Respiratory Care Pocket Reference

**Oxygen Sources & Delivery Devices**

**Non-Invasive Ventilation (NIV)**

- Non-invasive ventilation (NIV) is now considered standard therapy for hypoxic respiratory failure.
- With NIV, the goal is to improve oxygenation while avoiding the potential complications associated with invasive mechanical ventilation.
- NIV is typically delivered through a face mask, nasal cannula, or nasal prongs.
- Benefits include improved oxygenation, decreased work of breathing, and reduced risk of complications associated with invasive ventilation.
- NIV is commonly used in patients with acute respiratory failure, such as those with exacerbations of chronic obstructive pulmonary disease (COPD).

**Positive End Expiratory Pressure (PEEP)**

- Positive end-expiratory pressure (PEEP) is a key component of non-invasive and invasive ventilation.
- PEEP helps to recruit collapsed alveoli and improve gas exchange.
- PEEP is set by the ventilator and is adjusted based on patient response and clinical improvement.

**Respiratory Mechanics**

- Pressure (P) is the force applied to the airway, measured in Pascals (Pa).
- Volume (V) is the amount of air inhaled or exhaled, measured in liters (L).
- Resistance (R) is the opposition to flow, measured in Ohms.
- Compliance (C) is the change in volume per change in pressure, measured in liters per Pascal (L/Pa).

**Choosing a Ventilator Mode**

- **Assist Control (AC)**: In AC mode, the ventilator provides a set number of breaths per minute, and the patient is allowed to trigger the breaths.
- **Volume Control (VC)**: In VC mode, the ventilator delivers a set volume of air per breath, and the patient is allowed to trigger the breaths.
- **Continuous Positive Airway Pressure (CPAP)**: CPAP is used to keep the airway patent and improve oxygenation.

**Flow Deceleration Flow**

- Flow deceleration flow is a common mode of ventilation in mechanical ventilation.
- It is characterized by a gradual decrease in inspiratory flow during inspiration, followed by a gradual increase in expiratory flow during expiration.
- This mode is often used in patients with chronic obstructive pulmonary disease (COPD) to improve gas exchange.

**Other Names & Function**

- **Pressure Support (PS)**: Pressure support is a mode of ventilation that provides a constant level of positive airway pressure throughout inspiration.
- **Contras**: Pressure support is often used in patients with chronic obstructive pulmonary disease (COPD) to improve gas exchange.

**Oxygen Sources & Delivery Devices**

- **Nasal Cannula**: May be used in both NIV and invasive ventilation.
- **Nasal Cannulas**: Nasal cannulas are commonly used in NIV and may be used in invasive ventilation for low-flow oxygen therapy.
- **High Flow Nasal Cannulae (HFNC)**: HFNC is a technique that delivers high-flow oxygen through a nasal cannula.
- **Non-Invasive Ventilation (BiPAP)**: BiPAP is a form of non-invasive ventilation that delivers both inspiratory and expiratory pressures.

**Respiratory Care Pocket Reference**

- **Delivery Device**: Delivery device is a critical component of respiratory care.
- **Respiratory Care**: Respiratory care is a specialized field that focuses on the management of respiratory conditions.
Lung-Protective Ventilation (LPV)

**When to Use LPV?**

<table>
<thead>
<tr>
<th>Criteria for LPV</th>
<th>Criteria for Non-LPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Respiratory Distress Syndrome (ARDS)</td>
<td>Non-ARDS</td>
</tr>
<tr>
<td>High PIP, low P:F</td>
<td>Low PIP, high P:F</td>
</tr>
<tr>
<td>High Pplat, low P:F</td>
<td>Low Pplat, high P:F</td>
</tr>
</tbody>
</table>

**Acute Respiratory Distress Syndrome (ARDS)**

- Acute onset of respiratory failure
- Bilateral opacity on chest x-ray
- Positive radiographic findings on admission
- Hypoxemia with PaO2/FiO2 <300

**Predicted Body Weight (BMI) (kg)**

<table>
<thead>
<tr>
<th>Body Weight (kg)</th>
<th>Predicted Body Weight (kg)</th>
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<tbody>
<tr>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>65</td>
<td>80</td>
</tr>
</tbody>
</table>

**Pressure (Adults - Multipler [P] x [V] / [B])**

- PEEP/CPAP (cmH2O)
- FiO2 (fraction of inspired oxygen)
- Vt (tidal volume) (mL)
- PBW (predicted body weight) (kg)

**Proximity Calculation**

\[
\text{Proximity} = \text{PaO2} - \text{FiO2} \times \text{PBW}
\]

**Rapid Shallow Breathing Index**

- 

**Respiratory Rate**

- Set to 15 bpm or lower unless indicated otherwise
- See American Thoracic Society guidelines

**Impact Values for FiO2**

- SpO2 Values Corresponding to P:F ratio

**Additional LPV Reference Calculations**

**Respiratory Care, Setup, & Monitoring**

- Ensure suctioning (i.e., bag-valve-mask ventilation) device is operational and at bedside along with a face mask and PEEP valve

**Ventilator Setup (general to connecting patients)**

- Inspect all equipment for functionality & maintenance
- Ensure gas supply connected
- Ensure appropriate size tube & circuit
- Ensure mask or face mask is appropriate
- Ensure proper volume and rate settings
- Pipe down ventilator with appropriate disconnection fitting

**Patient Ventilation**

- Perform Full System Check (FiO2, PEEP, P/F, SpO2, Arterial Blood Gas) in addition to routine ICU monitoring
- VAP (Ventilator-Associated Pneumonia) Prevention

**Pulmonary, Tracheal, Tracheostomy Tube & Circuit Hygiene**

- Daily check of tubing for evidence of secretions, bacterial or viral contamination
- Daily check of the circuit for evidence of secretions, bacterial or viral contamination
- Change tubing upon initial application and every 3-4 days
- Change both the intubation circuit and the expiratory circuit when evidence of secretions, bacterial or viral contamination
- Cleanliness of personnel, equipment, & environment
- No-touch technique
- Finger aspiration of tracheal suction catheter
- Endotracheal intubation
- Evaluate vent & patient within ~1h of ventilator settings changes
- If Pplat <30 cm
- If P:F ≤300 or S:F ≤264 with CPAP ≤5 cmH2O

**Adjunctive Therapies for ARDS Hypoxemia**

**Fluid Management**

<table>
<thead>
<tr>
<th>Criteria for Fluid Management</th>
<th>Criteria for Non-Fluid Management</th>
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</thead>
<tbody>
<tr>
<td>Adequate hydration is essential</td>
<td>Maintenance fluid requirements</td>
</tr>
<tr>
<td>Goal-directed resuscitation</td>
<td>Non-goal-directed resuscitation</td>
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</tbody>
</table>

**Paralysis**

- Check adequate sedation, then consider paralysis
- Check adequate ventilatory support
- Check adequate sedation
- Check adequate ventilatory support
- Check adequate sedation
- Check adequate ventilatory support

**High Pressures, Desaturations & Dyssynchrony**

**General Considerations**

- If the ventilator is suspected to be causing hypoventilation
- If the ventilator is suspected to be causing hypoventilation
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**Hemodynamic Considerations**

- If the ventilator is suspected to be causing hypoventilation
- If the ventilator is suspected to be causing hypoventilation
- If the ventilator is suspected to be causing hypoventilation

**Patient-Ventilator Dysynchrony**

**General Approach**

- Review all aspects of ventilator function and patient status
- Don’t attribute changes in respiratory gas exchange to ventilator malfunction
- Don’t attribute changes in respiratory gas exchange to ventilator malfunction

**Ventilation Strategies**

- Low Pressures, High P:F, PEEP 0-5 cmH2O
- Low Pressures, High P:F, PEEP 0-5 cmH2O
- Low Pressures, High P:F, PEEP 0-5 cmH2O

**Extubation Considerations**

- Establish confidence in extubation plan
- Establish confidence in extubation plan
- Establish confidence in extubation plan

**Discharge Planning**

- Establish confidence in extubation plan
- Establish confidence in extubation plan
- Establish confidence in extubation plan

**SBT: Setup, Breathing, & Extubation**

- Setup: SBT - Suctioning, extubation, bronchoscopy
- Setup: SBT - Suctioning, extubation, bronchoscopy
- Setup: SBT - Suctioning, extubation, bronchoscopy

**Discomfort, Gagging, Anxiety, & Delirium**

- Establish confidence in extubation plan
- Establish confidence in extubation plan
- Establish confidence in extubation plan

**Discharge**

- Establish confidence in extubation plan
- Establish confidence in extubation plan
- Establish confidence in extubation plan