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Use of intravenous tranexamic acid with a bipolar sealer system for blood loss reduction in primary total knee arthroplasty – A randomized, controlled clinical trial

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Introduction: Total knee arthroplasty (TKA) bears risk of blood transfusion increasing complication rates, cost, and length of stay. Methods studied previously to reduce transfusions include tranexamic acid (TXA) and a bipolar sealer. Our center has nearly eliminated transfusions via pre-operative anemia management. We decided to test both tools to determine any effect on change in hemoglobin as a primary endpoint.

Methods: A four armed, double-blind, placebo controlled, prospective design was chosen. Groups included total knees with TXA or placebo and a bipolar sealer group with TXA or placebo. TXA was bolused 20 mg/kg IV and the bipolar sealer was used to “paint” the knee. Patients >18 undergoing primary TKA were included and excluded with adverse reaction to TXA, coagulation disorder, platelets <100,000, history of DVT, PE, CVA, acquired defective color vision, renal insufficiency, or coronary stents. An estimated sample size of 35 per group provided 80% power to detect a difference of 0.5 g/dL comparing delta hemoglobin pre-op day of surgery to post-op day 2. Comparisons utilized one-way ANOVA and Fisher’s least significant difference test for continuous variables, and Pearson’s chi-square test for categorical variables. 127 patients ultimately provided the necessary statistical endpoint.

Results: The mean hemoglobin change from baseline to post-operative days 2 was significantly lower in both groups with TXA compared to the control group (P=0.002). The group with the bipolar sealer alone showed no difference compared to control (P=0.074).

Conclusion: The data show that mean hemoglobin drop is lowered by TXA following total knee arthroplasty. There was no significant change due to the bipolar sealer compared to control. Multiple modalities have been shown to reduce transfusions following total knee. This study supports the use of TXA in primary total knee arthroplasty and calls into question to efficacy of the bipolar sealer.

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