

## A NOVEL DAILY BLEEDING SCALE TO CHARACTERIZE BLEEDING SEVERITY IN PEDIATRIC ECMO

Katherine Doane<sup>1</sup>, Danielle Guffey<sup>2</sup>, Laura Loftis<sup>3</sup>, Trung Nguyen<sup>3</sup>, Matthew Musick<sup>3</sup>, Amanda Ruth<sup>3</sup>, Ryan Coleman<sup>3</sup>, Arun Saini<sup>3</sup>

<sup>1</sup> Baylor College of Medicine, Department of Pediatrics, Critical Care

<sup>2</sup> Baylor College of Medicine, Dan L. Duncan Institute for Clinical and Translational Research, Critical Care

<sup>3</sup> Baylor College of Medicine, Pediatrics, Critical Care

**Background:** Bleeding events frequently occur in pediatric ECMO patients. The magnitude and impact of bleeding events of varying severity are unknown. We used a novel daily bleeding scale (graded 0 to 4 with increasing severity) to determine overall bleeding burden, timing of grade 3 or 4 bleeding events, and risk factors for bleeding events during ECMO course.

**Materials/Methods:** Multicenter retrospective cohort study of pediatric ECMO patients, excluding post-cardiac surgery and neonatal patients, at 10 centers utilizing Pediatric ECMO Outcomes Registry (PEDECOR) database from Dec 2013-Feb 2019.

**Results:** A total of 283 pediatric ECMO patients with median age 1.3 years (IQR 0.1, 9.0) and median ECMO duration of 5 days (IQR 3.0, 9.5) were included. Approximately 75% of patients had at least one bleeding event with the following distribution of maximum severity during ECMO course: 27.2%, 26.1%, 15.9%, and 5.7% (grade 1-4 respectively). Based on Kaplan-Meier analysis, 11% (CI 8-15%) of patients on ECMO will experience a grade 3 or 4 bleeding event by ECMO day 2, 20% (CI 15-26%) by 7 days, and 31% (CI 23-41%) by 14 days. Further, 42.6% of patients demonstrated mild to moderate bleeding 24 hours prior to a severe bleeding event. Age (adjusted hazard ratio (HR) 1.07 for each 1-year increase, CI 1.04- 1.10,  $p < 0.0001$ ) and veno-arterial (VA) ECMO (adjusted HR 1.95, CI 1.50-2.53,  $p < 0.001$ ) were associated with grade 3 or 4 bleeding events by Multivariable Cox Regression analysis.

**Conclusions:** Bleeding events are common among pediatric ECMO patients. Nearly one-fourth of these events are severe and are likely to occur within the first week of ECMO. Almost half of patients demonstrate mild to moderate bleeding prior to a severe bleeding event. Increasing age and VA ECMO are associated with earlier severe bleeding events. Further research into causation and prevention of severe bleeding events is needed.