Acute Respiratory Distress Syndrome

Jaqueline Yunker
Otterbein University, jacqueline.yunker@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn

Part of the Medical Pathology Commons, Nursing Commons, and the Respiratory Tract Diseases Commons

Recommended Citation
https://digitalcommons.otterbein.edu/stu_msn/14

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.
Acute Respiratory Distress Syndrome

**Signs and Symptoms**

Presenting symptoms of ARDS usually occur within 24-48 hours after the initial injury. The presence of a severe metabolic acidosis can be even more rapid, within 24 hours. Patients generally present with dyspnea, tachypnea, and hypoxemia (Villar & Kacmarek, 2013). The patient may also show adventitious breath sounds including crackles, rhonchi, and wheezes (Taylor, 2015).

**Underlying Pathophysiology**

Beginning with either a direct lung injury or an indirect lung injury, such as widespread infection, the pathophysiology and pathophysiology of ARDS stem from an inflammatory response. Injury to the lung causes an increase in local inflammation, and in an ARDS episode, there is severe lung injury and fibrosis follows. Circulating neutrophils are activated and release tissue-damaging proteolytic enzymes such as elastase and collagenase. Damaged capillary walls increase capillary permeability, allowing protein-rich fluid to leak into the alveolar spaces (Markus, 2014, p. 447). As a result, type II pneumocytes are damaged, reducing surfactant production and impairing fluid removal. Consequently, alveolar collapse, or collapsing of the alveoli, follows. With less alveolus to participate in gas exchange, there is a decrease in lung volume and dead space ventilation, causing intrapulmonary shunting to occur (Taylor, 2005). Lung inflammation is also diminished as a result of decreased surfactant. The need for extra effort gives way to deliver tidal volumes because of the decreased compliance and further lung injury and continue the cycle. All these factors cause severe hypoxemia in the patient because of increased deadspace (Impaired Gas Exchange) (Luks, 2013).

**Significance of Pathophysiology**

The pathophysiology is what has driven treatment modalities for ARDS. Understanding that ARDS stems from an inflammatory process from lung injury is instrumental in improving patient oxygenation and causing further damages, which exacerbate any inflammatory process and worsens ARDS (Taylor, 2015). Of importance is the understanding that patient oxygenation and nutritional care are not only important in the treatment of ARDS patients; they can be more efficient and competent in the care of these patients. (Villar, 2011)

**References**


High-Frequency Oscillation Ventilation (HFOV)

This method of ventilation utilizes a very high tidal volume with low respiratory rate. This prevents over distention and allows a higher end tidal CO2. Similar to other mechanical ventilation methods, HFOV may improve the physiologic process of ARDS is essential for new innovations and improved patient outcomes.

**Conclusion**

While there is no known treatment that can stop the underlying inflammatory process that causes ARDS, nurses should understand that therapy is supportive, focusing on maintaining adequate gas exchange. The current standard of care is to use lung protective ventilation. This can be defined as using a tidal volume of 6-8 mL/kg of the patient’s predicted body weight. Protective ventilation is essential in this patient population to prevent high distending pressures that are a result of low compliance. Decreased compliance causes the alveoli and lung tissue to be very fragile and high distending pressures cause further lung injury or volutrauma and can worsen the underlying ARDS (Luo, 2013). The goal of using a decreased tidal volume is to maintain a plateau pressure, or the peak pressure in the alveoli at the end of inspiration, that is less than or equal to 30 cmH2O. Additionally, the use of positive end-expiratory pressure (PEEP) prevents alveolar stretch, which is caused by repetitive opening and closing of the alveoli (Martin, 2014, p. 455). PEEP also recruits collateral alveoli to take part in gas exchange, decreasing the physiological shunting (Taylor, 2015).

As the advocate for the patient, nurse staff must pay close attention to the need for nutrition. Not only does patient ventilation status impact in the further lung damage and complicate the patients oxygenation issues, but use of mechanical ventilation can be uncomfortable for the patient causing anxiety. The healthcare team should ensure patient comfort thereby improve ventilator synchrony and optimize oxygen (Virk & Kane, 2012).

Although some patients may require further rescue measures (see rescue hypoxemia) for refractory hypoxemia, a goal of therapy for ARDS is to reduce the use of positive end expiratory pressure (PEEP) as a way to reduce the risk of barotrauma (Taylor, 2005). However, there is a fine balance between improving oxygenation and thereby improving patient outcomes and allowing for rescue ventilation to maintain adequate gas exchange (Ferguson et al., 2012).

To date, there are no studies that evaluate the safety and efficacy of novel ventilation strategies for refractory hypoxemia in ARDS patients. Instead, the focus has been on improving oxygenation and decreasing ventricular work through the use of rescue ventilatory strategies. (Ferguson et al., 2012).

**High-Frequency Oscillation Ventilation (HFOV)**

This method of ventilation utilizes a very high tidal volume with low respiratory rate. This prevents over distension and allows a higher end tidal CO2. Similar to other mechanical ventilation methods, HFOV may improve the physiologic process of ARDS is essential for new innovations and improved patient outcomes.

**References**


High-Frequency Oscillation Ventilation (HFOV)

This method of ventilation utilizes a very high tidal volume with low respiratory rate. This prevents over distension and allows a higher end tidal CO2. Similar to other mechanical ventilation methods, HFOV may improve the physiologic process of ARDS is essential for new innovations and improved patient outcomes.

**References**


High-Frequency Oscillation Ventilation (HFOV)

This method of ventilation utilizes a very high tidal volume with low respiratory rate. This prevents over distension and allows a higher end tidal CO2. Similar to other mechanical ventilation methods, HFOV may improve the physiologic process of ARDS is essential for new innovations and improved patient outcomes.

**References**


High-Frequency Oscillation Ventilation (HFOV)

This method of ventilation utilizes a very high tidal volume with low respiratory rate. This prevents over distension and allows a higher end tidal CO2. Similar to other mechanical ventilation methods, HFOV may improve the physiologic process of ARDS is essential for new innovations and improved patient outcomes.

**References**

