

International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622
© Gynaecology Journal
www.gynaecologyjournal.com
2021; 6(1): 61-64
Received: 06-11-2021
Accepted: 23-11-2021

Dr. Sravanthi Sadu
Assistant Professor, Department of
OBG, Vishwabharati Medical
College and General Hospital
Kurnool, Andhra Pradesh, India

Dr. Mohammad Kareemulla Shaik
Assistant Professor, Department of
General Surgery, Sambhram
Institute of Medical sciences,
Kolar, Karnataka, India

Evaluating the efficacy of tranexamic acid in reducing blood loss during abdominal hysterectomy: A randomized controlled trial

Sravanthi Sadu and Mohammad Kareemulla Shaik

DOI: <https://www.doi.org/10.33545/gynae.2021.v5.i6a.1710>

Abstract

Background and Objectives: There is a high risk of perioperative morbidity and blood transfusions because to the substantial intraoperative and postoperative blood loss that is prevalent during abdominal hysterectomy and other common gynecological surgeries. Several surgical techniques have demonstrated a decrease in blood loss when administered tranexamic acid (TXA), an antifibrinolytic drug.

Materials and Methods: This randomized controlled trial involved 60 women receiving elective abdominal hysterectomy for benign gynecological disorders. Patients were randomly assigned to two groups, each consisting of 30 individuals. Fifteen minutes before the skin incision, Group A had 10 mg/kg of tranexamic acid through an IV. Group B got the same amount of normal saline as a placebo. The blood loss, hemoglobin and hematocrit levels before and after surgery, the requirement for blood transfusion, and the side effects were all documented and examined statistically.

Results: On average, the tranexamic acid group experienced considerably less intraoperative blood loss (310.4 ± 55.8 mL) than the control group (460.2 ± 70.6 mL; $p < 0.001$). In Group A, the average amount of blood lost by drains after surgery was 85.3 ± 22.5 mL, which was lower than in Group B, which had 130.7 ± 30.8 mL ($p < 0.01$). Compared to the placebo group, the TXA group had a reduced mean drop in hemoglobin and hematocrit levels postoperatively (Hb: 0.9 ± 0.4 g/dL; Hct: $2.5 \pm 1.1\%$). In the TXA group, 6.7% of patients needed a blood transfusion, but in the control group, 26.7% did. We did not observe any serious side effects or thromboembolic complications.

Conclusion: Without any adverse effects, intravenous tranexamic acid given before abdominal hysterectomy significantly lessens blood loss during and after the operation, keeps hemoglobin levels stable after surgery, and lessens the necessity for blood transfusions. Patients having an abdominal hysterectomy would benefit from its regular use since it is a safe and inexpensive way to enhance perioperative outcomes.

Keywords: Tranexamic acid, abdominal hysterectomy, blood loss, randomized controlled trial, hemostasis, blood transfusion

Introduction

Adenomyosis, irregular uterine bleeding, uterine fibroids, chronic pelvic pain, and other benign conditions are the main indications for abdominal hysterectomy, which is one of the most commonly done gynecological surgery globally. Excessive blood loss is a significant intraoperative and postoperative complication that can occur during this normal surgery [1, 2]. This can cause hemodynamic instability, which in turn increases the need for blood transfusions, lengthens the patient's hospital stay, and increases the overall cost of therapy. Improving surgical results and lowering morbidity necessitates minimizing perioperative blood loss [3, 4].

Methods such as hypotensive anesthesia, careful surgical techniques, and the use of pharmacological drugs that promote hemostasis have all been used to lessen surgical bleeding. Among these, tranexamic acid (TXA) and other antifibrinolytic medicines have demonstrated encouraging outcomes in a range of surgical specialties, including obstetrics, cardiology, and orthopedics. A synthetic analogue of the amino acid lysine, tranexamic acid stabilizes fibrin clots and decreases blood loss by inhibiting fibrinolysis by blocking lysine-binding sites on plasminogen molecules [5, 6].

While TXA has been shown to effectively reduce blood loss after myomectomy and cesarean sections in previous trials, its application in hysterectomy has received less attention, especially in developing nations.

Corresponding Author:
Dr. Mohammad Kareemulla Shaik
Assistant Professor, Department of
General Surgery, Sambhram
Institute of Medical sciences,
Kolar, Karnataka, India

Furthermore, the risk-benefit profile must be thoroughly examined due to safety concerns regarding thromboembolic consequences [7, 8]. In order to determine if tranexamic acid is safe and effective in lowering blood loss after abdominal hysterectomy, this study was conducted. The purpose of this study is to offer proof that tranexamic acid (TXA) is an effective and straightforward way to improve surgical outcomes. Specifically, the researchers will compare the two groups' intraoperative and postoperative blood loss, hemoglobin changes, and transfusion requirements [9, 10].

Material and Methods: This randomized controlled trial was place in the Department of Obstetrics and Gynecology at a tertiary care hospital for a duration of 12 months. This study was conducted at the department of OBG, Vishwabharati Medical College and General Hospital Kurnool, Andhra Pradesh, from Jan 2021 to October 2021. A total of 60 female patients scheduled for elective abdominal hysterectomy due to benign gynecological disorders were enrolled following the acquisition of written informed consent. Before starting the trial, the Institutional Ethics Committee gave its clearance. To reduce variability, the same surgical team did all of the procedures while the patient was under spinal or general anesthesia. Standard monitoring throughout surgery and aseptic methods were used.

Inclusion Criteria

- Women aged 35-55 years undergoing elective abdominal hysterectomy for benign uterine conditions such as fibroids, dysfunctional uterine bleeding.
- Patients with hemoglobin ≥ 10 g/dL before surgery.
- Patients who provided written informed consent to participate in the study.

Exclusion Criteria

- History of thromboembolic disorders.
- Liver or renal impairment.
- Known coagulopathy or use of anticoagulant therapy.
- Known hypersensitivity to tranexamic acid.
- Patients undergoing emergency hysterectomy or surgery for malignancy.
- Pregnant or lactating women.

Results

This trial had 60 patients in all. There were 30 patients in the tranexamic acid group (Group A) and 30 patients in the placebo group (Group B). The groups were similar in age, weight, and starting hemoglobin levels, which made sure that the analysis was fair.

Table 1: Demographic and Baseline Characteristics of Patients

Parameter	Group A (TXA) (n=30)	Group B (Placebo) (n=30)	p-value
Age (years)	44.2 $\pm$ 5.6	43.7 $\pm$ 6.1	0.71
Weight (kg)	65.4 $\pm$ 8.2	66.1 $\pm$ 7.9	0.75
Preoperative Hb (g/dL)	12.3 $\pm$ 0.8	12.5 $\pm$ 0.9	0.49
Preoperative Hct (%)	37.5 $\pm$ 2.1	37.8 $\pm$ 2.3	0.63

Both groups were comparable before the intervention because their demographic and baseline hemoglobin characteristics were

similar. There were no notable variations that warranted statistical analysis.

Table 2: Intraoperative and Postoperative Blood Loss

Parameter	Group A (TXA)	Group B (Placebo)	p-value
Intraoperative blood loss (mL)	310.4 $\pm$ 55.8	460.2 $\pm$ 70.6	<0.001
Postoperative blood loss (mL)	85.3 $\pm$ 22.5	130.7 $\pm$ 30.8	<0.01
Total blood loss (mL)	395.7 $\pm$ 65.2	590.9 $\pm$ 85.3	<0.001

Blood loss during and after surgery was considerably less in patients given tranexamic acid as compared to those given a placebo. As a result of TXA's effectiveness in hemostasis

following abdominal hysterectomy, the total blood loss was approximately 33% lower in that group.

Table 3: Hemoglobin and Hematocrit Changes

Parameter	Group A (TXA)	Group B (Placebo)	p-value
Preoperative Hb (g/dL)	12.3 $\pm$ 0.8	12.5 $\pm$ 0.9	0.49
Postoperative Hb (g/dL)	11.4 $\pm$ 0.7	10.8 $\pm$ 0.8	<0.01
Hb drop (g/dL)	0.9 $\pm$ 0.4	1.7 $\pm$ 0.5	<0.001
Preoperative Hct (%)	37.5 $\pm$ 2.1	37.8 $\pm$ 2.3	0.63
Postoperative Hct (%)	35.0 $\pm$ 1.9	33.0 $\pm$ 2.1	<0.01
Hct drop (%)	2.5 $\pm$ 1.1	4.8 $\pm$ 1.3	<0.001

Reduced perioperative blood loss and better maintenance of hematological status were reflected in the much smaller fall in

hemoglobin and hematocrit levels in the TXA group.

Table 4: Blood Transfusion and Adverse Effects

Parameter	Group A (TXA)	Group B (Placebo)	p-value
Patients requiring transfusion (n)	2 (6.7%)	8 (26.7%)	0.04
Thromboembolic events (n)	0	0	—
Nausea/vomiting (n)	1 (3.3%)	2 (6.7%)	0.55
Allergic reactions (n)	0	0	—

The requirement for blood transfusions was drastically decreased with tranexamic acid. Patients having an abdominal hysterectomy did not have any major side effects or thromboembolic events when using TXA.

Discussion

Hemodynamic instability, blood transfusions, and extended hospital stays are possible complications of abdominal hysterectomy and other common gynecological procedures that involve large amounts of blood loss during and after surgery. Consistent with recent research in gynecological and other surgical populations, the current study shows that intravenous tranexamic acid (TXA) given before skin incision effectively reduces perioperative blood loss and transfusion needs^[11-13].

The average amount of blood lost during surgery in the TXA group (310.4±55.8 mL) was almost 33% less than in the placebo group (460.2±70.6 mL), according to this research. There was less overall blood loss in the TXA group due to less postoperative blood loss through drains. These findings corroborate those of randomized trials where TXA successfully reduced blood loss during gynecological procedures and cesarean sections^[14-16].

The TXA group showed improved maintenance of hematological state, as indicated by a much smaller decline in hemoglobin and hematocrit. Anemia and transfusion-related consequences are increased in cases of high hemoglobin decrease, making this effect clinically essential. Patient safety, as well as the expense and dangers connected with allogeneic blood transfusions, can be enhanced by TXA, as seen by the decreased transfusion requirement (6.7% in TXA group vs. 26.7% in placebo), which further highlights the hemostatic advantage of TXA^[17-19].

Additionally, tranexamic acid's safety profile is validated by the study. Minor side effects, such as nausea or vomiting, were uncommon and similar across groups, and no thromboembolic events were recorded. The results are in line with those of earlier meta-analyses that found TXA to be generally safe in surgical populations when administered at the approved doses^[20-22].

Specifically, tranexamic acid stabilizes fibrin clots and decreases fibrinolysis by blocking the conversion of plasminogen to plasmin. Giving it as a preventative measure before making an incision helps keep plasma levels high enough to halt bleeding during surgery.

This study's results have real-world applications^[23-25]. An economical way to lessen the risk of blood loss, cut down on transfusion needs, and speed up the healing process after an elective abdominal hysterectomy is to use TXA routinely. It is important to carefully identify patients, as there is a risk of thromboembolic complications, renal impairment, or hypersensitivity to TXA^[26, 27].

Conclusion

The current research shows that tranexamic acid given intravenously before an abdominal hysterectomy considerably lessens blood loss during and after the procedure, keeps hemoglobin and hematocrit levels from dropping too much, and cuts down on transfusion needs. Thromboembolic problems and major side effects were not seen, indicating that the intervention was safe and well-tolerated. Patients having abdominal hysterectomy can benefit from tranexamic acid as a dependable and cost-effective supplement to routine surgical care, which improves perioperative results and increases patient safety. Reducing transfusion-related risks and healthcare expenditures may be possible with routine use in carefully selected patients.

Funding: None

Conflict of Interest: None

References

1. Henry DA, Carless PA, Moxey AJ, O'Connell D, Stokes BJ, McClelland B, *et al.* Anti-fibrinolytic use for minimizing perioperative allogeneic blood transfusion. *Cochrane Database of Systematic Reviews*. 2011;1:CD001886.
2. Novikova N, Hofmeyr GJ, Cluver C. Tranexamic acid for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews*. 2015;7:CD007872.
3. Ker K, Edwards P, Perel P, Shakur H, Roberts I. Effect of tranexamic acid on surgical bleeding: systematic review and cumulative meta-analysis. *BMJ*. 2012;344:e3054.
4. Goobie SM, Kulik DM, Shamszad P. Reducing blood loss in pediatric cardiac surgery: role of antifibrinolytics. *Paediatric Anaesthesia*. 2013;23(6):487-500.
5. Maged AM, Elbakry H, Abo Elazm W. Effect of tranexamic acid on blood loss during abdominal hysterectomy. *Journal of Obstetrics and Gynaecology Research*. 2017;43(9):1436-1442.
6. Gai MY, Zhao YY, Chen L, Liu YL. Tranexamic acid for reducing perioperative blood loss in hysterectomy: a systematic review and meta-analysis. *International Journal of Gynecology and Obstetrics*. 2018;142(1):3-11.
7. Wu J, Li M, Luo Y. Efficacy of tranexamic acid in reducing blood loss in abdominal hysterectomy: a randomized controlled trial. *Journal of Obstetrics and Gynaecology*. 2019;39(3):373-379.
8. Lier H, Strassmann M, Stumpner J, *et al.* Safety and effectiveness of tranexamic acid in gynecological surgery. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2014;181:180-184.
9. Senthilkumar R, Choudhury M, Gopalakrishnan N, *et al.* Tranexamic acid in reducing blood loss in elective hysterectomy: randomized trial. *Indian Journal of Obstetrics and Gynecology Research*. 2016;3(4):204-209.
10. Gai MY, Zhang L, Chen L, *et al.* The role of tranexamic acid in gynecological surgeries: a meta-analysis. *Medicine (Baltimore)*. 2017;96(21):e6965.
11. Novikova N, Hofmeyr GJ. Tranexamic acid for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews*. 2010;1:CD007872.
12. Henry DA, Carless PA. Anti-fibrinolytic drugs in elective surgery: systematic review. *BMJ*. 2007;334:1156-1159.
13. Ker K, Edwards P. Anti-fibrinolytic drugs for reducing blood loss in surgery. *Cochrane Database of Systematic Reviews*. 2009;1:CD001886.
14. Shakur H, Roberts I, Bautista R, *et al.* Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients: CRASH-2 trial. *The Lancet*. 2010;376(9734):23-32.
15. Choi S, Song JE, Lee JH, *et al.* Efficacy of tranexamic acid in reducing blood loss in elective abdominal hysterectomy: randomized trial. *Journal of Obstetrics and Gynaecology Research*. 2016;42(10):1333-1338.
16. Senthilkumar R, Rajesh S. Role of tranexamic acid in reducing perioperative blood loss in gynecologic surgery. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017;6(8):3376-3380.
17. Maged AM, El-Bakry H. Preoperative tranexamic acid administration reduces blood loss in hysterectomy. *International Journal of Gynecology and Obstetrics*.

- 2018;141(1):73-78.
18. Goobie SM, Kulik DM, Shamszad P. Antifibrinolytics in pediatric cardiac surgery: review and meta-analysis. *Paediatric Anaesthesia*. 2013;23(6):487-500.
 19. Cao X, Liu J, Li H, *et al*. Effectiveness and safety of tranexamic acid in reducing perioperative blood loss in hysterectomy. *BMC Women's Health*. 2019;19:70.
 20. Ker K, Roberts I. Systematic review of the effectiveness of tranexamic acid in elective surgery. *British Journal of Surgery*. 2012;99(10):1421-1430.
 21. Maged AM, El-Bakry H. Tranexamic acid in elective gynecologic surgeries: a prospective study. *Journal of Obstetrics and Gynaecology*. 2017;37(4):451-455.
 22. Henry DA, Carless PA, Moxey AJ, *et al*. Anti-fibrinolytic drugs for reducing perioperative blood transfusion. *Cochrane Database of Systematic Reviews*. 2011;1:CD001886.
 23. Ker K, Shakur H, Roberts I. Tranexamic acid for reducing blood loss in surgery. *BMJ*. 2013;346:f443.
 24. Liu S, Zhou Y, Wang W. Efficacy of tranexamic acid in reducing intraoperative blood loss in hysterectomy: randomized controlled trial. *Journal of Minimally Invasive Gynecology*. 2018;25(5):861-867.
 25. Senthilkumar R, Rajesh S. Perioperative blood conservation in hysterectomy: role of tranexamic acid. *Journal of Clinical and Diagnostic Research*. 2016;10(10):QC01-QC04.
 26. Maged AM, El-Bakry H, Abo Elazm W. Tranexamic acid reduces blood loss in abdominal hysterectomy: randomized trial. *International Journal of Gynecology and Obstetrics*. 2018;142(2):215-221.
 27. Novikova N, Hofmeyr GJ, Cluver C. Tranexamic acid for preventing postpartum hemorrhage: review of evidence. *Cochrane Database of Systematic Reviews*. 2015;7:CD007872.