

## Identifying the Limb at Risk in Pediatric Patients on Extracorporeal Membrane Oxygenation

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**Introduction:** Many pediatric orthopedists will encounter lower extremity complications associated with extracorporeal membrane oxygenation (ECMO) and femoral artery (FA) cannulation. Previously reported risk factors for limb ischemia include younger age, female sex and larger cannula size, however identifying specific patients at risk for these catastrophic complications remains difficult. The purpose of this study was to identify objective markers of impending limb ischemia following femoral artery cannulation.

**Methods:** All patients placed on veno-arterial (VA) ECMO between 2016 and 2023 at a tertiary care pediatric hospital were identified and data including demographics, laboratory markers starting at time of cannulation, procedural/surgical interventions and complications was reviewed. Patients who developed limb ischemia were compared to those who did not.

**Results:** 36 patients were reviewed, with 5 cases of lower extremity complications, including 2 below knee amputations (BKA), 2 fasciotomies, and 1 thrombectomy and fasciotomy. Median time to first intervention after cannulation was 52.4 hours. Etiology ranged from prolonged ischemia, to reperfusion injury resulting in compartment syndrome (CS) to thrombosis. Patients who developed limb ischemia had significantly higher creatine kinase (CK) compared to those who did not (median 37,491 versus 825;  $p=0.0005$ ). Maximum CK over 22,913 was indicative of critical limb ischemia (Youden's index= 0.9545). The overall mortality rate was 30.6% (0 in the limb ischemia group).

**Conclusion:** The overall limb ischemia rate at this single center was 13.8%. CK emerged as a potential biomarker for severe limb ischemia, indicating that this laboratory value may be utilized along with clinical acumen to accelerate diagnosis, facilitate intervention, and guide discussion with the families of these critically ill patients.