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Acute Respiratory Distress Syndrome

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Pathophysiological Processes

Underlying Pathophysiology

- Three phases of ARDS
- Acute exudative phase: injury to the endothelium, composed to type I and type II cells, occurs (Carlucci et al., 2014).
- The injury results in spaces between endothelial cells which results in increased permeability and warrants alveolar flooding with protein rich fluid (Carlucci et al., 2014).
- According to (Carlucci et al., 2014), injury to the epithelium also causes damage to the type II cell, which leads to a reduction in perfusion to the lungs and overall results in impaired gas exchange.
- Injury to type II cells lessens surfactant production and impairs fluid transport, which causes alveoli to collapse and impairs gas exchange (Carlucci et al., 2014).
- Neutrophils in the lungs release inflammatory substances, which increase the inflammatory response (Carlucci et al., 2014).
- Coagulation pathways are disrupted and micro thrombi form in the lung (Carlucci et al., 2014).
- Fibroproliferative phase: neutrophil mediated inflammation and pulmonary edema lessen. A fibroproliferative process follows which causes a deposition of extracellular matrix, proliferating cells, and new blood vessels into the alveolar compartment (Carlucci et al., 2014).
- Resolution phase: The epithelium is repaired by type II cells, which proliferate and differentiate into type I cells (Carlucci et al., 2014).
- Neutrophil-mediated inflammation resolution is unclear, but apoptosis is thought to occur (Carlucci et al., 2014).
- Pulmonary edema moves from the alveoli into the interstitium and protein is removed through a variety of pathways (Carlucci et al., 2014).

Implications for Nursing Care

- Continuing research for treatments is warranted due to the high mortality of ARDS (Martin, Joseph, Mechina, & Hurford, 2016).
- Low tidal volume mechanical ventilation has shown promising results in the treatment of ARDS (Martin, Joseph, Mechina, & Hurford, 2016).
- Patients with severe ARDS in the early phase may benefit from prone positioning (Kress, 2015).
- In collaboration with physicians nurses can administer a neuromuscular blockade with initial mechanical ventilation and place patients in the prone position (Gibbons, 2015). Not all ARDS patients benefit from prone positioning (Martin, Joseph, Mechina, & Hurford, 2016).
- Biomarkers are useful as they reduce the heterogeneity of ARDS, thus enabling a better understanding of the pathophysiology in patients (Wan & Calfee, 2015).
- Advances in critical care have reduced ARDS mortality rates (Gibbons, 2015).
- Continued patient assessment is critical to evaluate the patient’s condition and response to therapy.

References (continued)


