

Clinical use of CytoSorb® as adjuvant therapy during CPB in patients with sepsis for bacterial endocarditis and hypothermic cardiac arrest

Dagoberto Fernandez Delgado¹; Nicola D'Apollò²; Claudia Spezie²; Mariachiara Brandi²; Maria Silvia Braccini²; Greta Mascheroni²; Valentina Tolio²; Leonardo Fontanesi²; Marco Meli³

1. Surgical Unit Department; Hospital Clinico - Quirurgico Hermanos Ameijeiras - Reparto Unidad; Havana; Cuba
2. Service of Anesthesia-Resuscitation and Critical Care Area; Hesperia Hospital; Modena; Italy
3. Department of Medicine and Thoraco-Vascular Surgery; Hesperia Hospital; Modena; Italy

Introduction

Cardiac surgery with cardiopulmonary bypass (CPB) induces a systemic inflammatory response (SIRS), contributing to vasoplegia, multiorgan dysfunction, and hemodynamic instability. CytoSorb®, an extracorporeal hemoadsorption therapy, remodulates the excess of cytokines and inflammatory mediators, aiming to reduce inflammation and improve clinical outcomes. This study evaluates the impact of CytoSorb® in patients undergoing high-risk cardiac surgeries, particularly in cases of hypothermic cardiac arrest (HCA) and acute bacterial endocarditis (ABE).

Methods

A retrospective study was conducted at Hesperia Hospital, Modena (November 2023 – August 2024), analysing 33 patients undergoing complex cardiac surgery with CPB and CytoSorb® therapy during intra and post-operative, for 24 to 48 hours. Patients were divided into two subgroups: 21 underwent HCA due to acute aortic dissection, and 12 with ABE. The control group included nine patients with aortic dissection and CPB without CytoSorb.

The primary endpoint was mortality. Secondary endpoints included hemodynamic stability (vasopressor requirements and lactate clearance), inflammatory response (C-reactive protein [CRP], procalcitonin [PCT]), level of injury (myoglobin levels), mechanical ventilation duration, and ICU length of stay. Measurements were taken at baseline, 24, and 48 hours postoperatively.

Results

HCA Patients: CytoSorb significantly reduced CRP and PCT levels at 24 and 48 hours ($p < 0.05$), while norepinephrine use declined markedly ($p = 0.00009$), with discontinuation by 48 hours. Myoglobin levels trended downward within 24 hours ($p = 0.1538$), suggesting reduced ischemia-reperfusion injury. Despite these benefits, mortality was 16%, though not statistically significant due to the small sample size.

ABE Patients: CytoSorb led to rapid hemodynamic stabilization, with norepinephrine discontinued by 48 hours. CRP and PCT reductions were significant ($p < 0.05$), and lactate levels showed a downward trend ($p = 0.15732$), reflecting improved perfusion. All patients survived.

Control Group: Patients without CytoSorb required vasopressor support beyond 48 hours, and inflammatory markers remained elevated longer. No significant differences were observed in ICU stay or mechanical ventilation duration.

Conclusion

CytoSorb reduced inflammation and vasopressor needs, improving hemodynamic stability. The lack of statistical significance in HCA mortality likely reflects the limited sample size rather than a lack of benefit. These results align with previous studies in cardiac surgery. Further multicenter research is needed to confirm CytoSorb's impact and refine patient selection.