ICU
MANAGEMENT & PRACTICE

ICU Volume 15 - Issue 1 - 2015 - Advertorial

Low-Flow Extracorporeal CO2 Removal: Enhancing Lung Protection in ARDS

New technique provides simple, minimally invasive extracorporeal lung support.

The Challenge of Optimizing Lung Protection in ARDS

Despite many advances, ARDS mortality remains between 27-45%. 1 Few interventions have proven effective at improving outcomes in ARDS, a notable exception being the use of low tidal volume (≤ 6 mL/kg PBW) along with limiting plateau pressure to less than 30 cmH 2O and providing adequate PEEP. The goal of this strategy is to limit ventilator-induced lung injury which has been shown to reduce mortality in ARDS patients by 23%.2 Practically, however, implementing protective ventilation can be challenging. Reducing minute ventilation can lead to respiratory acidosis and a range of potentially adverse physiologic effects including cardiovascular instability and non-pulmonary organ damage. Additionally, patient discomfort due to tachypnea and concerns about oxygenation are frequently cited as practical barriers to delivering protective ventilation. A recent study found only a 32% compliance with protective ventilation protocols.3 As a consequence, the risk of mortality was shown to increase 23% for every 1 mL/ kg PBW increase in the initially delivered tidal volume.

Low-flow ECCO2R Facilitates Ultra-Protective Ventilation

Low-flow extracorporeal CO2 removal (ECCO2R) is characterized by a blood flow rate of less than 550 mL/min which is achieved through a 15.5 Fr venous catheter. Providing CO2 removal on the order of 30-50% of production, this technique effectively facilitates lung protective ventilation strategies while mitigating the adverse effects of respiratory acidosis and hypercapnia that can develop when minute ventilation is reduced. Protective tidal volumes and pressures can be achieved while maintaining control of CO 2 levels. Evidence even suggests that “ultra-protective” ventilation, with tidal volume < 6 mL/kg and P PLAT< 30 cmH2O, may further reduce ventilator induced lung injury.

Our understanding of protective ventilation has recently improved with the publication by Amato et. al which showed a strong correlation between mortality and driving pressure (PPLAT minus PEEP), regardless of plateau pressure or end expiratory pressure alone. 5 Even when tidal volumes are limited to 6 mL/kg PBW, and plateau pressure to less than 30 cmH2O, there was a 36% increase in mortality risk for an increment in driving pressure of 7 cmH2O. Low-flow ECCO2R can enable use of low driving pressures, while minimizing the deleterious effects of reduced minute ventilation and resulting hypercapnia.

Getting Started with ECCO 2R

Extracorporeal CO2 removal with the Hemolung RAS from ALung Technologies provides an alternative or supplement to mechanical ventilation by removing carbon dioxide directly from the blood, reducing the risk of ventilator-associated events and facilitating lung rest, protection, and ultimate recovery. The system provides a simple, minimally invasive approach to ECCO2R, removing 30-50% of metabolically produced CO 2 to allow a reduction of ventilation requirements in patients who are either failing noninvasive ventilation (NIV) or who are already invasively ventilated.

The Hemolung RAS from ALung Technologies will be on exhibit at the ISICEM in Brussels, March 17-20, 2015 at stand 1.45-1.46. For additional information, please visit **www.alung.com**.

Caution: Federal law (USA) restricts this device for sale by or on the order of a physician. Not for sale in the USA.

Published on : Sat, 14 Mar 2015