

A Multi-Center Randomized Clinical Trial of Tranexamic Acid in Revision Total Knee Arthroplasty: Does the Dosage Regimen Matter?[◇]

Yale A. Fillingham, MD, Brian Darrith, MD, Tyler E. Calkins, BS, Matthew P. Abdel, MD, Arthur L. Malkani, MD, Ran Schwarzkopf, MD, Douglas E. Padgett, MD, Robert A. Sershon, MD, Stefano A. Bini, MD, Craig J. Della Valle, MD

Introduction: Tranexamic acid (TXA) is proven to reduce blood loss following total knee arthroplasty (TKA), but there are limited data on the impact of similar dosing regimens in revision TKA that is associated with greater blood loss. The purpose of this multi-center randomized trial was to determine the optimal regimen to maximize the blood-sparing properties of TXA in revision TKA.

Methods: 233 septic and aseptic revision TKA from six centers were randomized to receive 1g pre-incision intravenous (IV) TXA, 1g pre- and post-incision IV TXA, 1g pre-incision IV and 1g intra-operative topical TXA, or three doses of 1950mg oral TXA given 2 hours preoperatively, 6 hours postoperatively, and the morning of postoperative day 1. Randomization was performed based on type of revision to ensure equivalent distribution among groups. The primary outcome was reduction in hemoglobin. Power analysis determined 40 patients per group were necessary to identify a 1g/dL difference with an alpha of 0.05 and beta of 0.80. Per-protocol analysis involved regression analysis and two one-sided t-tests for equivalence.

Results: One patient withdrew, 3 didn't undergo surgery, 16 were screen failures, and 17 did not receive the assigned treatment, leaving 196 patients for the analysis. There was no significant difference in reduction in hemoglobin amongst treatment groups (2.88g/dL for oral TXA, 2.79g/dL for single-dose IV TXA, 2.59g/dL for combined IV/topical TXA, and 2.58g/dL for double-dose IV TXA; $p=0.48$). Similarly, calculated blood loss ($p=0.63$) and transfusions ($p=0.78$) were not significantly different between groups. Finally, equivalence testing assuming a 1g/dL difference in hemoglobin change as clinically relevant showed all possible pairings were statistically equivalent.

Conclusions: Despite the higher risk of blood loss in revision TKA, all TXA regimens tested had equivalent blood-sparing properties. Surgeons should consider using the lowest effective dose and the least costly regimen for TXA use in revision TKA.

◇ The FDA has not approved tranexamic acid for use in orthopaedics.