

Peripheral Extracorporeal Membrane Oxygenation is a safe and effective support modality for pediatric patients with sepsis

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Background

Extracorporeal Membrane Oxygenation (ECMO) can be used as a treatment modality for pediatric patients with refractory septic shock. Previous studies indicate central ECMO, with direct cardiac cannulation, is superior for septic patients. At Riley Hospital for Children, we believe that peripheral ECMO support, through cervical or femoral vessels, is an effective and safe method of supporting pediatric septic patients in a less invasive manner.

Methods

We reviewed pediatric (30 days to 18 years) patients supported with ECMO for septic shock from 2005-2019 at Riley Hospital for Children and compared them to non-septic respiratory failure patients supported with ECMO. Pre-ECMO data points, demographics, cannulation sites, flow rates, lab values, Vasoactive Inotropic Score (VIS), P-Prep score, and outcomes were collected and analyzed using t-test and multivariate analyses. We defined a significance as $p=0.05$.

Results

35 of 80 ECMO patients were supported for septic shock. Septic patients were larger (25.1kg vs 11.4kg, $p=0.005$) and older (85.6 vs 18.8 months, $p=0.001$). Pre-ECMO VIS and P-Prep were both greater in the septic group ($p=0.007$ and $p<0.001$). Pre-ECMO serum lactate level was higher in the septic group (3.7 vs 1.4, $p=0.012$), but by 96hrs, lactate normalized in both groups. Flow rates at 24 hours were similar between the two groups (91mL/kg/min vs 88mL/kg/min, $p=0.079$). No significant difference in bleeding complications or blood product administration was found, but there was a higher incidence of renal failure in septic patients. Survival in the septic group was similar to the comparison group (51.4% vs 62.2%, $p=0.37$). Hours on ECMO and length of stay were also similar.

Conclusion and Potential Impact

Despite septic patients appearing more ill prior to ECMO, they had similar mortality, support parameters, and outcomes, showing that septic shock is not a contraindication to peripheral ECMO support in pediatric patients.