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Impact of Early Hemodialysis on Hospital Length of Stay in Sepsis Patients: A Study at a Tertiary Center in Rajahmundry

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Abstract: ***Early initiation of hemodialysis in sepsis patients with acute kidney injury (AKI) has been hypothesized to improve clinical outcomes by reducing the length of hospital stay (LOS) and mitigating the risk of complications. This study evaluates the effect of early versus delayed hemodialysis on LOS in a cohort of sepsis patients at a 220-bedded tertiary center in Rajahmundry, Andhra Pradesh. The analysis of 200 sepsis patients shows that those receiving early hemodialysis had a mean reduction in LOS of 4.5 days compared to those receiving delayed intervention, highlighting the clinical and operational benefits of early treatment in sepsis-related AKI.***

Keywords: sepsis-related AKI, early hemodialysis, hospital stay reduction, acute kidney injury management, critical care timing

1. Introduction

Sepsis is a leading cause of morbidity and mortality worldwide, characterized by an uncontrolled immune response to infection, which can lead to multi-organ failure, including acute kidney injury (AKI). Renal replacement therapy, particularly hemodialysis, is often necessary to support patients with sepsis-induced AKI. In critically ill patients, the timing of hemodialysis is a key determinant of outcomes. Early initiation of hemodialysis is thought to prevent further deterioration of renal function and reduce the incidence of severe complications, potentially shortening hospital stay. However, studies differ on the exact benefits of early versus delayed initiation, and practice varies between hospitals.

This study aims to assess whether early hemodialysis initiation (<24 hours from AKI diagnosis) in sepsis patients decreases hospital LOS compared to delayed initiation, with a focus on patient data from a 220-bedded tertiary center in Rajahmundry.

2. Methods

This retrospective cohort study was conducted at a 220-bedded tertiary center in Rajahmundry from January 2023 to August 2024. A total of 200 sepsis patients who developed AKI and required hemodialysis were included in the analysis. Inclusion criteria were sepsis patients diagnosed based on the Sepsis-3 criteria who developed AKI and required hemodialysis. Exclusion criteria included patients with chronic kidney disease (CKD) or those on long-term dialysis prior to the study.

Data were collected from hospital records, including patient age, gender, comorbidities, date of sepsis diagnosis, hemodialysis initiation, and length of stay. Mortality and ICU duration were also recorded. A t-test was used to compare the mean LOS between patients receiving early (<24 hours) and delayed (>24 hours) hemodialysis. Multiple regression analysis was used to control for confounders such as severity of sepsis, age, and comorbid conditions.

3. Results

The following table provides a comparison of the patient outcomes based on the timing of hemodialysis initiation:

Patient Groups	Number of Patients	Mean LOS (days)	ICU Stay (days)	Mortality (%)	Renal Recovery (%)
Early Hemodialysis (<24h)	120	12.5±4.1	4.8 ± 1.6	18%	65%
Delayed Hemodialysis (>24h)	80	17.0±5.3	7.1 ± 2.4	28%	48%

The table above demonstrates the significant differences in patient outcomes based on the timing of hemodialysis initiation. Early hemodialysis (<24h) resulted in a mean length of stay (LOS) of 12.5 days, compared to 17.0 days for the delayed group (>24h). Additionally, patients in the early group had a shorter ICU stay (4.8 days) and lower mortality (18%) compared to the delayed group (7.1 days ICU stay, 28% mortality). Furthermore, 65% of patients in the early group showed renal recovery, compared to 48% in the delayed group.

The reduction in both LOS and ICU stay highlights the effectiveness of early hemodialysis in sepsis patients, particularly in a resource-constrained setting such as a tertiary center in Rajahmundry, where ICU bed availability is limited. Early intervention not only improves patient outcomes but also reduces hospital strain and optimizes resource utilization.

4. Discussion

Early initiation of hemodialysis in sepsis patients with AKI significantly reduced hospital LOS and improved clinical outcomes in the context of a tertiary center in Rajahmundry. The results align with the findings of other studies that have shown the benefits of early intervention in sepsis management. The statistical significance of the differences in LOS, ICU stay, and mortality suggests that early hemodialysis can be a vital strategy in improving outcomes for critically ill patients.

Limitations of this study include its retrospective design and potential selection bias, as patients who received early hemodialysis may have been healthier at baseline. Additionally, the study's focus on a single center may limit the generalizability of the findings. Further prospective studies are needed to confirm these results and explore their broader applicability.

5. Conclusion

Early hemodialysis in sepsis patients with AKI is associated with a significant reduction in hospital length of stay and improved clinical outcomes in the Rajahmundry context. The adoption of early intervention strategies in sepsis management protocols could potentially reduce healthcare costs and improve patient care. Further research is needed to validate these findings and determine the most effective protocols for managing sepsis in critically ill patients.

References

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