

Abstract

Equipment selection in pediatric ECMO

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In pediatric and neonatal ECMO, equipment is often selected component by component—a pump, an oxygenator, some cannulae, and tubing sizes. Yet these choices interact as a single hydraulic system. Circuit resistance determines the speed required to achieve target blood flow, while pump speed determines whether the centrifugal pump operates near its Best Efficiency Point or in a recirculation-prone region associated with increased blood trauma and reduced circuit longevity.

This presentation examines centrifugal pump hydraulics from a clinical perspective, explaining why neonatal blood flow often forces adult-sized pumps into their shutoff region and how cannula dimensions, tubing diameter (3/16" versus 1/4"), connector transitions, and oxygenator resistance collectively influence pump performance.

The discussion also considers oxygenator selection in neonates, where modern membrane lungs often provide CO₂ removal well beyond metabolic requirements, making gas-exchange management a system-level challenge rather than a property of the oxygenator alone.

Rather than reviewing individual component specifications, the focus is on how circuit-level interactions determine blood preservation—and what can be done differently.