



INCIDENCE AND ASSOCIATED RISK FACTORS OF DELIRIUM IN INTENSIVE CARE UNIT PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY

Anaesthesiology

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ABSTRACT

Background: Delirium is a frequent and serious neuropsychiatric complication in intensive care units (ICUs), characterized by acute onset and fluctuating disturbances in attention, consciousness, and cognition. Despite its high prevalence, delirium remains underdiagnosed, especially in resource-limited settings, where routine screening is not standardized. **Objectives:** To determine the incidence of delirium among ICU patients and to identify associated clinical, biochemical, and environmental risk factors in a tertiary care hospital setting. **Methods:** A prospective observational study was conducted from 2021 to 2024 in the Anaesthesia ICU of Dr. Sushila Tiwari Government Hospital, Haldwani. A total of 176 patients aged 18–65 years with ICU stays exceeding 24 hours were included. Daily assessments were performed using RASS and ICDSC tools. Logistic regression was applied to evaluate associations between risk factors and delirium. **Results:** Delirium was observed in 19.88% of patients. Significant risk factors included age (41–50 years), hypertension, substance abuse, use of sedatives and steroids, and hypernatremia. Environmental factors like clock and sunlight visibility were protective. **Conclusion:** Delirium remains a prevalent complication in ICU patients. Early identification using ICDSC and addressing modifiable risk factors can reduce incidence and improve outcomes.

KEYWORDS

Delirium; Intensive Care Units; Risk Factors; Electrolyte Imbalance; Sedation

INTRODUCTION

Delirium is characterized by an acute disturbance in consciousness, attention, and cognitive functioning, typically developing over a brief period and often presenting with fluctuating symptoms throughout hospitalization (1). Globally, up to 64% of patients admitted to intensive care units (ICUs) are affected by delirium (2-4). Meta-analyses report a pooled incidence of 31.8% and a prevalence of 33% for delirium in ICU settings (5,6).

Delirium manifests in three clinical subtypes: hyperactive, hypoactive, and mixed (7). Each type significantly contributes to increased caregiving demands, escalated treatment expenses, and poorer clinical outcomes (8). The condition also raises the likelihood of complications; for instance, intubated patients experiencing delirium are at elevated risk of self-extubation and dislodging urinary catheters. Although physical restraints may be employed to prevent such events, restraint use is associated with adverse effects and imposes an additional workload on nursing staff (9). Studies indicate that delirium correlates with prolonged mechanical ventilation, higher mortality rates, and increased healthcare costs (6,10). These consequences not only strain ICU resources but also increase the physical and emotional burden on nursing personnel. Notably, nurses managing delirious patients experience greater stress levels compared to those caring for non-delirious patients (11), further exacerbating the pressures on an already strained healthcare system, especially during and after the COVID-19 crisis.

Effective delirium management—encompassing risk identification, prompt recognition, and early diagnosis—could alleviate some of this burden. However, routine bedside assessment for delirium remains uncommon in many medical centers within developing countries (12). Therefore, exploring the incidence, risk factors, and outcomes associated with delirium in ICU populations in these settings is crucial. Such data can inform healthcare policies and underscore the need to recognize delirium as a significant and preventable ICU complication with substantial implications for patient care and healthcare system efficiency. This study aims to quantify the incidence of delirium in ICU patients and identify associated risk factors to inform preventive strategies.

MATERIAL AND METHODS

This prospective observational study was conducted in the Anaesthesia Intensive Care Unit (ICU) of Dr. Sushila Tiwari

Government Hospital, Haldwani, over a period from 2021 to 2024. Prior to initiation, ethical approval was obtained from the Institutional Ethics Committee, and informed written consent was secured from all participants or their legal representatives. A total of 176 patients were enrolled based on predefined inclusion and exclusion criteria

Patients aged between 18 and 65 years with an ICU stay of more than 24 hours were included in the study. Individuals were excluded if they declined consent, had bilateral deafness or blindness, presented with neurosurgical or neurological conditions, were receiving antipsychotic medications, or required mechanical ventilation at the time of enrollment.

Data collection was performed using a predesigned proforma that captured demographic details, American Society of Anesthesiologists (ASA) physical status grading, existing comorbidities, primary reasons for ICU admission, history of substance abuse, use of prescribed drugs, and environmental factors such as visibility of a wall clock and exposure to natural sunlight. Additionally, laboratory parameters including serum sodium and potassium levels were recorded on the first day of ICU admission.

Daily assessment for delirium was carried out using the Richmond Agitation Sedation Scale (RASS). Patients with RASS scores between -3 and +4 were further evaluated using the Intensive Care Delirium Screening Checklist (ICDSC), with a score of 4 or more indicating the presence of delirium (13). Follow-up assessments continued until the fourth day of ICU admission or until the patient was discharged, transferred, or deceased.

All data were statistically analyzed using descriptive methods to summarize baseline characteristics. Logistic regression models were applied to evaluate associations between various risk factors and the incidence of delirium. A 95% confidence interval was used, and a p-value less than 0.05 was considered statistically significant.

RESULTS

Sociodemographic Factors

In our study of 176 patients, 35 (19.88%) developed delirium. Most cases occurred in females (82.9%, n=29) compared to males (17.1%, n=6), with no significant gender difference (p=0.87). Delirium was most frequent in the 41–50 age group (p=0.001), followed by 51–65 years (p=0.02). ASA grade 2 patients showed a higher incidence (p=0.04).

Risk Factors

Significant factors associated with delirium included comorbidities such as hypertension ($p=0.001$), smoking ($p=0.03$), and drug abuse ($p=0.02$). The use of sedatives ($p=0.012$), steroids ($p=0.001$), and analgesics like paracetamol and tramadol ($p=0.03$) also showed strong associations. Electrolyte imbalances including hyponatremia, hypokalemia, and hyperkalemia (all $p=0.001$) were significant contributors. In contrast, the presence of a visible clock and natural sunlight exposure significantly reduced the risk (both $p<0.01$).

Timing And Severity

In our study, most delirium cases (85.7%) occurred within the first three days of ICU admission. The majority had ICDSC scores of 5–7 (80%) and RASS scores of -1 (51.43%), indicating mild sedation.

Table 1: Patient Distribution By Key Risk Factors

Factor	Delirium (n=35)	No Delirium (n=141)	p-value
Hypertension	25.7% (9)	13.5% (19)	0.001
Smoking	17.1% (6)	31.9% (45)	0.03
Drug Abuse	8.6% (3)	5.0% (7)	0.02
Sedative Use	8.6% (3)	0.7% (1)	0.012
Steroid Use	25.7% (9)	2.1% (3)	0.001
Hyponatremia	51.4% (18)	5.7% (8)	0.001
Clock Visibility	14.2% (5)	36.8% (52)	<0.01
Sunlight Visibility	17.1% (6)	32.16% (45)	<0.01

DISCUSSION

The observed delirium incidence of 19.88% in our study falls within the range reported by previous research, which has documented rates between 19% and 60% in ICU populations (14,15). Interestingly, the predominance of delirium among female patients in our cohort contrasts with studies that have identified a higher prevalence among males (16), suggesting that gender-related susceptibility may vary across different populations. Age was a significant determinant, with the highest incidence seen in the 41–50-year age group, aligning with existing evidence that emphasizes increased vulnerability to delirium with advancing age (17).

Several clinical factors, including hypertension, substance use, sedative administration, and steroid therapy, were significantly associated with delirium in our findings. These results are consistent with earlier studies that highlight the role of such comorbidities and medications in elevating delirium risk (2,18). In contrast, environmental elements—such as the visibility of a clock and natural sunlight—appeared to exert a protective effect, supporting the use of non-pharmacological strategies to prevent delirium (19).

Electrolyte disturbances, particularly hyponatremia, emerged as a significant and somewhat novel risk factor in our analysis, underscoring the critical role of metabolic regulation in ICU care (20). Additionally, the fact that most delirium cases developed within the first three days of ICU admission highlights the importance of proactive screening and close observation during the early phase of critical care (21).

Limitations

This study was conducted at a single center, which may limit the generalizability of the findings to other settings. The exclusion of mechanically ventilated patients may underestimate the true incidence of delirium. Additionally, some confounding variables like baseline cognitive function and pain scores were not assessed, potentially influencing the observed associations.

Strengths

A major strength of this study is its prospective design, allowing for real-time delirium assessment using validated tools like RASS and ICDSC. The inclusion of environmental and biochemical variables provides a comprehensive analysis of both clinical and contextual risk factors. Daily monitoring enhanced the accuracy of incidence reporting and strengthened the study's internal validity.

CONCLUSION

Delirium affects nearly one in five ICU patients, with significant risk factors including age, hypertension, substance abuse, sedative and steroid use, and hyponatremia. Environmental modifications, such as ensuring clock and sunlight visibility, may reduce incidence. These findings advocate for early screening using tools like ICDSC and

targeted interventions to improve patient outcomes in ICU settings.

Conflict Of Interest: None.

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Consent: Written consent secured.

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