Original Research Article

A STUDY ON DELIRIUM AND ITS ASSOCIATED FACTORS IN ICU PATIENTS REFERRED TO PSYCHIATRY

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Abstract

Background: A significant alteration in mental capacity is delirium. It causes people to think erratically and become unaware of their surroundings. Usually, the disorder manifests itself quickly—within a few days or hours. Delirium frequently has one or many causes. A serious or protracted disease or an imbalance in the body, like insufficient salt, could be contributing factors. Infections, surgeries, certain medications, and alcohol or drug use or withdrawal can also result in the illness. Sometimes, delirium symptoms are mistaken for dementia symptoms. In order to diagnose the illness, medical professionals may consult with a family member or caregiver. The objective of the study is to analyse incidence of delirium, motor sub types and assess risk factors of delirium among ICU patients referred to psychiatry department in tertiary care center Srikakulam between months of March 2023 to August 2023. **Materials and methods:** During a 6-month period (March 2023 to August 2023), a cross-sectional observational study was conducted on ICU patients. All referrals to the psychiatry department from Respiratory, Cardiac, Medical, Surgical, Trauma ICUs, and Emergency department were evaluated for behavioural changes, and patients diagnosed with delirium were included in the study. Informants gave their signed and informed consent after the Institute Ethics Committee approved the research proposal. Comatose during their ICU stay and severely aphasic patients that interfere with assessment are not included in the study. **Result:** Out of the 165 consecutive ICU referrals, 90 patients (54.4%) diagnosed as delirium. This study showed, Mean Age (56.72), with nearly one-fourth (23.64%) of the sample aged ≥65 years, gender (M=77%, F= 22%) and years of education was 5.96. In this study, major psychiatric symptoms of the patients in whom delirium was diagnosed are irritability, Agitation, Delusion of persecution, Visual Hallucinations. In this study most of the delirium cases are from Medical intensive care unit, followed by cardiac ICU. Hyperactive subtype of delirium is most common diagnosis among referrals. Alcohol use (51 %), Tobacco use (49%), Diabetes (33%), Hypertension (29%), Chronic liver disease (20%), significantly predisposed ICU delirium. Anemia (44%), Hyponatremia (29%), raised levels of bilirubin (29%) and creatinine (16%), significantly precipitated ICU delirium. **Conclusion:** In the ICU, delirium is very common and is linked to extended stays. Screening and monitoring for predisposing and precipitating risk factors might considerably enhance the probability of diagnosis and intervention as ICU delirium is associated with severe morbidity and mortality.

894

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INTRODUCTION

A complicated neuropsychiatric condition known as delirium is defined by a worldwide but momentary impairment of consciousness, or "clouding of consciousness," which impairs cognitive performance and causes problems with orientation, alertness, attention, memory, and environmental awareness. It is thought to be caused by anatomical or physiological abnormalities that are impacting the brain and may even be reversible. The Latin words de (away, from) and lira (furrow, track) are the origin of the word delirium. Since delirium is seen as a medical emergency, it needs to be treated and controlled similarly.[1]

In the intensive care unit, delirium is a frequently disregarded sign of organ malfunction. It is frequently ignored and not brought up during rounds. This frequently occurs because the ICU staff believes that since the patient's primary illnesses are being treated, there is nothing that can be done to address delirium, or because it would make sense for a sedated patient to experience cognitive impairment. Furthermore, it appears that the patient "needs" the sedatives since they are too ill to move from their bed. The sedatives facilitate mechanical ventilation, but they also have a role in the development of delirium. Additionally, it's well knowledge that individuals who have been drugged for multiple days and nights can experience temporal and spatial disorientation.[2]

The fundamental approach to treating ICU delirium is addressing the underlying medical problem. Determining the etiology of delirium in intensive care unit (ICU) patients can be challenging due to their complicated and severe medical conditions and frequent usage of multiple drugs. In clinical practice, the primary care physician's comprehensive assessment of the patient typically reveals the fundamental cause of delirium. However, because they are more concerned with the treatment concerns in the ICU, doctors frequently neglect to evaluate the patient's mental state.[3]

Hyperactive subtype is most common subtype based on referrals to consultation liaison psychiatry, hypoactive subtype of delirium is most common among ICU patients and is associated with higher mortality rates.[4]

MATERIALS AND METHODS

The study was cross- sectional observational in design conducted in ICU patients, during 6 months study period (March2023 to August 2023), all the referrals to psychiatry department, from Respiratory, Cardiac, Medical, Surgical, Trauma ICUs, Emergency department, in view of behavioral changes were assessed and patients diagnosed with delirium were taken into consideration for study. The research proposal was approved by the Institute Ethics Committee and written and informed consent was taken from informants.

The following rating scales and questionnaires were administered:

Semi-structured proforma: Information regarding age, gender, and education, marital status, Socioeconomic status, duration of ICU stay, past history of psychiatric comorbidity, assessment of psychiatric symptoms.

The Confusion Assessment Method-Intensive Care Unit (CAM-ICU) scale was used to diagnose delirium, was specifically developed for use in ICU settings even ON mechanically ventilated patients, has a sensitivity of 95%–100%, specificity of 93%–98%, and inter-rater reliability of 0.79–0.95.

The Richmond Agitation–Sedation Scale (RASS) was used to identify the motor subtypes of delirium. It is a 10 point scale with scores ranging from +4 to −5. Hyperactive delirium is defined as a persistent rating of +1 to +4 during all assessments. Hypoactive delirium is defined as a persistent rating of 0 to −3 during all assessments and mixed subtype is defined as present when the patients have rating of both hyperactive and hypoactive values.

Risk factors were divided into predisposing and precipitating factors.

The predisposing factors studied included age, gender, education, preexisting cognitive impairment, and Alcohol use, baseline physical status (Charlson Comorbidity Index), past history of delirium, depression, tobacco use, sensory impairment, immobility, and tuberculosis.

Precipitating factors studied were anemia, hypoxia, fever, hypoalbuminemia, electrolyte imbalance, Hyperbilirubinemia and Elevated creatinine, mechanical ventilation, fractures, and medications such as anticholinergics, opiates, benzodiazepines, and steroids.

Preexisting medical comorbidity was assessed using the Charlson Comorbidity Index (CCI), which includes 22 conditions. The total score gives an indication of the comorbid medical burden.

Inclusion Criteria
- Persons aged 18 years and above, and
- Willing to consent (proxy).

Exclusion Criteria
- Comatose throughout their ICU stay,
- Severely aphasic interfering with assessment.

RESULTS

Out of the 165 consecutive ICU referrals, 90 patients (54.4%) diagnosed as delirium, with Mean Duration of ICU Stay 8.56. This study showed, Mean Age (56.72), with nearly one-fourth (23.64%) of the sample aged ≥65 years, gender (M=77%, F= 22%) and years of education was 5.96. [Table 1]

[Table 2] shows the socioeconomic status of study subjects.5% in upper and 25%in middle and 70% subjects belongs to lower socioeconomic status.

[Table 3] shows psychiatric illness of study subjects. 1 subject had schizophrenia, 1 had BPAD and number of subjects suffered with depression was 8.

The number of subjects admitted in medical ICU were35.5%, Cardiac ICU – 20%, Orthopedics ICU - 18.8%, Emergency medicine ICU – 15.5%, Surgical ICU 13.8% and critically ill cancerous patients were 6.6%. [Table 4]

In this study, major psychiatric symptoms of the patients in whom delirium was diagnosed are irritability, Agitation, Delusion of persecution, Visual Hallucinations. [Table 5]

[Table 6] shows predisposing risk factors. Patients had a use rate of 51% for alcohol, 49% for tobacco, 33% for diabetes, 29% for hypertension, 9% for depression, 2% for tuberculosis, and 1% for cognitive impairment.

[Table 7] shows precipitating risk factors 44% of patients had anemia, 29% had hyperbilirubinemia, 13% had fracture, 11% had hyperoxia, 7% had hyperglycemia, 4% had hypoglycemia, and 2% had hypocalcemia.

Table 1: Sociodemographic profile of study subjects

Sociodemographic Profile	
Age (in years), mean	56.72
Gender, n (%) Male Female	 77 % 22%
Education (years), mean	5.96

Table 2: Socioeconomic status of study subjects

Socioeconomic status	
UPPER	5%
MIDDLE	25%
LOWER	70%

Table 3: Past history of psychiatric illness of study subjects

Psychiatric illness	No of Subjects
Schizophrenia	1
BPAD	1
Anxiety	0
Depression	8

Table 4: Prevalence of delirium in various ICUS

Prevalence of delirium (%)	
Medical ICU	35.5%
Cardiac ICU	20%
Orthopedics ICU	18.8%
Emergency medicine ICU	15.5%
Surgical ICU	13.8%
Critically ill, cancerous patients	6.6%

Table 5: Psychiatric symptoms in study subjects

Psychiatric symptoms	n=64(100%)

Emotion
     Irritable
     Anxious
     Depressed
     Fearful
	
	 40(64%)
	 16(26.4%)
	 10(16%)
	 12(20%)

Behavior
     Agitation
     Self- Talking
     Aggression
	
	 19(30%)
	 23(36%)
	 5(8%)

Thought
     Delusion of persecution
     Delusion of grandeur
     Suicidal idea
	
	 32(51%)
	 4(5.9%)
	 2(2.9%)

Perception
     Visual hallucination
     Auditory hallucination
	
	 34(53.3%)
	 25(40%)

Table 6: Predisposing risk factors

Predisposing Factors	Percentage of patients
Alcohol use	51%
Tobacco use	49%
Diabetes	33%
Hypertension	29%
Chronic liver disease	20%
Past history of delirium	19%
Stroke	16%

Cellulitis	13%
Immobility	11%
Depression	9%
Congestive heart failure	4%
Sensory impairment	4%
Chronic obstructive pulmonary disease	4%
Cancer	4%
Coronary artery disease	4%
Tuberculosis	2%
Cognitive impairment	1%

Table 7: Precipitating risk factors

Precipitating factors	Percentage of patients
Anemia	44%
Hyperbilirubinemia	29%
Hyponatremia	29%
Creatinine	16%
Hypoalbuminemia	16%
Hypokalemia	13%
Fracture	13%
Hypoxia	11%
Fever	11%
Hyperglycemia	7%
Hyperkalemia	4%
ICU medication (anticholinergics, opiates, benzodiazepines, and steroids)	4%
Hypoglycemia	4%
Mechanical ventilation	2%
Hypocalcemia	2%

DISCUSSION

In this study, using the CAM-ICU, 90 patients (54.4%) were diagnosed to have developed delirium during their ICU stay. Akhilesh Sharma et al studied, Incidence and prevalence rate of delirium were 24.4% and 53.6% respectively. Indian studies in the ICU setting have reported prevalence rates ranging from 16% to 53.6%. [5-7]

This wide variation in rates could be due to the type of ICU setting (medical, postoperative, cardiac ICU), instruments used (CAM-ICU versus others), and hospital setting (tertiary care referral centers tend to get more severe cases).[8]

In this study, mean duration of ICU stay in patients who developed delirium is 8.5 days. In Akhilesh Sharma et al study, the median duration of RICU stay of patients who developed delirium was 7.9 days.[5]

Hyperactive subtype (69.4%) is most common, while hypoactive subtype constituted 16.4% in this study. Hyperactive delirious states have been the predominant subtype based on referrals to Consultation Liaison psychiatry in a study by Sandeep Gover et al. [4] Hypoactive delirious states have been the predominant subtype in ICU settings in previous studies. This is primarily due to the very nature of hypoactive delirium difficult to draw the attention of the ICU staff.[9]

In this study major psychiatric symptoms of the patients in whom delirium was diagnosed are, irritability, Agitation, Delusion of persecution, Visual Hallucinations. In SHU-CHI HUANG et al study, the most common psychotic symptoms found in delirious patients was behavioural problems, particularly agitation and bizarre behaviour, Delusion of persecution, Visual hallucinations.[10]

Among predisposing risk factors, Alcohol use (51%) was most common risk factor for delirium in this study. Lahariya et al. study too found such an association. Evidence from alcohol withdrawal delirium suggests that a kindling mechanism might explain this vulnerability.[6]

Chronic exposure to high doses of alcohol results in compensatory reduction in GABA-A receptors response to GABA, i.e., the down regulation of GABA receptors. On the other hand, there is an up regulation of NMDA neuro receptors during heavy exposure to alcohol.[11] Thus, with a preexisting destabilized neurotransmitter system in this group of patients, an abrupt cessation of alcohol leads to a burst of NMDA activity which increases the hyper excitable state many times producing withdrawal fits or delirium.[12]

We also found nicotine use (49%) as a significant modifiable risk factor for delirium in ICU patients. In a systematic review, by Hshieh TT et al, nicotine use was independently associated with delirium and showed a dose-response relationship. Pathophysiologically, both delirium and nicotine withdrawal (during hospitalization) are associated with cholinergic deficiency.[13]

The hallmark of neuro-adaptation to nicotine is due to up regulation of nicotinic acetylcholine receptors, possibly due to nicotine- induced desensitization. Abrupt cessation of smoking may create an imbalance in neurotransmission particularly related to acetylcholine and dopamine, both of which have been hypothetically linked to neurotransmitter hypothesis of delirium.[14]

Results support the view that chronic liver disease (CLD) (20%) is significantly associated with the

897

development of ICU delirium which is in par with systemic review by Zaal IJ et al. [15]

History of depression (9%), did not significantly predict ICU delirium in this study. A systematic review by O'Sullivan et al. found 17 studies which reported that depression conferred a 1.3–9-fold increased risk for delirium.[16] However, the authors also note that these studies were predominantly in the geriatric population in postoperative surgical settings where the confounding effect of shared risk factors in the form of physical and psychological vulnerabilities conferred by cognitive impairment and frailty have not been accounted for.[17]

Among the precipitating risk factors for delirium, Anemia, increased bilirubin, creatinine, hyponatremia, fever, were significantly precipated the ICU delirium in this study, supportive of these are:

Anemia (44%) is the most common precipitating factor in this study. similarlyIt is considered as an independent risk factor for development of delirium in ICU patients in Joosten E, et al study.[18]

Hyperbilirubinemia (29%) is the 2nd common precipitating factor in this study, similarly Aldemir M et al study, considered hyperbilirubinemia has been shown to precipitate delirium in the ICU. Hepatic encephalopathy, leads to portosystemic shunting of toxic metabolites, primarily ammonia, which overwhelms the blood–brain barrier precipitating delirium.[19]

Increased creatinine (16%) is another precipitating factor in this study similar to Siew ED et al showed renal damage can lead to inflammation in the brain; reduce the clearance of medications, metabolites, or other potential neurotoxins all of which can potentially precipitate delirium.[20]

Dyselectrolytemia is another precipitating factor in this study similar to In van der Mast RC et al study, a disturbance in sodium or potassium levels is usually associated with a disorder of body fluids, including hypotonic or hyperosmotic dehydration and microcirculation disorders, leading to symptoms of delirium.[21]

CONCLUSION

Delirium is highly prevalent in the ICU setting and is associated with longer ICU stay. Delirium, especially the hyperactive subtype is a frequent referral in ICU patients, and associated with Alcohol and tobacco use. To reduce the impact of delirium on patients, caregivers, and hospital services, it is important to identify the patients with delirium as early as possible. Screening and monitoring for predisposing and precipitating risk factors can greatly improve the odds of detection and intervention as ICU delirium is associated with significant morbidity and mortality.

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898