

A Study effectiveness of TXA in reducing peri operative blood loss in various orthopedic surgeries at tertiary health care centre

Milind Nivrutti Kolhe^{1*}, Tushar Prabhakar Patil²

¹Assistant Professor, ²Assistant Professor, Department of Orthopedics, Dr Ulhas Patil Medical College, Jalgaon, Maharashtra, India.

Email: kolhe_milind@yahoo.co.in

Abstract

Background: In modern day orthopedic surgeries, apart from the complications directly related to fractures and implants, a surgeon faces numerous perioperative complications. **Aims and Objectives:** Study effectiveness of TXA in reducing peri operative blood loss in various orthopedic surgeries at tertiary health care centre. **Methodology:** This was a cross-sectional study carried out in the patients undergoing the various orthopedic surgeries where more blood lost is anticipated during the one year period i.e. January 2019 to January 2020 by taking written and explained consent so during the one year period 60 patients were enrolled to study by all standard protocols. Out of them 30 included in Group A: Given tranexamic acid (TXA) intravenously and remaining 30 Group B: Given no any special drugs except routine management of patient. The statistical analysis was done by chi-square test and unpaired t-test SPSS 19- version software. **Result:** In Our study we have seen The average age in both the groups was comparable i.e. 45.73±4.28 and 46.19±3.27 ($p>0.05, t=0.64, df=58$) and the male to female composition was also comparable i.e. 2.33:1 and 2:1 ($X^2=0.17, p>0.05, df=1$). Pre-operative HB (mean ± SD)- 11.29± 1.87 and 11.92± 0.98 ($p>0.05, t=0.98, df=58$); Pre-operative HC (mean ± SD)- 34.92±4.12 and 35.78± 3.74 ($p>0.05, t=0.34, df=58$) was comparable but the Post-operative HB (mean ± SD) was 10.41± 1.76 and 9.42±2.87 ($P<0.001, t=7.89, df=58$); Post-operative HC (mean ± SD)- 33.57±4.98 and 33.72± 3.78 ($P<0.001, t=8.92, df=58$); Post operative blood lost in ml (mean ± SD)- 683± 31.21 and 769±20.78 ($P<0.0001, t=10.34, df=58$) was significantly differed in Group A as compared to Group B. **Conclusion:** It can be concluded from our study that the patients who was treated with TXA were significantly less blood lost peri-opretatively assessed by the various parameters like post operative HB, HC, blood lost hence it should be preferred to reduce blood lost whenever feasible. **Key words:** Tranexamic acid (TXA), Blood lost, Hemostasis.

*Address for Correspondence:

Dr Milind Nivrutti Kolhe, Assistant Professor, Department of Orthopedics, Dr Ulhas Patil Medical College, Jalgaon, Maharashtra, India.

Email: kolhe_milind@yahoo.co.in

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INTRODUCTION

In modern day orthopedic surgeries, apart from the complications directly related to fractures and implants, a surgeon faces numerous perioperative complications. These range from excessive intraoperative and

postoperative blood loss, infection, poor wound healing, electrolyte imbalance to even acute renal shut down and shock. Surgeries in orthopedics being more invasive leads to more blood loss when compared to other surgical specialties¹ Various Orthopedic surgeries accounts for a significant proportion of all perioperative blood lost and requires packed red blood-cell transfusions². It is known that perioperative anemia and RBC transfusions are associated with increased healthcare resource utilization, hospital length of stay, delayed recovery and higher rates of postoperative morbidity and mortality^{3,4}. Various techniques have been introduced to reduce blood loss in the perioperative period and perioperative antifibrinolytic therapy is recommended as part of a comprehensive perioperative blood management strategy⁵. The use of antifibrinolytic agents is based on the fact that surgical

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trauma besides promoting clot formation by activating the intrinsic and extrinsic coagulation cascades also leads to a concomitant activation of plasminogen inducing a state of hyperfibrinolysis accelerating clot degeneration and increasing surgical site bleeding. Tranexamic acid (TXA) is a synthetic analogue of the amino acid lysine that reversibly occupies lysine-binding sites on plasminogen preventing its binding to the surface of fibrin and activation, resulting in inhibition of fibrinolysis⁶. Since the pioneering work of Hiippala and Benoni and colleagues^{7,8} many prospective randomized studies and meta-analyses have confirmed the effectiveness of TXA to reduce perioperative blood loss and the need for allogenic and autologous blood transfusion in patients undergoing TKA⁹. So we studied the effectiveness of TXA in reducing perioperative blood loss in various orthopedic surgeries at tertiary health care centre.

METHODOLOGY

This was a cross-sectional study carried out in the patients undergoing the various orthopedic surgeries where more blood lost is anticipated during the one year period i.e. January 2019 to January 2020 by taking written and explained consent so during the one year period 60 patients were enrolled to study by all standard protocols. Out of them 30 included in Group A : Given tranexamic acid (TXA) intravenously and remaining 30 Group B : Given no any special drugs except routine management of patient. The patients randomly enrolled two above groups by computer generated random numbers. The investigations like –HB, Hematocrit were carried out pre-operatively and post operatively. The post operative blood lost was measured by dry and wet mop method and measurement of drain for 24 hours. The statistical analysis was done by chi-square test and unpaired t-test SPSS 19- version software.

RESULT

Table 1: Distribution of the patients as per the age and sex

	Group A (n=30)	Group B (n=30)	p-value
Average Age (mean ±SD)	45.73±4.28	46.19±3.27	p>0.05,t=0.64,df=58
Sex			
Male	21	20	X ² =0.17,p>0.05,df=1
Female	9	10	

The average age in both the groups was comparable i.e. 45.73±4.28 and 46.19±3.27 (p>0.05,t=0.64,df=58) and the male to female composition was also comparable i.e. 2.33:1 and 2 :1 (X²=0.17,p>0.05,df=1).

Table 2: Distribution of the patients as per the peri-operative blood lost in both the groups

Peri-operative blood lost	Group A (n=30)	Group B (n=30)	p-value
Pre-operative HB (mean ± SD)	11.29± 1.87	11.92± 0.98	p>0.05,t=0.98,df=58
Pre-operative HC (mean ± SD)	34.92±4.12	35.78± 3.74	p>0.05,t=0.34, df=58
Post-operative HB(mean ± SD)	10.41± 1.76	9.42±2.87	P<0.001,t=7.89, df=58
Post-operative HC (mean ± SD)	33.57±4.98	33.72± 3.78	P<0.001,t=8.92, df=58
Post operative blood lost in ml (mean ± SD)	683± 31.21	769±20.78	P<0.0001,t=10.34, df=58

Pre-operative HB (mean ± SD)- 11.29± 1.87 and 11.92± 0.98 (p>0.05,t=0.98,df=58); Pre-operative HC (mean ± SD)- 34.92±4.12 and 35.78± 3.74 (p>0.05,t=0.34, df=58) was comparable but the Post-operative HB(mean ± SD) was 10.41± 1.76 and 9.42±2.87 (P<0.001,t=7.89, df=58); Post-operative HC (mean ± SD)- 33.57±4.98 and 33.72± 3.78 (P<0.001,t=8.92, df=58); Post operative blood lost in ml (mean ± SD)- 683± 31.21 and 769±20.78 (P<0.0001,t=10.34, df=58) was significantly differed in Group A as compared to Group B.

DISCUSSION

Pharmacological agents can be used to achieve hemostasis during and after surgery by altering the delicate balance between blood clotting and fibrinolysis. During a surgical insult there is activation of the clotting mechanism. In order to check uncontrolled clot formation fibrinolytic

mechanism also get activated simultaneously. Drugs used to reduce blood loss inhibit the fibrinolytic mechanism. Aprotinin, epsilon amino caproic acid and tranexamic acid are the three drugs in this group¹. Tranexamic acid has the same mechanism of action as EACA, with comparable efficacy and safety at a lower cost. In high blood loss

surgeries it is given intravenously at a dose of 10 mg per kg body weight, which can be repeated once or twice after 4 h. It is also available in oral formulation which can be used at a dose of 25 mg per kg body weight in prostatectomy, minor gynecological procedures, menorrhagia, epistaxis, haemophilia and hereditary angioneurotic edema. There are numerous studies with this drug that proved its efficacy.¹¹⁻¹³ Also a study conducted in our hospital showed this drug to be effective in reducing blood loss and transfusion in total knee replacement patients.¹⁴ In addition to the usual intravenous route this drug can be used topically as demonstrated by Wong *et al.* wherein 1.5 or 3 g of tranexamic acid in 100 ml of normal saline was applied to the joint surface for minutes at the end of surgery.¹⁵ In Our study we have seen The average age in both the groups was comparable i.e. 45.73±4.28 and 46.19±3.27 ($p>0.05, t=0.64, df=58$) and the male to female composition was also comparable i.e. 2.33:1 and 2 :1 ($X^2=0.17, p>0.05, df=1$). Pre-operative HB (mean ± SD)- 11.29± 1.87 and 11.92± 0.98 ($p>0.05, t=0.98, df=58$); Pre-operative HC (mean ± SD)- 34.92±4.12 and 35.78± 3.74 ($p>0.05, t=0.34, df=58$) was comparable but the Post-operative HB(mean ± SD) was 10.41± 1.76 and 9.42±2.87 ($P<0.001, t=7.89, df=58$); Post-operative HC (mean ± SD)- 33.57±4.98 and 33.72± 3.78 ($P<0.001, t=8.92, df=58$); Post operative blood lost in ml (mean ± SD)- 683± 31.21 and 769±20.78 ($P<0.0001, t=10.34, df=58$) was significantly differed in Group A as compared to Group B. These findings are similar to Kuan-Ting Wu ¹⁶ *et al.* they found Administration of TXA is not only effective in reducing perioperative blood loss and length of hospital stay but also exerts an anti-inflammatory effect following CAS-TKA without causing major complications

CONCLUSION

It can be concluded from our study that the patients who was treated with TXA were significantly less blood lost peri-opretatively assessed by the various parameters like post operative HB , HC, blood lost hence it should be preferred to reduce blood lost whenever feasible.

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