

Accelerated CRRT Circuit Exchange During Pediatric ECMO Therapy: An Alternative Technique To Reduce Transfusion Requirements



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Background:

- Implementation of Continuous Renal Replacement Therapy (CRRT) in pediatric patients requiring Extracorporeal Membrane Oxygenation (ECMO) therapy may be necessary for fluid management and solute clearance.
- Blood priming of the CRRT and ECMO circuits is often needed due to the large extracorporeal volume in relation to the child's total blood volume. Depending on the duration of the ECMO therapy, multiple CRRT circuit changes may be necessary due to clotting or age of the circuit.
- Blood priming for CRRT or discarding the blood in the old circuit exposes the patient to additional blood products. Furthermore, there are adverse consequences to blood transfusions and circuit blood priming.
- We have previously reported a circuit blood exchange technique used with transition from hemodialysis to CRRT, and with elective CRRT circuit changes in non-ECMO patients. This technique has been modified and allows the accelerated transfer of blood from the old to a new CRRT circuit while on ECMO.

Methods:

This procedure involves blood priming of the initial CRRT circuit prior to connecting to the ECMO system. Subsequent circuits are then primed with a transfer of the CRRT circuit blood to a new saline primed circuit. The following steps are utilized in this exchange.

- A second CRRT circuit is saline primed and is positioned next to the current CRRT machine. Treatment on the current CRRT machine is then suspended and the circuit is disconnected from the ECMO system.
- A buretrol is then connected to the return line of the current circuit. A saline rinse back is performed with the circuit blood being transferred to this buretrol.
- The buretrol is then connected to the access line of the new CRRT machine and is used to prime this circuit.
- The access and return lines are then attached to the ECMO system and CRRT is resumed.

Results:

- This procedure has been performed on 5 patients for a total of 14 exchanges. The patients range in age from 9 to 211 days old (mean 62.6), with weights from 2.86 to 5.41 kilograms (mean 3.75).
- All exchanges utilized AN-69 membranes. No pulmonary instability or changes to the patient's hemodynamic state were noted during any of the circuit exchanges.

Conclusions:

- ECMO/CRRT patients often have significant transfusion requirements. Alternative circuit priming techniques such as this CRRT exchange reduces the need for blood transfusion.
- Additional advantages include minimization of CRRT downtime and avoidance of hemodynamic instability seen with blood priming of AN69 membranes.
- This technique has been a safe and effective alternative for CRRT circuit changes in this patient population.

