



DOES TRANEXAMIC ACID REDUCE BLOOD LOSS IN CARDIAC SURGERY? OUR EXPERIENCE

Surgery

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ABSTRACT

Cardiac surgery is a fascinating field in surgery but bleeding in post operative period remains a night mare for the cardiac surgeons. Bleeding may be due to surgical or medical bleed following cardiac surgery. Surgical bleed requires reexploration but medical bleed generally requires blood and product transfusions. Blood and blood transfusion has its own pros and cons. Tranexamic acid- an antifibrinolytic agent is thought to decrease the medical bleed. In this article we study the usefulness of tranexamic acid in postoperative bleeding undergoing cardiac surgery in Rajiv Gandhi government general hospital, Chennai

KEYWORDS

Tranexamic acid, coagulation abnormalities, medical bleed, blood transfusion

BACKGROUND

Cardiac surgery has grown up with regard to technical advances and major cardiac anomalies are repaired, majorly aided and eased with the advent of cardio pulmonary by pass. But the use of cardio pulmonary by pass has not been free from adverse effects. The commonest function to be hampered is disruption in the normal coagulation system, leading to trivial to significant blood loss due to hemodilution. After receiving the patient in post operative room, if there is significant or obscene bleeding, it possibly is due to a surgical cause whereas if there is a steady rise in drains then it could be termed as medical bleed. Medical bleeding can be rectified by various measures compensating the loss with blood and blood products, protamine to neutralize heparin and administration of anti fibrinolytics like tranexamic acid.. Tranexamic acid is a water soluble lysine analog. Onset of action is rapid by intravenous route. The biological half life is two to three hours and the drug is totally cleared by renal route. One popular trial had tranexamic acid given in doses of 10 to 15 milligram per kilogram of body weight.

The adverse effects of tranexamic acid are lesser morbid and organ toxicity has rarely happened. Use of tranexamic acid has considerably reduced post operative bleed in patients known to have a higher propensity of bleeding. The efficiency of tranexamic acid in controlling post operative has been elaborately studied check for the efficacy of this drug in reducing the immediate medical bleed in patients undergoing cardiac surgery in Rajiv Gandhi government general hospital.

AIM OF THE STUDY

The study was designed with the primary AIM of evaluating the effect of tranexamic acid in reducing the bleeding tendency in immediate post operative period for patients who have undergone cardiac surgery.

To evaluate whether tranexamic acid reduces the need for red cell transfusions.

MATERIAL AND METHODS

This study, designed to be prospective and randomized was undertaken as an observational evaluation on the topic of usefulness of tranexamic acid in reducing post operative bleed in patients undergoing cardiac surgery. This study was conducted in the department of cardio thoracic surgery at Rajiv Gandhi government general hospital, Chennai.

This study design was during the year 2015 to 2018, and we used a descriptive analytical method. All patients undergoing cardiac surgery involving cardiopulmonary bypass were included in the study. Those who had previous coagulation disorder, renal and liver dysfunction were excluded from the study. Relevant information was documented in a specially designed proforma.

sixty patients undergoing cardiac surgeries were randomized into a group of two, thirty each. One group of thirty patients would receive tranexamic acid, loading dose of 15 milligram per kilogram of body weight, five minutes before skin incision and one more similar dose after weaning from CPB. The other group would not receive tranexamic acid.

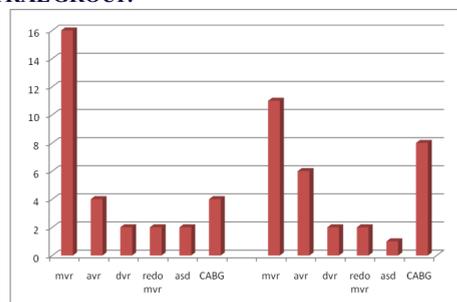
Assessment of efficacy was obtained by evaluating post operative data.

OBSERVATION

EPIDEMIOLOGICAL DATA

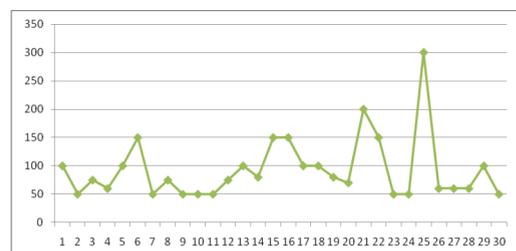
Out of 60 pts 30 were in study group and 30 were in control group. In study group 4 were in age group of 15-25yrs, 14 in 26-35 yrs, 7 in 36-50 yrs and 5 in more than 50 yrs. And in control group 3 were in age group of 15-25 yrs, 12 in 26-35 yrs, 12 in 36-50yrs and 3 in more than 50 yrs.

TYPE OF SURGERY IN 1) TRANEXAMIC GROUP AND 2) NEUTRAL GROUP.



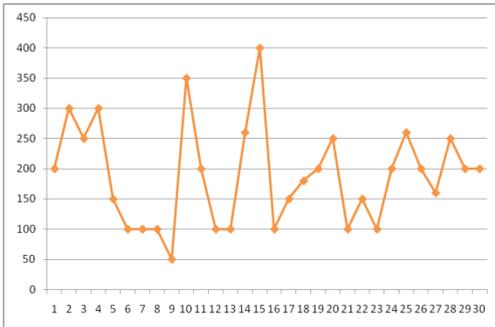
In both study group and neutral group mitral valve replacement followed by coronary bypass grafting remains the major surgeries.

DRAIN TREND IN TRANEXAMIC GROUP. EXPRESSED IN MILLILITER OVER FIRST SIX HOURS



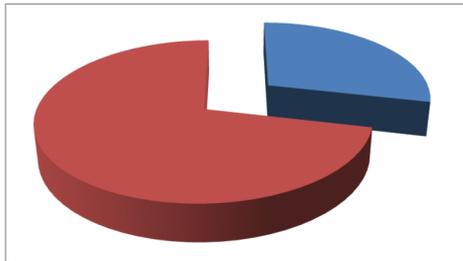
Post op drain -mean 120 ml over six hours.std deviation -5.781. p -value-0.256.

DRAIN TREND IN NEUTRAL GROUP...BLOOD LOSS EXPRESSED IN MILLILITRE FOR THE FIRST SIX HRS



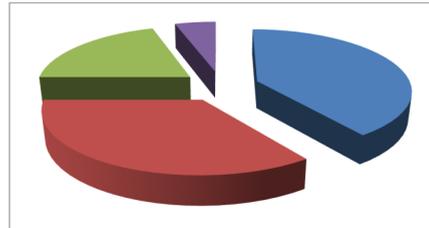
Post op drain at six hours- average..250 ml-std deviation-5.93 l and P-value 0.421.

PACKED CELL TRANSFUSION IN STUDY GROUP



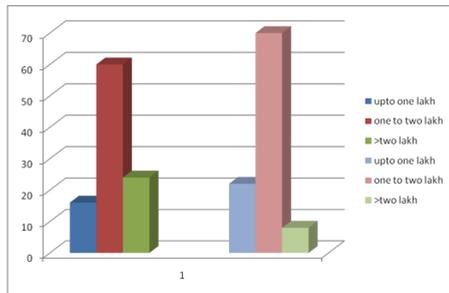
40%of patients who received one unit of packed cells. 60% percentage of people who did not receive transfusion.

PACKED CELL TRANSFUSION IN NEUTRAL GROUP.



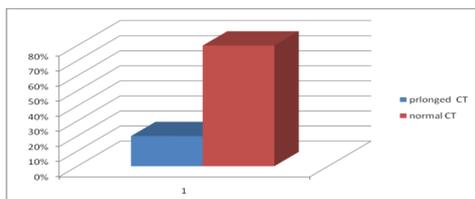
40% (maroon) who received one unit of packed cell. 35% (blue) received two units of packed cell. 20% (green) who received three units of packed cells. 5% (purple) who did not receive transfusion.

PLATELETS IN IMMEDIATE POST OP...IN BOTH GROUPS.



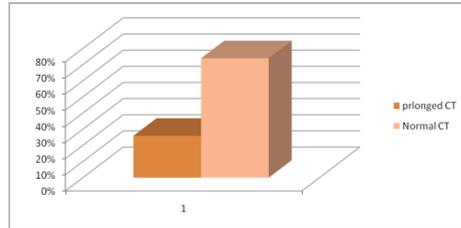
The darker colour illustration is the tranexamic acid group, and the lighter colour represents the neutral group. Mean-1.1 lakh and std deviation- 20.57 and p value - 6.840

CLOTTING TIME IN TRANEXAMIC ACID GROUP.



Mean 6 mts. std deviation-4.620. p value-0.27

CLOTTING TIME IN NEUTRAL GROUP.



Pearson chi square test. 0.039. P value.....0.744

DISCUSSION

This study was designed as a prospective and randomized study. This study was carried out in the department of cardiothoracic surgery, Rajiv Gandhi government general hospital in the year 2015 to 2018.

The study included 60 patients undergoing cardiac surgeries in our department. They were randomized into a group of two, one group of patients received tranexamic acid at a dose of fifteen mg per kg body weight of the patient. One loading dose five min before skin incision and one on weaning patient from CPB. The other group did not receive tranexamic acid. The patients were operated by single team of doctors, follow up charted meticulously, and recorded data converted into analytical data with the help of a statistician. The patients had their routine follow up. Clinical signs for medical bleed were carefully monitored. Drain levels documented. Transfusions of packed cell decided based on haematocrit. There was no patient in either group who had to be rereported.

The drain trends were definitely higher in the group that did not receive tranexamic acid. This group was always referred to as the neutral group. The neutral group did not receive any tranexamic acid at induction nor on weaning on CPB. The beneficial effects were obvious with tranexamic acid group in the immediate post op. The age distribution was almost similar to both groups. The young adult population seemed to dominate in both groups, underlining the higher incidence of rheumatic heart disease in that group.

And among the distribution of the pathology of heart diseases, mitral valve replacement was on top in both groups with 52% in tranexamic acid group and 42 % in neutral group, and CABG was more in neutral group, 24%.

The drain levels in tranexamic acid was an average of 100 ml over first six hours as compared to 250 ml of neutral group, the difference is striking, although the p value is not significant, the trend definitely points to the use of tranexamic acid in reducing post operative bleed. The drain levels at twelve hours of post op period in both the groups are not too different, with an average of 100 ml and 150 ml in tranexamic and neutral group respectively. The drain levels at twenty four hours remained almost similar, averaging 50 and 100 ml respectively. The benefits of tranexamic acid in reducing post operative bleed is obvious, yet the benefits after twenty four hours were not very obvious. The coagulation tests done on either group showed mild beneficial trends towards tranexamic acid. There was a minimal difference in clotting time, with both groups having 65 to 68% of patients with normal clotting time. And so were the results with the platelet counts with no gross disparity between the groups. The need for packed cell transfusion was only one unit in 45% and the remainder was not transfused in tranexamic acid group. About 40% were transfused with one unit, 35% with two units, and 20% with three units in the neutral group. This reflects the obvious trend of increased need of red cell transfusion in the neutral group. The platelet transfusions were given at eight hours or later only if there was a rebound bleed. About four units transfused, if required. There was no difference in platelets that was transfused, between the groups.

RESULTS

The observation and the analytical data from this prospective, randomized study yielded the following results.

- In this study, either group had a preponderance of young adult population. The age group of 25 to 36 were about 50% and 45% in tranexamic and neutral group.
- Mitral valve replacement was among the highest in both groups

- with close to 50 and 42% in tranexamic and neutral group.
- The mean post operative drain at six hours were 120 ml and 250 ml in tranexamic acid and neutral group, higher drain tendencies were reported in the neutral group. The p value was 0.27 not very significant, yet the trend reflects in favour of tranexamic acid.
- The need for red cell transfusion or packed cells were, only 45% required one unit of packed cell, in tranexamic acid group.
- The need for packed cell transfusion in neutral group was like, 40% required one unit, 35% required two units, and 20% required three and more, with 5% not requiring transfusion..
- The clotting time tests were almost similar with not much of disparity, but a smaller trend of benefit in tranexamic acid group, which had 20% of prolonged clotting time, six percent lesser than the tranexamic acid group.
- The platelet counts too, showed a benefit trend towards tranexamic acid group. The p value was not significant though, with 0.587
- There were no incidence of reoperation due to bleeding in either groups.

CONCLUSION

- In this study, we come to the conclusion that using tranexamic acid reduces immediate post operative bleeding and significantly reduces the morbidity of the patient. However there is not much benefit in post operative period beyond twenty four hours.
- The need for packed cell transfusion also is significantly lesser with the tranexamic acid group.
- The abnormalities in clotting time and platelets were almost similar with no statistical significance in either group, but showing marginal beneficial trend in tranexamic acid group.
- Tranexamic acid has been an efficient, cost effective and simple way in controlling post operative bleed in patients undergoing cardiac surgery.

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