

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

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

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INTRODUCTION

LIFE THREATENING REFRACTORY ASTHMA:

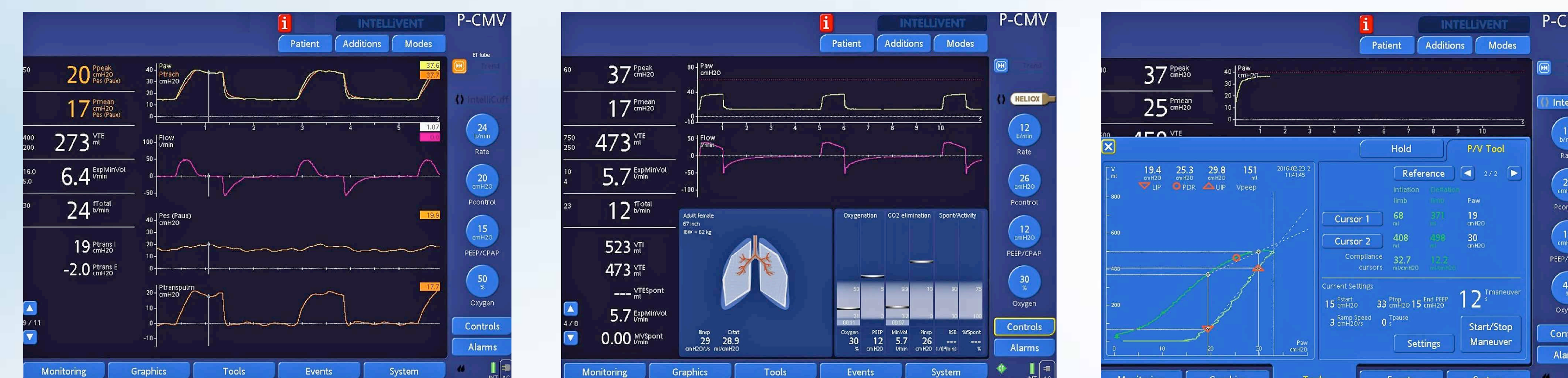
- Requires intubation and mechanical ventilation
- Often presents with high level of arterial PaCO₂ which require both a high minute ventilation and airway pressures despite lung protective ventilation and the administration of Heliox gas mixture
- Ventilator induced trauma (VILI) is common
- Has a mortality 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 rationale 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.



ECMO Device



Transpulmonary Monitoring

Heliox Administration

P/V tool

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.

Patient Number	Age/G	S/E	Vent Mode/ Setting	V-V ECMO LOS	ECMO Settings	Exit time from decannulation	Heliox
1	51/M	S	PCMV 4cc/kg	7	100/51pm	120 hrs.	Y
2	28/M	S	CMV 4cc/kg	8	100/91pm	70 hrs.	Y
3	49/M	S	PCMV 5cc/kg	5	100/4.51 pm	42 hrs.	Y
4	31/F	E	CMV 5cc/kg	15	80/31 pm	NA	Y
5	18/M	S	CMV 4cc/kg	8	80/41 pm	209 hrs.	Y
6	31/F	S	PCMV 4cc/kg/IBW	9	100/1.51 pm	42 hrs.	Y

All received continuous Proventil nebulization
PEEP settings were guided by transpulmonary E-2 to 2cm
PEEP range 10–16cm
Patients 4 and 5 developed barotrauma prior to cannulation

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.