Do Intra-operative Antifibrinolytics Reduce Blood Loss in Adolescent Idiopathic Scoliosis? A Prospective Randomized Comparison

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Summary: The benefit of the routine use of antifibrinolytics during spinal fusion surgery for AIS is unclear. We found a significant reduction in blood loss but not transfusion rate with antifibrinolytics compared with placebo. TXA, but not EACA, is effective in reducing post-operative drain output as well.

Background: Antifibrinolics are known to reduce blood loss. However, the benefit of using these medications for patients with Adolescent Idiopathic Scoliosis (AIS) is unclear. No study has compared tranexamic acid (TXA), epsilon aminocaproic acid (EACA), and placebo to directly assess blood loss, drain output, and transfusion rate in a prospective randomized study.

Methods: This is a prospective, randomized, double blinded comparison of TXA, EACA and placebo used intra-operatively in patients with AIS. 74 patients with AIS were randomly assigned to one of the treatment arms or the placebo group. TXA was administered at 10mg/ kg for a loading dose followed by 1mg/kg-hr, while EACA was given at a 10 fold higher dose. The physicians, patients, and researchers were blinded to the patient's treatment designation. Estimated blood loss (EBL), pre, intra and post-operative hematocrit, blood product usage, and post-operative drain output were recorded. An ANOVA with Tukey's post hoc analysis was used to compare groups. No pharmaceutical funding was received for this study.

Results: AIS patients received TXA (n=18), EACA (n=21), or saline (n=35) in the operating room (57F, 17M, mean age 15, range 11-21). Average blood loss with TXA (607 ± 545ml) or EACA (671± 517ml) was less than placebo (1038 ± 880ml) (p< 0.05). Total drain output was decreased with TXA (684 ± 355ml), but not EACA (1,161 ± 549ml), compared to Saline (1,125 ± 479ml) (p< 0.05). Similarly, total blood loss was reduced with TXA (1329 ± 567ml), but not EACA (1863 ± 857ml), compared to Saline (2,126 ± 1,187ml) (p < 0.05). There was no difference in the number of units transfused, duration of surgery, and hematocrit during surgery when comparing the three treatment arms. EACA may prevent a post-operative decrease in hematocrit compared to Saline (p = 0.06). There were no thromboembolic, renal, or major wound complications.

Conclusions: We report that antifibrinolytic treatment reduces blood loss but not transfusion rate in AIS. Total drain output and total blood loss were reduced with TXA, but not EACA, compared to Saline. Both treatment options were equivalent in terms of intra-operative blood loss.

Significance: Our study provided level-one data comparing TXA, EACA, and placebo in AIS.