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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 to ensure adequate oxygenation and ventilation. This reference guide provides critical patient care essentials, tips for troubleshooting ventilator alarms, and potential complications related to mechanical ventilation.

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 and patent. If the patient has a tracheostomy, check for patency, that the ties or Velcro straps are secure and that the stoma appears healthy.
- 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 and impairs venous return, which could affect blood pressure and cardiac output.
- Assess patient's pain, anxiety and sedation needs and medicate as ordered.
- Suction patient only as needed per facility policy. Hyperoxygenate the patient before and after suctioning and do not instill normal saline in the ET or tracheostomy tube; explain procedure to patient; 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 pulse oximetry and arterial blood gas (ABG) measurements 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 spontaneous awakening trials to assess for extubation readiness; providing stress ulcer prophylaxis; providing deep vein thrombosis prophylaxis; and perform oral care with chlorhexidine, per your facility policy.
- For awake patients provide writing tools or a communication board to facilitate communication. Ask yes or no questions so that the patient can respond by nodding their head.
- The use of an evidence-based bundled approach to managing pain and agitation, and promoting early mobility has been shown to decrease ventilator days and the incidence of delirium.

Ventilator Safety

- Complete bedside check: ensure suction equipment, bag-valve mask and artificial airway is present and functional at bedside.Verify ventilator settings with the prescribed orders.
- Effective communication among the critical care team members (intensivist, advanced practice provider, bedside nurse and respiratory therapist, etc.) is crucial. No one should initiate weaning or make changes to the ventilatory settings without consulting both the respiratory therapist and provider.
- The number of healthcare professionals who are allowed to make adjustments to the ventilator should be limited. Respiratory therapists (RTs) have more experience and clinical competence with mechanical ventilation than most healthcare professionals. Every time a ventilator

adjustment is made, the RT must be notified so that the alarm settings can be reviewed and adjusted as needed.

- Policies and procedures must be in place for the use of ventilators and the management of alarms. Alarm limits on rate, volume and pressure are important in detecting and alerting healthcare providers to potential issues or complications in real time.

Ventilator Alarms		
Alarm	**Potential Causes**	**Interventions**
High peak inspiratory pressure (PIP)	• Blockage of ET tube (secretions, debris from food, kinked tubing, patient biting on ET tube) • Coughing • Bronchospasm • Lower airway obstruction • Pulmonary edema • Pneumothorax • Ventilator/patient dyssynchrony	• Assess lung sounds. • Suction airway for secretions. • Insert bite block or administer sedation per orders if patient is agitated or biting on ET tube. • Assess breath sounds for adventisous sounds; treat as ordered. • Assess for tachypnea, pain, or anxiety which are factors that may cause dyssynchrony. Notify provider if existing sedation orders are inadequate or ineffective.
Low pressure alarm	• Air leak in ventilator circuit or in the cuff of the ETT or tracheostomy tube • Ventilator circuit disconnected from the ET tube • Self-extubation	• Locate leak or disconnection of ventilator system. • Check pilot balloon as an indicator of tube cuff failure. • Replace tubing as needed, per policy.
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; consider decreasing sedative dosage or increasing the set respiratory rate or tidal volume.

Low O_2 saturation (SpO_2)	• Worsening of clinical condition
	• Common causes of hypoxia:
	  ○ Pulmonary edema
	  ○ Pneumonia
	  ○ Pneumothorax
	  ○ Pulmonary embolus
	  ○ Mucus plugging
	  ○ Atelectasis
	• Pulse oximeter malpositioned
	• SpO_2 cable unplugged
	• Connective tissue disorder,
		• Ensure ventilator oxygen supply is connected.
		• Observe pulse oximeter waveform on the monitor. If the waveform is poor, consider applying monitor to a different location on the patient.
		• Ensure pulse oximeter is positioned correctly.
		• Verify all cables are plugged in.
		• Auscultate for presence of breath sounds, worsening

	such as Raynaud's disease or scleroderma • Hypoperfusion, such as with vasopressor use or shock states	adventitious breath sounds or respiratory distress. • Assess perfusion. • Consider chest X-ray and arterial blood gas analysis.
Apnea	• Breaths are not being taken by the patient or triggered on the ventilator	• Assess patient effort and SpO_2. • Immediately adjust ventilator settings to provide controlled breathing assistance. • Check system for disconnections. • Check patient for change in mental status (oversedation or acute neurologic condition such as stroke may cause central apnea).

Complications Related to Mechanical Ventilation		
Complication	**Potential Causes**	**Interventions**
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 of any signs of pneumothorax, such as unequal breath sounds, elevated peak airway pressures, respiratory distress, drop in oxygen saturation, tracheal deviation and hypotension. • Prepare patient for possible chest tube insertion. • Avoid high pressure settings for patients with chronic obstructive pulmonary disease (COPD), asthma, acute respiratory distress syndrome (ARDS), or history of pneumothorax.
Infection	• Breaks in ventilator circuit	• Use aseptic technique.

	• Decreased mobility • Impaired cough reflex • Aspiration of subglottic secretions	• Keep head of bed elevated 30 degrees. • Consider use of subglottic secretion drainage endotracheal tube. • Provide frequent mouth care with chlorhexidine. • Stress ulcer prophylaxis. • Support proper nutritional status.

References:

Han, M. & Mirza, S. (2025, September 16). Management and prognosis of patients requiring prolonged mechanical ventilation. *UpToDate.* https://www.uptodate.com/contents/management-and-prognosis-of-patients-requiring-prolonged-mechanical-ventilation

Hyzy, R. & Sparron, J. (2025, June 24). Overview of mechanical ventilation. *UpToDate.* https://www.uptodate.com/contents/overview-of-initiating-invasive-mechanical-ventilation-in-adults-in-the-intensive-care-unit

Patel, B.K. (2022, October 20). Overview of Mechanical Ventilation. *Merck Manuals Professional Edition.* https://www.merckmanuals.com/professional/critical-care-medicine/respiratory-failure-and-mechanical-ventilation/overview-of-mechanical-ventilation

Williams LM, Sharma S. (2023, August 8). Ventilator Safety. *StatPearls [Internet].* Treasure Island (FL): StatPearls Publishing. www.ncbi.nlm.nih.gov/books/NBK526044/