

Weaning Strategies for HFOV

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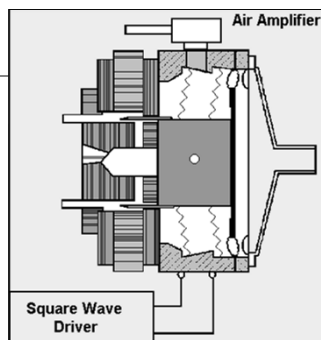
Specification of HFOV

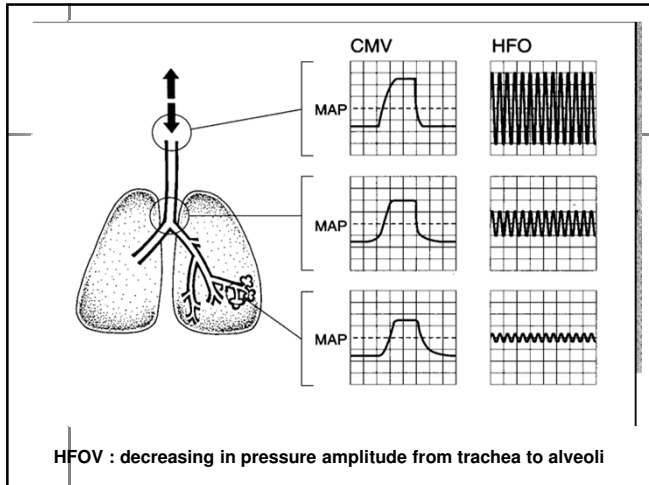
(Sensor Medics Model 3100 A)

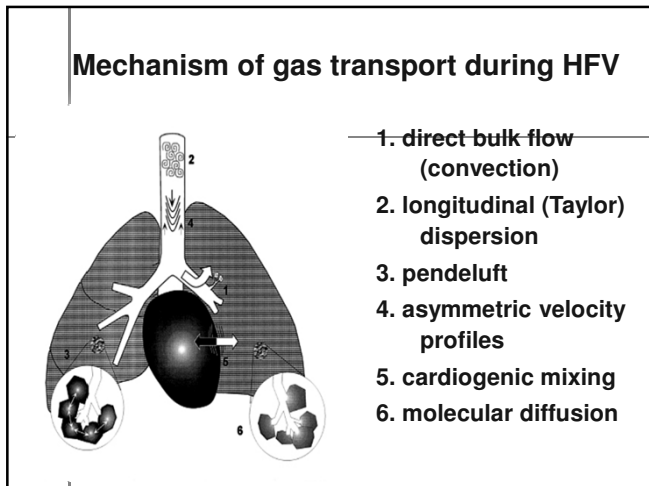
- Amplitude range 0-100 cmH₂O
- Frequency 3-15 Hz
(180-900 cycles/min)
- Ti 33-50 % of total cycle time
(I : E of 1:2 to 1:1)
- MAP 3- 45 cmH₂O
- Bias gas flow 0-40 L/min

SensorMedics 3100B

- ◆ Electrically powered, electronically controlled piston-diaphragm oscillator
- ◆ Paw of 5 - 55 cmH₂O
- ◆ Pressure Amplitude from 8 - 130 cmH₂O
- ◆ Frequency of 3 - 15 Hz
- ◆ % Inspiratory Time 30% - 50%
- ◆ Flow rates from 0 - 60 LPM







The benefit of HFOV in ARDS/ALS

- High volume strategy will recruit the atelectatic lungs
- Decreasing of tidal volume and pressure swing will reduce the lung injury and air leak syndrome
- The different flow pattern of HFOV will improve ventilation-perfusion matching

(New Horizons 1999;7:359)

Ventilator Strategies - Goals

- Normalize lung volume
- Minimize peak ventilator pressures

Physiological targets included:

- Oxygen Saturation > 88%
- Delay weaning mPaw until FiO₂ < 50%
- pH > 7.15
- PaCO₂ in the range of 40 – 70 mmHg

Initial HFOV setting in DAD/ARDS

- FiO₂ 1.0
- Frequency 5-15 Hz
- Inspiratory time (Ti) 33 % (1:2)
- Paw 5 cmH₂O > in mode CMV
- Bias gas flow ≥ 20 L/min
- Pressure amplitude : adjust to provide adequate chest wall movement and/or PaCO₂ 40-70 (Start 10-15>PIP in CMV)

Ventilation made easy

Oxygenation

Ventilation

• FiO₂

• Amplitude

• MAP

• Frequency

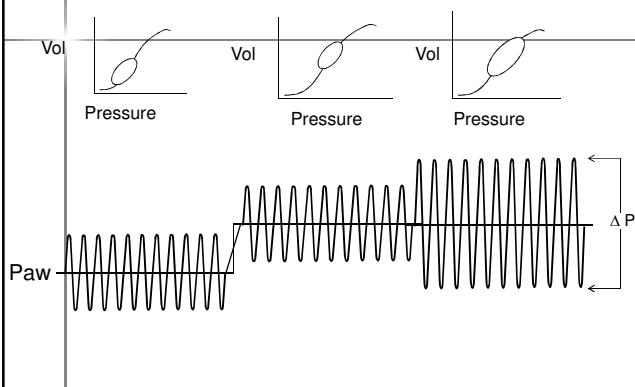
HFOV - Oxygenation Strategy

- Open lung strategy
- Initial mPaw + 5, increase in 2-3 cmH₂O increments Q 20 - 30 mins if FiO₂ > 60% until max 45 cmH₂O
- %IT 33
- Goal: FiO₂ < 60% with SpO₂ > 88%

HFOV - Ventilation Strategy

- ΔP : "chest wall vibration" - increase 10 cm H₂O increments if rising PaCO₂ to max ΔP of approximately 90 – 100 cmH₂O
- Hz 5-15 (could decrease to 3 Hz)
- ET cuff leak if rising PaCO₂
- Goal: pH > 7.15 and PaCO₂ 40 - 70 mmHg

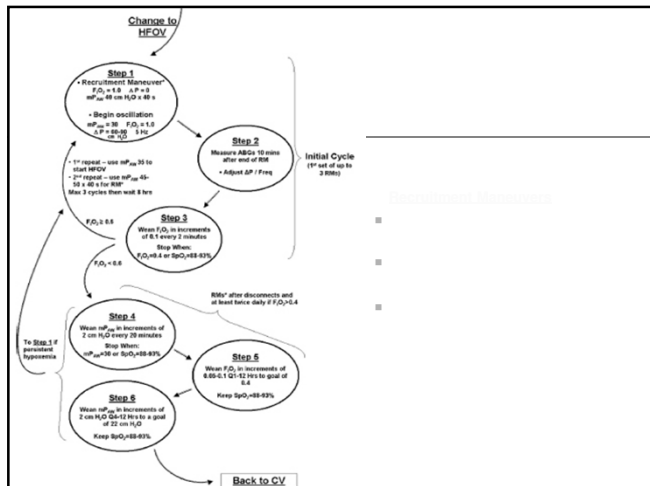
HFOV Effectively Decouples Oxygenation from Ventilation



Combining HFOV and recruitment maneuvers (RMs) in adults c ARDS

- High MAP : to avoid atelectrauma and limiting volutrauma
- avoiding both lung over-distention and under recruitment
- RMs : sustained inflation c pressure 30 - 40 cmH₂O for 30 - 40 sec.

(Crit Care Med 2005; 33: 479-86)



Algorithms for HFOV setting in adult

Weaning

- **Goal** is FiO₂ of 0.4, SpO₂ of > 88%, mPaw 20-24 cm H₂O before CV transition
- If required mPaw > 35 cm H₂O, give equal priority to reducing mPaw and FiO₂.
- Reduce mPaw 2-3 cm H₂O every 4-6 hrs
- When mPaw approaches 20 cm H₂O, transition to CV (e.g., TV 6 mL/kg; PEEP 10 cm H₂O; Pplat < 30 cm H₂O; I:E 1:1; rate 15-25 breaths/min or to APRV (e.g., Phi 20 cm H₂O; Plo 0 cm H₂O; Thi 4 secs, Tlo 0.8 sec)
- Conventional weaning; Progressing to spontaneous breathing trials