

Hemoperfusion with CytoSorb in pediatric age: a valid therapeutic option in the treatment of refractory cardiogenic shock in septic patients

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Introduction

Refractory cardiogenic shock is one of the main causes of death in pediatric age, requiring timely diagnosis and treatment, especially in cases of overlap with septic shock. At the base of myocardial and multi-organ dysfunction, the "cytokine storm" plays a crucial role. In support of standard immunosuppressive treatments, hemoperfusion with CytoSorb presents itself as an additional therapeutic option. CytoSorb is a cartridge composed of polystyrene-divinylbenzene beads, whose purpose is to remove medium molecular weight molecules (≤ 55 kDa), including multiple cytokines.

Methods

We report the case of a 5-year-old girl who arrived at the emergency room tachycardic, oliguric, and febrile, with otalgia, latero-cervical lymphadenopathy, and hypotension, associated with neutropenia and elevated levels of PCR, PCT, and NT-proBNP. In her medical history, a previous episode of acute pharyngitis successfully treated with corticosteroids and antibiotic therapy. The echocardiogram showed severe biventricular dysfunction with 15% ejection fraction (EF). The CT scan showed an extensive tonsillar abscess and upper lobe pneumonia. Due to positivity to the urinary antigen of Streptococcus, a fulminant infection by Streptococcus dysgalactiae was diagnosed, with rapid evolution into septic and cardiogenic shock and a Predicted Death Rate (PDR) of 86.4%. Upon finding metabolic acidosis and hyperlactatemia, hemoperfusion with CytoSorb was initiated, associated with methylprednisolone and immunoglobulins.

Results

The first two cartridges were changed every 6 hours, the last one after 12 hours. 12 hours later, an increase in EF to 38% was noted, further improved to 50% after 24 hours. Additionally, there was a reduction in lactate, PCR, NT-proBNP, PELOD-2 score, and PDR to $<20\%$. 3 and 6 days after the start of hemoperfusion, adrenaline and dobutamine were respectively discontinued.

Conclusion

CytoSorb proved to be effective as supportive treatment in septic shock with multi-organ involvement, even in pediatric patients, especially where standard therapies alone fail.