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TRANEXAMIC ACID FOR THE PREVENTION OF BLOOD LOSS AFTER CESAREAN DELIVERY

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ABSTRACT

Background: Postpartum hemorrhage, a major maternal fatality, is linked to advanced age, nuliparity, uterine fibroids, and labor characteristics. Tranexamic acid, a fibrinolysis inhibitor, may reduce mortality. **Aim of the study:** To assess the effectiveness of Tranexamic acid in the prevention of postpartum hemorrhage following the delivery by cesarean section. **Methodology:** A randomized-controlled clinical trial was carried out for 360 women who were at risk of postpartum hemorrhage at Al-SalamTeaching Hospital between February 1, 2020, and December 1, 2021. The participants were divided into two groups: those who received Tranexamic acid before cesarean incision and those who received normal saline solution. Oxytocin was administered after delivery. All patients were assessed by full history, clinical examination, and laboratory investigations. The study used SPSS-26 for statistical analysis, with a chi-square for proportions and a t-test for unpaired data. The p-value of ≤ 0.05 was considered significant. **Results:** The study found that the mean age of the Tranexamic acid group was 30.34 ± 8.3 years, while the control group had a mean age of 29.05 ± 6.9 years. The study also found that 70.0% of the Tranexamic acid group had a previous cesarean section, and the average amount of blood loss was significantly higher in the Tranexamic acid group (435.67 ± 80.45 cc) compared to the control group (588.23 ± 129.33 cc). **Conclusion:** Tranexamic acid is a cost-effective and safe medication used to reduce blood loss during CS without short-term negative effects on the mother or fetus.

KEYWORDS: Caesarean delivery, Postpartum hemorrhage, Tranexamic acid.

INTRODUCTION

Postpartum hemorrhage (PPH) is defined by the World Health Organization as "blood loss from the birth canal in excess of 500 mL during the first 24 h after delivery".[1] On the best term to use, however, there is now debate.[2]

Worldwide, PPH is a main cause for around 25% of fatalities in the pregnant women; among those who survive, 12% will suffer from severe anemia.[1] Clinically, tachycardia, weakness, and sweating are linked to it. When blood volume is lost between 35 and 45 percent per minute, hemodynamic collapse occurs. PPH is one of the commonest problems associated with cesarean delivery (CD) and a potentially lethal outcome. Recently, the percentage of CDs has increased to 25–35% in a number of wealthy nations.[3]

Although several risk factors associated with labor (e.g., prolonged second stage of labor, episiotomy, retained placenta), gestational (e.g., multiple pregnancy, preeclampsia, fetal macrosomia, placenta accreta), and maternal characteristics (e.g., advanced age, nuliparity, uterine fibroids) have been identified, an ideal model for PPH prediction remains absent.[4] Thus, the primary objectives of therapeutic care to reduce the risk of death and improve maternal outcomes continue to be early detection and fast treatment initiation.[5]

The administration of the fibrinolysis inhibitor Tranexamic acid (TXA) was linked to a substantial decrease in overall mortality among patients with bleeding injuries.[6] Patients with known obstetric hemorrhage and traumatic brain damage have reported similar outcomes.[7,8]

There has been prior research on a rise in fibrinolytic activity following placenta delivery, as seen by elevated levels of D-dimer and tissue plasminogen activator.[9] It makes biological sense that using Tranexamic acid to suppress fibrinolysis after delivery might enhance hemostasis by limiting clot disintegration. It has been documented that Tranexamic acid can be used to stop obstetrical bleeding.[10,11] However, the bulk of studies on postpartum hemorrhage have been carried out using single-center trials, which have been limited by low sample sizes and inadequate power to evaluate meaningful therapeutic benefits.

AIM OF THE STUDY

To assess the effectiveness of Tranexamic acid in the prevention of postpartum hemorrhage following the delivery by cesarean section.

METHODOLOGY

A randomized-controlled clinical trial was carried out for 360 women who were at risk of postpartum hemorrhage at Al-Salam Teaching Hospital between February 1, 2020, and December 1, 2021. The research comprised 360 women who met the requirements for enrollment: they were single mothers carrying a viable fetus with a gestational age between 35 and 42 weeks, scheduled for elective caesarean sections. All the women were at risk of postpartum hemorrhage. The exclusion criteria were those women with accompanied medical and surgical complications such as cardiovascular, renal, hepatic, brain disease and blood disorders. Bleeding tendency, hypersensitivity to TXA, and history of thrombo-embolic disorders were also excluded.

The studied sample was allocated into two main groups, 180 pregnant women in every group:

Tranexamic acid group: this included pregnant women who were subjected to slowly intravenous infused over 5 min of 2 ampules of 1 gm tranexamic acid (kapron®, Amoun, Egypt). The dose was administered 10 minutes before cesarean incision.

Control group: Pregnant women in the control group received 10 ml of normal saline intravenously 10 minutes prior to cesarean incision, steadily infused over a period of 5 minutes.

Following the newborn's delivery, an IV drip containing 10 units of oxytocin was given to each group.

Prior to involvement, both written and verbal consent were acquired from every patient.

Every patient had their complete medical history evaluated, paying special attention to bleeding tendencies and thrombotic episodes. A clinical examination was conducted, which involved examining the abdomen to determine the gestational time, fetal weight, alcohol consumption, presentation and position of the fetus, uterine contractions, fetal heart sounds, and scars from prior surgery. Examines: Hematocrit value, Rh type, packed red cell volume (PCV), and hemoglobin level (Hb) were assessed in laboratory experiments using CBC. Dip sticks are used to analyze urine for proteins. For women who were in labor, trans-abdominal ultrasound studies were performed to determine the fetal weight, gestational age, and placenta implantation location. Following placental delivery till the end of CS by uterine and skin closure, the blood loss was monitored. As soon as the mother gave birth, her vital signs and blood pressure were recorded.

The statistical analysis was done by SPSS-26, the data presented in proportions and means. The chi square used for the proportions while the t-test for the unpaired data was used to estimate the difference between the means. The p-value ≤0.05 reflected significant association.

RESULTS

According to table (1), the average maternal age of the Tranexamic acid group was 30.34 ± 8.3 years, with a range of 20-40 years, whereas the control group's mean age was 29.05 ± 6.9 years, with a range of 20-48 years. According to statistics, there was no change (p=0.110).

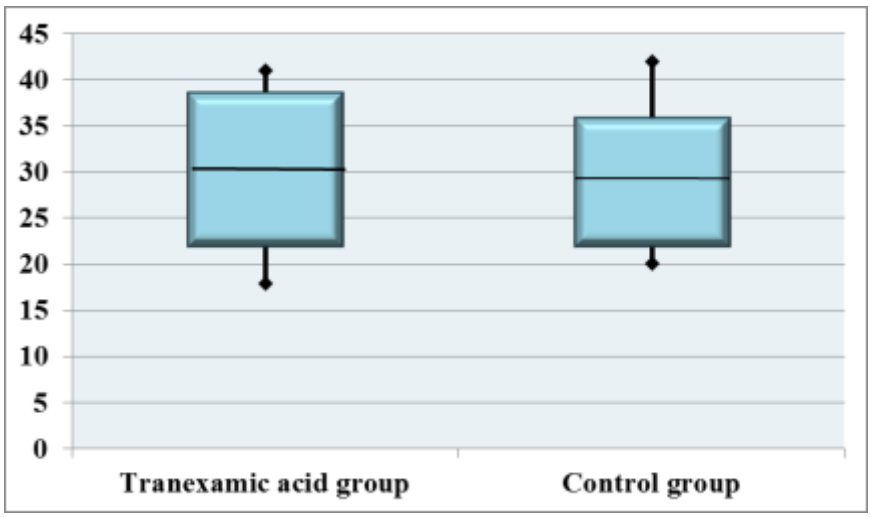

Figure (1): The mean age between the studied groups.

The difference between the studied groups concerning the obstetric characteristics was demonstrated in table (1) which showed that the differences were statistically not significant.

Table 1: Comparison between the studied groups concerning the obstetric characteristics.

	Tranexamic acid group		Control group		p-value *
	Mean	SD	Mean	SD	
Gravidity	3.1	1.65	2.8	1.22	0.051
Para	2.1	1.15	1.9	0.81	0.058
Abortion	0.97	0.41	1.01	0.36	0.330
*t-test for independent two means					

The previous cesarean section was found among 70.0% of the Tranexamic acid group and among 66.1% of the control group, the difference was statistically not significant (p=0.429) as shown in figure (2).

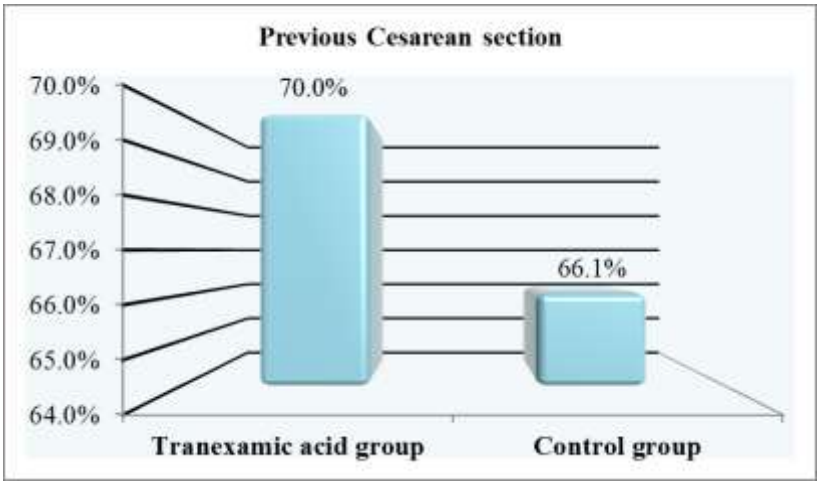

Figure 2: Comparison of previous cesarean section.

The comparison between the studied groups concerning the amount of blood loss was showed in figure (3). This figure elicited that the average amount of blood loss among the Tranexamic acid (435.67±80.45) cc which was higher than that among the control group (588.23±129.33) cc; the variation was statistically significant (p=0.000).

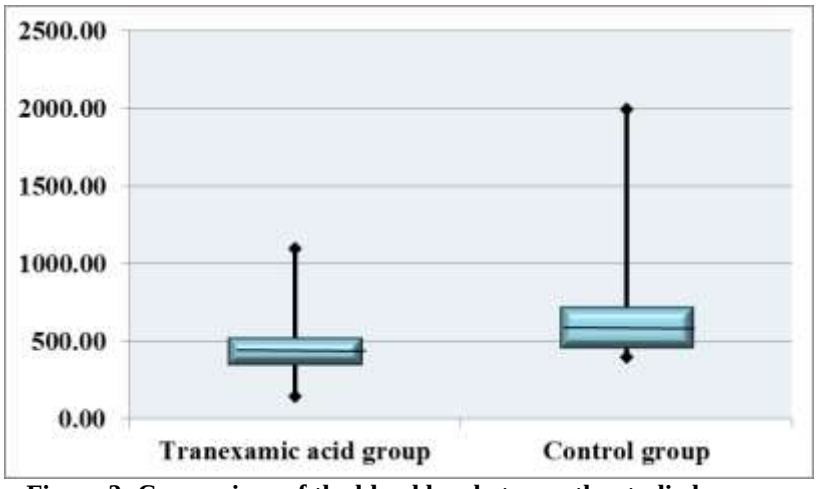

Figure 3: Comparison of the blood loss between the studied groups.

DISCUSSION

Over the past decade, Tranexamic acid has gained recognition as a potential medication to prevent blood loss during delivery. Its therapeutic benefits are primarily due to its antifibrinolytic actions, which encourage hemostasis by blocking lysine-binding sites on plasminogen molecules.[12] Tranexamic acid has been shown in non-obstetric clinical trials to lower the incidence of transfusion requirement during elective surgery[13], as well as to lower the death rate in patients experiencing extracranial or mild-to-moderate intracranial trauma.[7]

The current investigation revealed that although there was a mean mother age difference between the TXA group and the control group, the difference was not statistically significant. These results are comparable to those of Perveen *et al.*,[14] who discovered no significant differences between the groups under study and that the mean age of the women within the Tranexamic acid group was 28.80 ± 3.72 years. Lower mean maternal age among the TXA group was reported by Goswami *et al.*,[15] and Pacheco *et al.*,[16] with no significant difference to that among control group.

The current findings demonstrated a biologic effect of prophylactic use of TXA at cesarean delivery, as demonstrated by the significantly smaller calculated estimated blood loss in the Tranexamic acid group compared to the placebo group; this difference was attributed to a significantly smaller decrease in hematocrit from pre-surgery to post-surgery in the TXA group. This was parallel to that reported by Sentilhes *et al.*, study.[17] Furthermore, the current study showed that the difference between the amount of blood loss between the two studied groups was 150 cc. In the studies carried out by Simonazzi *et al.*,[18] and Bellos *et al.*,[19] the results were higher; the women who received TXA in Simonazzi *et al.*, study[18] had significant lower blood loss during the postpartum (mean difference –160.27 cc) when compared to women who did not receive it. The meta analysis carried out by Bellos and Pergialiotis[19] comprised 36 studies totaling 10,659 women. With a mean difference of 189.44 cc, TXA-treatment was linked to considerably reduced total blood loss. Other studies showed significantly reduced total estimated blood loss but with lower amount Halifa *et al.*,[20] with an average of 138 ml, Gungorduk *et al.*,[21] of 101cc, and Gai *et al.*,[22] of 88 cc.

CONCLUSION

Using Tranexamic acid is one efficient strategy to diminish the bold volume lost during cord clamping in high-risk pregnancies. Cheap and safe, Tranexamic acid has no instant harmful effects on the pregnant women or their fetus.

REFERENCES

1. World Health Organization (WHO). WHO guidelines for the management of postpartum haemorrhage and retained placenta. Available online at: http://whqlibdoc.who.int/publications/2009/ 9789241598514_eng.pdf.
2. Knight M, Callaghan WM, Berg C, Alexander S, Bouvier-Colle MH, Ford JB, et al. Trends in postpartum hemorrhage in high resource countries: a review and recommendations from the International Postpartum Hemorrhage Collaborative Group. *BMC Pregnancy Childbirth*, 2009; 9: 55.
3. Nigussie J, Girma B, Molla A, *et al.* Magnitude of postpartum hemorrhage and its associated factors in Ethiopia: a systematic review and meta-analysis. *Reprod Health*, Mar. 9, 2022; 19(1): 63. doi: 10.1186/s12978-022-01360-7. PMID: 35264188; PMCID: PMC8905908.
4. Borovac-Pinheiro A, Pacagnella RC, Cecatti JG, *et al.* Postpartum hemorrhage: new insights for definition and diagnosis. *Am J Obstet Gynecol*, 2018; 219: 162–168.
5. Neary C, Naheed S, McLernon DJ, *et al.* Predicting risk of postpartum haemorrhage: a systematic review. *BJOG*, 2021; 128: 46–53.
6. CRASH-2 trial collaborators. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomized, placebo-controlled trial. *Lancet*, 2010; 376: 23–32.
7. CRASH-3 trial collaborators. Effects of tranexamic acid on death, disability, vascular occlusive events and other morbidities in patients with acute traumatic brain injury (CRASH-3): a randomized, placebo-controlled trial. *Lancet*, 2019; 394: 1713–1723.
8. WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomized, double-blind, placebo-controlled trial. *Lancet*, 2017; 389: 2105–2116.
9. Hellgren M. Hemostasis during normal pregnancy and puerperium. *Semin Thromb Hemost*, 2003; 29: 125–130.
10. Ray I, Bhattacharya R, Chakraborty S, *et al.* Role of intravenous tranexamic acid on caesarean blood loss: a prospective randomised study. *J Obstet Gynaecol India*, 2016; 66(1): 347–352.
11. Lakshmi SD and Abraham R. Role of prophylactic tranexamic acid in reducing blood loss during elective cesarean section: a randomized controlled study. *J Clin Diagn Res*., 2016; 10(12): QC17–QC21.
12. Sentilhes L, Madar H, Mattuizzi A, *et al.* Tranexamic acid for childbirth: why, when, and for whom. *Expert Rev Hematol*, 2019; 12: 753-761.
13. Myles PS, Smith JA, Forbes A, *et al.* Tranexamic acid in patients undergoing coronary-artery surgery. *N Engl J Med*., 2017; 376: 136-148.
14. Perveen S, Ali R, Mehak R Efficacy of Tranexamic Acid to Control of Postpartum Hemorrhage. *Population*, 2017; 7: 11-16.
15. Goswami U, Sarangi S, Gupta S, *et al.* Comparative evaluation of two doses of tranexamic acid used prophylactically in anemic parturients for lower segment cesarean section: A double-blind randomized case control prospective trial. *Saudi J Anaesth*, 2013; 7(4): 427-431.
16. Pacheco LD, Clifton RG, Saade GR, *et al.* Tranexamic Acid to Prevent Obstetrical Hemorrhage after Cesarean Delivery. *The New England Journal of Medicine*, 2023; 388(15): 1365. https://doi.org/10.1056/NEJMoa2207419
17. Sentilhes L, Sénat MV, Lous ML, *et al.* Tranexamic Acid for the Prevention of Blood Loss after

Cesarean Delivery. *N Engl J Med.*, 2021; 384: 1623-1634. DOI: 10.1056/NEJMoa2028788

18. Simonazzi G, Bisulli M, Saccone G, *et al.* Tranexamic acid for preventing postpartum blood loss after cesarean delivery: A systematic review and meta-analysis of randomized controlled trials. *Acta Obstetricia et Gynecologica Scandinavica*, 2015; 95(1): 28-37. https://doi.org/10.1111/aogs.12798
19. Bellos I. and Pergialiotis V. Tranexamic acid for the prevention of postpartum hemorrhage in women undergoing cesarean delivery: an updated meta-analysis. Am J Obstet Gynecol, Apr. 2022; 226(4): 510-523.e22. doi: 10.1016/j.ajog.2021.09.025. Epub 2021 Sep 25. PMID: 34582795.
20. Halifa IS, Olusesan Oluwasola TA, Fawole B, *et al.* Intravenous tranexamic acid for reducing blood loss during cesarean delivery: A double-blind, randomized-controlled trial. *N Niger J Clin Res.*, 2021; 10: 40-6.
21. Gungorduk K, Yıldırım G, Asıcıoğlu O, *et al.* Efficacy of intravenous tranexamic acid in reducing blood loss after elective cesarean section: A prospective, randomized, double-blind, placebo-controlled study. *Am J Perinatol*, 2011; 28: 233-40.
22. Gai MY, Wu LF, Su QF, *et al.* Clinical observation of blood loss reduced by tranexamic acid during and after caesarian section: A multi-center, randomized trial. *Eur J Obstet Gynecol Reprod Biol.*, 2004; 112: 154-157.