

## Use of CytoSorb in a patient with fecal peritonitis secondary to sigmoid diverticula perforation with refractory septic shock

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*This case reports on a 61-year-old male with no comorbidities, who was hospitalized for an elective orthopedic procedure.*

### Case presentation:

- One day prior to surgery he developed acute onset of abdominal pain
- Initial radiological imaging revealed a left-sided calculus at the vesiculo-ureteric junction followed by immediate urethroscopy
- Thereafter however, the patient continued to have abdominal pain associated with progressive abdominal distension and onset of fever
- Contrast enhanced abdominal CT revealed diverticular perforation at the sigmoid region with resulting fecal peritonitis
- In anticipation of an imminent septic response he was immediately transferred to the intensive care unit (ICU) and an emergent operative intervention was scheduled
- Preoperatively, the patient was conscious and alert with a heart rate of 100/min, a mean arterial pressure of 65 mmHg, respiratory rate of 26/min, a qSOFA-Score of 1, SpO<sub>2</sub> 95%, however with abdominal distension, tenderness and absent peristalsis
- Antibiotic therapy was initiated by a loading dose of tigecycline (200 mg IV) and metronidazole (400 mg IV)
- Intraoperatively, despite minimal blood loss, the patient developed hypotension. Hence, fluid resuscitation with colloids and crystalloids was started accompanied by the initiation of vasopressor therapy (norepinephrine 0.3 µg/kg/min)
- Postoperatively, the patient was transferred to the ICU under maintained mechanical ventilation. Normothermia, euglycemia and hourly urine output were strictly monitored
- A subsequent chest radiogram showed consolidations and was suggestive of pulmonary edema
- On the first postoperative day, the patient showed decompensated intra-abdominal sepsis with vasoplegia
- IL-6 level was >5000 pg/ml and CRP levels 29.8 mg/dl
- Antibiotic therapy with intravenous colistimethate (9 million units loading dose) was resumed. Fluid from the intra-abdominal drain revealed the presence of gram-negative bacilli. Therefore, ertapenem and teicoplanin were added to the antimicrobial regimen and anidulafungin was added as antifungal agent
- On postoperative day 2, additional vasopressin and epinephrine administration were necessary as well as still norepinephrine to maintain mean arterial pressure above 65 mmHg
- Due to the state of refractory septic shock with vasoplegia and elevated inflammatory parameters, the decision was made to initiate CytoSorb hemoadsorption treatment

## Treatment

- Two CytoSorb adsorbers were used for 12 hours each
- CytoSorb was used with a 4008s machine (Fresenius Medical Care) in hemoperfusion mode only
- Blood flow rate: 150 ml/min
- Anticoagulation: none
- CytoSorb adsorber position: hemoperfusion application without additional hemofilter/dialyzer

## Measurement

- Hemodynamics and vasopressor requirement
- Cytokines
- Serum lactate
- PaO<sub>2</sub>/FiO<sub>2</sub>
- Clinical status

## Results

- CytoSorb treatment resulted in rapid and sustained hemodynamic stabilization accompanied by a marked reduction in vasopressors within 48 hours. Vasopressin and epinephrine could be tapered off after 36 hours followed by cessation of norepinephrine administration 2 days after the last CytoSorb therapy
- Treatment was further associated with a significant reduction in plasma levels of inflammatory markers. IL-6 decreased to 251 pg/ml after the first and to 108 pg/ml after the second CytoSorb treatment. Likewise, CRP levels dropped to 15.8 mg/dl after the second treatment session
- Also serum lactate levels could be significantly reduced reaching normal levels on day 5
- There was a considerable improvement in lung/respiratory function as indicated by an increase in Horovitz quotient (PaO<sub>2</sub>/FiO<sub>2</sub>) from 141 mmHg to 299 mmHg on day 6
- Furthermore, his clinical status noticeably improved. He was afebrile with no tachycardia, maintained cardiac output, peripheral perfusion and normal renal function

## Patient Follow-up

- Abdominal drain output gradually declined. The drain fluid showed the presence of E. coli followed by adaptation of antibiotic therapy
- Following the 2nd CytoSorb treatment, the patient could be gradually weaned off the ventilator and was extubated 2 days after CytoSorb was stopped
- The patient was transferred to the normal ward 2 days after the last CytoSorb treatment
- After 96 hours, a secondary worsening of his pulmonary function led to a transfer back to the ICU which over time resolved under standard of care treatment
- He was monitored in the ICU for another 6 days followed by transfer back to the normal ward

## Conclusion

- In this patient with fecal peritonitis secondary to sigmoid diverticular perforation with refractory septic shock, the application of CytoSorb along with conventional treatment resulted in rapid hemodynamic stabilization, control of the hyper-inflammatory response, resolution of lactic acidosis as well as an improvement in lung function and his overall clinical condition
- Hemoadsorption by CytoSorb serves as a rescue therapy in cases of severe hyperinflammation following peritonitis and intra-abdominal sepsis and its early application can expedite recovery and thereby reducing the number of ICU days
- According to the authors, the key to success of the CytoSorb therapy is starting at the right time and sustaining therapy until sufficient clinical and hemodynamic stability has been achieved
- Application of CytoSorb was safe and easy