Intraoperative blood loss was calculated in accordance with the blood volume in the aspirator and the weight of the sponge used. Both groups were compared in terms of operation duration, perioperative and postoperative hemoglobin count, hospitalization periods, and intraoperative and postoperative complications.

2.1. Patient selection

Eighty patients with myomectomy indications between 30 and 45 years of age, whose body mass indexes were within the normal limits (BMI: 20-25), who were diagnosed with type 3-6 myomas through trans vaginal ultrasonography (TVUSG) or

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magnetic resonance imaging (MRI) according to FIGO classification and who had 2 and/or 4 myomas, were selected consecutively (1:1). The approximate volume of the myomas were measured by TVUSG using 3-dimensional distance measurements.

Patients with a history of malignant disease, thromboembolic disease, coronary artery disease, cerebrovascular disease and smoking were not included in this study. In addition, patients with a single myoma, or more than 4 myomas were also excluded and also patients included in the study, who regularly use nonsteroid anti-inflammatory drug and acetyl salicylic acid were asked to stop using their medication 10-14 days before the operation. Preoperative hemoglobin, APTT, PT, bleeding time, and coagulation time of the patients were noted. If any kind of blood products were used, preoperatively and/or postoperatively, the number of units used were noted.

2.2. Operation and evaluation

The operations were performed by two experienced surgeons through Pfannenstiel incision and performing by intracapsular myomectomy technique (17). The 1st group was injected 10 mg/kg bolus iv TXA within 10 minutes (maximum 1 gr), 15 minutes before the incision. Then infusion was applied continuously for 10 hours within 1 liter of saline as 1 mg/kg/hour. The 2nd group was also given the same amount fluid in the same manner without TXA.

Total blood loss was calculated by summing up the blood volume in the aspirator, the weight differences between sponges, and the total volume of liquid from the drain. The localizations of myomas were noted postoperatively by the surgeons. Hemoglobin values were noted postoperatively on the 2nd day. The symptomatic patients with hemoglobin values under 8 mg/dl were given blood transfusion. All patients had used antiembolic stockings until they were released from the hospital. All operational complications were noted.

Table 1. Patients' demographics and preoperative data

Particularities	Operation	Control	P Value
Age ^a	39.5 (30-45)	38.5 (30-45)	0.809
Body Mass Index ^a	23 (20-25)	23 (20-25)	0.772
Preoperative PT ^b	12.2 ± 0,9	11.5±0,9	<0.001
Preoperative APTT ^a	32 (36-35)	32 (27-35)	0.505
Preoperative Hb ^b	10.27 ± 0,66	10.11±0,68	0.554
FIGO Grade (n, %) ^c			
Type 6	7 (17,5)	9 (22,5)	0.915
Type 3	13 (32,5)	11 (27,5)	
Type 4	9 (22,5)	10 (25)	
Type 5	11 (27,5)	10 (25)	
Myoma's Volume ^a	295(224-365)	305 (205-320)	0.310

^aMann-Whitney U Test was used

^bT test was used

^cChia test was used

2.3. Statistical analysis

SPSS version 26.0 was used for analysis. Kolmogorov-Smirnov test was made in order to evaluate the normality of the distribution of data. T test was used for normally distributed

numeric variables; Mann Whitney U test was used for non-normally distributed numeric variables. Chi-square test was used for categorical variables. P<0.05 was considered significant.

3. Results

The pre-operational demographics of the patients such as age, gender, BMI, etc., were given in Table 1. The intraoperative and postoperative complication rates, bleeding amounts, transfusion need rates and postop hemoglobin and hematocrite values of 80 patients were given in Table 2. When intraoperative blood loss amounts were compared, it was found that the TXA group's blood loss amount was less than the control group. This difference was statistically significant (p=0.008). Both groups did not need blood transfusion. On the postoperative 2nd day, it was observed that the Hg values decreased less in TXA group when compared to the control group (p=0.002). There was no significant difference between both groups in terms of operation duration (p=0.131).

Table 2. Patients' intraoperative and postoperative attributes

Particularities	Operation	Control	P Value
Operation Period ^a	67 (60-78)	69 (60-75)	0.131
Length of Stay ^a	2 (2-3)	2 (2-3)	0.366
Blood Loss (cc) ^a	155 (115-176)	162.5 (115-180)	0.008
Postoperative Hemoglobin ^b	9.62 ± 0.67	9.35 ± 0.73	0.111
Pre-postop. Hemoglobin Difference ^a	0.65 (0.4-1)	0.75 (1.1-0.45)	0.002

^aMann-Whitney U Test was used.

^bT test was used.

4. Discussion

Uterine leiomyomas are benign gynecological tumors of the uterus which are commonly seen in women under 50 years of age and they are one of the common reasons of abnormal uterine bleeding.

In this study, a comparison of intraoperative bleeding in myomectomy operation was evaluated retrospectively between an intravenous TXA administered group and a placebo group. We have found that the use of intraoperative TXA had a positive impact on reducing the amount of bleeding. There are not many studies in literature regarding the use of TXA in gynecological operations.

In a study, where the amount and duration of TXA use was investigated (18), it was found that the amount of bleeding reduced significantly during operation in patients who were administered TXA before incision when compared to the placebo group and the hemoglobin values of the patients were less affected in the postoperative period.

However, no statistically significant differences were found between the two groups in terms of blood transfusion and operation time rates.

In a study regarding intraoperatively administered TXA's reducing effect on bleeding during myomectomy, the surgical methods employed were all minimally invasive and since the surgical method would affect the incision type and the amount of bleeding, all patients in our study were selected among patients who were operated through Pfannenstiel incision (19).

In another study, injection of oxytocin, TXA, and vasoconstrictive agents into myoma's subcapsular area were mentioned among the options provided to control bleeding throughout myomectomy besides other tourniquet methods. However, the difference of the effect of TXA administration prophylactically before the operation and intraoperative TXA administration was not compared as we did in this study (20).

In another study, it was found that the use of TXA acid did not have an impact on blood loss during myomectomy (21). Unlike our study, that study included patients with only a single myoma.

Although the incision and operation types were similar, it should be noted that there were two active surgeons, the fact that locations of myomas of the patients were different even though they were similar in size, and these would impact the duration of the operation.

In this study, the long-term complications of the patients were not recorded. Neither group needed postoperative blood transfusion in our study. Future studies on this matter may include more patients.

Consequently, we have found that the use of intraoperative TXA had a positive impact on reducing the amount of bleeding. The results of a meta-analysis (22) published on the use of TXA during myomectomy support the results of our study. However, only 4 articles were examined in relevant literature regarding this subject, and it shows that more randomized controlled studies are needed on this matter. In addition, new studies should be conducted about the safe TXA dosage range and its effect on intraoperative blood loss.

Conflict of interest

The authors declared no conflict of interest.

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None to declare.

Authors' contributions

Concept: Ü.K., K.B., Design: Ü.K., K.B., Data Collection or Processing: Ü.K., M.Ö., Analysis or Interpretation: Ü.K., M.Ö., Literature Search: Ü.K., M.Ö., Writing: Ü.K., M.Ö., K.B.

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