

# First report of cytokine removal using CytoSorb in severe noninfectious inflammatory syndrome after liver transplantation

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This case study reports on a 46-year-old man who underwent deceased donor liver transplantation (LT) for Hepatitis-B-Virus (HBV) and alcoholic cirrhosis.

## Case presentation

- Postoperatively, the patient remained neurologically unresponsive, could not be extubated, and there was a massive increase in serum transaminases and bilirubin
- Hyperdynamic hemodynamic status with a high cardiac index (CI) and low systemic vascular resistance index (SVRI) requiring vasopressor support was noted immediately after surgery
- Laboratory results showed disseminated intravascular coagulopathy and one session of plasma exchange was performed for severe coagulopathy and cholestasis
- Acute graft dysfunction was diagnosed on the 1st postoperative day with emergency retransplantation (ABO incompatible) 36 hours after the first LT

## Treatment

- Cytosorb was used in conjunction with CVVH during retransplantation for the entire duration of surgery (total treatment time of 7 hours) and on the first postoperative day with a treatment time of 12 hours
- CytoSorb was installed into the CVVH circuit (MultiFiltrate® using an Ultraflux® AV 600S hemofilter)
- Blood flow rates were 150 ml/min
- Anticoagulation was achieved using heparin

## Measurements

- Cytokine levels were measured at the beginning of surgery (T1), after graft reperfusion (T2), at the end of surgery (T3) and before (T4) and after (T5) the second Cytosorb treatment
- Hemodynamic parameters, biochemical assays and vasopressor support were noted

## Results

- During the first treatment proinflammatory cytokines IL-1b, TNF-a, IL-6 and IL-8 levels decreased, antiinflammatory cytokines IL-4, IL-13 were constant within the normal range, IL-10 and MCP-1 levels decreased 10-fold to about normal levels
- Improvement in hemodynamics with a stabilized MAP and a continuous decrease in vasopressor support (NE) during surgery (NE discontinued at the end of surgery)
- The use of CytoSorb during the second session was associated with an improvement in cardiac output and SVRI
- Lactate levels and central venous oxygen saturation (ScvO2) returned to normal values
- A decrease in platelet count was observed during both treatments (attributed to a multifactorial etiology: CVVH procedure, use of heparin, intraoperative blood loss, and possibly to the use of CytoSorb)
- The treatment was well tolerated with no obvious adverse effects

#### Patient Follow-Up

- Patient was extubated 12 hours after re-transplantation
- Liver function returned to normal within the next 5 days
- Discharge from the Post Anaesthesia Care Unit 7 days after retransplantation
- Discharge from hospital on the 35th postoperative day
- At the 4 month follow-up the patient was in good clinical state with normal liver function
- A normal liver function was also recorded at the 1-year follow-up

#### CONCLUSIONS

- 1st use of CytoSorb during CVVH in a patient undergoing re-transplantation with ABO incompatible graft for Acute Graft Dysfunction
- The use of CytoSorb® was associated with an excellent outcome in terms of improved hemodynamic parameters, rebalancing proinflammatory and antiinflammatory cytokines, and patient survival to hospital discharge
- Observation suggests a shift from a SIRS state to a more compensated inflammatory response syndrome
- Hemoadsorption columns may represent an approach to bridge patients with acute liver failure or Acute Graft Dysfunction to liver transplantation
- A randomized controlled trial is needed to further evaluate efficacy and indications for hemoadsorption in patients with either acute liver failure or chronic liver disease in the perioperative period of LT, especially in patients with severe I-R injury