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Awake extracorporeal membrane oxygenation in a neonatal patient with respiratory failure

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Background: Awake extracorporeal membrane oxygenation (ECMO) in conscious, extubated patients has been used successfully in adults and children, primarily as a bridge to lung or heart – lung transplantation and recovery from refractory cardiogenic shock.^{1,2} However, this strategy has been reported only as an exceptional measure in neonatal patients. We present a case of neonatal respiratory failure where an infant was extubated while on ECMO and managed without invasive ventilation.

Methods: The clinical details, laboratory investigations, management, and outcome of the patient were reviewed from the electronic health record. This single-patient case report was exempt from the IRB at our institution. The photograph was used with parental consent.

Results: The patient was a 2950 g product of an uncomplicated term pregnancy, whose postnatal course was complicated by neonatal acute respiratory failure, pulmonary hypertension, and bilateral pneumothoraces. The infant was managed on veno-arterial (VA) ECMO. Despite the presence of thoracostomy tubes and rest ventilator settings while on VA ECMO, pneumothoraces persisted. On ECMO day 2, the patient was electively extubated to a humidified high-flow nasal cannula. At 96 h after extubation, there was complete resolution of bilateral pneumothoraces. The infant achieved adequate lung recruitment with only spontaneous respiration and underwent decannulation on ECMO day 6. He was electively intubated for decannulation and extubated 12 h later. At 5 days post-decannulation, the infant was weaned off respiratory support and discharged home 4 weeks after decannulation after weaning from sedation and establishing successful oral feedings.

Conclusions: Awake neonatal ECMO appears to be safe and effective and may offer significant



Figure 1. A neonatal patient with acute respiratory failure on VA ECMO electively extubated secondary to air leak. During the extubation period on VA ECMO support, the infant was maintained on minimal necessary sedation and allowed to be awake.

advantages over traditional management in certain clinical scenarios, particularly in cases of persistent air leak. To our knowledge, there have been no published studies comparing awake ECMO with traditional (ventilated) ECMO in neonatal patients, although we have successfully managed five patients in our neonatal intensive care unit using this strategy for various clinical indications. Extubation offers the advantages of mitigating ventilator-associated

pneumonia (VAP) risk and tracheal trauma, facilitating resolution of air leak, de-escalating sedation, and promoting family bonding. Prospective comparison trials are warranted.

Keywords: neonatal ECMO, awake ECMO

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