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 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.

### VENTILATOR ALARMS

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Potential Causes</th>
<th>Interventions</th>
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</thead>
<tbody>
<tr>
<td>High Peak Inspiratory Pressure (PIP)</td>
<td>• Blockage of ET tube (secretions, kinked tubing, patient biting on ET tube)</td>
<td>• Assess lung sounds.</td>
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<tr>
<td></td>
<td>• Coughing</td>
<td>• Suction airway for secretions.</td>
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<td></td>
<td>• Bronchospasm</td>
<td>• Insert bite block or administer sedation per orders if patient is agitated or biting on ET tube.</td>
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<td></td>
<td>• Lower airway obstruction</td>
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<td></td>
<td>• Pulmonary edema</td>
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<td>• Pneumothorax</td>
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</tbody>
</table>
### COMPLICATIONS RELATED TO MECHANICAL VENTILATION

<table>
<thead>
<tr>
<th>Patient Complication</th>
<th>Potential Causes</th>
<th>Interventions</th>
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<tr>
<td>Cardiovascular issues</td>
<td>• Decrease in venous return to the heart due to positive pressure applied to the lungs.</td>
<td>• Assess for adequate volume status by checking heart rate, blood pressure, central venous</td>
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- **Ventilator/patient dyssynchrony**
  - Assess breath sounds for increased consolidation, wheezing, and bronchospasm; treat as ordered.

- **Low Pressure Alarm**
  - Air leak in ventilator circuit or in the ET tube cuff
  - Locate leak in ventilator system.
  - Check pilot balloon as an indicator of ET tube cuff failure.
  - Replace tubing as needed, per policy.

- **Low Minute Ventilation**
  - 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
  - Ensure ventilator oxygen supply is connected.
  - 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.
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:


