

## 4th Annual ELSO-SWAC Conference Proceedings

# Management strategy during neonatal/paediatric VV ECMO run

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**Introduction:** Strategy during extracorporeal membrane oxygenation (ECMO) support is guided by available outcome data. Boundaries limiting selection of cases are shifting with advances in ECMO technology, conventional support, and destination therapies.

**Evolution:** Neonatal respiratory ECMO numbers continue to decline due to improved conventional therapies, whereas infants historically excluded from ECMO (for example, ex-premature infants with O<sub>2</sub>-dependent chronic lung disease and severe RSV) are now successfully supported. ECMO for bridging of children to lung transplant is now established.<sup>1</sup> Advances are also being made in mobile ECMO,<sup>2</sup> long duration of ECMO support, and ECMO while wide awake.

**Initiation:** Flow requirements and patient or vessel size govern cannula choice. Percutaneous cannulation of vessels with ultrasound guidance is described in all sizes of children, including small infants.<sup>3</sup> Serial imaging and ECHO control are needed for optimisation of cannula position and orientation. Transoesophageal ECHO is preferable to transthoracic where available. Reconfiguration of the circuit may prove necessary in some cases and is better done early in the run.<sup>4</sup>

**Troubleshooting:** Protocol and bundle adherence are the keys to preventing complications. Detection requires vigilance and rigorous checks along with comprehensive handover and tight teamwork. Management is about appropriate escalation and pathway utilisation. Simulation is an essential component of staff training and a powerful tool for reinforcing these points.<sup>5</sup>

**Lung recovery:** ECMO can be considered the ultimate in "lung rest" techniques. Enhancing lung recovery during the rest provided by ECMO is mainly achieved by attention to fluid balance, pulmonary toilet, and

adoption of ventilator rest settings. Bronchoscopy is also particularly useful in this context.<sup>6</sup> Other therapies such as prone position, steroid use, surfactant, perfluorocarbon,<sup>7</sup> and even individual lung ventilation<sup>2</sup> have a role in selected cases.

**De-cannulation:** Patience can be needed when timing the end to VV ECMO support. Removing the sweep gas from the oxygenator can be done simply without having to wean ECMO flow. In more difficult situations, 12–24 h trial off can be used. Radiological lung clearance, improving lung compliance, reduction of sweep gas requirements, and oxygen challenges are all informative in the run up to a decision to trial off. Lung biopsy<sup>8</sup> or genetic test

results are useful when recovery is absent to help establish futility. Earlier de-cannulation can be indicated in the setting of an intractable or severe complication.

**Summary:** Strategy for management of VV ECMO support is evolving with improvements in ECMO techniques and advances in supporting therapies. A proactive, rigorous but flexible approach to individual cases can deliver excellence.

**Keywords:** neonatal, pediatric, ECMO, respiratory, lung rest

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