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

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Published In/Presented At  

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The Utilization of High Frequency Percussive Ventilation to Reduce V-V Extracorporeal Oxygenation Membrane Support

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Materials/Methods and Results

Pre VDR

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.

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 FIO2 and sweep settings.
• More research needs to be conducted to determine this ventilator strategy effect on morbidity and mortality.

High Frequency Percussive Ventilation:

Technologically classified as:
- pneumatically driven
- time cycled
- pressure limited
- bi-phase percussive 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<10cmH2O
• Provides lung protection in unilateral lung disease process

Goal of Venous-Venous ECMO:

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

Goal of Mechanical Ventilation During ECMO:

• Maintain lung recruitment
• Provide lung protection
• Augmentation of gas exchange if needed

Results

| Patient | Baseline | Pre VDR | Pre VDR | Post VDR | Post VDR | VDR | VDR | VDR | 100% | 60% | 70% | 40% | 50% | 30% | 20% |
|---------|----------|---------|---------|----------|----------|-----|-----|-----|-------|------|------|-----|------|-----|-----|-----|
| 1       | 100%     | 6Ipm    | 70%     | 4Ipm     | 40%      | 40/16| 40/16|
| 2       | 100%     | 7Ipm    | 60%     | 5Ipm     | 50%      | 36/20| 36/20|
| 3       | 100%     | 8Ipm    | 80%     | 6Ipm     | 50%      | 40/16| 40/16|
| 4       | 100%     | 7Ipm    | 60%     | 5Ipm     | 50%      | 36/20| 36/20|
| 5       | 100%     | 7Ipm    | 60%     | 5Ipm     | 50%      | 36/20| 36/20|
| 6       | 100%     | 8Ipm    | 60%     | 5Ipm     | 50%      | 36/20| 36/20|
| 7       | 100%     | 6Ipm    | 70%     | 4Ipm     | 50%      | 36/20| 36/20|
| 8       | 100%     | 6Ipm    | 50%     | 6Ipm     | 50%      | 36/20| 36/20|
| 9       | 100%     | 6Ipm    | 70%     | 4Ipm     | 50%      | 36/20| 36/20|
| 10      | 100%     | 7Ipm    | 60%     | 6Ipm     | 50%      | 36/20| 36/20|
| 11      | 100%     | 8Ipm    | 60%     | 6Ipm     | 50%      | 36/20| 36/20|
| 12      | 100%     | 8Ipm    | 50%     | 5Ipm     | 50%      | 36/20| 36/20|
| 13      | 100%     | 7Ipm    | 60%     | 5Ipm     | 50%      | 36/20| 36/20|
| 14      | 100%     | 6Ipm    | 50%     | 5Ipm     | 50%      | 36/20| 36/20|
| 15      | 100%     | 8Ipm    | 60%     | 6Ipm     | 50%      | 36/20| 36/20|

Goals