

Use of CytoSorb in a patient diagnosed with sepsis and MODS due to infection with *Salmonella typhi*

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This case reports on a 19-year-old male patient, who was admitted to the emergency department of the Max Hospital Patparganj with a 4-5 day history of fever, vomiting, generalized weakness, and decreased appetite with poor food intake.

Case presentation

- Previously, the patient had presented to a general practitioner and was suspected to have typhoid fever
- On admission, his blood pressure was 60/40 mmHg and he exhibited tachypnea (26/min) and hypoxia (O₂ saturation of 89% with face mask at 15 l/min)
- All relevant diagnostic tests were performed and he was started on intravenous fluids and empirical antibiotic therapy (ceftriaxone and azithromycin)
- As the patient remained hypotensive, vasopressor therapy was initiated
- Working diagnosis now was sepsis complicated by typhoid fever and the patient was admitted accordingly to the intensive care unit (ICU) for further management
- Abdominal examination showed tenderness, however a subsequent CT of the abdomen did not provide any evidence of intestinal perforation
- SOFA and APACHE II score were 9 and 15, respectively. Glasgow-Coma-Scale (GCS) score was 10
- On day 2 after admission, after a short period of non-invasive ventilation, the patient was intubated and put on invasive mechanical ventilation due to progressive respiratory distress
- Blood cultures confirmed growth of *Salmonella typhi* bacteria, and according to the antibiogram antibiotic therapy was changed to piperacillin/tazobactam, metronidazole and azithromycin
- Total leucocyte count was $3.8 \times 10^3/\mu\text{l}$, serum creatinine 1.77 mg/dl, procalcitonin (PCT) 4.63 ng/ml, CRP 152 mg/l and platelet count $48 \times 10^3/\mu\text{l}$
- Over time the patient became more and more unresponsive to standard of care treatment accompanied by a further increase in PCT levels, he developed renal dysfunction and continued to require ventilatory support
- Due to progressive renal failure, sepsis with MODS and further clinical deterioration the decision was made to simultaneously start continuous renal replacement therapy (CRRT) together with CytoSorb hemoadsorption as an adjuvant therapy

Treatment

- One hemoadsorption session with CytoSorb for a period of 8 hours
- CytoSorb was used in combination with a CRRT machine (Prismaflex, Gambro)
- Blood flow rate: 150 ml/min
- No anticoagulant was used

Measurements

- Hemodynamics and vasopressor requirements
- Laboratory markers of inflammation and organ dysfunction
- Overall clinical status and severity scores

Results

- Treatment resulted in a clear hemodynamic stabilization. MAP improved from 62 to 86 mmHg and norepinephrine infusion could be reduced and stopped after the treatment
- Laboratory parameters also improved during combined CytoSorb and CRRT treatment, including a reduction in creatinine levels from 1.77 to 0.48 mg/dl, PCT from 4.63 to 0.5 pg/ml, and an increase in platelet count from 48 to $63 \times 10^3/\mu\text{l}$
- During the course of the treatment, the general condition of the patient improved with a concomitant reduction in SOFA score from 9 to 2 while GCS score increased from 10 to 15
- Patient Follow-Up
- The patient could be extubated the same night after discontinuation of CytoSorb therapy but was maintained on non-invasive ventilatory support, which was subsequently weaned off 24 hours post CytoSorb therapy
- He was discharged from the ICU on day 9
- The patient continued to improve and was discharged from the hospital on day 11

Conclusion

- In this patient with septic shock due to infection with *Salmonella typhi*, treatment with CytoSorb resulted in rapid hemodynamic stabilization, control of the inflammatory situation, an improvement in organ function and in the patients general clinical condition
- The use of CytoSorb in this case with thrombocytopenia appeared to be safe and platelet count was even increased after treatment
- Although standard of care support was administered, the patient was unresponsive to treatment. Therefore, CytoSorb is likely to have played a key-role in regaining control over the septic condition and to further improve the patients' condition with bacterial typhoid infection. According to the medical team, this proves that CytoSorb as an adjuvant therapy used early can lead to better clinical outcomes
- The use of CytoSorb together with CRRT treatment proved to be easy, safe and effective with no signs of adverse events