Tranexamic Acid Use in High-Energy Pelvic, Acetabular, and Femoral Fractures

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Purpose: Tranexamic acid (TXA) inhibits clot break down by binding plasminogen and preventing conversion to plasmin. TXA decreases transfusion requirements in hip fracture surgery and elective arthroplasty without increased the risk of venous thromboembolic events (VTE). Use of TXA has not been evaluated in the setting of high-energy fractures in the pelvis or femur. The purpose of this study was to assess the efficacy and safety of TXA in such fractures. We hypothesized that TXA would decrease total blood loss and transfusions in patients with these fractures.

Method: A prospective, randomized controlled trial was performed of TXA use in patients with isolated closed pelvic and femur fractures treated with open reduction and internal fixation and expected EBL>300 mL. 100 patients were randomized into two groups. Exclusion criteria included pregnancy, oral contraceptives, contraindication to VTE prophylaxis, operation for another injury, hypercoagulable state, and renal insufficiency. The treatment group received IV TXA in two 15mg/kg doses: one at incision and another 3 hours later. The control group did not receive the medication. A transfusion trigger of hemoglobin (Hgb) <8 g/dL was used in healthy patients. Patients with symptomatic anemia were transfused regardless of Hgb level. Low molecular weight heparin was used for VTE prophylaxis. Data analyzed included demographics, AO/OTA fracture classification, pre- and postoperative Hgb/Hct, number of pRBC units transfused, EBL, total blood loss, and VTE. Primary outcome measures were total blood loss (by Hgb dilution method), change in preoperative to postoperative hematocrit values, and units of pRBCs transfused.

Results: After post-randomization exclusions, 84 patients were analyzed. Forty-four patients received TXA, and 40 patients were controls. TXA group had a lower average preoperative Hct but this was not significant (TXA=34.1, No TXA=35.6, P=0.22). EBL was higher in the TXA group, but this did not reach significance (P=0.28). The number of intraoperative units transfused was not significantly different between groups (TXA=1.32, No TXA=0.54, P=0.051). Control patients were twice as likely to receive a postoperative transfusion (cOR= 1.91, P=0.22), but this association was not statistically significant. Average drop in Hct from preop to postop day 1 was significantly greater (P=0.02) in the control group (-5.43 ± 3.77) than in the TXA group (-2.88 ± 5.70). Total blood loss was higher in the control group but this was not significant (TXA=880mL, No TXA=1010mL, P=0.44). There were no significant differences between the TXA and control groups in inpatient VTE events.

Conclusion: The use of TXA in high-energy fractures of the pelvis and femur may decrease total blood loss and postoperative transfusion. TXA did not increase the rate of VTE. These data show trends toward improved blood conversation, but further study is warranted prior to making broad recommendations for use of TXA in these fractures.