

CytoSorb in pneumogenic septic shock after ethyltoxic bone marrow depression and increased comorbidity (alcohol abuse, 3-fold ACVB)

Dr. Matthias Lutze, Head of Department for Anaesthesiology and Intensive Care Medicine, Hospital Teterow, Germany

This case study reports on a 53-year-old male patient (medical history of 3-fold ACVB and pacemaker implantation) who presented at the hospital with ethyltoxic pancytopenia, acute alcohol withdrawal delirium and hypostatic bilateral pneumonia.

Case presentation

- Immediate transfer to intensive care unit – at this point of time the patient was awake, responsive, tachycardic and hallucinating
- Instant initiation of anti-delirious therapy (gamma hydroxybutyrate, Haloperidol) as well as administration of ampicillin/sulbactam for treatment of community acquired pneumonia
- On the 2nd day, deterioration of the patients' clinical condition, delirious alcohol withdrawal went more complex and the patient exhibited psychological abnormalities – changeover of sedation to midazolam
- Respiratory exhaustion in the afternoon followed by intubation and mechanical ventilation
- Diagnosis of complete lower lobe pneumonia left and diffuse pneumonia right
- Change of antibiotic regimen to meropenem
- Aggravation of the patients' condition to septic shock (circulation, kidney, lung)
- Drastically increased inflammatory parameters (PCT 44 ng/ml, CRP 176 mg/dl, lactate 8.8 mmol/l)
- Further deterioration of renal function with oliguria (excretion 20 ml/h), however tending towards further declining urinary output
- Excessive increase of catecholamine dosages (norepinephrine 1 µg/kg/h)
- Due to acute renal as well as lung failure, a sharp increase of inflammatory markers and progressive need for catecholamine and septic shock with multiple organ failure CytoSorb was started simultaneously with early CRRT

Treatment

- One CytoSorb treatment session for 72 hours (CRRT and CytoSorb were started and stopped simultaneously after one cycle of CVVH à 72 hours)
- CytoSorb was used in conjunction with citrate dialysis (Prismaflex; Gambro) in CVVHDF mode
- Blood flow rate: 150 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: post-hemofilter

Measurements

- Demand for catecholamines
- Inflammatory parameters (PCT, CRP, leucocytes)
- Renal function (excretion)
- Lactate

Results

- Clear stabilization of hemodynamics during the course of the combined CVVH and CytoSorb treatment with a reduction of catecholamine dosages – after 6 hours, norepinephrine could be reduced significantly and after 72 hours dosages were at 0.08 µg/kg/h constantly
- Improvement of lung function after 72 hours of treatment, also invasiveness of mechanical ventilation could be reduced significantly (FIO₂ from 70% to 45 %)
- Marked decrease of inflammatory parameters during the course of the treatment: PCT to 26 ng/ml, CRP to 129 mg/dl
- Normalization of leucocytes to almost normal values of 11.200/µl
- Lactate stable at 1.4 mmol/l
- Quick recovery of kidney function after one cycle of CVVH and CytoSorb (72 hours) all the way to polyuria (150-200 ml/h)

Patient Follow-Up

- Termination of renal replacement therapy after 72 hours together with CytoSorb
- In the further course a second septic episode developed (MRSA, 40°C fever) with increasing dosages of catecholamines, which was handled successfully within 6 hours (however without application of CytoSorb)
- Patient clearly stabilized, still intubated and ventilated, sedation with Propofol and Sufentanil

CONCLUSIONS

- Acute phase of septic shock could be overcome surprisingly quick despite multiple comorbidities (bone marrow depression, alcohol abuse, vitamin deficiency, heart disease, severely impaired synthesis function of the liver)
- Physicians did not expect the patient to survive the next day
- Kidney function was unexpectedly re-established after 48 hours of CVVH+CytoSorb, which to the impression of the treating physicians is quite uncommon to happen in septic shock (potentially due to the reduction of plasma cytokine levels)
- Clear stabilization and consolidation of hemodynamics and inflammatory mediators during CytoSorb treatment
- Handling of the adsorber was easy and safe, even after 72 hours there were no issues with transmembrane pressure and clotting