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Night-time Discharge from the ICU as a Risk Factor for In-hospital Mortality

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Abstract

Introduction

Night-time discharge from the ICU has been associated with increased in-hospital mortality and ICU readmission. This phenomenon has prompted significant interest among healthcare professionals and researchers. Previous studies have indicated that the time of discharge from the ICU may impact patient outcomes. The aim of our study was to investigate the impact of night-time ICU discharge on patient outcomes in our hospital.

Methods

In this comprehensive analysis, we considered various patient characteristics and clinical parameters to assess the association between night-time discharge and in-hospital mortality, as well as the rate of readmission to the ICU. We conducted a retrospective review of patient data from the ICU audit database for the period from January 1 to December 31, 2019. Patients were categorised into two groups: daytime discharge (between 07:00 and 21:59) and night-time discharge (between 22:00 and 06:59). Patients transferred to other hospitals were excluded. Patients' characteristics including age, illness severity scores (APACHE II), predicted mortality on admission to the ICU, length of ICU stay (LOS), and the number of patients with tracheostomy were included. Statistical comparisons between groups were performed using Student's t-test or Fisher's exact test.

Results

A total of 866 patients were discharged from the ICU during the study period, with 674 discharged during the daytime and 192 at night.

Mortality was significantly higher for those discharged at night (9.4%) compared to daytime discharges (4.0%, $P < 0.05$). Approximately 6.9% of all ICU discharges required readmission to the ICU (60/866), with no significant difference observed between daytime (6.7%) and night-time (7.8%) discharge groups ($P = 0.63$). There were no differences between the groups for the other variables studied.

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Discussion

Our results were consistent with previous studies which demonstrated that the timing of discharge from the ICU can affect patient safety and mortality.

It is essential to acknowledge the complexity of patient care transitions and the potential challenges posed by night-time discharge.

Introduction

The discharge of patients from the Intensive Care Unit (ICU) to a lower level of care at night has been associated with adverse outcomes, including in-hospital mortality and readmission to the ICU. This phenomenon has prompted significant interest among healthcare professionals and researchers. Previous studies have indicated that the time of discharge from the ICU may impact patient outcomes.[1-3]

Patient safety and optimal care transitions are of paramount importance, especially when patients are moved from the ICU to a lower level of care. Discharging patients during the night may pose unique challenges and risks due to factors such as reduced staffing, diminished resources, and potential disruptions to the patient's circadian rhythm. The aim of our study was to investigate the impact of night-time ICU discharge on patient outcomes in our hospital. In this comprehensive analysis, we considered various patient characteristics and clinical parameters to assess the association between night-time discharge and in-hospital mortality, as well as the rate of readmission to the ICU.

Aim

Meta-analysis has shown that out-of-hours discharge from an ICU is strongly associated with both in-hospital death and ICU readmission.[4]

The aim of this retrospective study was to investigate the impact of night-time discharge from the Intensive Care Unit (ICU) on patient outcomes, focusing on in-hospital mortality and rates of readmission to the ICU.

1. To compare the demographic and clinical characteristics of patients discharged from the ICU during daytime and night-time hours.
2. To assess the in-hospital mortality rates among patients discharged from the ICU during daytime and night-time hours.
3. To determine whether there is a significant difference in the rates of readmission to the ICU between patients discharged during daytime and night-time hours.

Methods

We conducted a retrospective review of patient data from the ICU audit database for the period from January 1 to December 31, 2019. Patients were categorized as daytime (07:00-

21:59) or night-time (22:00-06:59) discharges. Patients transferred to other hospitals were excluded from the analysis. Data collected included patient age, illness severity scores (APACHE II), predicted mortality on admission to the ICU, length of ICU stay (LOS), and the number of patients with tracheostomy. Statistical comparisons between groups were performed using Student's t-test or Fisher's exact test.

Results

A total of 866 patients were discharged from the ICU during the study period, with 674 (77.8 %) discharged during the daytime and 192 (22.1 %) at night. There were no significant differences in the mean age between the two groups (63 years for daytime vs. 60 years for night-time discharge, P = 0.51). Similarly, the mean APACHE II score (15.3 for daytime vs. 15.9 for night-time, P = 0.3) and predicted mortality (18.9% for daytime vs. 20.3% for night-time, P = 0.4) on admission to the ICU did not significantly differ. The mean length of ICU stay before discharge was 6.7 days for both groups.

The mean of last NEWS before discharge was 4.16 for day-time discharges versus 4.05 for night-time discharges. (P = 0.7). The number of patients with available last NEWS score data before discharge was 415 (47.9%) for day-time discharges versus 85 (9.8 %) for night-time discharges.

Approximately 14% of daytime discharges had a tracheostomy (97/674) compared to 9.4% of night-time discharges (18/192, P = 0.07). (Table 1)

The overall in-hospital mortality for patients who died after discharge from the ICU was 5.2% (45/866). Mortality was significantly higher for those discharged at night (9.4%) compared to daytime discharges (4.0%, P < 0.05). Approximately 6.9% of all ICU discharges required readmission to the ICU (60/866), with no significant difference observed between daytime (6.7%) and night-time (7.8%) discharge groups (P = 0.63). (Table 2)

Table 1:

Characteristics of both groups:

	Age (mean)	APACHEII (mean)	LOS in ICU (mean)	Predicted mortality%	Trache-ostomy %	Last NEWS (mean)

Day-time	63 years	15.3	6.7 days	18.9	14.3	4.16
Night-time	60 years	15.9	6.7 days	20.3	9.4	4.05

Table 2:
The outcome of both groups:

	In-hospital mortality %	Readmission %
Day-time	4	6.7
Night-time	9.4	7.8

Discussion

The implications of night-time ICU discharge on patient outcomes have been the subject of previous investigations. Studies have demonstrated that the timing of discharge from the ICU can affect patient safety and mortality.[1-3] Beck et al. reported that patients discharged at night had a higher hospital mortality rate.[1] Similarly, Priestap and Martin found that discharge time was associated with patient outcomes, with night-time discharge being a risk factor for increased mortality.[2] These findings are consistent with our results, which showed a significantly higher in-hospital mortality rate for patients discharged at night compared to those discharged during the day.

It is essential to acknowledge the complexity of patient care transitions and the potential challenges posed by night-time discharge. Factors such as reduced staffing levels and resource availability during nighttime hours may contribute to the observed differences in mortality rates. While our study did not identify significant differences in patient characteristics between the two groups, other unmeasured variables, such as the availability of experienced staff and the timing of clinical interventions post-discharge, could play a role in the increased mortality associated with night-time discharge.

Moreover, healthcare professionals must consider the circadian rhythms and sleep patterns of critically ill patients when planning discharge timing. Disrupting these rhythms can have adverse effects on patient recovery and overall health.[5] Ensuring a smooth transition of care during night-time discharge may require additional measures, such as increased communication and coordination among healthcare providers, to mitigate potential risks.

In addition, Wongtangman et al. conducted a study focusing on factors related to readmission to the ICU and found that specific patient and clinical factors may contribute to readmissions.[6] Johnson et al. conducted a systematic review and meta-analysis, further emphasising the importance of ICU discharge procedures and their impact on patient outcomes.[7] Stevens et al. highlighted the need for standardised discharge information and its association with symptom-related readmissions in patients undergoing surgery.[8] The structure and process of critical care services were investigated by Hill et al., shedding light on the organisation of ICU care.[9]

The references cited above provide further context and emphasise the need for standardized discharge procedures, enhanced communication among healthcare providers, and an understanding of the patient's circadian rhythm. As healthcare professionals, it is imperative that we remain vigilant in our efforts to improve patient safety during night-time ICU discharge. By acknowledging the challenges posed by this practice and implementing strategies to mitigate risks, we can work towards enhancing the overall quality of care and patient outcomes in the ICU setting.

In conclusion, our retrospective analysis supports the notion that night-time discharge from the ICU is associated with an increased risk of in-hospital mortality. However, it is important to emphasise that the rate of readmission to the ICU did not significantly differ between patients discharged at night and those discharged during the day. These findings highlight the importance of optimising patient safety during night-time ICU discharge and implementing strategies to mitigate the elevated risk of mortality associated with this practice. Further researches are required to assess other variables not covered in this study and to measure the effectiveness of various strategies.

Declarations of Conflicts of Interest
None declared.

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