The Utilization of High Frequency Percussive Ventilation to Reduce V-V Extracorporeal Oxygenation Membrane Support (Poster).

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Goals

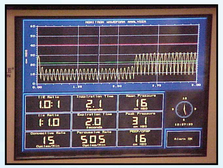
Goal of Venous-Venous ECMO:

- Stabilization of gas exchange
- Minimize the risk of ventilator induced injury

Goal of Mechanical Ventilation During ECMO:

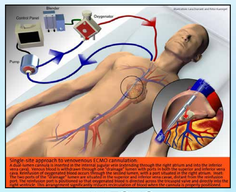
- Maintian lung recruitment
- Provide lung protection
- Augmentation of gas exchange if needed

VDR-4



VDR waveform

Maquet Rotoflow



V-V ECMO

Materials/Methods and Results

High Frequency Percussive Ventilation:

- Technologically classified as:
  - pneumatically driven
  - time cycled
  - pressure limited
  - bi-phasic percusive delivery
  - high frequency venturi flow interrupter
  - **exhalation is passive**

Role of HFPV (VDR) in ECMO Patients:

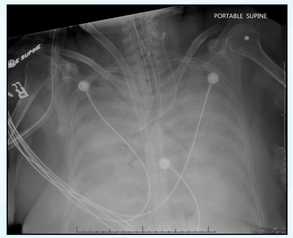
- Maximumized ECMO settings
- Retained secretions
- Inadequate lung inflation
- Constant poor pulmonary mechanics CLT<10cm$H_2$0
- Provides lung protection in unilateral lung disease process

Results

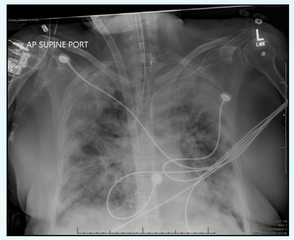
Patient	Pre VDR ECMO FIO_2%	Pre VDR ECMO LPM	Post VDR ECMO FIO_2%	Post VDR ECMO LPM	VDR FIO_2%	VDR* PIP/PEEP cm/h20
1	100%	6lpm	70%	4lpm	40%	40/16
2	100%	7lpm	60%	5lpm	50%	38/20
3	100%	8lpm	80%	6lpm	50%	40/16
4	100%	7lpm	60%	5lpm	50%	38/18
5	100%	7lpm	100%	6lpm	90%	40/22
6	9lpm	9lpm	60%	6lpm	40%	40/18
7	100%	6lpm	70%	4lpm	50%	34/16
8	100%	6lpm	90%	4lpm	50%	38/18
9	100%	8lpm	60%	7lpm	40%	36/16
10	100%	7lpm	80%	5lpm	50%	40/18
11	100%	8lpm	90%	4lpm	50%	34/16
12	100%	7lpm	80%	5lpm	50%	40/16
13	100%	8lpm	60%	5lpm	40%	40/16
14	100%	8lpm	60%	6lpm	40%	38/14
15	100%	9lpm	100%	8lpm	90%	40/22

*Prior to placing on HFPV a pressure/ volume tool measurement was performed to determine starting airway pressure and PEEP parameters to set on the VDR.

Pre/POST HFPV



Pre VDR



Post VDR 24 hours

Discussion and Conclusions

DISCUSSION

- HFPV provides both an endobronchial wedge via the percussive rate and an oscillatory plateau via the convective rate.
- Provides an internal mucokinesis and maintains a patent airway
- With this ventilator strategy lower pressures and oxygen delivery can be employed and ECMO parameters can be often reduced.
- Benefit of lower ECMO FIO2 and sweep increases the ability to match patient's hemodynamic demand by the delivery of a higher blood flow via the ECMO.
  - Less ECMO chatter
  - Less supplemental fluid replacement

CONCLUSIONS

- HFPV can help ECMO maintain gas exchange for patients at a lower FIO_2 and sweep settings.
- More research needs to be conducted to determine this ventilator strategy effect on morbidity and mortality.