

Ventilator Strategy for the Acute COPD Exacerbation

Background: 50% of patients admitted to the ICU for a COPD Exacerbation are intubated

Important Considerations when ventilating:

1. Dynamic Hyperinflation (DH):

1. In spontaneous breathing, gas is exhaled completely at the end of expiration. In patients with obstructive lung diseases (asthma and COPD), this **doesn't happen completely with a severe exacerbation**. This process is known as dynamic hyperinflation which leads to **air trapping**. As gas becomes trapped in the distal airways, this generates auto-PEEPing or **intrinsic-PEEP**. In this situation, the lungs must work harder to increase the transpulmonary pressure in order to draw a normal volume of air into the lungs (they have to **overcome the auto-PEEP**).
2. DH leaves the patient susceptible to **Ventilator Induced Lung Injury** due to overdistension of alveoli causing barotrauma and volutrauma AND increases intrathoracic pressure which can **decrease venous return and lead to hypotension**.

2. Positive Pressure Ventilation (PPV):

1. In these patients, PPV can worsen dynamic hyperinflation when using higher inflation volumes (10cc/kg).

3. Ventilator Strategies (Lung Protective Ventilation in COPD Patients):

1. Calculate Predicted Body weight (PBW):

1. Males: $50 + 2.3(\text{height in inches} - 60)$.
2. Females: $40 + 2.3(\text{height in inches} - 60)$.

3. Lung volumes are proportional to HEIGHT not weight.

2. Mode: AC/VC at 6ml/kg (from PBW). Keep Plateau Pressure <30 (measure using inspiratory hold on Ventilator)

3. PEEP of 5 (want this to be less than auto-PEEP). You may need to increase this if patient isn't able to trigger vent due to being unable to overcome the auto-PEEP

4. Set FIO2 lowest for SpO2 of 88-92%

5. Decrease I:E Ratio => Lower the RR (8-12), Increase the Peak Flow Rate (90-120 ml/min). Maintain Permissive Hypercapnia w/ pH >7.2

6. If patient becomes acutely hypotensive w/ increased RR and increased Peak Pressures, **disconnect the pt from the vent**. Pt is likely auto-PEEPing, which is causing significantly decreased venous return leading to cardiovascular collapse

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