Sensormedics 3100B Adult HFOV: Preliminary Procedure and Guidelines

Purpose:

The Sensormedics 3100B Adult HFOV is recently available for rental. These guidelines are not a protocol for its use, but having been developed from the experience of other clinicians, can be valuable in managing the ventilator. They are not a substitute for good clinical judgment.

Indications:

1. Severe ARDS requiring > 60% O2, mean Paw > 24 cmH2O, and inability to maintain a lung protective strategy with Pplat < 30 to 35 cmH2O.

Hazards/Complications:

1. HFOV in adults with COPD or asthma may exacerbate hyperinflation and air trapping.

Personnel:

Respiratory Therapy Technician I and II, Respiratory Therapist I and II

Procedure:

Prior to Initiation

1. Ensure patency of ET-tube with suction catheter. If in doubt, direct visualization with bronchoscopy may be recommended.
2. Adequate titration of sedation / paralysis.
3. Adequate assessment of patient’s intravascular volume status as higher mean Paw associated with HFOV may have potential to cause hypotension.

Initial Settings

**Perform circuit calibration prior to use and with every circuit change**

1. Bias flow 20 to 30 Lpm.
2. Mean Paw 5 cmH2O higher than mean Paw on conventional ventilation.
3. Power to achieve initial amplitude for chest wiggle to mid-thigh. (Suggest 20 plus PaCO2).
4. Frequency 5 Hz.
5. I time 33%.
6. O2 100% then wean to 40 to 50% with SpO2 90 to 92%.

Management

**Oxygenation** – Mean Paw is the main determinant of oxygenation. If oxygenation goals are not being met, increase mean Paw in 3 to 5 cmH2O increments Q30 minutes.

(Maximum achievable mean Paw on the 3100B is 45 to 55 cmH2O. Flow may have to be increased to 30 to 60 Lpm to maximize mean Paw.)

**CO2 Elimination** – The main determinants of CO2 elimination are amplitude and frequency.

- Increasing amplitude and decreasing frequency will decrease PaCO2.
- Decreasing amplitude and increasing frequency will increase PaCO2.
For rapidly rising PaCO2, increase amplitude in increments of 10 cmH2O Q 30 minutes. If necessary, decrease frequency to 3 Hz.

NOTES:
- Upon initiation of HFOV, PaCO2 may initially climb before it stabilizes and begins to come back down.
- Improvements in PaCO2 do not occur as quickly as with conventional ventilation.
- Don’t forget to rule out ET-Tube obstruction.
- If severe hypercapnea continues, try producing a small ET-tube cuff leak by deflating the cuff enough to drop mean Paw by 5 cmH2O. Then increase bias flow to return mean Paw to baseline.

Weaning

1. First wean the O2 to 40% maintaining SpO2 at 90 to 92%.
2. Next wean mean Paw gradually in 2 to 3 cmH2O increments Q4 to 6 hrs. (Remember, the mean Paw is what recruited the lung, don’t be in a rush to wean it.)
3. Once mean Paw of 20 to 24 cmH2O is tolerated (on O2 40%), the patient may be ready to switch back to conventional Pressure Control or PRVC ventilation.
4. Conventional ventilation initial settings: O2 40%, PC or PRVC mode, frequency 10 to 12 b/min, PEEP 12 to 15 cmH2O, Pplat 30 to 35 cmH2O for Vt approximately 6mL/Kg IBW.

Infection Control: All disposable circuit parts are discarded between patient use. The ventilator is wiped down with aseptic cleaning solution.

References: “High Frequency Oscillatory Ventilation: Clinical Management Strategies for Adult Patients”, Dr. Steve Derdack

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