The Impact of Tranexamic Acid in Postoperative Outcomes of Pelvic and/or Acetabular Fracture: A Systematic Review and Meta-Analysis

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INTRODUCTION:
Tranexamic acid (TXA) is a plasminogen inhibitor that preserves existing blood clots, prevents fibrinolysis, and has displayed improved bone healing in vivo. Its use has also been shown to be a safe, cost-effective way to decrease operative blood loss in healthy arthroplasty patients. While there have been several smaller studies that have shown decreased rates of blood transfusions in hip fracture patients, its role in orthopaedic trauma surgery has yet to be defined. Orthopaedic pelvic trauma is associated with high volume blood loss, but due to the paucity of evidence available, the use of TXA in pelvic and/or acetabular fractures (PAF) remains controversial. We aimed to evaluate available literature on the efficacy of TXA in reducing perioperative transfusion rates and blood loss in PAF patients. We hypothesize that there will be no difference in transfusion rates or blood loss in these patients.
METHODS: This is a systematic review and meta-analysis was performed using PRIMSA guidelines. The review was completed by searching PubMed, Cochrane, and Embase databases. Retrospective and prospective cohort studies and randomized control trials that reported the use of TXA in PAF were included in the analysis. Variables abstracted were time to TXA delivery, dosages, number of doses given preoperatively, drug delivery mode, estimated blood loss, transfusion rates, and number of venous thromboembolic events (VTE). Meta-analysis was performed using a random-effect model. Funnel plots and bias assessments were used to assess publication bias.
RESULTS: Eight studies (925 patients) were included in the qualitative systematic review, and 5 studies (627 patients) were included in the statistical analysis. TXA was commonly administered via intravenous (IV) access, 87.5% of the studies, with 1-gram doses given in 50% of the studies. There was variety in the number of doses and administration times. There was no significant difference in transfusion rate (Relative Risk: -0.19; 95% CI –0.65, 0.27; I2 = 81.7%, p = 0.42), operative duration (Mean Difference: -4.8 minutes; 95% CI –33.12, 23.51; I2 = 82.0%), and estimated blood loss (Mean Difference: -93.77 mL; 95% CI: -239.36, 105.83, I2 = 82.8%, p=0.36). There were no differences in the VTE rate (Relative Risk: -0.06, 95% CI: -1.06, 0.95; I2 = 0% p =0.91). Funnel plot (Figure 1) did not show significant asymmetry. Heterogeneity was documented in Figure 2.
DISCUSSION AND CONCLUSION: Our systematic review here revealed that TXA does not reduce the associated transfusion rate or estimated blood loss in pelvic or acetabular fracture fixations. Furthermore, the use of TXA in this patient population does not pose an increased risk of VTE. However, it is important to note that given the moderate heterogeneity noted in the data further investigation would be essential to better understand the role of TXA in PAF management.

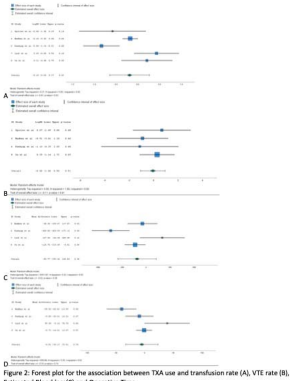

Figure 2: Forest plot for the association between TXA use and transfusion rate (A), VTE rate (B), Estimated Blood loss(C) and Operative Time.

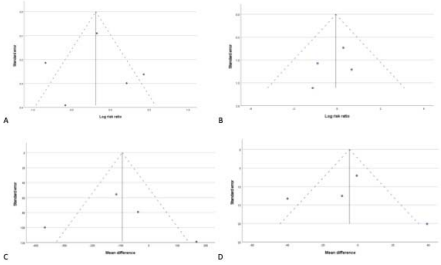

Figure 1: Funnel plot for the association between TXA use and transfusion rate (A), VTE rate (B), Estimated Blood loss (C) and Operative time (D). The pooled effect is the (solid line) and psuedo 95% confidence limits (dashed line).