

CytoSorb in Septic Shock with Multiorgan Failure secondary to methicillin-sensitive Staphylococcus aureus (MSSA): a case report

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Introduction

A 49-year-old male with a history of intravenous drug use was admitted to the ICU in a state of profound septic shock and multiorgan failure (MOF), secondary to methicillin-sensitive Staphylococcus aureus (MSSA) pneumonia and acute polysubstance intoxication. On arrival, he was hypotensive and tachycardic, requiring high-dose vasopressors. Initial labs revealed severe acute kidney injury (creatinine 10.57 mg/dL), coagulopathy (platelets 122,000/mmc, INR 1.3) and an extremely elevated procalcitonin (PCT 454.70 ng/mL), indicative of a hyperinflammatory cytokine storm. A diagnosis of pneumonia with parenchymal consolidations was confirmed radiologically. Given the clinical severity, early initiation of CytoSorb hemoadsorption therapy was undertaken as adjunct to supportive care.

Methods

Continuous veno-venous hemodiafiltration (CVVHDF) was started approximately 6 hours post-ICU admission, in conjunction with a single CytoSorb cartridge which was used continuously for 23 hours. Hemodynamic assessment was conducted using the MostCare monitoring system which provided real-time advanced metrics including cardiac index (CI), systemic vascular resistance index (SVRI), and dP/dt MAX. Dobutamine was added 6 hours after CytoSorb commencement due to persistent hemodynamic instability despite optimized volume resuscitation and dual vasopressor therapy.

Results

Following initiation of CytoSorb, progressive hemodynamic improvement was noted. Argipressin was discontinued at 16 hours, Norepinephrine at 42 hours, and Dobutamine at 66 hours. A decrease in CI from 4.0 to 2.7 L/min/m² and an increase in SVRI from 1500 to 2300 dyn·s·cm⁻⁵·m² reflected recovery of vascular tone and attenuation of hyperdynamic circulation. Contractility, as measured by dP/dt MAX, improved from 0.8 to 1.2 mmHg/ms. Renal function significantly improved (creatinine dropped to 3.0 mg/dL), PCT fell notably and the patient was successfully extubated on day 15 and transferred to the medical ward on day 21.

Conclusions

This case highlights the potential benefit of early CytoSorb use in combination with CVVHDF and MostCare-guided hemodynamic management in patients with refractory septic shock. The rapid weaning from vasopressors, along with favorable trends in CI, SVRI, and dP/dt MAX, supports the hypothesis that targeted cytokine removal can modulate the dysregulated host response in sepsis. This aligns with emerging evidence suggesting improved short-term survival and hemodynamic stabilization with CytoSorb therapy.