Medical Literature Summary
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This is a Fresenius Medical Care summary of:

Clearance of Selected Plasma Cytokines with Continuous Veno-Venous Hemodialysis Using Ultraflux EMiC2 versus Ultraflux AV1000S

Eichhorn T et al. Blood Purif 2017;44;260-266

Introduction

Sepsis affects numerous patients and improved therapy options are required for this syndrome involving an inadequate immune response against infection. Acute kidney injury (AKI) is a frequent complication of sepsis and extracorporeal blood purification is available to support renal function. Cytokines can also be removed by extracorporeal blood purification, which may support restoration of the immune response.

Objective

This study compared cytokine removal using two hemofilters, the Ultraflux EMiC2 (high cutoff) and the Ultraflux AV1000S (standard).

Design

This is a single-centre, randomised clinical study in 30 patients with both sepsis and AKI. Citrate anticoagulation using the Ci-Ca protocol was applied, and patients were randomised to continuous veno-venous hemodialysis (CVVHD) using EMiC2 or AV1000S. At 1, 24, and 48h, the concentrations of interleukin (IL)-8 (8 kDa), IL-10 (17 kDa), IL-6 (26 kDa), and tumour necrosis factor (TNF)-α (51 kDa) were measured in blood and effluent samples to evaluate cytokine removal and possible differences between the two hemofilters. Corresponding *in vitro* experiments were also done.

Results

- In the *in vitro* experiments, sieving coefficients for all measured cytokines were significantly higher with EMiC2 vs. AV1000S.
- Clinically, significantly higher removal of IL-8 and IL-6 into the effluent was confirmed with EMiC2 vs. AV1000S at all investigated time points.
- All investigated cytokine levels decreased during the 48h treatment period with both hemofilters. The greater removal of IL-8 and IL-6 with EMiC2 was, however, not associated with significantly lower systemic IL-8 and IL-6 concentrations at 48h.
- Clinically, removal of IL-10 and TNF-α into the effluent was limited and not statistically different between filters. The authors hypothesize that binding of IL-10 to heparan sulfate in patients' blood could explain differences to the *in vitro* situation.
- Albumin loss into the effluent was low and not statistically different between filters. The authors think that this demonstrates safety of the high-cutoff hemofilter EMiC2 in terms of albumin loss.

Conclusion

Ci-Ca CVVHD using the high cutoff hemofilter EMiC2 resulted in significantly higher removal of certain cytokines compared to the standard hemofilter AV1000S, while albumin loss using either filter was insignificant.

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