Original Article

A Hospital Based Observational Study to Determine the Incidence and Risk Factors in Delirium in Critical Patients in ICU at Tertiary Care Centre

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Abstract

Background: Delirium is a common problem in intensive care unit (ICU) patients. Patients in the intensive care unit (ICU) face such a high psychological strain under the dire circumstances of death or loss of function that they become delirious. In order to give a guide for reducing ICU delirium, this research sought to analyze both the incidence and risk factors of delirium in ICU patients. **Material and Methods:** We conducted a prospective, observational study in the medical ICU, surgical ICU, and anaesthesia department of a teaching hospital, Barmer, Rajasthan, India. All consecutive patients admitted to the ICU for 1 year were included in the study if they were aged >18 years, had an ICU stay of >24 h, and signed informed consent (their family members also signed). Risk factors were assessed and classified into predisposing and precipitating factors. The data were analysed using the Statistical Package for Social Sciences (SPSS) version 21.0. **Results:** Among the predisposing factors, only a history of hypertension (32.5 vs 15%; p<0.05) was significantly associated with the development of delirium, while the others were not. High APACHE II scores (14.8 ± 5.3 vs 9.6 ± 7.5; p <0.001), the use of opioids (i.v. morphine 100 µg/kg/fentanyl 1 to 2 µg/kg; 80% vs. 26.66%; p <0.001), sepsis (40 vs. 15%; p <0.001), the need or use of physical restraints (77.5% vs 3.33%; p <0.001), mechanical ventilation (97.5% vs 55%; p <0.001) with duration of mechanical ventilation [20.5 ± 10.3; vs 4.21 ± 7.34], and the length of ICU stay (26.00 ± 16.20 days vs 6.08 ± 7.35 days; p <0.001) were all found to be significant in the development of delirium. **Conclusion:** Our research found that 40% of adult intensive care unit patients had delirium. ICU patient outcomes may be improved by effective surveillance, early delirium detection, and prompt management.

Keywords: Intensive care unit, delirium, risk factor, predisposing factors, precipitating factors.

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Introduction

Delirium is a common problem in intensive care unit (ICU) patients. Delirium is an acute, fluctuating perturbation of consciousness, primarily characterised by an abrupt onset of altered awareness and impairments in cognitive abilities. There may be frequent oscillations between remission and recurrence. Patients in the intensive care unit (ICU) are so emotionally burdened by the dangers of death or loss of function that they develop delirium. The most prevalent form seen in clinical practice is hyperactive delirium, which is characterised by extreme agitation and may be mistakenly diagnosed as either agitated dementia or psychotic illness. Despite being common, hypoactive delirium has a poor prognosis due to professionals' failure to recognise it.[1,2] Previous research found that between 11% and 87% of patients in the intensive care unit (ICU) had delirium.[3,4] Those who are old, have pre-existing cognitive impairments, have terminal diseases, are having major surgery, or are hospitalised to the intensive care unit are at a heightened risk of developing delirium.[5-9] Delirium was seen in 20–50% of ICU patients on non-mechanical ventilation and up to 60–80% of patients on mechanical ventilation.[10,11] In addition to causing significant mental injury to patients, intensive care unit delirium also increases hospital mortality, lowers life quality, increases medical costs, and necessitates longer hospital stays and mechanical ventilation. Twelve Thus, it is crucial to comprehend the risk factors for ICU delirium to avoid delirium in ICU patients and enhance their prognosis.[12]

The incidence of delirium in ICU patients has been linked to a variety of variables, including the patient's personal traits, clinical illness features, therapy, and surroundings, according to prior research. The outcomes haven't been totally constant; however,[13,14] age, smoking, chronic obstructive pulmonary disease, sedative usage, sepsis, stroke, renal insufficiency, and physical constraint were all identified as independent risk factors for delirium in intensive care unit patients in a Chinese meta-analysis.

In contrast, another meta-analysis found a significant correlation

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between delirium and a history of hypertension, mechanical ventilation, and a high Acute Physiology and Chronic Health Evaluation II (APACHE II) score.[13,15] To provide guidelines for ICU delirium prevention, this study assessed the incidence and risk factors of delirium in ICU patients.

Materials and Methods

In the medical intensive care unit, surgical intensive care unit, and anaesthesia department of a teaching hospital in Barmer, Rajasthan, India, we conducted a prospective, observational study. If a patient was older than eighteen, had stayed in the intensive care unit for more than twenty-four hours, and had signed an informed consent form (as had their family members), they were included in the investigation. Because it is difficult to evaluate delirium in this population, patients who had a history of dementia or psychosis, experienced a cardiac arrest, or had made the choice not to resuscitate were not included in the research. When a patient was admitted to the intensive care unit, their medical history, medication history, comorbidities, and reason for admission were all documented. Every patient had an evaluation twice a day, at 9 a.m. and 5 p.m. Positive findings of delirium, ICU discharge, or ICU death were the endpoints. Acute Physiology and Chronic Health Assessment II (APACHE II) scores were used to evaluate the patients, and the lowest score during the first 24 hours was recorded. The Richmond Agitation-Sedation Scale is a 10-point rating system with values ranging from +1 to +4 for agitation to combativeness, 0 for alertness and calmness, and −1 to −5 for coma or low arousal. CAM-ICU is a well-proven screening tool for delirium, especially in patients on mechanical ventilation who are unable to speak. 3. After assessment, risk variables were divided into precipitating and predisposing factors. Before being admitted to the intensive care unit, a patient may have predisposing factors such as comorbidities, such as hypertension, COPD, alcoholism, smoking, numerous drugs, and illnesses. Iatrogenic (mechanical ventilation, sedatives, proximity to a window, physical constraints, dyselectrolytemia) precipitating variables are associated with disease severity. Statistical analysis: The unpaired t-test and Mann-Whitney test were used to compare quantitative data. In contrast, the Chi-square test and Fisher's exact test were used to analyse qualitative variables. A p-value of less than 0.05 was deemed statistically significant. The Statistical Package for Social Sciences (SPSS) version 21.0 was used to analyse the data.

Results

One hundred adult patients who satisfied the inclusion and exclusion criteria were evaluated over the research period. During their time in the intensive care unit, forty patients (40%) had delirium.

Both groups' demographic profiles were similar. Patients with greater comorbidities who were admitted from the medical ward (63.4%) were found to be significantly ($p < 0.05$*) in the delirious group. Only the history of hypertension (32.5 vs. 15%; $p<0.05$) was a significant predisposing factor for the development of delirium. High APACHE II scores (14.8 ± 5.3 vs 9.6 ± 7.5; $p <0.001$), benzodiazepine i.v. Midazolam 1 mg more than once during their stay (30% vs 13.3%; $p <0.05$), opioids i.v. morphine 100 µg/kg/fentanyl 1 to 2 µg/kg (80% vs 15%; $p <0.001$), sepsis (40 vs 15%; $p <0.05$), exposure to windows or natural light (12.5% vs 91.66%; $p <0.001$), the need or use of physical restraints (77.5% vs 3.33%; $p <0.001$), mechanical ventilation (97.5% vs 55%; $p <0.001$) with duration of mechanical ventilation [20.5 ± 10.3; vs 4.21 ± 7.34], and the length of ICU stay (26.00 ± 16.20 days vs 6.08 ± 7.35 days; $p <0.001$) were all found to be significant in the development of delirium) [Table 1].

Table 1: General characteristics and risk factors for development of delirium

Variables	Delirium group (N = 40) (%)	Non-delirium group (N = 60) (%)	p value
Age [mean ± SD (years)]	37.5 ± 13.5	38.6 ± 15.3	>0.05
Sex (male/female)	26/14	40/20	>0.05
Mode of admission	25 (62.5%)	21 (35%)	>0.05
Medical ward	8 (20%)	23 (38.33%)	<.0.05
Surgical ward	7 (17.5%)	16 (26.66%)	>0.05
Trauma	7 (17.5%)	18 (30%)	>0.05
Predisposing factors			
Smoking history	16 (40%)	20 (33.3%)	>0.05
Alcohol history	21 (52.5%)	29 (48.33%)	>0.05
Tobacco history	4 (10%)	9 (15%)	>0.05
Hypertension	13 (32.5%)	9 (15%)	<0.05
COPD	4 (10%)	5 (8.33%)	1.00
Diabetes	9 (22.5%)	9 (15%)	>0.05
Tuberculosis	Nil	5 (8.33%)	>0.05
Epilepsy	2 (5%)	4 (6.66%)	>0.05
Thyroid dysfunction	3 (7.5%)	3 (5%)	1.00
Coronary artery disease	Nil	2 (3.33%)	>0.05
Precipitating factors			
APACHE II score	14.8 ± 5.3	9.6 ± 7.5	<0.001
SOFA score	8.5 ± 5.27	4.28 ± 3.6	<0.001
Hypotension	8 (20%)	11 (18.33%)	>0.05
Benzodiazepine (i.v midazolam)	12 (30%)	8 (13.33%)	<0.05
Steroids	24 (60%)	25 (41.66%)	>0.05
Opioids (i.v morphine/fentanyl)	32 (80%)	16 (26.66%)	<0.001
Sepsis	16 (40%)	9 (15%)	<0.05

Nasogastric feeds	29 (72.5%)	33 (55%)	>0.05
Foleys catheterization	36 (90%)	51 (85%)	>0.05
Window/natural light exposure	5 (12.5%)	55 (91.66%)	<0.001
Physical restraints	31 (77.5%)	2 (3.33%)	<0.001
Mechanical ventilation	39 (97.5%)	33 (55%)	<0.001
No. of days on mechanical ventilation (IQR)	20.5 ± 10.3	4.21 ± 7.34	<0.001
Duration of stay (IQR)	26.00 ± 16.20	6.08 ± 7.35	<0.001

Discussion

The intensive care unit (ICU) is a unique ward because patients there are more likely to be moribund and endure a lot of stress, both physically and mentally, in addition to their physical surroundings, which may lead to delirium. According to our study's assessment using the RASS and CAM-ICU methods, 40% of patients had delirium. In some earlier studies, the incidence of ICU delirium was slightly greater (40.9%-46.3%) and lower (21.3%-26.1%). This might be because the study subjects and evaluation indices differed.[16–20] The many ICU settings (cardiac, surgical, and respiratory), the methods used to evaluate delirium interpretation, local sedation techniques, and confounding variables may all contribute to this large range of variances in the occurrence. Delirium may be caused by several precipitating and predisposing factors, despite its complicated aetiology. While triggers like mechanical ventilation, sedatives, being near a window, physical restraints, dyselectrolytemia, and the severity of the illness are modifiable, predisposing factors like comorbidities, alcoholism, smoking, and different medications may exist before the ICU admission and are rarely modifiable. In our investigation, the onset of delirium was correlated with hypertension (p=0.035), one of the precipitating risk factors. In a similar vein, Ouimet et al. (OR, 1.88; 95% CI, 1.3–2.6),[8] and Dubois et al,[21] also connected delirium to hypertension. When hospitalised to the intensive care unit (ICU), hypertensive patients are at a heightened risk of developing delirium due to damage to their vascular structures, which results in brain hypoxia and hypoperfusion.[22] Furthermore, delirium may be more common in these individuals due to persistent hypertension, which has been linked to memory, attention, and abstract thinking impairment. However, delirium was not explained by other risk variables in our research, such as fever, smoking, tobacco use, steroid usage, dyselectrolytemia, COPD, or diabetes mellitus. Conversely, smoking was linked to delirium, according to Ouimet et al.8 and Van Rompaey et al.[23] Patients who were moved from the medical ward had a greater rate of delirium (80%). Patients with a medical reason may have developed delirium due to more comorbidities, higher APACHE scores, and complicated courses. Similar findings were made by Van Rompaey et al,[23] who discovered that patients with chronic illnesses had delirium at higher rates than surgical patients. Additionally, Thomason et al,[24] found that delirium was linked to high APACHE II scores but not to increasing age, sex, or race. Conversely, Sharma et al,[15] and Thomason et al,[24] have reported a higher APACHE II score to be associated with a later onset of delirium. Among drugs, the use of opioids (morphine/fentanyl) and benzodiazepines (midazolam) was linked to the onset of delirium. Our results are supported by studies by Sharma et al,[20] and Lahariaya et al.[25] The use of drugs was a significant predictor of delirium because benzodiazepines raise GABA levels, which enhances drowsiness, and because benzodiazepines and opioids are often used in the intensive care unit to treat behavioral issues. Sedation should thus be administered sparingly in the intensive care unit.

Apoptosis, metabolic disturbances, endothelial activation, vascular injury, and disruption of the blood-brain barrier are among the plausible causes of sepsis-associated delirium. We also discovered a high correlation between delirium and sepsis. In our research, delirium was seen in 16 of the 40 (40%) sepsis patients (p = 0.004). In contrast to the nondelirious group, the patients in our research who were not subjected to windows that let in natural light had a higher incidence of delirium. Lack of light or a room without windows in an intensive care unit has been identified as a risk factor for delirium symptoms.[21,23] According to research by Smonig et al,[26] putting patients in a room with windows or sun exposure seems to prevent agitation episodes. In our study, almost 77.5% of patients under physical constraint had delirium. Critical occurrences such as the self-removal of numerous invasive catheters and endotracheal tubes were also caused by this. Our findings were higher than those of Pan et al. (39.8%),[19] and Rompaey et al.[23] It has been shown that mechanical ventilation is a significant risk factor for delirium.[27]

Conclusion

In our research, 40% of adult ICU patients had delirium. ICU patient outcomes may be improved by effective surveillance, early delirium detection, and prompt management.

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Conflicts of interest

There are no conflicts of interest.

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