Original Article

Comparison of Tranexamic Acid Versus Placebo for Prevention of Postpartum Hemorrhage in Females Undergoing Delivery at Term

Fehmida, Zarmeena Liaqat and Reema Fateh

ABSTRACT

Objective: The objective of the present study was to compare the mean blood loss with intravenous tranexamic acid versus placebo in pregnant females presenting at term for delivery.

Study Design: Randomized control trial study.

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynecology, Saidu group of Hospital, Swat, from January 2023 to June 2023.

Methods: Through non-probability consecutive sampling, a Sample size of 250 women (Group A- TXA group n=125, Group B- Placebo n=125). In group A, females were given intravenous tranexamic acid. In group B, females were given an injection of normal saline. All females were followed till delivery. After delivery, the female was shifted to the ward and blood loss was measured.

Results: Mean± S. D of the pre-operative hemoglobin (HB) of the participants in groups A and B was 11.99 ± 0.72 and 12.44 ± 0.86 g/dL, respectively (P<0.0001). Mean± S. D of the post-operative hemoglobin (HB) of the participants in groups A and B was 10.8 ± 0.73 and 7.44 ± 0.976 g/dL, respectively (P<0.0001). Mean± S. D of the blood loss of the participants in groups A and B was 297.56 ± 69.4 and 912.10 ± 67.1mL, respectively (P<0.0001). In group A, 17% of participants had blood loss of more than 1000mL, while in group B 50% of participants had blood loss of more than 1000mL (p<0.0001). In group A, 8% of participants required a blood transfusion, while in group B 26% of participants required a blood transfusion (p<0.0001).

Conclusion: The research emphasized the importance of tranexamic acid in the management of post-partum hemorrhages, the enhancement of post-partum hemoglobin levels, and the potential reduction in the need for blood transfusions.

Key Words: Delivery, blood loss, postpartum hemorrhage, tranexamic acid

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INTRODUCTION

Postpartum hemorrhage (PPH) is a critical pregnancy complication that poses a significant risk to maternal health, often resulting in severe illness or death. The prevalence of PPH diagnosis varies between 1% and 10% of pregnancies, impacting around 14 million women globally each year[1]. However, the precise incidence of PPH is contingent upon the specific criteria used for its characterization.

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There are various risk factors that have been identified in relation to maternal health, such as advanced age, nulliparity, and uterine fibroids[2]. Additionally, gestational factors like preeclampsia, multiple pregnancy, fetal macrosomia, and placenta accreta, as well as labor-related factors like episiotomy, prolonged second stage of labor, and retained placenta, have also been recognized as risk factors[3]. Despite these findings, there is currently no established model that can accurately predict PPH. Consequently, the primary objectives of clinical management are the timely detection and commencement of treatment in order to minimize the likelihood of mortality and improve maternal outcomes[4]. In order to achieve this objective, the current recommendation is to provide oxytocin prophylactically, with the intention of facilitating uterine contractions and mitigating the occurrence of excessive blood loss during both vaginal and cesarean deliveries[5]. Tranexamic acid (TXA) is a synthetic inhibitor that competes with lysine receptors. It functions as an antifibrinolytic drug by preventing the connections between plasmin and fibrin, as well as

stabilizing the fibrin matrix[6]. The potential benefits of its administration have been proposed in enhancing clinical outcomes among patients with intracerebral haemorrhage[7], trauma[8], and as well as reducing perioperative blood loss in abdominal[9] and orthopedic procedures[10]. The World Maternal Antifibrinolytic study has provided evidence to support the efficacy of TXA in mitigating the mortality risk associated with PPH in women, while also indicating that its use does not lead to an increased likelihood of adverse events[11]. Significantly, the earliest dose of TXA at the commencement of bleeding yielded the most advantageous results, suggesting that its mechanism of action may involve the prevention of coagulopathy rather than the treatment of the disorder[12]. Previous studies[13,14] have indicated the potential utility of TXA as a preventive intervention for women requiring cesarean delivery. However, the generalizability of these findings has been constrained by the smaller sample sizes of the studies included in these analyses. The new study on the efficacy of appropriately powered Tranexamic Acid for Preventing PPH has significantly contributed to the advancement of knowledge in the field. In the Cesarean Delivery (TRAAP2) trial, a comprehensive evaluation was conducted to determine if the advantages of administering TXA as a standard practice during cesarean deliveries exceed the potential long-term dangers associated with its use[15]. The objective of the present study was to compare the mean blood loss with intravenous tranexamic acid versus placebo in pregnant females presenting at term for delivery.

METHODS

After the ethical approval from institutional review board, this randomized control trail was conducted at Department of Obstetrics and Gynecology, Saidu group of Hospital, Swat, from January 2023 to June 2023. Through non-probability consecutive sampling, Sample size of 250 women (Group A- TXA group n=125, Group B- Placebo n=125) was calculated with 95% confidence level, 80% power of test and taking magnitude of total blood loss i.e. 379.2±160.1ml with tranexamic acid and 441.7±189.5ml placebo in females undergoing delivery at term. Women between ages 18-40 years, with any parity presenting during gestational age≥37 weeks, undergoing either vaginal or cesarean delivery. Women with multiple pregnancies, with chronic or gestational hyptertension or pre-eclampsia, with chronic or gestational diabetes, with renal disease, with anemia, with placental problem i.e. placenta previa, accrete, increta or placental abruption and with deranged clotting profile were excluded from the present study. All basic demographic information of each patient (name, age, gestational age, address and contact) was be noted. Then females will be randomly divided in two groups by using random number table. In group A, females were given intravenous tranexamic acid. In group B, females were given an injection of normal saline. All females were followed till delivery. After delivery, the female was shifted to the ward and blood loss was measured. All this information was recorded through pre-designed proforma. The collected data was analyzed statistically by using SPSS version 21. Quantitative variables like age, gestational age and blood loss was presented as mean ± S.D. Qualitative variables like parity was presented as frequency and percentage. Independent sample t-test was applied to compare both groups. P-value ≤0.05 was considered as significant.

RESULTS

Table 1 shows the clinical and demographic parameters of the study participants in both study groups. Mean± S. D of the ages of the participants in groups A and B was 30.17±4.84 and 29.42±4.65 years, respectively (P=0.265). Mean± S. D of the BMI of the participants in groups A and B was 24.38±3.39 and 23.4±3.48 kg/m^2, respectively (P=0.031). Mean± S. D of the parity of the participants in groups A and B was 2.8±0.98 and 3.02±1.07, respectively (P=0.197). Mean± S. D of the gestation age of the participants in groups A and B was 38.032±1.42 and 38.15±1.37 weeks, respectively (P=0.503). In group A, 52% participants underwent normal vaginal delivery while 48% underwent C-section. In group B, 60% participants underwent normal vaginal delivery while 40% underwent C-section. Table 2 shows the primary and secondary outcomes measured in this randomized controlled trial study. Mean± S. D of the pre-operative hemoglobin (HB) of the participants in groups A and B was 11.99 ± 0.72 and 12.44 ± 0.86 g/dL, respectively (P<0.0001). Mean± S. D of the post-operative hemoglobin (HB) of the participants in groups A and B was 10.8 ± 0.73 and 7.44 ± 0.976 g/dL, respectively (P<0.0001).

Table No.1: Clinical and demographic parameters of the study participants

Parameters	Group A (n=125)	Group B (n=125)	P value
Age (years)	30.17±4.84	29.42±4.65	0.265
BMI (kg/m^2)	24.38±3.39	23.4±3.48	0.031
Parity	2.8±0.98	3.02±1.07	0.197
Gestation age (weeks)	38.032±1.42	38.15±1.37	0.503
Mode of delivery			0.123
Vaginal	65 (52%)	75 (60%)	
Caesarian	60 (48%)	50 (40%)	

Table No.2: Comparison of primary and secondary outcomes in study groups

Parameters	Group A (n=125)	Group B (n=125)	P value
Preoperative HB (g/dl)	11.99 ± 0.72	12.44 ± 0.86	<0.0001
Postoperative HB (g/dl)	10.8 ± 0.73	7.44 ± 0.97	<0.0001
Calculated blood loss (ml)	297.56 ± 69.4	912.10 ± 67.1	<0.0001
Blood loss more than 1000 ml	22 (17%)	63 (50%)	<0.0001
Required transfusion	10 (8%)	32 (26%)	<0.0001

Mean± S. D of the blood loss of the participants in groups A and B was 297.56 ± 69.4 and 912.10 ± 67.1mL, respectively (P<0.0001). In group A, 17% of participants had blood loss of more than 1000mL, while in group B 50% of participants had blood loss of more than 1000mL (p<0.0001). In group A, 8% of participants required a blood transfusion, while in group B 26% of participants required a blood transfusion (p<0.0001).

DISCUSSION

This study aimed to assess the effectiveness of tranexamic acid (TA) in lowering blood loss during and after term delivery. The results demonstrated that TXA was successful in reducing blood loss compared to a placebo, with volumes of 297.56 ± 69.4 and 912.10 ± 67.1 mL, respectively (p<0.0001). The findings of this investigation are consistent with a previous study conducted in Turkey, which demonstrated the considerable impact of TXA in lowering postoperative blood loss at 48 hours compared to the placebo group. Specifically, the study stated that the TXA group had a blood loss level of 499.9 ± 206.4 ml, whereas the placebo group had a blood loss level of 600.7 ± 215.7ml[16]. Similar findings were documented in investigations conducted on women from India and Egypt[17,18]. An observable decrease in the occurrence of PPH, defined as blood loss above 1000 ml, was noted following the administration of TXA in the present study with a p value <0.0001. In a study conducted by Gai et al., similar findings were obtained, indicating that patients in the TXA group experienced a mean blood loss of 351 ml during the operating procedure, while the control group had a blood loss of 440 ml[19]. In recent years, there has been an increase in the number of trials done to validate the effectiveness of TXA in reducing blood loss after vaginal delivery. Xia et al. conducted a study whereby they examined the efficacy of the drug in lowering the occurrence of PPH and postoperative blood loss in women undergoing normal delivery[20]. Additionally, we have seen a significantly lower incidence of post-surgical blood transfusions in our TXA group compared to the palcebo group (10 women vs. 32 women, p<0.0001). This outcome is consistent with the previously published results in comparable research[21,22]. Nevertheless, Bhatia and Deshpande found that there was no statistically significant disparity in the requirements for blood transfusions across the two cohorts under investigation, as indicated in their research[18]. Once again, the observed disparities in outcomes may be attributed to the specific demographic chosen for the study, namely high-risk women in our particular investigation. This study has many limitations that should be acknowledged. Firstly, it is unable to provide data on the extent to which the treatment influenced the maternal death rate or the need for more invasive procedures. In a similar vein, the appropriate evaluation of thromboembolic events connected to TA was hindered by the restricted duration of the follow-up period.

CONCLUSION

In summary, the research underscored the importance of tranexamic acid in the management of post-partum hemorrhages, the enhancement of post-partum hemoglobin levels, and the potential for reducing the need for blood transfusions.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Fehmida, Zarmeena Liaqat
Drafting or Revising Critically:	Zarmeena Liaqat, Reema Fateh
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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