Final Considerations in Ventilator Setup

Chapter 8
FiO2

- The goal in selecting a specific FiO2 is to try to achieve clinically acceptable arterial oxygen tensions between 60-100mmHg

\[
\text{Desired FiO2} = \frac{\text{PaO}_2 \text{ desired} \times \text{FiO}_2 \text{ known}}{\text{PaO}_2 \text{ known}}
\]

- If there is no baseline ABG usually a high initial FiO2 is set (0.5-1.0)
When to use 100% Oxygen

• When the patient is seriously ill and it is required
• Before and after suctioning
• During bronchoscopy
• Any procedure that might be risky for the patient
Sensitivity

Flow Triggered
• 1-10 lpm below baseflow
• Preferred method with a slightly faster response to pt demand

Pressure triggered
• -1 to -2 cmH2O from baseline
• AutoPEEP can affect negatively
Humidification:
30mgH2O/L of absolute humidity at a range of 31°-35° for all available flows up to a Ve 20-30L/min

- Heated Humidity is most commonly used
- Avoid and drain condensation/ use heated wire circuits
- Assess secretions for adequacy of humidification
- HME or artificial nose
- Provide 10-14 mgH2O/L
- Continually assess for drying of secretions, increase in WOB
- Increase in deadspace
- Need to be removed to aerosolize medications
Alarms

Warn of possible dangers related to the patient ventilator system

• Low pressure alarms - 5-10 cmH2O below PIP
• High pressure alarms - 10 cmH2O above PIP
• Low PEEP - 2-5 cmH2O below PEEP
• Apnea – 20 seconds
• Ratio Alarm – prevent Ti > 50% TCT
• Low exhaled Vt – 10-15% below set Vt
• Low exhaled Ve - 10-15% below set Ve
• Oxygen – 5% above and below set FiO2
Action during Alarms

• Ensure the patient is being ventilated – disconnect and manually ventilate if necessary
• Silence the alarms and get help
• Troubleshoot the ventilator – may need to replace if mechanical problem
Final Considerations

• Prepare the patient
• Establish an interface
• Manual Ventilation
• Cardiovascular stabilization
• Ventilatory requirements
• Treating the cause of respiratory failure—mechanical ventilation is not curative the underlying problem must be resolved
A patient with COPD is receiving PSV and seems to be having difficulty triggering the breaths. Auto-PEEP is measured at 8cmH2O and no PEEP is being used. Sensitivity is set at -1cmH2O. How much of an effort in cmH2O must the patient generate to actually trigger a breath?

A patient must trigger -8cmH2O to bring the alveolar pressure to 0 plus -1cmH2O to trigger the ventilator. Total effort is -9cmH2O
Gas leaves a heated humidifier at a temperature of 34° and 100%RH. The absolute humidity is 37mg/L. The gas enters a heated wire circuit that is heated to 37° at the proximal airway.

What happens to the absolute humidity of the gas that becomes 100% saturated at normal body temperature?

What is the difference between what is provided by the humidifier and what is needed by the patient?

What happens to the relative humidity of the gas as it leaves the humidifier and enters the circuit?

The absolute humidity of a gas that is 100% saturated at normal body temperature is 44mg/L. The humidifier provides 37mg/L and the patient needs 44mg/L. The humidity deficit is 7mg/L. The relative humidity decreases as RH = absolute/maximum capacity x 100 so: 37/44x100 = 84.3%