ORIGINAL ARTICLE

To Assess the Prophylactic Role of Tranexamic Acid in Reducing Blood Loss during and After Two Hours of Caesarean Section

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ABSTRACT

Aim: To assess the prophylactic role of tranexamic acid in reducing blood loss during and after two hours of caesarean section.

Methods: This randomized controlled trial study was conducted at Lady Aitcheson Hospital, Lahore Unit-4, King Edward Medical University over a period of one year from 1st January 2016 to 31st December 2017. Sixty two participants were enrolled in study. Patients were divided into two groups i.e. group A and group B, randomly using Microsoft excel 5.0 random number generator. The patient groups were matched according to their mean age, parity, gestational age and indication of LSCS. 1gm tranexamic acid (TXA) was given to the subjects included in group A, by slow intravenous injection by the anaesthetist, over 5min at time skin incision. The members of group B were not given TXA. The experienced 3rdyear resident of Gynecology and Obstetrics preceded caesarean section. Later, the duty doctor measured the blood loss at two stages. 1stblood loss was measured after the placental delivery till end of LSCS while 2nd at end of LSCS to two hours after baby birth.

Results: Women participated in study had mean age of 27.76±4.79 yrs with mean gestational age was 39.16±1.17 weeks. The mean preoperative Hb in all cases was 11.13±0.69 mg/dL. The mean calculated estimated blood loos in group A (Tranexamic acid given) was 711.78±20.89 and in group B (Tranexamic acid not given) was 866.92±39.23 with significantly lower mean estimated blood loos, p-value <0.001. The mean difference in Hb was 0.46±0.10 in the group A & 0.82 ± 0.13 in the group B with significantly lower change in Hb level, p-value < 0.001. No blood transfusion complication or side effect was noted in group A.

Conclusion: Current study elaborates the positive effect of the acid: Tranexamic, resulting in reduced blood loss, but does not reduce Hb in patients giving the birth by CS. No adverse side effect and complication was found. So, in future TA can be utilized in females undergoing caesarean section to reduce burden of blood transfusions.

Key words: Cesarean section, Blood loss, Blood transfusion, Side effects

INTRODUCTION

Lower segment caesarean section (LSCS) rates, in many areas worldwide, has increased to as high as 25% to 30%[1], whereas elective LSCS has been reported at about 11%[2]. compared to vaginal deliveries, LSCS have a higher blood loss volume.[3] In spite of considerable progress made in obstetric care, around 125,000 maternal deaths have been reported annually worldwide, due to obstetric hemorrhage. Such a high number of deaths is the reason why bleeding during a delivery procedure is always of primary concern[4].

Till date, one of the major, maternal mortality and morbidity, determinants is obstetric haemorrhage, in both developed and under-developed countries. For this reason, obstetric hemorrhage (ante-partum and postpartum hemorrhages) must be investigated[5]. It has been observed, to decrease the risk of major hemorrhage, use of prophylactic utero-tonic drugs are most effective[6]. The World Health Organization (WHO) included TXA-Tranexamic acid in the list of essential medicines. The treatment with TXA is preferred in all countries as it is a very effective treatment along with being cost effective[7]. TXA is an artificial analog of Lysine (amino acid), used for either treatment or to stop excessive bleeding, in the course of the surgery and/or different clinical conditions or disorders (helping haemostasis). The acid is antif-ibrinolytic agent, which works by binding the specific, definitive sites of both the plasminogen and the plasmin, therefore, the acid competitively avoids the activation of plasminogen to produce plasmin. Plasmin, a protein accounts for the degradation of fibrin (the main protein responsible for blood clotting). The antifibrinolytic activity of TXA is approximately 8 times more than an older analogue ε-aminocaproic acid. The treatment may be responsible for condition like thrombosis[8].

It was seen that the acid also remarkably minimized amount of blood loss from placental delivery to 2 hrs postpartum, by 372.71 mL in TXA group, versus the 469.70 mL in non-TXA group (p= 0.003). there were no reports of adverse effects in either group[9]. Likewise, another study supported the use of TXA, as the results showed a notable decline in blood loss in patients given TXA treatment when compared with control group for both intra-operative blood loss (262.5± 39.6 mL vs 404.7± 94.4 mL) while for post-operative blood loss (67.1±6.5 ml vs 141.0±33.9 ml)[1]. Tranexamic acid was effective against bleeding during the elective LSCS procedure. There have been studies conducted that have concluded the safety and efficacy of TXA. Tranexamic acid minimized need to use other uterotonic agents as well.[11]

MATERIALS AND METHODS

This randomized controlled trial study was conducted at Lady Aitcheson Hospital, Lahore Unit-4 King Edward Medical University over a period of one year from 1st January 2016 to 31st December 2017. Sixty two participants were enrolled in study. Patients with

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primigravida and multi-parous women, term pregnancy and women undergoing elective caesarean section were included. Women on therapy of anti-coagulation, abnormal coagulation profile, anaemia, pre-eclampsia/eclampsia, abnormal placentation (placental abruption and placenta praevia), multiple pregnancy, macrosomia, previous history of thrombo-embolism and polyhydroamnios were excluded. The study participants were randomly divided into two groups i.e. A and B, after fulfilling the inclusion criteria. The written informed consent was taken from each patient. Using Microsoft excels 5.0 random number generators and matched according to their mean age, parity, gestational age and indication of LSCS, participants were grouped. 1gm TXA was given slowly by intravenous route to the participants of group A, over 5 minutes at the time skin incision by the anaesthetist. On the other hand, in group B TXA was not given and the caesarean section was proceeded by the experienced 3rd year resident(s) of Gynecology and Obstetrics. The caesarean section was performed via trans-peritoneal approach and a curvilinear incision method on lower uterine segment under the spinal anaesthesia. The routine dose of 10 units of oxytocin by intra-venous route stat was given at the time delivery of the baby in all participants i.e. group A and group B. The cord traction was used to deliver the placenta. The volume for the loss of blood was measured first after the placental delivery to the end of the LSCS, and secondly at end of LSCS to 2 hours after the birth by the attending doctor. The analysis of the finding was carried out in SPSS v.17.

RESULTS

There was no difference between the groups in age of patients (Table 1).No significant difference was noted in the mean gestational age in either group. The p-value was >0.05 (Table 2).The mean difference in Hb was 0.46±0.10 in the group A while 0.82±0.13 in group B with significantly lower change in Hb level, p-value < 0.001 (Table 3). The mean intraoperative and post-operative blood loss was remarkably low in the group A when matched with the group B (Table 4).

Table1: Comparison of age in both groups

Group	Age (years)	P value
Group A	28.13±4.79	0.393
Group B	27.38±4.80	

Table2: Comparison of gestational age in both groups

Group	Gestational age (weeks)	P value
Group A	39.07±1.07	0.410
Group B	39.24±1.26	

Table 3: Comparison of difference in hemoglobin (pre-operative and post-operative) in both groups

Group	Age (years)	P value
Group A	0.46±1.10	0.001
Group B	0.82±0.13	

Table 4: Comparison of intraoperative and postoperative blood loss

Blood loss	Group A	Group B	P value
Intraoperative	440.98±108.43	857.08±69.85	<0.0001
Post-operative	96.97±27.56	144.25±14.76	<0.0001

DISCUSSION

Post-partum hemorrhage is among five major causes of the deatd[12]. Fourteen millions women suffer from Post-partum hemorrhage per year. 1-2 percent of these patients die within 2-4 hours after the bleeding starts while 1-11 percent of these cases develop anemia.[13] Post-partum hemorrhage is responsible for 13% death rate of parturients in developed countries.[14] Globally, Post-partum hemorrhage is the major cause of maternal deaths with a prevalence of about 6 percent. The African region with the highest death rate of approximately 10.5 percent was reported. A study in Pakistan, reported 27.1% maternal deaths due to PPH.[15] Another report from Karachi published, death rate due to PPH as 51%.[16] Casus of PPH include trauma of genital tract, uterine atony and the placenta remained after the delivery.[17] Protracted and boosted labor, placental abruption, macrosomia, Primiparity, multiparity and obesity are among factors that may be responsible for uterine tensions leading to PPH. That is surprising to know that there is a number of women going through Post-partum bleeding, may show few risk factors for pregnancy. Coagulopathy and fibrinolysis may cause due to extensive tissue damage while proceeding for delivery. This may also lead towards hemorrhage. On the basis of these facts i.e. role of anti-fibrinolytic drugs, primarily TXA (tranexamic acid) and aprotinin in the management of PPH, is highly recommended.

Tranexamic acid and other anti-fibrinolytic drugs are proposed to stop and even reduce the hemorrhage during the surgery in a systematic review, with 211 randomized control trials with total of 20,781 contributors. Tranexamic acid and aprotinin reduced the relative risk for blood transfusion by 34 and 39 percent, respectively.[18] The occurrence of PPH needs to reduce critically to achieve the target. Additionally, management of PPH should be maintained since the maternal mortality rate due to bleeding approximately 25%. A number of studies reported the efficacy of anti-fibrinolytic agents to reduce PPH and its complications.[3]

In current study during surgery the mean blood loos in group-A (with TXA) was 459.10±108.48 ml and in group-B (without TXA) was 857.08±69.85 ml with significantly and postoperative mean bleeding in group A & group B was 96.97±27.56 ml and 144.25±14.76 ml respectively. The mean intraoperative and post-operative blood loss was remarkably low in the group A when matched with the group B.

In a study, it was found that during surgery the mean blood loos in group A was 459.10±108.48 mL and in group-B was 857.08±69.85 mL with significantly and postoperative mean blood loss in group A & group B was 96.97±27.56 ml and 144.25±14.76 ml respectively. The mean intraoperative and post-operative blood loss was remarkably lower in group A as compared to participants of group B. 100 women participated in this prospective to go for LSCS (lower segment caesarean section). Fifty of the participants were administrated with TXA immediately before the procedure. These were compared to 50 participants of group B, those were not given the TXA. The bleeding was notably reduced due to TXA after the LSCS to two hours post-partum. It was recorded to be 75.71 mL

in the study group of participants as compared to 133.03 mL of control group at p value of 0.001. The difference in volume of blood loss was also remarkable between placental delivery times to two hours post-partum. The study group had 372.71mL of blood loss in study group while controls were recorded with 469.70mL at P value 0.003. Any side effect or complication was not reported in any participant from both groups.[9] These findings are consistent with the findings of current study.

Another study on the effect of TXA reported that bleeding notably low in TXA group in comparison to control group. The results were same for both intra-operative blood loss was 262.5±39.6 mL and 404.7±94.4 mL, respectively and post-operative blood loss was recorded as 67.1±6.5 mL and 141.0±33.9 mL, respectively.[10] These findings were also in agreement to our findings in terms of reducing blood loos in TA group.

Another study[19] demonstrated that administration of tranexamic acid at rate of 10 mg per kg body weight reduced the blood loss during period from the end of caesarean section to two hours post-partum. The decline in total blood loss volume from placental delivery to two hours post-partum was also remarkable. This helped in reducing the need for hysterectomy, the chances of severe anaemia were reduced and off course the requirement of blood transfusion.[20] On the other hand, the desired results to decline the blood loss for the period between placental delivery and end of caesarean section, possibly because very late administration of TXA. The need for early administrated of TXA was recommended. So far, a few studies carried out on TXA administration to reduce the blood loss following CS. Gungorduk et al[21] reported to reduce the post-operative blood loss of about 17% at two hours, in the intervention participants those were given 1 gm of TXA regardless of individual's body weight. A multi-center, randomized control trial published about 18 % blood loss reduction in TXA treated participants.[22] These reports are in completely accord with this study. Two meta-analysis described the Tranexamic acid effect to be compared 32.5 mL[23] and 75.1 mL[24] reduced bleeding, with placebo dose, respectively. Additionally, the findings of study from Iran [10] and France[25] also supported this study. Besides, tranexamic acid has the shown to reduce the incidence of PPH in the study group, which is according to results reported by Gai et al[22] and Peitsidiset al.[23] Tranexamic acid statistically reduces the bleeding from placental delivery to two hours post-partum and its use was also safe as far as side effects or indications are concerned. Therefore, TXA can safely be used and because of its effectivity in reducing the bleeding resulting from caesarean section.[22] The mean blood loss reduction when both groups were compared to the control group were 146.34±56.32 ml and 262±31.51 ml for group T1 and T2 respectively.[26] In the duration from placental delivery to the end of caesarean section (T1), The bleeding didn't differ between the tranexamic acid (336.7±151.2) and the control group (368.5±156.4).[19] TXA remarkably reduced the volume of bleeding from placental delivery to the end of caesarean section which was 356.44 ±143.2 ml in the TXA group versus 710.22 ±216.72 ml in the placebo group (p-value less than 0.001).[27] We also found lower blood loos in females having TA.

In current study we did not observe any side effect but a study found gastrointestinal complications of tranexamic acid were experienced by 16.3% of the participants (7.9% having nausea, 5.9% with vomiting, and 2.5% reporting diarrhea).[21] The severe side effects we reported were gastro-intestinal and neurological manifestations as previously described[25,28] which were mild and reversible but more commonly found in the TXA group than in the placebo group. No complications and side effects was noted in both groups.[27]

CONCLUSION

The study elaborates the positive effect of tranexamic acid in reducing the blood loos and does not reduce less Hb in the participants giving birth by caesarean section. We found no adverse side effects and complications. So, in future TA can be utilized in females undergoing caesarean section to reduce burden of blood transfusions.

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