ALTECO MEDICAL

ENDOTOXIN REMOVAL IN HEMOPERFUSION

Alteco® LPS Adsorber for extracorporeal blood purification

Endotoxin

Endotoxin is the toxic part of gram-negative bacteria, present in the outer membrane of the bacteria cell wall, released when the bacterial cell disintegrates. **Endotoxemia** (elevated endotoxin) is often present in sepsis and septic shock, conditions with high mortality.[1]

By sensing endotoxin, organ damage is induced in:

- the kidney (acute kidney injury, AKI)
- lung (acute lung injury, ALI)
- heart (negative effect on cardiac contractility)
- liver (pro-coagulant state)
- the vascular endothelium (loss of barrier function and dysregulation of vascular tone)[2]

Removing the threat

Endotoxin is the main molecular cause of sepsis, meaning the recognition of endotoxin by immune cells is important in the pathogenesis of sepsis and septic shock. LPS activates TL4, which subsequently triggers two signaling cascades and pro-inflammatory reactions.[3]

Excessive levels of endotoxin may originate from, for example:

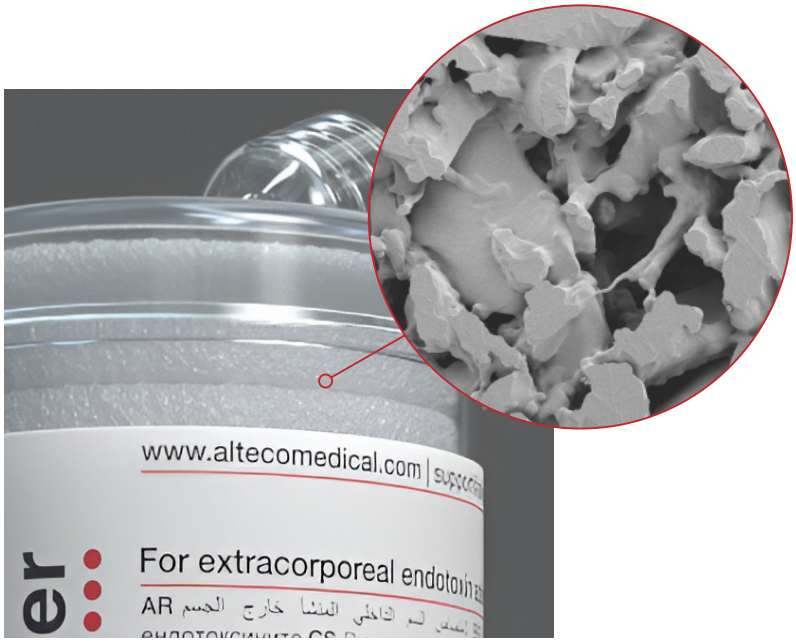
- bacterial infections (in particular gram-negative bacterial infections such as meningitis[4] and infections of respiratory, uro-genital, or abdominal origin)[5]
- translocation of bacteria due to gut barrier dysfunction[6]
- antibiotics, potentially liberating endotoxin from the bacterial cell wall when killing the bacteria, which may lead to a rapid clinical deterioration for the patient.[7]

Alteco® LPS Adsorber

The Alteco® LPS Adsorber is used together with blood purification systems to remove circulating endotoxin from the bloodstream during extracorporeal treatment.

By removing endotoxin, Alteco® LPS Adsorber can help stabilize the patient's hemodynamic parameters.

The recommended treatment time is 2-6 hours and the product is safe for multiple treatments.



The device removes endotoxin from the patient's blood as it passes through the device with adsorption technology. The product contains resin discs (porous polyethylene) coated with a unique synthetic peptide. The peptide is non toxic and tailor-made to bind with high affinity to lipid-A, the toxic part of the endotoxin.

Treatment with Alteco® LPS Adsorber

For best treatment results, the Alteco LPS Adsorber should be used as early as possible – e.g., in hemoperfusion (HP). Start treatment with the device as soon as the patient shows signs of imminent clinical deterioration, meaning:

- Urine production is decreasing (acute kidney failure approaching)
- Mean arterial pressure (MAP) ~ 65 mmHg
- >2 hours of vasopressor support and patient still unstable

After treatment, the following clinical benefits can be expected as a positive effect of decreasing the level of endotoxin:

- Improved and stabilized hemodynamic parameters
- Reduction in procalcitonin and lactate levels
- Increase in lung oxygenating function
- Reduction or elimination of vasopressor support
- SOFA-score improvement[9]

References

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