January Image of the Month

Article:  
Extracorporeal Life Support in Trauma: Indications and Techniques

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Legend:

Figure 1:

Figure 2: VV ECMO Circuit Demonstrating Improved Oxygenation of Post-Oxygenator Blood via Return Venous Cannula

Case Vignette:

A 26-year-old male was brought to the trauma bay following a submersion injury in which witnesses reported the patient dove into a shallow pool followed by loss of consciousness. The patient was extricated and found to be pulseless resulting in the initiation of bystander CPR. Upon arrival of prehospital providers, the patient was noted to have a pulse and oxygen saturations were 85%. An attempt at intubation was unsuccessful and a supraglottic airway was placed.

Upon arrival in the trauma bay, the patient remained hemodynamically stable and profoundly hypoxic with an initial SpO2 of 80%. Attempts at intubation were unsuccessful and a surgical cricothyroidotomy was performed without complication. Arterial blood gas revealed a PaO2 of 45 despite an FiO2 of 1.0. Chest x-ray demonstrated diffuse bilateral consolidations consistent with ARDS in the context of recent drowning and aspiration of pool water.

Given the patient’s refractory hypoxemia and severe ARDS, the decision was made to proceed with venovenous extracorporeal membrane oxygenation (VV-ECMO). Simultaneous ultrasound-guided common femoral venous cannulation was performed in the trauma bay without complication (Figure 1). Following initiation of VV-ECMO, oxygenation status rapidly improved (Figure 2). The patient was then taken urgently to the operating room for hemorrhage control of the surgical cricothyroidotomy site which was then left in situ. Follow up imaging demonstrated no other injuries. The patient’s respiratory status rapidly improved and extracorporeal life support (ECLS) was discontinued on ICU day 3. The patient was subsequently decannulated and discharged home on hospital day 9.

Take Home Points:

- Among trauma patients, there are currently 3 broad indications for ECLS based on multidisciplinary consensus:
  1. gas exchange for lung injury (GE)
  2. extended damage control for severe injuries associated with the lethal triad (EDC) and
  3. circulatory support for cardiogenic shock or hypothermia (CS)
Advanced institutional planning and multidisciplinary standardization of ECLS techniques (cannulation, circuit configuration, anticoagulation, and duration) are required prior to the introduction of ECMO.

**Figure 1**: Simultaneous ultrasound-guided bilateral common femoral venous cannulation in the trauma bay.
Figure 2: VV ECMO circuit demonstrating improved oxygenation of post-oxygenator blood via return venous cannula