

Use of CytoSorb in severe sepsis after 4-quadrant peritonitis and aspiration pneumonia

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This case study reports on a 70-year-old female patient (previous known medical conditions: non-metastatic gastric carcinoma uT3N, preoperative chemotherapy (4 cycles fluorouracil, leucovorin, oxaliplatin, and docetaxel FLOT), who had presented at the hospital for elective gastrectomy.

Case presentation

- After complication-free surgery, the patient complained about nausea and pain in the upper abdomen three days later, slight self-realized confusion, and evidence of intestinal content from her abdominal drain, which resulted in the suspicion of anastomotic insufficiency
- Indication for revision by immediate re-laparotomy (<2 h)
- Up to this time, the patient was hemodynamically stable, showed appropriate diuresis, and exhibited no fever
- Massive aspiration during anesthetic induction despite RSI (rapid sequence induction)
- Laparotomy was performed with 4-quadrant peritonitis diagnosed intraoperatively, with sewing, flushing, sampling and various smears being taken
- Intraoperative worsening of the circulatory (norepinephrine up to 0.8 µg/kg/min, volume 2.5 liters) and oxygenation situation (FiO₂ 1.0) with anuria
- Postoperative transfer to intensive care unit in full-blown septic shock, renal failure, oxygenation disorder with development of acute respiratory distress syndrome (ARDS) within the next 6 hours (Horowitz Index 59, FiO₂ 1.0 / pmax 30 cm WS / PEEP 12 cm WS / Resp Rate 30, I:E 1:1) and circulatory failure (norepinephrine 1.1 µg/kg/min / epinephrine 0.05 µg/kg/min), lactate 4.0 mmol/l
- Initiation of advanced hemodynamic monitoring using PiCCO
- Preoperative initiation of calculated antibiotic therapy with tazobactam/piperacillin, levofloxacin and diflucan (later proof of E. coli/3 MRGN)
- Massive volume substitution (16 liters in the first 48 hours) and positive inotropic support with epinephrine (0.1 µg/kg/min)
- Highly elevated inflammatory parameters (CRP 375 mg/l, leukocytes 8.4 Gpt/l, PCT 24.9 ng/ml, IL 6 -34200 ng/l)
- Multiple organ failure including liver (GOT 54.3 µmol/l, GPT 25.0 µmol/l, GLDH 38785 nmol/l) with coagulation disorder, kidney and lung failure and persistently high-dose catecholamine and volume therapy as well as coagulation factor substitution
- Due to her septic condition with multiple organ failure as well as her hemodynamic instability and the increased inflammatory markers, the decision was made to initiate CytoSorb as an adjunctive therapy together with CVVHDF

Treatment

- Two consecutive treatments with CytoSorb for a total treatment time of 72 hours (1st and 2nd treatment for 24 hours each)
- CytoSorb was used in conjunction with CRRT (Prismaflex, Gambro) performed in CVVHDF mode
- Blood flow rate: 100-200 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: post-hemofilter
- Continuation of CVVHDF after 72 hours without cytosorb

Measurements

- Demand for catecholamines under hemodynamic monitoring
- Renal function (excretion)
- Inflammatory parameters (CRP, PCT, leucocytes, IL-6)
- Liver function
- Lactate

Results

- Hemodynamic stabilization with a significant reduction in catecholamine doses –norepinephrine doses could be reduced to 0.35 µg/kg/min within the first 24 hours and to 0.1 µg/kg/min after the second treatment
- Clear reduction in inflammatory parameters under CytoSorb therapy (CRP 153 mg/l, leucocytes 18.4 Gpt/l, PCT 15 ng/ml, IL6 75 ng/l)
- Significant reduction of liver dysfunction parameters (GOT 6.5 µmol/l, GPT 13.0 µmol/l, GLDH 13394 nmol/l)
- Clear improvement of lactic acidosis (lactate 1.7 mmol/l)

Patient Follow-Up

- Termination of renal replacement therapy 7 days after the acute event, recovery of diuresis to initial quantity 6 days after the last CytoSorb treatment
- Tracheotomy 6 days after the acute event
- Weaning and achievement of spontaneous breathing with removal of the tracheal cannula successful 43 days after CytoSorb use
- Over the following days the patient was clinically stable, awake, adequately alert, mentally appropriate, with adequate oral nutrition and could be discharged directly into rehabilitation 52 days after the use of CytoSorb

CONCLUSIONS

- The treatment with CytoSorb resulted in rapid stabilization of vital parameters as well as organ functions (improvement in the circulatory, liver, lung and renal functions) with declining doses and finally complete cessation of catecholamines
- The early additional use of CytoSorb therapy in patients with septic shock should be considered
- CytoSorb was safe and easy to use