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Acute Respiratory Distress Syndrome

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Acute Respiratory Distress Syndrome

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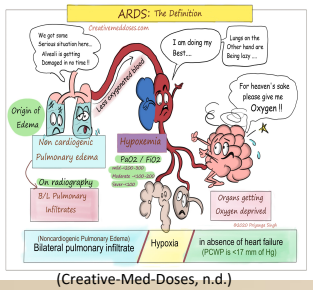
Topic

Acute Respiratory Distress Syndrome (ARDS)



(Creative-Med-Doses, n.d.)

Why ARDS?

- ARDS is an inflammatory response causing diffuse alveolocapillary membrane damage.
- The mortality rate is 43% when suffering from severe disease, with a combined overall ARDS death rate of up to 20%.
- ARDS in the United States ranges from 64.2 to 78.9 cases per 100,000
- ARDS inflammatory response causes multiple organ system dysfunction syndrome.

(McCance & Huether, 2018)

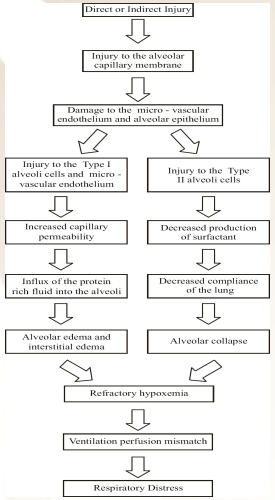
Signs and Symptoms

Early Symptoms
- Tachycardia
- Tachypnea
- Dyspnea

Late symptoms
- Right sided heart failure
- Pulmonary hypertension
- Hypercarbia
- Cyanosis

Underlying Pathophysiology

- ARDs is a secondary disease process.
- ARDS severity is based upon hypoxemia.
  - Mild: 200 mmHg< PaO2/FIO2 <300 mmHg
  - Moderate 100 mmHg < PaO2/FIO2 < 200 mmHg
  - Severe: PaO2/FIO2 <100 mmHg
- Primary disease triggering ARDS:
  - Sepsis
  - Trauma
  - Multi-organ failure
  - Pulmonary insult
  - Pancreatitis
  - Drug Overdose
  - Burns
  - Blood Transfusion



(Acute Respiratory Distress Syndrome: A Case Presentation Rajakumari a - Indian J Cont Nsg Edn, n.d.)

Phases of ARDS

- Acute Exudative Phase (0-3 days)
  - -Cell injury
  - -Uncontrolled inflammation
  - -Increased Permeability
  - -Type II alveolar cells that produce surfactant are attacked, decreasing compliance
  - -Neutrophils, macrophages, platelets, and cytokines all activated.
- Proliferation Phase (4-21 days)
  - -Proliferation of Type II cells, Lymphatic Drainage of edema fluid
  - -Pulmonary hypertension occurs causing right sided heart failure (Schreiber, 2018)
- Fibrotic Phase (14-21 days)
  - -Fibrosis begins, worsening heart failure and respiratory failure
  - -Reduction in functional reserve capacity, increasing left to right shunting.

(McCance & Huether, 2018)

Significance

- Early detection is key to help initiate treatments to protect the lungs
- Neuromuscular blocking agents (NMBAs)-Help maintain synchronization with the ventilator
- Prone position early
- Fluid management to limit the amount of pulmonary edema
- Changes to smaller tidal volumes on the mechanical ventilator to minimize damage to the alveoli

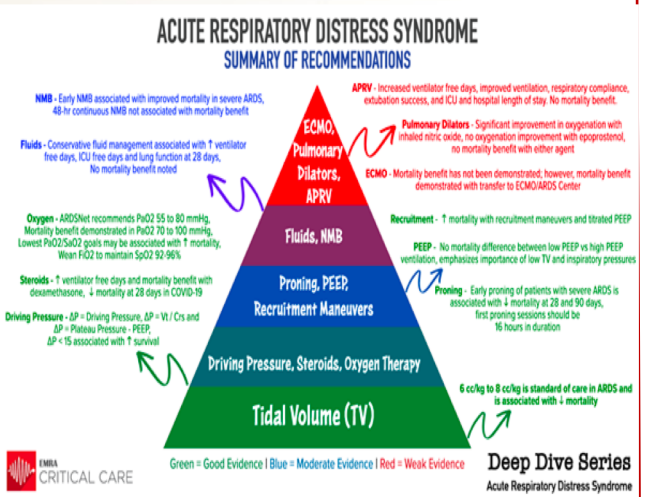
(Santa Cruz et al., 2021), (Wiart et al., 2021)

Treatments of ARDS

Treatments for ARDS have a vast range of modalities. Although there is not one specific drug in the treatment of ARDS, the treatment focuses on supportive care of the patient. Such as reduction in the primary insulting agent. Increasing diffusion across the alveolar-capillary membrane by increase peak end-expiratory pressure and or giving a diuretic to try and reduce any pulmonary edema.

- Patients often require machinal ventilation at a tidal volume of 6ml/kg. ARDS patients in theory will benefit from higher PEEP pressures
- Several pharmacological approaches are thought to help, such as steroids, statins, and inhaled prostacyclin's
- Prone positioning, although sometimes is considered the most labor-intensive, has the most research support and positive change in patient outcomes
- Neuromuscular blocking agents to help ensure ventilator synchrony
- Caution with Driving Pressures such as Plateau pressure, Peak airway pressures as well as PEEP.
- Airway pressure release ventilation (APRV)
- Extracorporeal Membrane Oxygenation (ECMO)

(Lewis et al., 2019)



Implications for Nursing

- Early identification of patient's risk factors for ARDS
- Assess for complications and provide preventative measures when possible
- Continuous monitoring and titration of sedation and analgesia levels.
- Proper titration of NMBA using train of four (TOF)
- Family education
- Preventative measures for ventilator-associated pneumonia
- Coordination with respiratory therapist of airway maintenance in patients in prone positioning
- Ensure proper skin care of all prolonged non-mobile patients

Complications of ARDS

- Blood Clots
- Pneumothorax (collapsed lung)
- Infections
- Pulmonary Fibrosis (scarring)
- Prolonged breathing problems
- Depression
- Problems with memory and thinking clearly
- Tiredness and muscle weakness
- Death

(Santa Cruz et al., 2021), (Wiart et al., 2021)

Conclusions

- ARDS is considered a preventable syndrome as long as the primary source of insult is found and treated early.
- Ensure 6 ml/kg once placed on ventilator
- Use multimodal approach to treatment
- Prone positioning early if patient meets criteria
- Use of NMBA to ensure patient synchrony
- Ensure proper preventive measures to prevent ventilator-associated pneumonia
- Intravenous Fluids
- PEEP
- APRV

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