

The Role of CytoSorb® Hemoadsorption in the Perioperative Management of Patients Undergoing Cardiac Surgery for Aortic Dissection: Impact on Clinical Outcomes

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Introduction

Acute type A aortic dissection (AAD-A) is a surgical emergency often complicated by a systemic inflammatory response due to cardiopulmonary bypass (CPB). This phenomenon is particularly severe in patients with high vasoactive-inotropic needs, who often show unstable hemodynamics and poor prognosis. CytoSorb® is an extracorporeal hemoadsorption device that may help mitigate inflammation by modulating circulating cytokines, potentially improving postoperative outcomes in this vulnerable population.

Methods

A retrospective single-center study analyzed 19 patients undergoing emergent surgery for AAD-A between March and October 2024. Patients were divided based on intraoperative CytoSorb® use. A subgroup of patients with VIS >15 was analyzed for differences in hemodynamic stability (lactate clearance), respiratory function (P/F ratio), and inflammatory response (IL-6 levels).

Results

Among patients with VIS >15, those treated with CytoSorb® had lower IL-6 levels during and after CPB. At the end of bypass, IL-6 peaked at 477 pg/mL in the CytoSorb® group compared to 1250 pg/mL in controls, a 61.8% difference, indicating the effectiveness of cytokines' adsorption. After 24 hours, IL-6 remained 60% lower in the CytoSorb® group (87.1 vs 146 pg/mL), and at 72 hours, IL-6 dropped further to 50 pg/mL compared to 108 pg/mL, marking a difference of 53.7%.

Lactate clearance was also notably better in the CytoSorb® group. At 36 hours post-op, lactate levels were reduced to 1.1 mmol/L, versus 2.75 mmol/L in the control group (40% lower). This trend persisted at 60 and 72 hours.

Improvement in respiratory performance followed a similar trajectory. At 72 hours, the median P/F ratio in CytoSorb® patients was 190, more than double that of the non-treated group (82.5), suggesting a 130% relative improvement in oxygenation.

Conclusion

In AAD-A patients with severe hemodynamic compromise (VIS >15), CytoSorb® hemoadsorption was associated with a markedly reduced inflammatory response, faster lactate normalization, and superior respiratory recovery. These results support the potential of CytoSorb® to modulate postoperative trajectories in high-risk surgical patients. Although mortality differences were observed, the most compelling signals lie in the physiologic stabilization that may underlie longer-term outcome improvements. Larger studies are warranted to validate these promising observations.