

Paper #5

The Effect of Topical and Intravenous Tranexamic Acid on Drug Levels in Patients Undergoing Total Knee Arthroplasty: A Randomized Double-Blind Placebo Controlled Study[◇]

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Introduction: Tranexamic acid (TXA) is used to decrease blood loss during total knee arthroplasty (TKA). We sought to examine if TXA levels changed systemically and in the wound when the drug is given intravenously (IV) compared to topical.

Methods: 76 TKA patients were enrolled. Patients received combined spinal-epidural anesthesia with 0.5% bupivacaine and an adductor canal nerve block. Before tourniquet (TQ) inflation, patients received 1.0 gm of TXA or placebo, and another dose three hours later. Topical TXA or placebo solution was poured into the wound 5 minutes prior to TQ release. The topical group received 3.0 gm of TXA in 75 mL of saline vs. placebo directly on the wound. Blood was measured for levels of TXA using high performance liquid chromatography. Wound blood from the Constavac drainage was measured 4 hours post-TQ release.

Results: Systemic TXA levels were higher in the IV group at all time points ($p < 0.001$). At 4 hours post-TQ release, wound and systemic levels of TXA were similar in the IV group. Wound levels of IV TXA were greater than in the topical group ($p < 0.001$). At 4 hours post TQ release, topical TXA wound blood levels were significantly higher than the systemic level ($p < 0.001$). Calculated total blood loss was higher in the topical group ($p = 0.023$), but there was no significance difference between the amount of wound blood from the drain ($p = 0.404$).

Conclusions: High wound levels of TXA are achieved when the drug is given IV raising the possibility of the wound being its major site of action. Four hours post TQ release, higher wound blood levels are seen compared to topical administration. Topical TXA systemic levels in the blood are about 1/3 that of IV TXA at 1-hour post TQ release.

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