

# Effects of the timing and intensity of treatment on septic shock patients treated with CytoSorb®: Clinical experience



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## Background

In the last three decades a number of devices have been developed to neutralize the pathogen or damage-associated molecular patterns (PAMPs and DAMPs) responsible for the multiple-organ dysfunction syndrome (MODS) observed in septic shock and in other conditions characterized by a cytokine release. The hemoabsorption (HA) with the CytoSorb® (Cytosorbents Corporation, New Jersey, USA) have been extensively used in septic shock patients. This technique uses a biocompatible resin capable of absorbing hydrophobic substances from whole blood with a molecular weight <60 kD.

## Methods

In the present study we assessed the role of the intensity of treatment, the pre-treatment interval and its duration in a group of septic shock patients treated with CytoSorb® since 1.1.2018 to 31.12.2020. The cartridge was located downstream a filter used for a Continuous Venovenous Hemodiafiltration (CVVHD) using an initial Qb of 150–200 mL/min. Each patients received two HA sessions which were to last 24 h but the effective duration of a session was influenced also by other factors, including the clotting of the circuit, the occurrence of hemodynamic instability etc.

## Results

51 patients were treated with the CytoSorb®; 26 patients (51%) survived (S) and 25 (NS) (49%) died in the ICU; age and frailties did not differ among S and NS. At the end of treatment, the MAP increased in both groups (from 60 to 77 and from 53 to 62 respectively) but in NS this variation was associated with the increase of both CI (from 98 to 108) and PCAI (from 1.70 to 1.67).

Patients Indexes	Survivors	Non-survivors	p*
Charlson comorbidity index	3 (1–5)	4 (2–7)	n.s.
SAPS II	53 (49–59)	62 (56–65)	<0.05
SOFA pre	9 (8–12)	13 (11–15)	0.002
SOFA after	9 (8–12)	12 (11–15)	<0.05

CytoSorb Treatment	S	NS	p*
Pre-treatment time (h)	15 (7–24)	25 (10–52)	<0.05
Duration of treatment (h)	53(46–70)	28(13–60)	0.007
Volume processed (l)	645(561–848)	342(162–722)	0.007

**Table 1: The pre-treatment interval was shorter in S than in NS; the volume of blood processed was higher and the duration of the procedure was longer in S than in NS.**

## Conclusion

CytoSorb should be used on an individual basis taking into account the cause of septic shock and coexisting disease, that the pretreatment interval should be reduced as much as possible and, finally, that its intensity should be frequently adjusted by evaluating both clinical and biochemical indicators, including changes in vasopressor needs and changes in blood levels of septic mediators.