

Extracorporeal techniques in sepsis treatment: benefits and risks



Sepsis, a leading cause of morbidity and mortality worldwide, is characterised by a dysregulated immune response to infections that results in life-threatening organ dysfunction. Conventional therapy of sepsis typically starts with resuscitative measures; however, the only definitive therapy is adequate antibiotics and source control in surgical cases of sepsis.

Renal replacement therapy (RRT) is recommended in septic patients who develop acute kidney injury (AKI). Interestingly, different extracorporeal techniques have been studied in recent years in the hope of maximising the effect of RRT in modulating the exaggerated host inflammatory response in sepsis, according to a review article in the journal *Critical Care*.

High volume haemofiltration (HVHF) or very high volume haemofiltration (VHVHF), high cut-off (HCO) membranes, adsorption alone, and coupled plasma filtration adsorption (CPFA) are among the major evolving strategies. These strategies are not widely utilised in practice, depending on resources and local expertise.

"To date, evidence is insufficient to support the use of extracorporeal techniques in sepsis," the article notes, adding that further studies to guide clinicians in the application of these techniques in the proper clinical setting are still needed.

The article provides a comprehensive overview concerning both the benefits and risks of these techniques.

- HVHF and VHVHF are easily implemented in centres capable of performing conventional continuous RRT, as no additional component to the usual circuit is needed. Despite the promising results of earlier studies – mostly small observational studies/randomised controlled trials (RCTs) – HVHF seems to have no significant impact on short-term mortality, improvement in haemodynamics, or reduction in intensive care unit (ICU) or hospital length-of-stay (LOS).
- HCO membranes are characterised by a large pore size (average pore diameter (20 nm) compared with the standard high-flux membrane (10 nm). HCO membrane use is similar to the standard RRT prescription, including the choice of anticoagulation. The evidence for the effectiveness of this strategy comes from small RCTs and observational studies. Overall, these studies suggest a decrease in inflammatory cytokines and improvement of haemodynamics, along with an improvement in ICU patient severity of illness scores.
- Adsorption can be used in isolation or in combination with HD or continuous veno-venous haemofiltration (CVVH). Prescription (including the duration of therapy) depends on the adsorption cartridge used. To date, the evidence remains for the polymyxin B-immobilised fibre column is largely mixed. Cartridge clotting and treatment failure rates were high in one trial. Meanwhile, the evidence for cytosorb (CS) is limited to case reports/series and a few RCTs, but it is growing. Observational data suggest improvement in haemodynamics and a trend towards decreased mortality.
- CPFA is a combination of separation of plasma from the cellular components of blood with a highly permeable filter, followed by sorbent adsorption of the plasma component with a styrene resin to remove a number of different cytokines and then reinfusion of the purified plasma before the haemofilter to finally simultaneously provide CRRT for renal/fluid support. The effectiveness of CPFA is dose-dependent, and volumes of plasma cleared in excess of 0.18 L/kg/day are typically associated with better outcomes.

"It is important to recognise that the above-described techniques are not without side effects," the article points out. Common to all the techniques are extracorporeal circuit-related adverse events. The risks of bleeding, clotting/changes in anti-coagulation requirements, drops in platelets counts, and catheter complications are all well-known.

"The application of these extracorporeal techniques is generally highly variable worldwide depending on resources and local expertise. Therapy should be tailored to the individual patient condition. Furthermore, side effects should be carefully monitored," the article adds.

Source: [Critical Care](#)

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