

Title: The Evolution of Extracorporeal Anticoagulants in Continuous Kidney Replacement Therapy: Lessons Learned

Author(s): Nirav Agrawal, Kristen Kusumi, Rupesh Raina

Affiliation: Akron Nephrology Associates/ Cleveland Clinic Akron General Medical Center, Akron, OH

Abstract

Continuous kidney replacement therapy (CKRT) is the primary therapeutic modality utilized in hemodynamically unstable patients with severe acute kidney injury. As the circuit is extracorporeal, it poses an increased risk of blood clotting and circuit loss; frequent circuit losses affect the provider's ability to provide optimal treatment. The objective of this meta-analysis is to evaluate the evolution of extracorporeal anticoagulants for their safety and efficacy in the pediatric CKRT population.

Results

We conducted a literature search on PubMed and Embase for relevant citations. Studies were included if they involved patients under the age of 18 years undergoing CKRT, with the use of anticoagulation as a part of therapy. Only English articles were included in the study. Initial search yielded 58 articles and a total of 24 articles were included and reviewed. A meta-analysis was performed focusing on the safety and effectiveness of regional citrate anticoagulation (RCA) vs unfractionated heparin (UFH) anticoagulants in children. RCA had statistically significantly longer circuit life of 50.65 hours vs. UFH of 42.10 hours. Two major adverse effects metabolic acidosis and electrolyte imbalance seen more commonly in RCA compared to UFH. There was not a significant difference in the risk of systemic bleeding when comparing RCA vs. UFH.

Conclusion

RCA is the preferred anticoagulant over UFH due to its significantly longer circuit life, although vigilant circuit monitoring is required due to the increased risk of electrolyte disturbances. Additional studies are needed to strengthen the study results further."