Use of CytoSorb in severe refractory SIRS with multiple organ failure after post-resuscitation syndrome and cardiac surgery

Dr. Mike Strunden, Dr. A. Salhi*, PD Dr. M. Laß*, Prof. Thoralf Kerner
Asklepios Clinics Hamburg GmbH - Asklepios Clinics Harburg; Anaesthesiology, Intensive Care Medicine, Emergency medicine, Pain therapy
* Asklepios Kliniken Hamburg GmbH - Asklepios Klinikum Harburg; Abteilung für Herzchirurgie

This case study reports on a 71-year-old male patient, who was admitted to hospital in an intubated, ventilated and highly catecholamine-dependent condition after experiencing an infarction-related avulsion of a papillary muscle and associated free mitral valve insufficiency and prior successful cardiopulmonary resuscitation.

Case presentation
- Mitral valve replacement emergency surgery with extended cardiopulmonary bypass time > 2 hours on the day of admission
- Post-operative transfer to ICU in intubated, ventilated, highly catecholamine-dependent condition and mechanical circulatory support with an intra-aortic balloon pump (IABP)
- On the first postoperative day, development of multiple organ failure with kidney (anuric, creatinine 2.2 mg / dl) and circulatory failure
- In addition, highly increased inflammatory parameters (IL-6 of 63 mg/l, CRP 167 mg/l, leukocytes 18,000/µl) and plasma myoglobin levels (2,001 µg/l)
- Initiation of renal replacement therapy (CVVHDF)
- Due to the high and stable catecholamine-dependency (norepinephrine 30 µg/min, adrenaline 4 µg/min), persistent renal failure, elevated inflammatory parameters, increased myoglobin plasma levels and condition after resuscitation and extended cardiopulmonary bypass time a CytoSorb adsorber was additionally installed into the CVVHDF circuit 12 hours after the start of renal replacement therapy

Treatment
- Three treatments with CytoSorb for a total treatment time of 72 hours (1st treatment for 12 hours, 2nd and 3rd treatment for 30 hours each)
- CytoSorb was used in conjunction with CRRT (Prismaflex, Gambro) performed in CVVHDF mode
- Blood flow rate: 100-140 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: post-hemofilter

Measurements
- Demand for catecholamines
- Renal function (creatinine, excretion)
- Inflammatory parameters (IL-6, CRP, leucocytes)
Results

- Hemodynamic stabilization with significant reduction of catecholamines doses
- Kidney function – excretion rate rising after starting the 2nd treatment (400 ml/day), creatinine after 2nd treatment back in the normal range at 1.1 mg/dl
- On day 2 of treatment IL-6 fell to 21 ng/l – trend towards further decrease; leukocytes rose to 22,000/µL, however normalized to 13,000/µL two days after the last CytoSorb treatment
- Two days after completion of CytoSorb therapy CRP was at 120 mg/l - trend towards further decrease

Patienten Follow-Up

- Termination of renal replacement therapy and extubation 5 days after the last CytoSorb treatment
- Mobilization was possible still on intensive care unit
- 10 days after CytoSorb treatment the patient could be transferred to a normal ward
- Transfer without any residuals to a cardiac rehabilitation unit

CONCLUSIONS

- Treatment with CytoSorb was accompanied by an unexpectedly rapid and significant stabilization of hemodynamics and declining catecholamine dosages
- Based on the clinical course of this patient the internal decision was made that CytoSorb should be used in the future already intraoperatively in combination with the heart-lung machine when conditions apply as in the present case (emergency cardiosurgery, severe post-resuscitation syndrome SIRS) and should be continued in the post-operative course
- CytoSorb use should be further considered in septic patients not responding to conventional standard therapy within 12 hours
- Treatment with CytoSorb was safe and easy to apply