



## **Comparison of Estimated vs Calculated Perioperative Blood Loss in Adolescent Idiopathic and Neuromuscular Scoliosis Surgery**

Christopher Cheng, MD<sup>1</sup>, Connie Poe-Kochert, CNP<sup>2</sup>, George H. Thompson, MD<sup>1,2</sup>, Jochen Son-Hing, MD<sup>1,2</sup>, Christina K. Hardesty, MD<sup>1,2</sup>

### **Background**

Posterior spinal fusion for scoliosis correction can be associated with substantial blood loss. Allogenic blood transfusion is an important tool for management of acute peri-operative anemia however is not without risks. Previous literature on the subject utilizes estimated blood loss, which may underestimate bleeding. We sought to investigate the difference in blood loss in patients with idiopathic and neuromuscular scoliosis utilizing both estimated blood loss (EBL) and a calculated blood loss (CBL) based on patient height, weight, and hemoglobin values.

### **Methods**

Retrospective review was conducted of children who underwent posterior spinal fusion for scoliosis correction between June 2013 and January 2021. Estimated blood loss was determined from estimated intraoperative blood loss and measured postoperative drain output. Calculated blood loss was computed as described by Foss et al. All values were further normalized based on vertebral levels fused and patient weight.

### **Results**

Final cohort included 224 children with adolescent idiopathic scoliosis (AIS) and 76 with neuromuscular scoliosis (NMS). EBL significantly underestimated total blood

loss compared to CBL ( $882.2 \pm 447.1$  mL vs.  $1315.0 \pm 375.1$  mL,  $P < 0.001$  in AIS;  $1132.9 \pm 562.1$  mL vs.  $1455.2 \pm 482.7$  mL,  $P < 0.001$  in NMS). CBL in patients with NMS was significantly higher than those with AIS ( $1455.2 \pm 482.7$  mL vs.  $1215.0 \pm 375.1$  mL,  $P < 0.001$ ). Per-level CBL however was significantly lower in the NMS cohort, and in subgroup analysis was significantly less in patients with NMS requiring fusion to pelvis compared to those who did not.

## **Conclusion**

EBL significantly underestimates blood loss compared to CBL. Patients with NMS undergoing surgical correction also have significantly greater blood loss than AIS counterparts. From this study, these differences appear to be driven by extent of fusion. Updated cutoffs and guidelines would be valuable for more accurate identification of patients at risk for requiring transfusion and determination of when to type and cross-match blood products prior to posterior spinal fusion for pediatric scoliosis.

## **Disclosures**

Christina K. Hardesty, MD: Consultant for Orthopediatrics, Medtronic, and Alcyone; Royalties from Orthopediatrics

Jochen Son-Hing, MD: Consultant for Orthopediatrics

George H. Thompson, MD: Consultant for Orthopediatrics, Royalties from Orthopediatrics, Editor of the Journal of Pediatric Orthopaedic Surgery

All other authors: Nothing to Disclose