The Utilization of Venous-Venous Extracorporeal Membrane Oxygenation Membrane for the Management of Status Asthmaticus

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INTRODUCTION
LIFE THREATENING REFRACTORY ASTHMA:
• Requires intubation and mechanical ventilation
• Often presents with high level of arterial PaCO₂ which require both a high minute ventilation and airway pressures despite lung protective ventilation and the administration of Heliox gas mixture
• Ventilator induced trauma (VILI) is common
• Has a mortality rate of around eight percent

INTERVENTION
• Another approach to meet gas exchange goals and to provide maximum lung protective is to place these patients on venous-venous extracorporeal membrane oxygenation (ECMO) support.
• The clinical rational for this management would be to protect the lung from any additional VILI and provide a stable level of ventilation and acid-base balance.
• Allows for other clinical interventions to be administered in a more systematic manner.

METHODS
• During a two year time frame, we placed six status asthmaticus patients with refractory gas exchange on V-V ECMO.
• Five of the six patients were managed on V-V ECMO until the asthma exacerbation was stabilized and progressed to ECMO and ventilator liberation.
• One patient expired secondary to multi-system organ failure unrelated to asthma.
• All patients were ventilated via pressure or volume target modes to achieve an exhaled tidal volume between 4-5cc/kg/IBW and PEEP was set via either a pressure/volume tool or via transpulmonary monitoring.
• ECMO parameters were set to achieve a SpO₂>88% and a PH>7.25. There was no additional occurrences of VILI post ECMO intervention.
• All patients receive pharmacological paralytics, heliox, and continuous beta-agonist therapy for the first forty hours of mechanical ventilation and ECMO support.

CONCLUSION
BASED ON OUR CLINICAL EXPERIENCES:
• V-V ECMO along with lung protective ventilation can provide a safe, clinical management of the status asthmaticus with refractory gas exchange.
• Lower minute ventilation and airway pressures can be achieved minimizing the risk of VILI.