Title: Implementation of Tranexamic Acid to Reduce Blood Loss During Cranial Vault Remodeling for Craniosynostosis at a Single Institution

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Background: Cranial vault remodeling for repair of craniosynostosis is associated with significant blood loss and need for blood transfusion. To reduce these events, our institution began using tranexamic acid (TXA) peri-operatively in 2012. We sought to quantify the impact TXA has had on reducing blood loss and the transfusion of all blood product components.

Methods: With institutional review board approval, a retrospective study from 2006 to 2013 was performed for all patients undergoing surgical correction of craniosynostosis at our institution. All available records were reviewed, and patient data were collected from the time of preoperative evaluation until discharge. We focused our review on patients with non-syndromic single-suture synostosis, before and after the implementation of TXA into our program.

Results: We identified a total of 220 patients with craniosynostosis, of which 177 had non-syndromic single-suture disease. Of these 177, a total of 49 received TXA. A single surgical team performed all operations. Median age at time of surgery was 9.1 months (IQR of 5.9-10.4 months). The TXA group had a significant reduction in estimated blood loss (29 vs. 37 ml/kg $p<0.01$), cell saver volume (6 vs. 10 ml/kg $p<0.01$), red cell transfusion (33 vs. 40 ml/kg $p<0.01$), and exposure to plasma/cryoprecipitate transfusion (2% vs. 31% $p<0.01$). Reduction in platelet transfusion did not reach significance (2% vs. 9% $p=0.18$). Even with reduced red cell transfusion, the TXA-treated patients exhibited similar post-operative hematocrits (30.1 vs. 30.9 $p=0.508$) to those not treated with TXA. We found that length of stay was reduced with the use of TXA (4 days IQR 3-4 vs. 4 days IQR 4-5, $p<0.01$), as was output from surgically placed drains (177 vs. 328 ml $p<0.01$). We found no difference in mortality or post-operative complications between groups.

Conclusions: The introduction of TXA for non-syndromic single-suture synostosis repair at our institution resulted in significant reductions in blood loss and need for blood product transfusion for cranial vault remodeling. Postoperative hematocrits remained the same even with less blood transfusion. In addition, TXA use nearly eliminated the need for plasma transfusion, and is associated with shorter hospital stay. No difference in postoperative complications was observed. Our data provides further support for the continued use of TXA in our program and its wider acceptance for pediatric cranial vault remodeling.