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Case of the week 48/2021

Use of CytoSorb in a patient with postoperative septic shock following extended pancreaticoduodenectomy (Whipples procedure)

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This case reports on a 49-year-old female patient who presented to hospital with locally advanced carcinoma of the pancreatic head with jaundice, weight loss, abdominal pain and ascites already manifested.

Case presentation

- One year previously, the patient presented to a hospital in her home country (Peru) complaining of pain in the right upper abdomen. After examination, a mass in the pancreatic head region with infiltration of the vessels was diagnosed, which, after further CT diagnostics, was compatible with an advanced carcinoma of the pancreatic head
- On admission to the Landesklinikum Gmünd, the diagnosis of a locally advanced carcinoma of the pancreatic head with occlusion of the mesenteric vein, high-grade stenosis of the lienal vein and the confluent area of the portal vein as well as complete sheathing of the superior mesenteric artery with questionable sheathing of the common hepatic artery while consecutive cholestasis was confirmed
- This was followed by endoscopic retrograde cholangiography (ERC) with papillotomy and stent placement
- Two weeks later, neoadjuvant chemotherapy was started and continued for a total of 5 months (with 12 x Folfirinox - consisting of fluorouracil, leucovorin, irinotecan and oxaliplatin)
- Restaging (CT, tumor markers) was performed another 2 months after the start of chemotherapy with the result of a good prognosis and achievable secondary resectability
- Three weeks after completion of chemotherapeutic treatment and with the indication of a locally advanced, initially irresectable pancreatic carcinoma cT4, Nx, M0 and excellent regression, the patient finally underwent a surgical extended pancreaticoduodenectomy (Whipples procedure) with long-distance resection of the portal vein confluence, reconstruction by a vein interposed from the vena femoralis superficialis sinistra as well as a partial resection of the mesocolon transversum (operation time 7 hours)
- Postoperatively, the patient was then transferred to the intensive care unit for monitoring and therapy in the following condition: intubated, hemodynamically unstable (norepinephrine 0.43 µg/kg/min, positive balance +7,246 litres) and with analgesia via a thoracic epidural catheter
- Already she had a pronounced metabolic acidosis (lactate 6.8 mmol/l, base excess -5.3, pH 7.36) with clearly deranged oxygenation (FiO2 45%, pO2 255 mmHg) and elevated liver parameters as well as signs of systemic hyperinflammation were observed
- In addition, the administration of vasopressin (1.8 IU/h) had to be initiated given a progressive increase in norepinephrine requirements (0.73 µg/kg/min)
- Due to the progression of septic shock with impending multi-organ failure, the decision was made to start renal replacement therapy in combination with CytoSorb hemoadsorption therapy with the rationale to reduce high-dose catecholamine and vasopressin therapy and to control hyperinflammation and metabolic acidosis

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Treatment

- A total of 3 consecutive treatments with CytoSorb over 48 hours were performed (1st treatment 8 hours, 2nd treatment 16 hours, 3rd treatment 24 hours)
- CytoSorb was used in combination with CRRT (Prismaflex Max, CVVHDF, Filter ST 150) run in CVVHDF mode
- Blood flow rate: 120 ml/min
- Anticoagulation: Citrate
- CytoSorb adsorber position: post-hemofilter

Measurements

- Hemodynamics and vasopressor dosages
- Inflammation
- Parameters of metabolic acidosis
- Oxygenation parameters

Results

- Treatment resulted in an impressive improvement in the hemodynamic situation and cardiac function accompanied by a rapid reduction of norepinephrine and vasopressin dosages. After only 8 hours, norepinephrine could be reduced from 1.33 to 0.66 µg/kg/min and had decreased to 0.13 µg/kg/min by the end of CytoSorb therapy. Five days after the end of CytoSorb, norepinephrine and vasopressin could be completely stopped
- Within the first twelve to 24 hours, there was a significant reduction in the inflammatory parameter levels
- In addition, treatment was associated with a clear improvement in metabolic acidosis, with lactate and pH levels as well as base excess which had already reached normal values during the 2nd treatment cycle
- Oxygenation parameters remained stable at a low level

Patient Follow-Up

- Extubation on post-operative day 7
- Four days later, the patient had to be re-intubated due to suspected aspiration
- Due to a suspected infected hematoma in the Douglas space and mildly infected ascites, a second look operation with hematoma evacuation, lavage, insertion of a bleeding drain in the Douglas space, jet lavage and subcutaneous vacuum-assisted closure (VAC) therapy was performed
- Nine days later, a percutaneous tracheostomy was performed due to prolonged weaning
- 12 days later, the patient was decannulated and 3 days later she was transferred to the normal ward in a significantly improved general condition

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Conclusion

- The use of CytoSorb in this case of a patient with postoperative septic shock after extended pancreaticoduodenectomy led to a significant and steady improvement of the patient's critical situation, mainly due to the rapid stabilization in hemodynamics and control of the metabolic acidosis
- According to the medical team, CytoSorb has already been used many times in-house and they are convinced that the system allows them to regain some degree of control over the septic state of a critically ill patient
- The authors state that integration of CytoSorb into the CRRT circuit is easily and quickly possibile with only minimal training effort