Potential savings associated with faster septic shock resolution in the ICU

An exploratory analysis of extracorporeal hemoperfusion using the Efferon LPS device

O. Ethgen[1], A.Y. Popov[2], A.N. Nesmeyanov[2], V.V. Kulabukhov[3], N.V. Sklifosovsky[3], S. Russell[4], I.V. Bessonov[5]

[1]Université of Liège, Department of Public Health Sciences, Faculty of Medicine, Liège, Belgium, [2]Russian Academy of Sciences, Institute of Organoelement Compounds, Moscow, Russian Federation, [3]Research Institute for Emergency Medicine, Moscow, Russian Federation, [4]NorrDia AB, Lund, Sweden, [5]Efferon International GmbH, Tuttlingen, Germany

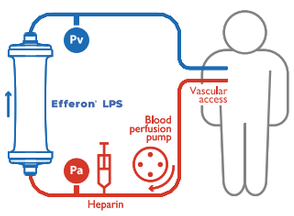
Poster presented at 44th International Symposium on Intensive Care & Emergency Medicine (ISICEM)
March 18-21, 2025 – Brussels, Belgium

Background

- Septic shock is among the most serious complications and a leading cause of early mortality in the ICU [1].

The Efferon LPS device

- Efferon LPS is a single-use hemoadsorption cartridge with **surface-modified polymeric beads**, capable of selective adsorption of **lipopolysaccharides** via surface-immobilized ligand and non-selective adsorption of **cytokines**, myoglobin, cellular debris, endogenous and exogenous toxic substances via intrinsic porosity.



- Extracorporeal hemoperfusion using the Efferon LPS adsorber was recently shown in the **LASSO trial** to result in faster resolution of septic shock compared with a conventional protocol in patients with intra-abdominal sepsis (ClinicalTrials.gov NCT04827407) [2].

The LASSO trial

- LASSO was a multicenter randomized controlled trial that enrolled 58 adult patients with abdominal sepsis, complicated with septic shock, from four large multi-speciality hospitals.
- Patients were included within the first 12h after the initiation of vasopressor infusion and within 24h after source control surgery.
- All patients received basic intensive therapy for septic shock according to the Surviving Sepsis Campaign (SSC) 2016 guidelines [3].
- Patients were randomized 2:1 into Efferon LPS hemoadsorption twice at 24h intervals (Efferon LPS group, n=38) and standard therapy alone (control group, n=20).
- The study has reached its primary endpoint, resolution of septic shock.

Objective

- **To assess the potential healthcare resources utilisation (HCRU) savings from faster septic shock resolution enabled by the Efferon LPS device.**

Methods

- HCRU consisted of intensive care unit (ICU) and hospital lengths of stay, as well as requirements and durations of mechanical ventilation (MV).
- MV duration, ICU and hospital LoS differences between Efferon LPS and conventional approach (i.e., control group) were evaluated from the LASSO trial.
- A decision-analytic model was also designed to compare HCRU associated with Efferon LPS and the conventional approach. The models used a daily cycle over 6-day and 28-day time horizons to project HCRU. The analysis was scoped on 50 septic shock patients.
- Potential cost differences were extrapolated from these differences in HCRU from the LASSO trial and the decision analytic model. For that purpose, we considered a cost per day in the ICU for a septic shock patient of € 3,038 in 2025 [4,5], a reduction of 33% when the patient is weaned from MV [6] and a cost per day in the general ward 55% lower than the cost of the last day in the ICU [7].

References

[1] Vincent J-L., *et al.* Crit Care 2019;23:196.
[2] Rey S., *et al.* Shock 2023;59:846-854.
[3] Rhodes A., *et al.* Intensive Care Med 2017;43:304-377.
[4] Koster-Brouwer M.E., *et al.* Neth J Crit Care 2016;4:12-18.
[5] Statistics Netherlands. Consumer Price Index 2013-2025. www.cbs.nl
[6] Turunen H., *et al.* Crit Care 2015;19:67.
[7] Zwerwer L.R., *et al.* Health Econ Rev 2024;14:4.

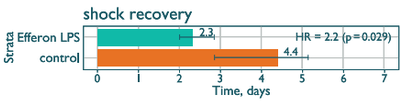
Conclusion

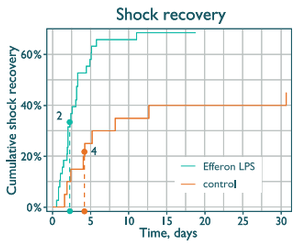
- Faster resolution of septic shock with the Efferon LPS treatment could lead to significant savings in the ICU.
- This is particularly noteworthy in our increasingly cost-constrained healthcare systems, of which ICUs are no exception.
- Further observational research is warranted to confirm the results of this RCT-based modelling analysis.

Results

Shock recovery

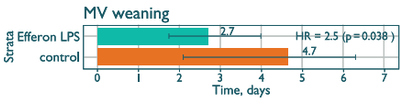
- Septic shock was successfully resolved in 68% of patients in the Efferon LPS group vs. 45% in the control group (p=0.098).
- There was also a shorter duration of septic shock in survivors with Efferon LPS vs. control (2.3 vs 4.4 days, p=0.029).

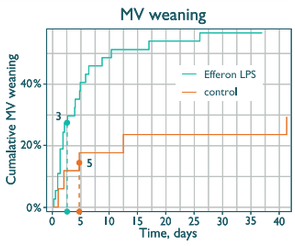




MV weaning

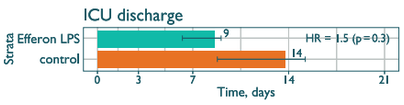
- MV was successfully weaned in 57% of patients in the Efferon LPS group vs. 29% in the control group (p=0.037).
- There was also a shorter duration of MV in survivors with Efferon LPS vs. control (2.7 vs. 4.7 days, p=0.038).

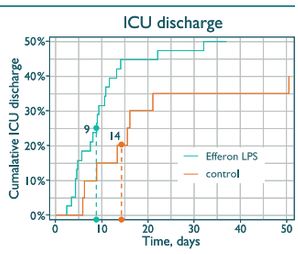




ICU discharge

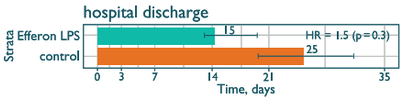
- There was a trend towards shorter duration of ICU length of stay with Efferon LPS vs. control (9 vs. 14 days, p=0.3).

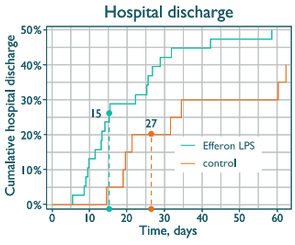




Hospital discharge

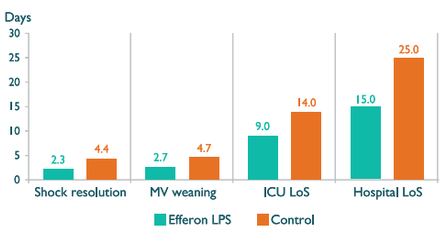
- There was a trend towards shorter duration of hospital length of with Efferon LPS vs. control (15 vs. 25 days, p=0.3).

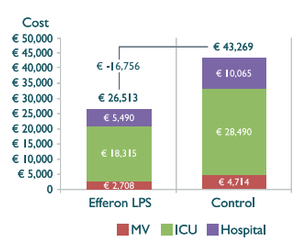




Potential cost-savings (LASSO trial)

- If the differences in HCRU observed in the LASSO trial were translated into monetary terms, the Efferon LPS device would save €16,656, a reduction of 38.7%.





Potential cost-savings (decision analytic model)

- For 50 patients whose septic shock is treated with Efferon LPS instead of the conventional approach, Efferon LPS could save:
  - 105 days of MV, a reduction of -20.7% (2.1 MV days per patient);
  - 200 days of ICU, a reduction of -24.6% (4.0 ICU days per patient);
  - 248 days of hospital, a reduction of -20.8% (5.0 hospital days per patient);
  - € 556,228 of cost, a reduction of –22.2% (€ 11,125 per patient).