**Pulmonary Causes**
- Pneumonia: Viral Or Bacterial
- Aspiration
- Inhalational Injury
- Pulmonary Contusion

**Non Pulmonary Causes**
- Sepsis
- Pancreatitis
- Severe trauma/burns
- Massive transfusion
- Overdose/toxins

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**Major Management Principles**

**Lung Protective Ventilation**
- Tidal volume (VT) should be = 6mL/kg using ideal body weight (IBW) (range 4-8mL/kg)
  - IBW Men = 50 + (0.91 × [height in centimeters – 152.4])
  - IBW Women as 45.5 + (0.91 × [height in centimeters – 152.4])
- Volume control ventilation may be preferred to ensure VT compliance. If pressure control is used, VT must be monitored regularly to avoid recurrent VT above 6mL/kg.
- Plateau pressures should be < 30cmH2O - Plateau pressure is calculated by performing an end-inspiratory hold maneuver on the ventilator and is used to estimate the pressure the alveoli and small airways are seeing
- Permissive hypercapnia: pH ≥ 7.25

**Sedation**
- Sedation is important to improve ventilator synchrony and decrease the patient’s oxygen consumption
- Almost all patients will require sedation to meet the lung protective ventilation targets

**Paralysis**
- While mortality benefit is controversial, paralysis should still be considered in the following situations:
  a. Evidence of ventilator-patient asynchrony
  b. PaO2/FiO2 < 100
  c. High plateau pressures
  d. Refractory hypoxia/hypercapnia
  e. Prior to prone positioning
- If paralysis is going to be used, patients must be very deeply sedated before it is administered. **Sedation should never be lightened in paralyzed patients** as level of awareness cannot be assessed.

**Prone Positioning**
- Prone positioning should be considered in all patients with severe ARDS (PaO2/FiO2 < 100) despite high ventilatory support (F>O2 ≥ 60 and PEEP > 5)
  - Some centres implement proning when PaO2/FiO2 < 150
  - Patients should be placed in the **prone position for > 12 hours/day**
- Contraindications: Refractory shock, unstable cardiac arrythmias, elevated intracranial pressure, spinal instability, open wounds on the chest or abdomen, unstable facial or pelvic fracture

**PEEP Titration**
- In general, a **higher PEEP strategy (PEEP ≥ 10)** is preferred for moderate to severe ARDS
- Recruitment maneuvers and PEEP titration studies could be considered in consultation with a respiratory therapist or ICU physician. The F>O2/PEEP table can be used as a guide to appropriate PEEP levels. However, when using PEEP ≥ 16, suggest ICU physician input.

<table>
<thead>
<tr>
<th>F&gt;O2</th>
<th>0.3-0.5</th>
<th>0.6-0.8</th>
<th>0.9-1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEEP</td>
<td>5-12</td>
<td>12-18</td>
<td>16-20</td>
</tr>
</tbody>
</table>

**Rescue Therapies for Severe Hypoxemia**
- Inhaled nitric oxide or prostacyclin, two pulmonary vasodilators, may improve oxygenation; especially in patients with concomitant RV failure. Consider a trial if refractory hypoxemia and treatments above have failed. However, there is no proven mortality benefit and may even be harmful associated with them.
- ECMO referral can be considered in cases of refractory hypoxemia (inadequate oxygen delivery) or hypercapnia despite the above interventions.

**Other Supportive Measures**
- A conservative fluid strategy should be implemented → Drop IV fluids to to keep vein open once initial resuscitation is complete.
  - Consider diuretics to avoid a positive fluid balance, even in patients on low dose vasopressors.
- **If COVID-19 positive with severe ARDS, may consider steroids** (limited evidence). If COVID positive without ARDS, do not give steroids.
- For patients with COVID-19 and ARDS, empiric antibiotics should be administered. However, antibiotics should be reassessed in 48-72 hours, pending culture results.