Use of CytoSorb in Staph aureus Sepsis

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This case study reports on a 46-year-old male patient (previous known medical condition: type 1 diabetes mellitus), who was brought to the hospital via emergency jet transport after a spinal injury accident (fracture of lumbar vertebrae 1) whilst he was on a trip abroad.

Case presentation

- Previously, in the context of the first aid received abroad, venous access was obtained which then became infected. Thrombophlebitis developed at the peripheral venous catheter site
- After transport of the patient back to Austria he was initially admitted to the normal ward
- Initiation of antibiotic therapy with ciprofloxacin and fosfomycin
- One day after admission, surgery was performed with fixation of the vertebral fracture and osteosynthesis
- Postoperative transfer to intensive care unit with routine 2-day post-operative monitoring
- Discharge from ICU to the normal ward for a total of 6 days followed by readmission to the intensive care unit due to the development of septic signs
- Focus search by CT showed a psoas abscess and revision surgery was subsequently required including septic wound revision and insertion of a drain into the psoas abscess
- Post-operative transfer to the intensive care unit with increasing inflammatory parameters (leukocytes 21,800/μl, CRP 43.9 mg/dl, platelets 139,000/μl) and catecholamine requirement (norepinephrine 0.2 μg/kg/min)
- On the following day, further deterioration in the clinical condition with further increasing inflammatory parameters (CRP to 58 mg/dl, IL-6 1422 pg/ml), catecholamine requirement (norepinephrine 0.25 μg/kg/min) and progressive impairment of renal function (creatinine increased from 0.8 to 2 mg/dl) including oliguria
- Due to his acute oliguric renal failure, increasing inflammatory parameters, and the progressive deterioration in the circulatory situation, continuous renal replacement therapy with the additional installation of a CytoSorb adsorber was started
- Final diagnosis and detection of bacteria: Staph aureus sepsis after thrombophlebitis in the peripheral venous access infection, and psoas abscess with colonization of the osteosynthesis material

Treatment

- In total three consecutive treatments with CytoSorb for a total treatment time of 72 hours (each for 24 hours)
- CytoSorb was used in conjunction with citrate dialysis (Multifiltrate, Fresenius Medical Care) performed in CVVHD mode
- Blood flow rate: 100 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: pre-hemofilter
Measurements

- Need for catecholamines
- Inflammatory parameters (leucocytes, CRP, IL-6)

Results

- Hemodynamic stabilization with reduction in catecholamine doses to 0.03 μg/kg/min after completion of the first treatment with CytoSorb and gradual catecholamine cessation with complete discontinuation 4 days after initiation of the therapy
- Leukocytes returned to normal levels (10,800 / μl) 24 hours after the onset of treatment
- IL-6 decreased from 1422 to 534.3 pg/ml after the first treatment, after the second treatment day to 221.4 pg/ml and then decreased further
- Increase of CRP initially to 70.3 mg/dl - but thereafter decreased to 61.8 on the first day of treatment with further decreasing levels thereafter

Patient Follow-Up

- Further improvement in all organ functions over the following days
- CRRT could be completely stopped 5 days after treatment with CytoSorb
- After successful healing of the fractured vertebra the osteosynthesis material was removed
- The patient was transferred to the normal ward 12 days after CytoSorb treatment

CONCLUSIONS

- The combined treatment with CRRT and CytoSorb in this patient with Staph aureus sepsis resulted in rapid stabilization of the organ functions including hemodynamics, with decreasing catecholamine requirements and a significant reduction in the excessively high inflammatory parameters
- The use of CytoSorb therapy was simple and safe