

Use of CytoSorb in septic shock with multi-organ failure in liver cirrhosis Child-Pugh C and hepatic encephalopathy

Dr. Radovan Novak

Department for Anesthesiology and Intensive Therapy Zittau, Hospital Oberlausitzer Bergland gGmbH, Germany

This case study reports on a 51-year-old female patient (known previous medical history: ethyltoxic decompensated liver cirrhosis Child-Pugh C with ascites, long-term alcohol abuse), who was admitted to hospital with signs of sepsis and a progressive increase in her abdominal circumference.

Case presentation

- Admission of the patient to the Intensive Care Unit (ICU) already in multiple organ failure (circulatory, hepatic and renal failure)
- Additional development of a 1st grade hepatic encephalopathy (ammonia 76 $\mu\text{mol/l}$) as well as extremely high bilirubin values (total 196 $\mu\text{mol/l}$), cholinesterase (27 $\mu\text{kat/l}$) and elevated transaminases (GGT 3.69 $\mu\text{mol/l}$, ALT 3.3 $\mu\text{mol/l}$, AST 30.9 $\mu\text{mol/l}$)
- Immediate initiation of conservative sepsis therapy including calculated antibiotic therapy with ceftriaxone, volume therapy, catecholamine therapy with up to 0.44 $\mu\text{g/kg/min}$ of norepinephrine, coagulation factor substitution, albumin, hydrocortisone and puncturing ascites for a total of 12 hours
- Respiration was sufficient with adequate gas exchange and therefore the patient only received CPAP ventilation
- Initiation of medication to support the liver with glycyllpressine and lactulose
- After re-evaluation of her condition and due to the progressive renal and hepatic failure as well as their further deteriorating condition, continuous renal replacement therapy (CRRT) was started in combination with CytoSorb

Treatment

- In total two treatments with CytoSorb (each treatment for 24 hours)
- CytoSorb was used in conjunction with CRRT (Multifiltrate, Fresenius Medical Care) performed in CWHD mode
- Blood flow rate: 100-150 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: pre-hemofilter

Measurements

- Demand for catecholamines
- Inflammatory parameters (IL-6, CRP, PCT)
- Lactate
- Ammonia
- Cholestatic parameters and markers of liver failure (ALT, AST, GGT, direct bilirubin)

Results

- Rapid and clear dose reduction of norepinephrine
- Quick stabilization of hemodynamics with improved peripheral perfusion
- Rapid improvement of vigilance despite minimal reduction in ammonia levels

Patient Follow-Up

- Discontinuation of renal replacement therapy after a total of 8 days
- Patient on ICU for a total of 16 days
- Development of a delirium with subsequent resolution and acceptable and steady improvement in the hemodynamic, liver and renal functions as well as her cognitive state
- Discharge to the normal ward

	Pre CytoSorb	After 12 h	After 24 h	After 36 h	After 48 h	After 72 h
Noradrenalin (µg/kg/min)	0.44	0.13	0.05	0.08	0.02	0
IL-6 (ng/l)	3827	548.9	307.2	120.5	99.1	62.7
PCT (µg/l)	6.59	5.33	1.97	1.31	1.06	2.01
CRP (mg/l)	83.4	54.8	50.2	50.3	48.7	39.8
Lactate (mmol/l)	20.68	14.98	8.39	4.26	4.88	4.3
Bilirubin direct (µmol/l)	196	120	99	100	91	107
GGT (µkat/l)	3.69	1.82				
ALT (µkat/l)	3.34	2.67	2.35	2.09	1.43	1.32
AST (µkat/l)	30.96	22.75	18.73	12.65	7.15	5.74
Ammonia (µmol/l)	76	54	69			

CONCLUSIONS

- Rapid and clear reduction in jaundice and hepatic encephalopathy under CytoSorb therapy
- In the case of this patient with high levels of IL-6, ammonia and bilirubin, CytoSorb was an efficient, fast and practicable treatment option to enable relief and ultimately improvement in the liver function
- According to the medical team, the early use of CytoSorb decisively influenced the prognosis of this patient
- The use of CytoSorb was safe and easy