Extracorporeal hemocorrection in patients with acute kidney injury and severe cardiac insufficiency

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This case study reports on two patients with contrast-induced nephropathy (CIN; induced by usage of contrast cardiovascular system radiologic imaging) and severe cardiac insufficiency (NYHA IV) after undergoing coronary angiography (acute coronary syndrome, Killip IV).

Case presentation

• Due to chronic cardiac insufficiency in the setting of ischemic heart disease (functional Class 3-4) and the administration of contrast agent symptoms of acute kidney injury occurred 6 hours after the procedure.
• Both patients were hypervolemic (CVP 18±1.2 mmHg, ELWI 15±1 ml/kg)
• Left ventricular ejection fraction (LVEF) decreased to 34±3% while respiratory index was at 250±15
• This condition required artificial lung ventilation, renal replacement therapy and intensive catecholamine support
• Due to clinical need for renal replacement therapy, elevated levels of inflammatory markers, and high need for catecholamines CytoSorb was additionally installed into the CRRT circuit

Treatment

• CytoSorb was used in conjunction with a common dialysis machine (Multifiltrate; Fresenius Medical Care) run in CVVHDF mode
• Ultrafiltrate volume was 2,500-3,000 ml per day
• CytoSorb adsorber position: pre-hemofilter

Measurements

• Demand for catecholamines
• Hemodynamics (MAP, cardiac index, GEDVI, ITBVI, EVLWI)
• Inflammatory parameters (IL-6, IL-8, TNFα)
• Renal function (creatinine, urea, electrolytes)
Results

- Hemodynamics considerably improved during the course of the combined treatment; catecholamine support could be stopped while cardiac index increased by 30%, hypervolemia could be clearly reduced (CVP 8-9 mmHg, ELWI 8±1 ml/kg), left ventricular myocardial contractility improved with the ejection fraction increasing to 45%
- Respiratory index also increased to 390±15 mmHg
- Markers of inflammation could be significantly reduced: IL-6 and IL-8 decreased by 64% and 72%, respectively, TNFα decreased by 48% during the course of the treatment

Patienten Follow-Up

- By day 3 of extracorporeal hemocorrection urine output restored, renal retention parameters decreased
- After 7 days on ICU both patients were discharged to further therapy

CONCLUSIONS

- Extracorporeal hemocorrection methods (CytoSorb + CRRT) in patients with contrast-induced nephropathy and cardiogenic shock in the setting of acute cardiac insufficiency (NYHA IV) could be viewed as an effective therapy method