SEPTIC SHOCK

CytoSorb®

Clinical Evidence for CytoSorb® Therapy in Septic Shock

Name	Title	Aim	Number of patients	Type of study	Outcome
Mariano et al., Burns 2024; epub	CytoSorb® in burn patients with septic shock and Acute Kidney Injury on Continuous Kidney Replacement Therapy is associated with improved clinical outcome and survival	Severe burn patients who were all on renal replacement therapy for acute kidney injury associated septic shock, treated with either CytoSorb® as adjunctive therapy compared to those given standard care.	35 (11 v 24)	Retrospective cohort study	Mortality at 270 days significantly less in CytoSorb gp (p=0.0444, 45.5% v 70.8%). Significant difference also in pH, white blood cells (WBCs) and norepinephrine requirements confirming CytoSorb is associated with clinical improvements and mortality benefit.
Kogelmann et al., J Clin Med 2024; 13(1):294	Impact of CytoSorb® Hemoadsorption Therapy on Fluid Balance in Patients with Septic Shock	Analyzed data on administered fluid volumes within different time periods to obtain an assumption of the stability of the vascular barrier / endothelial function in patients receiving CytoSorb®.	124	Multicentre case series	Treatment with CytoSorb® was associated with a reduced positive fluid balance paralleled by reductions in vasopressor needs, suggesting a potential positive effect on endothelial integrity / glycocalyx stability. Fluid balance was significantly lower in hospital survivors compared with non-survivors.
Jansen et al., Critical Care 2023; 27(1):117	CytoSorb® hemoperfusion markedly attenuates circulating cytokine concentrations during systemic inflammation in humans in vivo	Healthy male volunteers injected with bacterial lipopolysaccharide (LPS, bolus injection followed by infusion for three hours on day 0, and day 7) to induce an inflammatory response. During the first challenge (day 0), 12 patients were also put in CytoSorb® hemoadsorption for 6 hours and 12 not (controls).	24 (12 v 12)	Experimental endotoxemia in vivo model of systemic inflammation	LPS administration led to a profound increase in plasma cytokine concentrations during both LPS challenge days. CytoSorb® use resulted in statistically significantly lower plasma levels of tumor necrosis factor, interleukin (IL)-6 , IL-8 and IL-10 during the first LPS challenge compared to controls. No differences in cytokine responses were observed during the second LPS challenge on day 7 (no CytoSorb® use). The absence of any device-related adverse events supports safety profile of CytoSorb® Therapy.
Mitzner et al., J Clin Med 2023; 12:7199	Adjunctive hemoadsporption therapy with CytoSorb® in patients with septic/ vasoplegic shock: A best practice consensus statement	In this consensus statement, the authors summerise the existing evidence on the use of CytoSorb® in patients with septic / vasoplegic shock in order to provide consensus guidance based best practice.	N/A	Consensus Statement	The properties of the CytoSorb® are discussed, effects on circulating cytokines and improvments in hemodynamic stability are described. Evidence regarding patient selection, timing of therapy initiation and dosing duration is also given.

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Brouwer et al., Crit Care 2019; 1:317	Hemoadsorption with CytoSorb® shows a decreased observed versus expected 28-day all-cause mortality in ICU patients with septic shock: a propensity-score-weighted retrospective study.	Retrospective comparison of CytoSorb® use with continuous renal replacement therapy (CRRT) (n=67) versus CRRT alone (n=49) in septic shock patients.	116	Propensity weighted retropective study, 28 days and one year	In this large group of septic shock patients, CytoSorb® treatment was associated with a statistically significant improvement in 28-day survival, both on the basis of observed versus predicted mortality rates, as well as compared to a control group with CRRT alone.
Rugg et al., Biomedicines 2020; 8(12): 539	Hemoadsorption with CytoSorb® in septic shock reduces catecholamine requirements and in-hospital mortality: a single-center retrospective 'genetic' matched analysis.	Retrospective propensity-score matched comparison of CytoSorb® use with continuous renal replacement therapy (CRRT) versus CRRT alone in septic shock patients.	84 (42 v 42)	Retrospective *genetic* matched controls	Catecholamines levels were approximately halved within 24 hrs after initiation of CytoSorb® Therapy. In-hospital, as well as 28-day mortality was significantly lower in the CytoSorb® group.
Hawchar et al., J Crit Care 2019; 49:172-178	Extracorporeal cytokine adsorption in septic shock: A proof of concept randomized, controlled pilot study	Investigate effects of CytoSorb® cytokine removal as a standalone treatment (hemoperfusion mode) in patients with early septic shock Investigate effects of CytoSorb® cytokine removal as a standalone treatment (hemoperfusion mode) in patients with early septic shock	20 (10 v 10)	Pilot RCT	Norepinephrine requirements and procalcitonin significantly decreased (p=0.016 & p=0.004) in CytoSorb® gp despite the norepinephrine requirement being nearly double that of the control gp initially. No CytoSorb® related adverse events.

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