Caring for the Mechanically Ventilated Patient

Mechanical ventilation is utilized in intensive care and long-term care settings to assist patients who require additional respiratory support. This handy reference guide provides critical patient care essentials, tips for trouble-shooting ventilator alarms, and potential complications.

Care Essentials for Patients on Mechanical Ventilation

- Maintain a patent airway. Per policy, note endotracheal (ET) tube position (centimeters) and confirm that it is secure.
- Assess oxygen saturation, bilateral breath sounds for adequate air movement, and respiratory rate per policy.
- Check vital signs per policy, particularly blood pressure after a ventilator setting is changed. Mechanical ventilation increases intrathoracic pressure, which could affect blood pressure and cardiac output.
- Assess patient’s pain, anxiety and sedation needs and medicate as ordered.
- Complete bedside check: ensure suction equipment, bag-valve mask and artificial airway are functional and present at bedside. Verify ventilator settings with the prescribed orders.
- Suction patient only as needed, per facility policy; hyperoxygenate the patient before and after suctioning and do not instill normal saline in the ET tube; suction for the shortest time possible and use the lowest pressure required to remove secretions. Monitor for upper airway trauma as evidenced by new blood in secretions.
- Monitor arterial blood gas (ABG) after adjustments are made to ventilator settings and during weaning to ensure adequate oxygenation and acid-base balance.
- To minimize the risk for ventilator-associated pneumonia (VAP), implement best practices such as strict handwashing; aseptic technique with suctioning; elevating head of bed 30-45 degrees (unless contraindicated); providing sedation vacations and assessing patient’s readiness to extubate; providing peptic ulcer disease prophylaxis; providing deep vein thrombosis prophylaxis; and performing oral care with chlorhexidine, per your facility policy.

<table>
<thead>
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<th>VENTILATOR ALARMS</th>
<th>Potential Causes</th>
<th>Interventions</th>
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| High peak inspiratory pressure (PIP) | • Blockage of ET tube (secretions, food, kinked tubing, patient biting on ET tube)  
• Coughing  
• Bronchospasm  
• Lower airway obstruction  
• Pulmonary edema  
• Pneumothorax | • Assess lung sounds.  
• Suction airway for secretions.  
• Insert bite block or administer sedation per orders if patient is agitated or biting on ET tube. |
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| **Low minute ventilation** \( V_e \) | **Low air exchange due to shallow breathing or too few respirations** | **Check for disconnection or leak in the system.**  
**Assess patient for decreased respiratory effort.** |
| **Low O₂ saturation** \( SpO₂ \)     | **Pulse oximeter malpositioned**  
**SpO₂ cable unplugged**  
**Connective tissue disorder, such as Raynaud’s disease or scleroderma** | **Ensure ventilator oxygen supply is connected.**  
**Observe pulse oximeter waveform on the monitor.**  
**Ensure pulse oximeter is positioned correctly.**  
**Verify all cables are plugged in.**  
**Assess patient for respiratory distress.** |
| **Apnea**                              | **Breaths are not being taken by the patient or triggered on the ventilator** | **Assess patient effort.**  
**Check system for disconnections.** |
## COMPLICATIONS RELATED TO MECHANICAL VENTILATION

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| **Cardiovascular issues**    | • Decrease in venous return to the heart due to positive pressure applied to the lungs. | • Assess for adequate volume status by checking heart rate, blood pressure, central venous pressure and urine output.  
• Assess patient for increasing autopeep, which can increase risk for cardiac tamponade. |
| **Barotrauma/pneumothorax**  | • Positive pressure applied to lungs.  
• Elevated mean airway pressures may rupture alveoli. | • Notify healthcare provider.  
• Prepare patient for possible chest tube insertion.  
• Avoid high pressure settings for patients with chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), or history of pneumothorax. |
| **Infection**                | • Breaks in ventilator circuit.  
• Decreased mobility.  
• Impaired cough reflex. | • Use aseptic technique.  
• Provide frequent mouth care.  
• Support proper nutritional status. |

### References:

Han, M. (2019, June 21). Management and prognosis of patients requiring prolonged mechanical ventilation. UpToDate.  

