

This is a Fresenius Medical Care summary of:

Super High-Flux Continuous Venovenous Hemodialysis Using Regional Citrate Anticoagulation: Long-Term Stability of Middle Molecule Clearance

Siebeck M et al. Germany, *Ther Apher Dial* 2018; Feb 8. doi: 10.1111/1744-9987.12656

Introduction

In critically ill patients with conditions like sepsis, burns or rhabdomyolysis, concentrations of middle molecules such as myoglobin might be increased. Middle molecule removal by extracorporeal blood purification including continuous renal replacement therapy (CRRT) with super high-flux filters can be one therapeutic approach. As convective forms of CRRT with such filters can result in significant albumin loss, this study investigated use of the super high-flux filter Ultraflux EMiC2 in citrate anticoagulated continuous veno-venous hemodialysis (Ci-Ca EMiC2).

Objective

To assess Ci-Ca EMiC2 performance over 72 h, i.e. the upper limit stated in the instructions for use of the Ultraflux EMiC2.

Design

Fourteen patients with severe acute kidney injury (AKI) and an indication for CRRT were included in this study. Performance of Ci-Ca EMiC2 at a fixed dialysate flow of 2000 ml/h was assessed for a wide range of molecular sizes: urea (60 Da), creatinine (113 Da), osteocalcin (5.8 kDa), beta2-microglobulin (12 kDa), myoglobin (17.2 kDa), kappa and lambda free light chains (25 kd and 50 kDa, respectively) as well as albumin (66 kDa). Blood samples were taken before (0 h) and during (1, 6, 12, 24, 48 and 72 h) treatment.

Results

- All 14 filters used remained patent over 72 h and no clotting occurred.
- Compared with 1 h, clearances at 72 h of:
 - small molecules did not differ
 - beta2-microglobulin and myoglobin decreased by 22% and 42%, respectively; with serum levels decreasing by 39% and 81%, respectively
 - lambda and kappa light chains were stable at a low level.
- Albumin sieving coefficient was low throughout treatment ($0.09\% \pm 0.04\%$ at 1 h and $0.04\% \pm 0.01\%$ at 72 h). Serum albumin concentrations were not affected.
- Based on these data, a Ci-Ca EMiC2 cut-off of 37kDa was calculated.
- Catecholamine doses to maintain mean arterial pressure decreased significantly over the treatment period.
- The authors commented that filter changes prior to 72 h are clinically not necessary and considered as the most important result of their study that Ci-Ca EMiC2 “yielded a high middle molecule clearance up to 25 kDa during the complete 72 h in-use period with almost no albumin loss”.

Conclusion

The authors concluded that Ci-Ca EMiC2 potentially improves blood purification and hemodynamics in AKI patients in intensive care.