

CytoSorb® in Combination with CRRT in A Patient Suffering from Septic Shock, Acute Respiratory Distress Syndrome (ARDS) and Acute Kidney Injury (AKI): A Case Report

Gauri Shankar Sharma¹, Madhvi Narwal²

¹ Critical Care Medicine, Fortis Hospital Vasant Kunj, New Delhi

² Critical Care Medicine, Venkateshwar Hospital, Dwarka, New Delhi

Int J Health Sciences & Research 2023; 13(10):353-357

This case reports on an 53-year-old female patient who was admitted to the hospital with an 8 day history of fever and chills, loose stools, vomiting, severe weakness, and reduced oral intake.

Case presentation

- Prior to hospitalization, she was receiving outpatient empiric treatment with paracetamol, amoxicillin/clavulanate, and nimesulide
- On admission, she was febrile (39.5°C), tachycardic (140/min), tachypneic (40/min), and hypoxic (84%-88%)
- After initial resuscitation in the Emergency Room (ER) she was started on non-invasive ventilation (NIV), and all routine investigations were conducted
- Antibiotic therapy was initiated with ceftriaxone, doxycycline and oseltamivir
- She was then transferred from the ER to the intensive care unit (ICU)
- Laboratory results indicated substantially abnormal liver function (bilirubin 5.7 mg/dL), a low platelet count as well as metabolic acidosis (blood lactate 5 mmol/L)
- Her tropical disease work-up tests (malaria, dengue and typhoid) as well as hepatotropic viral tests were all negative, however she tested positive for scrub typhus
- Abdominal ultrasonography revealed hepatosplenomegaly
- An echocardiogram indicated a left ventricular ejection fraction of 45%
- High-resolution computed tomography (HRCT) of the chest revealed infiltrates consistent with viral or typical pneumonia, with a small pleural effusion
- High inotropic and vasopressor support (norepinephrine 0.58 ug/kg/min, epinephrine 0.08 ug/kg/min, and vasopressin 0.03 unit/min) was initiated for hemodynamic stabilization with increasing doses over time
- As NIV proved insufficient due to development of acute respiratory distress syndrome (ARDS), she was intubated and placed on mechanical ventilation with ventilator settings as follows: positive end expiratory pressure (PEEP) 18 cmH₂O, FiO₂ of 90%, resulting in a PaO₂ of 95.2 mmHg, and PaCO₂ of 49.2 mm Hg
- Following a brief recovery in diuresis, she subsequently became anuric followed by worsening of the metabolic acidosis, necessitating the start of continuous renal replacement therapy (CRRT)
- Due to the ongoing clinical deterioration, including the development of ARDS, the decision was made to additionally integrate a CytoSorb® hemoadsorber into the CRRT circuit on day 5 after ICU admission in order to stabilize the hemodynamic condition

Treatment

- A total of two consecutive CytoSorb® therapy sessions were run for 48 hours (24 hours per treatment)
- CytoSorb® was used in conjunction with CRRT in CVVHD/CVVHDF mode

Measurements

- Hemodynamics and vasopressor requirements
- Respiratory parameters
- Renal function
- Lactate
- SOFA score

Results

- Treatment with adjuvant CytoSorb® was associated with a reduction in vasopressor requirements throughout the two treatment sessions (norepinephrine decreased to 0.17 µg/kg/min and epinephrine to 0.025 µg/kg/min) with progressively decreasing doses thereafter. Vasopressors could be finally stopped after 10 days
- With the second cycle of CytoSorb®, respiratory parameters improved consistently (PaO₂ of 95.2 mmHg and PaCo₂ of 37 mm Hg), accompanied by a reduction in ventilation settings (FiO₂ 40%)
- Renal function improved under combined CRRT and CytoSorb® therapy, with reductions in serum creatinine levels from an initial 2.42 to 1.52 mg/dL, and improved diuresis
- Also, serum lactate levels returned to normal (1.2 mmol/L)
- Organ functions improved marginally, as evidenced by a decrease in SOFA score from 16 to 14

Patient Follow-Up

- CRRT was continued for an additional eight days, initially along with mechanical ventilation, antibiotics, and supportive care
- On day 9, she was successfully extubated
- After 14 days in the ICU, she was able to be transferred to the normal ward
- The patient was finally discharged in a clinically stable condition with a review plan for routine kidney function testing

Conclusions

- The authors conclude that the use of adjuvant CytoSorb® therapy in conjunction with standard treatment and CRRT was found to be a safe and effective therapeutic alternative in this patient suffering from septic shock, ARDS, and AKI
- Adjuvant CytoSorb® therapy helped achieve immunological homeostasis and was associated with rapid hemodynamic stability, reduction in vasopressor requirements and decrease in blood lactate as well as improvement in respiratory function