

Use of CytoSorb in a patient with neutropenia, septic shock and multiple organ failure

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This case reports on a previously healthy 38-year-old male patient who was admitted to the emergency department of Narayana Super Specialty Hospital with fever, neutropenia and septic shock.

Case presentation:

- On admission, his heart rate was 124/min with a mean arterial pressure of 62 mmHg
- Chest X-ray and cardiovascular examination was unremarkable and there was no need for mechanical ventilation
- Arterial blood gas analysis revealed severe lactic acidosis (lactate 11.24 mmol/l, paCO_2 16.8 mmHg, paO_2 77.9 mmHg, HCO_3 9.9 mmol/l)
- Laboratory diagnostics showed a severe leucocytopenia (1,000/ μl) and neutropenia (750/ μl) as well as procalcitonin plasma concentrations >200 ng/ml indicative of an ongoing systemic hyperinflammatory response to an infectious origin
- Additionally, the patient had increased serum bilirubin levels (3.31 mg/dl)
- Blood cultures were done and he was started on an antibiotic therapy regimen including meropenem, teicoplanin and colistin
- Acute gastroenteritis was diagnosed and a bacterial translocation was considered the most probable source of infection
- In the meantime, the patient's hemodynamic condition deteriorated drastically necessitating norepinephrine (0.4 $\mu\text{g}/\text{kg}/\text{min}$) and vasopressin (0.04 IU/min) support
- Due to severe hemodynamic instability, persistent lactic acidosis, neutropenia and standard care not able to improve the patient's condition, CytoSorb was started as an adjuvant therapy in hemoperfusion mode

Treatment

- Two CytoSorb sessions were performed for 10 and 12 h respectively, separated by a pause interval of 12 hours between both treatments
- CytoSorb was used in hemoperfusion mode only (4008s machine, Fresenius Medical Care)
- Blood flow: 150 ml/min
- Anticoagulation: none

Measurements

- Hemodynamics and requirement for catecholamines and vasopressin
- Inflammatory status
- Metabolic status
- Bilirubin levels
- Overall clinical status

Results

- Treatment resulted in a hemodynamic stabilization with an improvement in mean arterial pressure and a concomitant decrease in norepinephrine and vasopressin requirements. Both drugs were completely weaned off on the 2nd day
- During the course of treatment, the inflammatory status improved as indicated by an increase in leucocyte count to 7,800/ μ l, a decrease in PCT levels to 37.2 ng/ml and a reversal of the neutropenia
- Furthermore, CytoSorb therapy resulted in a decrease in lactate levels to 3 mmol/l and of bilirubin to 1.7 mg/dl
- CytoSorb therapy was associated with a reversal in the septic shock and an improvement in the overall clinical status

Patient Follow-Up

- During the follow-up period blood stream infection with E.coli sensitive to colistin was confirmed
- The patient was discharged to the normal ward after a total of 6 days on the ICU
- Eventually, the patient was discharged a further 3 days later in a stable condition

Conclusions

- In this patient diagnosed with neutropenia, septic shock and multiple organ failure, the combined use of standard care and CytoSorb therapy proved to be very efficient in stabilizing the hemodynamic, inflammatory and metabolic situation and led to a clear decrease in bilirubin levels as well as to an improvement in the patients' general clinical condition
- This case signifies that starting CytoSorb therapy at the right time helped to regain control of this critically ill patient
- Application of CytoSorb was safe and without any side effects