Case of the Week 12/2017

CytoSorb®

# Use of CytoSorb in severe septic shock after a protracted ambulatory disease course

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This case study reports on a 41-year-old male patient who was admitted via the emergency department with dyspnea, reduced general condition and an unspecific complex disease pattern.

## Case presentation

- Already in the weeks before the patient complained about a drop in his overall performance, thirst, fever and chills, but did not show up for a medical check due to his profession as self-employed craftsman
- At the time of admission, the patient was hypotensive, tachypnoeic, tachycardic and pyrexic
- During the hematological workup a severe hypophosphatemia (non-detectable levels) as well as completely deregulated blood glucose values of up to 112 mmol/l were found, which was interpreted as a sign of a latent diabetes mellitus
- Ongoing need for extremely high doses of norepinephrine (21 mg/hr) and dobutamine (40 mg/hr)
- Initiation of volume therapy with pronounced positive balance over the first 3 days (admission day 7.2 liters, second day 9.2 liters, third day 8 liters)
- Intubation of the patient on the first day with subsequent BiPAP ventilation
- On the same day initiation of advanced hemodynamic monitoring (PiCCO)
- With persistently increased volume requirements, elevated retention parameters (urea 20 mmol/l, creatinine 300 µmol/l), and oliguria/anuria (GFR 23.3 ml/min) renal replacement therapy (CVVHD) was initiated on day 2
- Highly elevated inflammatory parameters: leukocytes (> 30,000/µl), PCT (> 35 ng/ml) and lactic acidosis (4.5 mmol/l)
- Development of a transient sepsis-associated liver function including septic encephalopathy

- Empirical antibiotic therapy was switched from initial ceftriaxone to meropenem, after *Staph aureus* was confirmed in the blood culture and the bronchial secretion on day 3
- Due to the inability to stabilize the patient despite adjuvant sepsis therapy (hydrocortisone, empirical antibiotic therapy, ACC, selenium, pentaglobin) and because of the picture of full-blown sepsis, a CytoSorb adsorber was installed into the CRRT circuit 28 hours after initial admission
- Final diagnosis: septic multiple organ failure with an unknown focus (presumably pneumogenic genesis)

## Treatment

- One treatment with CytoSorb over a total treatment period of 24 hours
- Cytosorb was applied in conjunction with CRRT (Multifiltrate, Firma Fresenius Medical Care) run in CVVHD mode
- Blood flow: 100-150 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: pre-hemofilter

## Measurements

- Demand of catecholamines
- PCT, leucocytes
- Lactate

## Results

- Hemodynamic stabilization with a significant reduction in norepinephrine dose to 15 mg/h within the 24-hour treatment, also the dobutamine dose could be significantly reduced
- Significant reduction in inflammation-relevant parameters (leukocytes from> 30,000/µl to 23,000/µl, PCT from> 35 to 23 ng/ml and later to 14.9 ng/ml)
- Lactate plasma concentrations decreasing from initially 4.5 mmol/l to 2.2 mmol/l

## Patient Follow-Up

- 13 days of dialysis until sufficient spontaneous diuresis and normalization of renal function (predominantly of retention values) was achieved
- Patient stayed mechanically ventilated for a total of 35 days (including multiple weaning attempts)
- Proof of critical illness polyneuropathy/critical illness myopathy
- After 38 days on the intensive care unit, discharge to a rehabilitation center (for 4 weeks) and later discharge to her home environment without deficits

## Conclusion

- During the course of the 24-hour treatment with CytoSorb, applied in addition to standard as well as adjuvant sepsis therapy, a clear reduction in the inflammatory parameters and an accompanying stabilization of hemodynamics could be achieved
- According to the medical team, CytoSorb was responsible for the decisive turnaround leading to the steady clinical improvement in the patient, even despite the relatively late application and particularly after the standard and adjuvant sepsis therapies were exhausted
- The application of CytoSorb therapy was simple, safe and without problems installing the adsorber in a pre-hemofilter position