**STERILITY AND PERFORMANCE OF OPEN AND CLOSED EXTRACORPOREAL CIRCUITS AFTER LONG-TERM DRY AND WET SETUPS**

Joseph Deptula, MPS, CCP1, Catrina McGrath, CCP2, Thomas Preston, CCP3, Hayden Miller, CCP3, Bianca Yen, CCP2, Lenny Munari, CCP2, Shaun P. Setty, MD2

1 Department of Pediatric Cardiac Surgery, Levine Children’s Hospital, Charlotte, NC

2 Department of Pediatric and Adult Congenital Cardiac Surgery, MemorialCare Heart and Vascular Institute, Long Beach, CA

3 Innovative ECMO Concepts Inc, Arcadia, OK

Background. The timeframe for safely using pre-set up dry, wet-primed and blood-primed extracorporeal circuits has long been debated. This study was undertaken to validate deviation from standardized recommendations with the objective of reducing costs and waste while providing emergent cardiopulmonary support.

Methods. Open bypass circuits and closed extracorporeal membrane circuits (complete systems and integrated component systems) were setup dry for up to 60 days. Circuits were then wet primed for up to 6 weeks. Each wet circuit group had one control inoculated with Escherichia coli. Open circuits were cultured daily, closed circuits weekly. Circuits were primed with washed banked blood, albumin, heparin, NaHCO3, and CaCl2. Baseline pCO2, pO2, hemoglobin, lactate, and plasma free hemoglobin were measured. Circuits were run at 6 liters/minute blood flow, sweep gas of one liter/minute, 100% FiO2, for 1 minute. Post oxygenator blood gases were collected to calculate gas exchange and repeated at 8, 16, and 24 hour intervals.

Results. There was no compromise of the circuits’ sterility and no clinically significant gas exchange abnormalities over time. Statistical significance (p<0.01) was seen in free hemoglobin and lactate levels, most significant in the 16 to 24-hour time point with the closed systems inoculated with E. Coli.

Conclusions. Open and closed circuits can be safely set up dry for emergency use up to 60 days. Open, wet circuits can be used safely up to 5 days. Closed, wet circuits can be used safely up to 6 weeks. Blood primed circuits can be safely run up to 16 hours prior to patient use.