

## Use of CytoSorb in a case of hyperinflammation in the context of severe acute necrotizing pancreatitis

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*This case reports on a 34-year-old male patient with a history of heavy alcohol intake (1 bottle of wine per day for the past 15 years) but no other comorbidities, who was transferred to the emergency department due to an acute onset of epigastric abdominal pain, 24 h prior to admission.*

### Case presentation

- Following initial physical and laboratory examinations, he was transferred to the general ward with severe pain and nausea, but without hemodynamic instability or respiratory failure
- Over the next 48 hours, the patient showed progressive abdominal distention, tachypnea (36/min) and otherwise poor respiratory mechanics while already on a non-rebreather mask (15 L/min)
- As a trial, high flow nasal cannula did not ameliorate his clinical picture, so he was finally intubated and mechanically ventilated. His hypoxemic respiratory failure was seen to be primarily attributed to volume overload due to aggressive fluid resuscitation (cumulative fluid-balance: 5 liters) as well as abdominal distention interfering with respiratory mechanics
- After intravenous administration of furosemide and following initiation of positive pressure ventilation, a PaO<sub>2</sub>/FiO<sub>2</sub> ratio >200 mmHg could be achieved
- During his stay, the patient was extremely difficult to sedate, most probably due to high benzodiazepine tolerance and alcohol withdrawal
- 24 hours after intubation, a new onset of fever was noticed, accompanied by increasing vasopressor requirements and abdominal hypertension (intraabdominal pressure 16-18 mmHg)
- Abdominal CT confirmed suspicion of pancreatic necrosis (around 80%) without any fluid collection, and bi-basal infiltrates (serum lipase on admission 1,718 U/L, amylase 389 U/L)
- Moreover, methicillin-sensitive Staphylococcus aureus (MSSA) was isolated from his sputum and bacteremia with Streptococcus agalactiae was confirmed in the blood, resulting in the initiation of antibiotic therapy with meropenem
- Despite antibiotic therapy and supportive care, his condition deteriorated further, with persistent fever, tachycardia (130/min), norepinephrine requirements up to 0.4 µg/kg/min, increasing leucocytes, C-reactive protein (CRPI 648 mg/l) and elevated procalcitonin (PCT) levels (4.2 ng/ml)
- Given his worsening clinical condition and with the rationale to control the ongoing hyperinflammatory response, CytoSorb hemoadsorption was commenced in a stand-alone configuration (in the absence of renal failure)

### Treatment

- Two consecutive treatments with CytoSorb were performed for an overall treatment duration of 48 hours
- CytoSorb was used in a stand-alone configuration (hemoperfusion mode) using a conventional dialysis machine (Aferetica)
- Blood flow rate: 200 ml/min
- Anticoagulation: 400-600 IU/h

## Case of the month 04/2023

### Measurements

- Hemodynamics and catecholamine requirements
- Inflammatory response
- Renal function
- Cumulative fluid-balance

### Results

- Treatment resulted in an immediate improvement in his clinical condition. Within the first 6 hours of therapy, the dose of vasopressors could be reduced significantly (norepinephrine 0.1 µg/kg/min) accompanied by control of his hyperdynamic state (heart rate 95-100/min). He remained hemodynamically stable on low-dose vasopressor therapy over the following days. Norepinephrine administration was finally stopped on day 8 after admission
- Additionally, there was control of the hyperinflammatory condition indicated by a clear reduction in inflammatory mediators (procalcitonin 2.69 ng/ml, CRP 559 mg/l) during the course of hemoadsorption therapy. This was accompanied by decreasing fever and an overall improvement in his clinical condition
- Renal function remained normal throughout the entire period
- The cumulative fluid balance (+7 liters at 48 hours) also decreased over time without any necessity for initiation of renal replacement therapy or ultrafiltration treatment

### Patient Follow-Up

- Following discontinuation of CytoSorb treatment, the patient remained on mechanical ventilation and medical management of the abdominal hypertension for 10 more days
- In the follow-up period, the patient suffered an episode of severe acute respiratory distress syndrome (ARDS) in the context of ventilator-associated pneumonia, which was treated with prone positioning, steroids (dexamethasone) and intravenous antibiotics
- Tracheostomy was performed and weaning from mechanical ventilation was started as well as adjustments to his nutrition and physical therapy
- The patient was transferred to the normal ward after a total of 30 days
- At the time of documentation, the patient is able to perform active exercises in the rehab center, is managing a low-fat diet by mouth with no assistance, requires only minimal oxygen support (nasal cannula 3L/min) and is planned for discharge in a stable clinical condition

### Conclusion

- In this patient with hyperinflammation in the context of severe acute necrotizing pancreatitis the use of CytoSorb led to hemodynamic stabilization and control of hyperinflammation
- According to the authors, application of CytoSorb contributed to an overall reduction in morbidity and potentially rescued the patient from more severe long-term sequelae
- In this case, CytoSorb was safe and easy to apply