Antifibrinolytics: When Do They Reduce Blood Loss during Spinal Deformity Surgery?

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Introduction: Adult spinal deformity correction surgery often involves significant intraoperative blood loss and results in the need for blood transfusions. Surgeons have begun administering perioperative antifibrinolytic agents which significantly reduces intraoperative blood loss. To our knowledge, however, there have been no studies at what phase during surgery antifibrinolytics decrease blood loss. The purpose of the study was to determine which phase of surgery antifibrinolytics (antifib) decrease blood loss and compare it to blood loss incurred without antifibrinolytic administration in adult thoracolumbar deformity surgeries.

Methods: Retrospective study; reviewed consecutive surgical case logs (2012-2015) from spinal deformity surgeons at a single, academic center. Inclusion criteria were: age > 18 years, thoracolumbar surgeries, surgery duration between 6 and 9 hours, and levels of fusion > 7. Patients (n=65) divided into two groups: 43 patients with no osteotomies (Group 1) and 22 patients with osteotomies (Group 2) during surgery. We analyzed blood loss for every 2 hours in Group 1 and 2, and compared between patients receiving antifibrinolytic agents and no antifibrinolytics. Patients who were administered an antifibrinolytic received either AMICAR or TXA. AMICAR patients were given a loading dose of 100mg/kg 30 minutes prior to incision followed by a maintenance dose of 10mg/kg/hr. TXA patients received a loading dose of 10mg/kg 30 minutes prior to incision followed by a maintenance dose of 1mg/kg/hr. ANOVA and Chi square analyses performed; p < 0.05 was considered statistical significant.

Results: Study consisted of 65 patients: mean age of 60Â±16 years. The number of levels fused and duration of surgery between with and without antifibrinolytic patients were nearly different in Group 1 and 2. The patients in Group 2A were significantly younger than patients in Group 2B (38 vs. 58 years, respectively with a p=0.017). The duration of surgery and the number of levels of fusion in Group 2B were greater than Group 2A, but these did not reach statistical significance. The duration of surgery in Group 1B was significantly (p=0.02) longer (7.5hrs) than in Group 1A (6.9hrs). The mean age (p=0.07) was higher in Group 1B There were no significant differences between the Charlson Comorbidity Index (CCI) or the American Society of Anesthesiologists Physical Status (ASA). (Table 1) In Group 1 (Table 2): Total blood loss (TBL) was 1.8L and 2.2L (p=0.08) in patients without and with antifibrinolytics, respectively; blood loss in patients (no Antifib vs. with Antifib) at first 2 hours (507 vs. 620ml), third and fourth hour (512 vs. 682ml), fifth and sixth hours (512 vs. 682ml), and seventh and eighth hour (1125 vs. 580ml). In Group 2: TBL was 1.5L and 2.1L (p=0.07) in patients without and with anti-fibrinolytics, respectively; blood loss in patients (no Antifib vs. with Antifib) at first 2 hours (397 vs. 592ml), third and fourth hour (403 vs. 678ml), fifth and sixth hour
(388 vs 622ml), and seventh and eighth hour (716 vs. 437ml), respectively. The TBL and blood loss at every 2 hours were not statistically significant between patients in Group 1 and 2.

Conclusion: Antifibrinolytics tend to decrease blood loss after 4 hours from the start of surgery (Figure 1). The total blood loss is higher in patients who received antifibrinolytics due to more levels of fusions and higher duration of surgery in both groups. Our low sample size failed to show any statistical significance between with and without antifibrinolytic patients. To our knowledge this is the first study to see which phase during surgery antifibrinolytics decrease blood loss. Further studies with a larger sample size are needed to support our findings.