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Evaluating Early Versus Late CVVHDF Initiation in Acute Kidney Injury: A Retrospective ICU Case Study

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Abstract: ***Background: Acute Kidney Injury (AKI) is a common and life-threatening complication in critically ill patients, particularly within the Intensive Care Unit (ICU). Continuous Renal Replacement Therapy (CRRT), specifically Continuous Veno-Venous Hemodiafiltration (CVVHDF), is commonly used to manage AKI. This study aimed to evaluate the impact of early versus late initiation of CVVHDF on patient outcomes. Methods: We performed a retrospective analysis of medical records from our institution's ICU over a two-year period (2023-2024). Patients admitted for non-cardiac surgery who developed AKI and received CVVHDF were included. AKI was defined based on KDIGO criteria. We divided the patients into two groups: early initiation (≤48 hours of AKI diagnosis) and late initiation (>48 hours of AKI diagnosis). We also assessed the influence of high (30-35 ml/kg/h) versus standard (20-25 ml/kg/h) effluent doses. The CVVHDF protocol used heparin anticoagulation. Data collected included demographics, AKI etiology, SOFA and SAPS II scores, ICU length of stay, 28-day mortality, and laboratory parameters. Results: A total of 66 patients were included in the analysis, with a mean age of 64.18 years (66.7% male). The early CVVHDF group comprised 37 patients, while the late CVVHDF group included 29 patients. The most common etiologies of AKI were septic AKI (31.8%) and cardio-renal syndrome (19.7%). Patients in the early CVVHDF group showed better biochemical results, as evidenced by lower urea and creatinine levels at 24 hours post-initiation. There was a statistically significant trend toward lower 28-day mortality in the early CVVHDF group compared to the late group. However, subgroup analysis showed no significant difference between high and standard effluent rates.***

Keywords: Acute Kidney Injury (AKI), Continuous Veno-Venous Hemodiafiltration (CVVHDF), Continuous Renal Replacement Therapy (CRRT), Intensive Care Unit (ICU), Timing of Intervention, Early vs Late Initiation

1. Discussion

Clarifying the timing of CVVHDF initiation could help improve clinical protocols and ultimately enhance survival rates among ICU patients with AKI. Early intervention, defined as within 48 hours of AKI diagnosis, appears to confer a benefit in terms of improved biochemical control and a trend towards reduced mortality. It's important to take note that The lack of statistical significance might be due to a number of factors, including the relatively small sample size or the heterogeneity of the patient population.

2. Limitations

The study is limited by its retrospective design, which introduces the potential for selection bias and limits the ability to establish causality. The small sample size may have limited our power to detect statistically significant differences, particularly with respect to mortality. Additionally, this was a single-center study, which may limit the generalizability of the findings.

3. Conclusion

In summary, early initiation of CVVHDF in patients with AKI in the ICU appears to offer better biochemical control and a trend toward lower short-term mortality. While these findings are encouraging, they are limited by the study's small sample size and retrospective design. Larger, prospective studies are essential to validate these outcomes and develop robust clinical guidelines.

Acknowledgments:

Conflicts of Interest: Based on my current understanding and to the best of my knowledge, I do not have any relationships or arrangements, direct or indirect, with any commercial company that could reasonably be considered to affect the work in the Scientific Forum. I have based my contributions and perspectives solely on my academic training, professional experience, and objective analysis of available data. Should any potential conflict of interest arise in the future, I commit to promptly disclose it.

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