Hemoperfusion using CytoSorb® in a cirrhotic patient with sepsis and multiple organ failure – A case report

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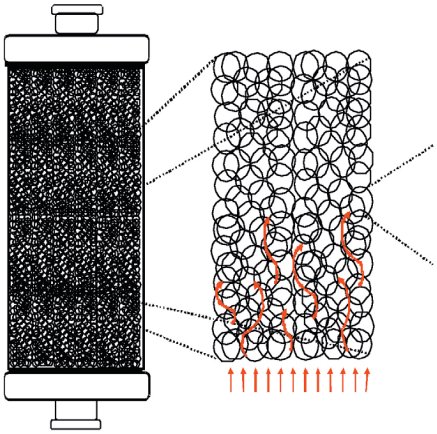
INTRODUCTION:

Hemoperfusion with CytoSorb® is a new treatment option for patients with sepsis or septic shock. At the heart of this blood purification therapy are biocompatible, highly porous polymer beads able to capture and adsorb cytokines and other middle molecules with a range of 10-55kDA. Several in vitro and animal studies showed the effective removal of toxic cytokine levels. [2] One first clinical trial was promising regarding safety and efficacy of the therapy. [1] Nevertheless clinical data are rare. We used this new device to stabilize a young patient with multi organ failure and severe sepsis.



CytoSorb™**adsorber** cartridge

Blood flow

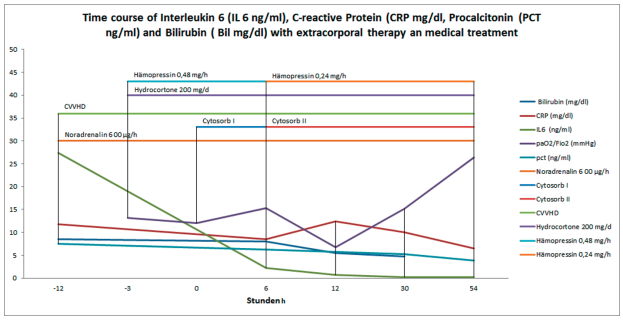
CASE REPORT:

A 37 year old patient with alcoholic liver cirrhosis was admitted to our ICU because of multi organ failure due to bilateral pneumonia with staphylococcus aureus sepsis. Despite antibiotic treatment we observered a deterioration of the patient with cardiovascular instability, renal insufficiency, hepatic encephalopathy, and respiratory failure. The calculated CLIF SOFA Score with >3 organ failure (renal insufficiency AKI stage 3; hepatic encephalopathy III, catecholamine dependend circulation, coagulation disorder (INR 1.9), liver failure (bilirubin 9.2 mg/dl), lung failure (paO2/FiO2 < 200) proved 18 points, and 16 points for the original SOFA score (estimated mortality >90%).

The patient was ventilated with pressure support (PEEP 18, PS 18 mmHg and FiO2 1.0) (p02 72, pC02 48, pH 7.28, Lactat 3.0 mmol/l). To stabilize hemodynamics (MAP > 60 mmHg), noradrenalin (dose 600 ug/h) terlipressin (0.48mg/h) and hydrocortisol (200 mg/die) was given. Anuria was treated with CVVHDF (Prismaflex Gambro® blood flow 140 ml/min, Substituat POST 500 ml/h, Dialysat 1000 ml/h, Citrat 2,5 mmol/l blood)

Plasma Il-6 concentration was primary at 27 423 pg/ml. After the first period of blood purification with CytoSorb® (lasting for 6 hours) Il-6 concentration dropped to 2266, after the second to 812 and after the third to 151.

The patient improved hemodynamically within 6 hours after the first hemoperfusion. Noradrenalin could be stopped after this time period. CI increased from 4.3 l/m2 to 6.6 L/m2 but dropped again to 4.3 l/m2 before starting the second Cytosorb treatment. FiO2 could be reduced to 0.55 and pressure support to 14 mmHg after the second Cytosorb treatment. Urine output increased and CVVHDF could be stopped after 3,5 days of CytoSorb®treatment.



CONCLUSION:

Despite the fact that the role of extracorporeal therapies in sepsis is not fully understood yet, there is growing evidence for the removal of toxic cytokine levels (Literaturzitate).

From our best knowledge - we report the first successful clinical case of a patient with sepsis and multi organ failure on a basis of alcoholic liver cirrhosis treated with standard of care plus CytoSorb®. The new hemoperfusion therapy was well tolerated (no adverse events). Interleukin 6 concentration could be dramatically reduced and a hemodynamic stabilisation occured within hours after starting the therapy. The patient survived and is still alive 4 months after this event.

Cytokine removal with CytoSorb® in patients with therapy refractory multi organ failure and sepsis might be a new additional option to improve clinical outcome. Further clinical studies are needed to answer questions regarding the best timing, duration and frequency in the clinical setting.

Treatment time in in h	-12	-3	0	6	12	30	54
Bilirubin (mg/dl)		8,5			8	5,5	4,7
CRP (mg/dl)	11,8			8,5	12,4	10	6,5
Il- 6 (pg/ml)	27 423			2260	762	151	250
PCT (ng/ml)	7,52			6,22		5,24	3,9
paO2/FiO2 (mmHg)		13,2	12	15,3	6,7	15,2	26,4

Quellen:
- (1) Schädler D et al. Critical Care 2013, 17 (Suppl 2): P62 (19 March 2013)
- (2) Peng ZY et al, Crit Care Med (2008) 36 (5): 1573-7
- (3) Trauner M N Engl J Med 1998; 339:1217-7