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Othropedics

Tranexamic Acid as Anti-Fibrinolytic to Control Blood Loss during Pre and Post Hemiarthoplasty of Trance Cervical Fracture Neck Femur

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Abstract: Major orthopedic surgeries are commonly associated with marked blood loss, which is associated with post operative mortality and morbidity. The causes of bleeding are multifactorial, increased fibrinolytic activity being one of them. Antifibrinolytic activity of Tranexamic acid may reduce peri-operative blood loss. To study the effect of inj. Tranexamic acid in reducing post operative blood loss. The present randomized control study was conducted on 41 patients with fracture neck femur who undergone bipolar hemiarthroplasty at tertiary care teaching hospital of medical college. All the participants were randomly divided in to test and control group. Test group (n=21) patients received injection Tranexamic acid and control group (n=20) received placebo. The average amount of blood loss in test group and placebo group was 400-450 ml and 700 to 1000 ml respectively. Blood loss was found to be 60% less in test group as compared to placebo group. The present study conclude that, injection Tranexamic acid may be use as anti-fibrinolytic to control blood loss during pre and post hemiarthoplasty of trance cervical fracture neck femur.
Keywords: Inj Tranexamic acid, Hemiarthoplasty, Fracture neck femur, Blood loss.

INTRODUCTION

Since ancient era bleeding is main hindrance in surgical care. Despite recent advances in techniques of orthopedic surgery and mechanical improvements of implants [1]; major and supra major orthopedic surgeries are commonly associated with bleeding, and a subsequent blood transfusion is often needed. Furthermore, transfusion can cause complications, including anaphylactic and allergic reaction to blood products and infections and even death [2].

Peri-operative blood loss is a common complication of orthopedic surgery that has been linked to post-operative mortality [3].

With the aging of society and the increasing number of old people with osteoporosis, the incidence rate fractures are increasing [4]. Trans-cervical fracture of the neck of femur is seen in all age groups while the inter trochanteric fracture of the neck of femur is seen mostly in old age, which is also associated with osteoporosis and other diseases like hypertension and diabetes mellitus. Trans-cervical fracture is intra capsular type of fracture of neck of femur which is known for bleeding during surgery, due to release of soft tissue from surrounding structures. The causes of bleeding are multifactorial, increased fibrinolytic activity being one of them [5] although bleeding from these surgical sites is usually controllable; there may be significant blood loss. Several approaches have been tried to reduce intraoperative blood loss, and each of one these have own both advantages and disadvantages. The alternate approaches are administration of ant fibrinolytic agents such as tranexamic acid (TA) preoperatively to stabilize the multiple micro-clots that form within the surgical wound.

Tran's cervical fracture is intra capsular type of fracture of neck of femur which is known for bleeding during surgery, due to release of soft tissue from surrounding structure. In India hemiarthroplasty with 'southern approach' is a treatment of choice for trans-cervical fracture neck femur. As this approach is through muscles it leads to bleeding even after use of electrocautery to split the muscle.

Tranexamic acid is a synthetic derivative of the amino acid lysine (4-aminoethyl cyclohexane carboxylic acid) [6]. Tranexamic acid exerts its antifibrinolytic effect through the reversible blockade of lysine binding sites on plasminogen molecules, thereby reducing the conversion of plasminogen to plasmin. Hence, it blocks the dissolution of hemostatic fibrin, which stabilizes fibrin structure and thus may decrease the blood loss secondary to increase fibrinolysis [7, 8]. Tranexamic acid has been used in neuro, orthopedic, cardiac, spine and maxillofacial surgeries and has reduced the amount of blood loss and subsequent need for blood transfusion [9-14]. With this background present randomized controlled study was conducted at tertiary care medical teaching hospital to study the effects of Inj. Tranexamic acid to reduce peri and post operative blood loss during bipolar hemiarthroplasty for the treatment of trans-cervical fracture of the neck of femur.

MATERIALS AND METHODS

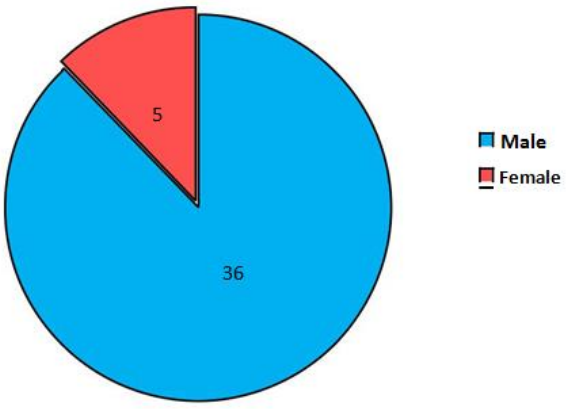
The present randomized control study was conducted on 41 patients with fracture neck femur who undergone bipolar hemiarthroplasty at tertiary care teaching hospital of medical college. Those patients who were willing to give written informed consent were recruited by using purposive sampling method. Those patients who had history of blood dyscrassis, known allergic to test drug were excluded. All the participants were randomly divided in to test and control group. Test group (n=21) patients received injection Tranexamic acid and control group (n=20) received placebos. All participants had history of road traffic accidents with pain, swelling, fracture of hip joint, and deformity of lower limb in external rotation and abduction. Garden's type III and IV was done in all these cases. Austin moor femoral head implant was used for treatment of Trans cervical fracture of the neck of femur. Southern surgical approach was used for hemiarthroplasty. The blood loss 700-1000 ml during and after surgery considered significant. Injection Tranexamic acid 10 mg/ kg body weight was given intravenously slowly over a period of 10 to 15 minutes. Routine blood investigation, cardiogram and 2-D echo for anesthesia were carried out for the entire patient.

OBSERVATION AND RESULTS

Out of all participants, in test and control group 21 and 20 patients were randomly allocated respectively. The mean age of the test and control participants was 55.19 ± 5.90 and 54.65 ± 6.76 respectively. There was no statistical difference was observed in the between the mean age of test and control group participants (Unpaired't' test t=0.27, P=0.78 Non significant) (Table 01). Out of all patients 87.80% (36) and 13.88% (05) were male and females respectively (Fig 01). In present study during and after surgery there was 60% decrease in blood loss in test group as compared to placebo group (Table 02). The average amount of blood loss in test group and placebo group was 400-450 ml and 700 to 1000 ml respectively.

Table-01: Age wise distribution of the patients (n=41)

Sr. No.	Age group	Test group (21)	Control group (20)`	Total
1.	45 to 50 Yr.	06	03	09 (21.95%)
2.	51 to 55 Yr.	07	07	14 (34.14%)
3.	56 to 60 Yrs	05	06	11 (26.82%)
4.	≥ 61 Yrs	03	04	07 (17.07%)
	Total	21 (51.21%)	20 (48.78%)	41 (100%)
	Mean age ± SD	55.19 ± 5.90	54.65 ± 6.76	Upaired 't'
				P=0.78 NS



Graph-01: Gender wise distribution of the participants (n=41)

Table-02: Blood loss per group

Group	Blood Loss
Test group	400-450 ml
Placebo group	700-1000 ml

50 to 60% less blood loss in test group as compared to placebo

DISSCUSSION

The present study was conducted at tertiary care medical teaching hospital; to study the role of injection Tranexamic acid as anti-fibrinolytic to reduce blood loss during pre and post hemiarthroplasty of trance cervical fracture neck femur. Total 41 patients participated in study, who were randomly divided in to test and placebo group. In present study 60% less blood loss was observed in test group as compared to placebo group. Similar finding was observed in a study conducted by Vijay BS *et al*. [5]. In our study the average amount of blood loss in test group and placebo group was 400-450 ml and 700 to 1000 ml respectively. In study conducted by Vjiay BS *et al*. [5] mean volume of blood in test group was 39.33 ± 10.09 ml as compared to 91.11 ± 17.61 ml of placebo group and difference was found to be statistical significant ($P<0.001$).

CONCLUSION

The present study conclude that injection Tranexamic acid may be use as anti-fibrinolytic to control blood loss during pre and post hemiarthoplasty of trance cervical fracture neck femur.

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