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Application of oXiris-CRRT in Managing Septic Shock-Induced Acute Kidney Injury: A Clinical Case Report

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Abstract

Methods: This case report outlines the clinical application of continuous renal replacement therapy (CRRT) using the oXiris adsorbing filter in a 35-year-old male patient diagnosed with acute kidney injury (AKI) secondary to septic shock and diabetic ketoacidosis (DKA). The patient initially showed improvement in renal function, hemodynamic stability, and inflammatory markers following oXiris-CRRT. However, the onset of ARDS on day 10 required a reinitiation of therapy. Subsequent treatment cycles led to significant recovery in oxygenation, renal parameters, and reduced vasopressor dependence, ultimately resulting in patient discharge. This case underscores the potential of oXiris-CRRT in managing systemic inflammation and organ dysfunction, while also highlighting the need for vigilance against ARDS progression in septic patients. Further studies are recommended to explore predictive markers and optimize therapy protocols. The purpose of this case report is to evaluate the clinical efficacy of oXiris-CRRT in managing acute kidney injury due to septic shock, with particular focus on its role in modulating inflammation and preventing complications like ARDS.

Results: Initial findings suggest that oXiris-CRRT contributed to improvements in hemodynamic stability, renal function, and inflammatory markers. Over the first 48 hours of oXiris-CRRT, the patient's hemodynamic and laboratory parameters improved. In this 80 kg patient with DKA and sepsis, CRRT was maintained for 72 hours with blood flow of 150–200 mL/min, dialysate at 1000 mL/hr, replacement fluids at 800 mL/hr, and fluid removal of ~150 mL/min. Heparin was titrated to an aPTT of 1.5–2.5, with continuous monitoring. However, on day 10, the patient developed acute respiratory distress syndrome (ARDS) with a chest X-ray demonstrating diffuse, hazy airspace opacities. Secretion cultures grew Acinetobacter baumannii. Consequently, treatment was reinitiated. The reinitiation of oXiris-CRRT demonstrated its utility in modulating inflammatory parameters and supporting renal function. Azotemia improved from 128.3 mg/dL on day 10 to 48.9 mg/dL on day 19, and creatinine improved from 5.04 mg/dL to 1.5 mg/dL in the same period. Throughout days 10-19, the patient's PaO2/FiO2 ratio improved from 124 to 520, and vasopressor support decreased. The patient was ultimately discharged from the hospital.

Discussion: This case prompts critical discussion regarding the interplay between CRRT and ARDS in septic shock. While oXiris-CRRT effectively modulates the inflammatory response in septic AKI, ARDS development—even after initial improvements—necessitates careful consideration. ARDS in sepsis arises from a complex interaction of factors, including direct lung injury, systemic inflammation, and possibly ventilator-induced lung injury (VILI). This suggests that targeting inflammatory mediators alone through CRRT may not suffice to prevent ARDS in all instances. Optimizing outcomes also requires careful attention to CRRT timing and settings and the application of adjunctive treatments like lung-protective ventilation. Given the limited randomized controlled trials (RCTs) on oXiris-CRRT efficacy, additional high-quality research is needed to inform clinical decisions. Future studies should concentrate on identifying predictors of oXiris-CRRT response and on developing strategies to prevent or mitigate ARDS in this patient population. This report adds to the limited literature on oXiris application in adult ICU patients, offering clinical insights that may support future randomized studies.

Conclusion: This case illustrates the therapeutic promise of oXiris-CRRT in septic AKI complicated by ARDS. While initial improvements in renal and inflammatory profiles were observed, the onset of ARDS underscores the multifactorial nature of sepsis-related organ dysfunction. The patient's eventual recovery highlights the value of individualized, dynamic treatment

strategies. However, more extensive clinical studies are needed to define clear indications, timing, and outcome predictors for oXiris use in critically ill patients.

Keywords: acute kidney injury, septic shock, oXiris filter, CRRT, ARDS.

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