Annals of Medicine and Medical Sciences (AMMS)
Volume 04, 2025, *Page No.: 120 to 128*
Available at: *http://ammspub.com*

Original Article

OPEN ACCESS

Acute Confusional State in Elderly: Prognostic factors and Outcome

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Abstract

Objective: The study aimed to evaluate the prognostic factors and clinical outcomes of Acute Confusional State (ACS) in elderly patients, focusing on predisposing and precipitating factors, cognitive impairment, and mortality rates. ***Design:*** A prospective observational study was conducted over 18 months at a tertiary care hospital in Maharashtra. ***Subjects/Patients:*** A total of 100 patients aged ≥60 years admitted with ACS in the male and female medical wards. Patients with ACS due to psychiatric illness or trauma were excluded. ***Methods:*** Patients meeting the inclusion criteria were assessed using the Mini-Mental State Examination (MMSE) and analyzed for predisposing (age, dementia, comorbidities) and precipitating factors (metabolic disturbances, infections, hypoxia). Data collection included demographics, medical history, systemic examination, and laboratory investigations. Statistical analysis was performed using SPSS software. ***Results:*** The most common predisposing factors were hypertension (59%), diabetes (47%), and dementia (9%). Metabolic disturbances (49%) and hypoxia (37%) were the leading precipitating factors. ICU admission was required in 74% of cases. The mortality rate was 33%, with 67% of patients discharged. ***Conclusion:*** ACS in the elderly is associated with high morbidity and mortality, emphasizing the need for early identification and targeted management of risk factors to improve clinical outcomes.

Keywords: ***Acute Confusional State, Delirium, Mini-Mental State Examination***

Introduction

Delirium, also referred to as Acute Confusional State (ACS), is a sudden decline in cognitive function that deviates from a person's previous mental baseline. It is characterized by disturbances in attention, disorganized thinking, disorientation, fluctuating levels of awareness, and an altered state of consciousness, typically developing over a short period, often within a week. ACS is a syndrome that includes impairments in cognition, awareness, and attention, along with a reduced ability to recognize one's surroundings and confusion regarding time, place, or identity. Additional neurological symptoms may also be present, such as psychomotor changes (hyperactive, hypoactive, or mixed states), disturbances in sleep patterns, emotional instability, and perceptual disturbances like hallucinations or delusions, although these are not essential for diagnosis. ACS is triggered by an acute organic process, meaning a structural, functional, or chemical disruption in the brain, often resulting from conditions affecting overall health. Common causes include infections, hypoxia, medication side effects, drug withdrawal, excessive alcohol intake, malnutrition, or unmanaged pain. It is distinct from psychiatric disorders like schizophrenia or bipolar disorder, which do not meet the criteria for ACS. Diagnosing

Received: February 19, 2025; **Revised:** March 24, 2025; **Accepted:** April 05, 2025

ACS requires an understanding of a person's usual mental function, as its symptoms may overlap with psychiatric conditions such as depression, psychosis, or dementia. It can also manifest in individuals with pre-existing mental illnesses, intellectual disabilities, or dementia without being directly caused by these conditions.

Management of ACS involves addressing the underlying cause, often requiring a multidisciplinary approach for optimal patient outcomes. In some cases, temporary symptomatic treatments may be necessary to provide comfort or facilitate medical interventions, such as preventing the removal of life-supporting devices. The use of antipsychotics is not recommended for either treatment or prevention of ACS in hospitalized patients. However, when ACS results from alcohol or sedative withdrawal, benzodiazepines are the preferred treatment. ACS is prevalent in hospitalized patients, affecting approximately 14-24% of admissions. In the general population, it occurs in about 1-2%, but its prevalence rises with age, reaching 14% in individuals over 85. Among elderly patients, ACS is reported in 15-53% of post-surgical cases, 70-87% of ICU patients, and up to 60% of individuals in nursing homes or post-acute care facilities. Furthermore, critically ill patients who develop ACS face an increased risk of mortality within the following year. At our hospital, we frequently encounter elderly patients exhibiting ACS. To enhance patient outcomes, we aim to conduct a study focusing on its various causes, diagnostic approaches, and clinical outcomes in the elderly population admitted to our facility.

Materials and Methods

This is a prospective observational study in which a total of 100 patients aged more than or equal to 60 years admitted in male and female medical wards of a tertiary centre with acute confusional state, who were willing to participate were included. The study was spread over a period of 18 months in a tertiary care hospital in Maharashtra. Approval was sought from the Institutional Ethics Committee. The inclusion criteria was 1) Age more than or equal to 60 years and 2) Acute Confusion within 7 days of various illnesses. The exclusion criteria was 1) ACS due to proven psychiatric illness and 2) ACS due to trauma. This was a prospective evaluation of around 100 Elderly patients more than equal to 60 years of age with features of acute confusional state. All patients with symptoms suggestive of delirium were screened after inclusion and exclusion criteria. Patients with definitive delirium were assessed by Mini Mental State Examination or MMSE and analyzed for various predisposing factors, precipitating factors and by clinical criteria.

Patient data, including age, sex, education level, caregiver details, and address, were gathered from both patients and their caregivers. Since obtaining history from confused or uncooperative patients can be challenging, information was primarily collected from caregivers, family members, and past medical records. The present history assessment included basic activities of daily living, while past history covered cognitive status, psychiatric illnesses, medication use, and any visual or hearing impairment, as reported by caregivers and medical records. Additionally, personal history regarding smoking, alcohol consumption, and bowel and bladder habits was documented. A comprehensive general examination was conducted, assessing hydration status, skin condition, and vital signs. Systemic examinations were performed for all patients. Prior cognitive status was determined based on patient history. The presence of medical devices such as Foley's catheters and Ryle's tubes was also noted. Standard diagnostic tests performed for all patients included a complete blood count, electrolyte levels, blood glucose levels, renal and liver function tests, urine analysis, and electrocardiograms. Additional specialized investigations, conducted when clinically indicated, included thyroid function tests, serum ammonia levels, vitamin B12 levels, blood and urine cultures, neuroimaging, chest X-rays, lumbar punctures, and arterial blood gas analysis. Patients received appropriate treatment based on their diagnoses. The analysis examined age and sex distribution, along with risk factors, including both predisposing and precipitating factors. Data entry was carried out using Microsoft Excel (Windows 7, Version 2007), and statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) software (version 22.0; SPSS Inc., Chicago). Descriptive statistics, including mean and standard deviation (SD) for continuous variables and frequencies and percentages for categorical variables, were calculated. A paired t-test was employed to compare quantitative variables from the first to the third week. Data visualization was achieved using bar and pie charts. The significance level was set at 0.05.

Results

In our study of delirious patients, individuals aged 60-69 years made up 44% of the study population, while those aged 70-79 years comprised approximately 39%. Patients aged 80 years and above accounted for 17% of the total participants. Mild cognitive impairment and dementia was present in about 9% of the study population. Functional impairment and disability affected nearly 30% of patients, while special sensory impairments were observed in around 20%. Additionally, a history of alcohol abuse was recorded in 22% of cases, and prior episodes of delirium were noted in 10% of the participants.

Elderly patients often have multiple medical comorbidities, which are significant risk factors for delirium. In our study, 86% of participants had at least one comorbidity. Among these, systemic hypertension was the most prevalent, affecting 59% of patients, followed by diabetes mellitus at 47%. Chronic kidney disease was present in 23% of cases. Cerebrovascular accidents and coronary artery disease were each observed in 20% of the study population. Chronic obstructive pulmonary disease and malignancies were found in 8% of cases each. Additionally, 5% of patients had congestive heart failure or chronic liver disease.

Metabolic disturbances emerged as the leading precipitating factor for delirium in this study, contributing to 49% of cases. Hypoxia was the second most common factor, affecting 37% of patients. Infections accounted for approximately 29% of cases, while dehydration was identified in 9%. Medications were a contributing factor in 9% of patients.

Among the infections, respiratory infections were the most frequently observed, making up 28% of the cases. Urinary tract infections accounted for 19%, while skin and subcutaneous infections comprised 11% of all infections. Hyponatremia was the most prevalent metabolic disturbance, affecting 28% of patients. Uremia was the second most common, observed in 23% of cases. Other metabolic imbalances included hyperglycemia (8%), hypoglycemia (6%), hypernatremia (3%), and hypercalcemia (1%). In this study, fifty-five percent of the patients had mild cognitive impairment; 43% had severe cognitive impairment whereas 1.5 percent had no cognitive impairment. Due to poor general condition, MMSE score could not be evaluated in thirty-three percent of the patients. Fifty-five percent of the patients had mild cognitive impairment, twenty percent had no cognitive impairment and only ten percent had severe cognitive impairment at discharge. The MMSE Score at discharge could not be evaluated in thirty-three

percent of the patients due to poor condition and or death of the patients.

In our study, the most common (17%) cause of delirium was found to be uremic encephalopathy followed by sepsis and hyponatremia which constitute 16% each. 13% of the patients had dementia and 12% had community acquired pneumonia. Cerebrovascular accidents include 8% whereas malignancy includes 6% of the study population. 6 % of the patients had carbon dioxide narcosis and 5% had hypoglycemic encephalopathy. Diabetic ketoacidosis, hepatic encephalopathy and hypothyroidism constitute 4 % each. 3% of the patients had hypernatremia and hyperosmolar nonketotic coma. Remaining 1% of the patients had alcohol withdrawal, COVID-19 encephalopathy, dengue shock syndrome and hypoxic encephalopathy each.

In our study out of 100 patients, 74 % of the patients required ICU admission. Out of 100, only sixty-seven percent of the patients got discharged. In the study group of 100 patients, thirty-three percent of the patients expired. Out of 13 patients of dementia, 4 patients required ICU admission. 12 patients got discharged and 1 patient expired. 1 patient of dengue shock syndrome was included in the study group and the patient got discharged. Out of 4 patients of hepatic encephalopathy, 2 patients required ICU admission. 3 patients got discharged and 1 patient expired. Out of 6 patients of carbon dioxide narcosis, all 6 patients required ICU admission. All patients got discharged and none expired. 1 patient of COVID-19 encephalopathy was included in the study group and the patient got discharged. Out of 12 patients in the community acquired pneumonia, 10 patients required ICU admission. 9 patients got discharged and 3 patients expired. Out of 4 patients of diabetic ketoacidosis, all 4 patients required ICU admission. 2 patients got discharged and 2 patients expired. Out of 7 patients of malignancy, all 7 patients required ICU admission. Only 1 patient got discharged and the remaining 6 patients expired. All 3 patients of hyperosmolar non ketotic coma required ICU admission and all 3 patients expired. Out of 5 patients of hypoglycemic encephalopathy, 3 patients required ICU admission. 3 patients got discharged and 2 patients expired. Out of 16 patients of hyponatremia, 11 patients required ICU admission. 11 patients got discharged and 5 patients expired. 1 patient of hypoxic encephalopathy was included in the study group and the patient got discharged. Out of 5 patients of hypoglycemic encephalopathy, 3 patients required ICU admission. 3 patients got discharged and 2 patients expired. All the 3 patients of hypernatremia required ICU admission and all 3 expired. Out of 8 patients of cerebrovascular accident, 7 patients required ICU admission. 2 patients got discharged and 6 patients expired. Out of 16 patients of sepsis, 15 patients required ICU admission.11 patients got discharged and 5 patients expired. Out of 17 patients of uremic encephalopathy, 14 patients required ICU admission. 10 patients got discharged and 7 patients expired. 1 patient of alcohol withdrawal was included in the study group and the patient got discharged.

Table 1: Number of patients and percentage of patients in each of the age distribution of patients out of a total of 101.

Age group	Number of patients	Percentage (%)
60 - 69 years	44	44.00%
70 - 79 years	39	39.00%
>= 80 years	17	17.00%
Total	100	100.00%

Table 2: Number of patients and percentage of patients in each of the sex wise distribution of patients out of a total of 101.

Sex	Number of patients	Percentage (%)
Male	61	61.00%
Female	39	39.00%
Total	100	100.00%

Table 3: Number of patients and percentage of patients in each of the predisposing factors for delirium

Predisposing Factors		Number	Percentage (%)
Cognitive impairment including dementia	Yes	9	9
	No	91	91
Functional impairment & disability	Yes	30	30
	No	70	70
Vision/hearing impairment	Yes	20	20
	No	80	80
Past history of delirium	Yes	10	10
	No	90	90
History of alcohol abuse	Yes	22	22
	No	78	78
Medical Comorbidities	Yes	86	86
	No	14	14

Table 4: Number of patients and percentage of patients in each of the medical comorbidities for delirium

Comorbidities		Number	Percentage (%)
Diabetes Mellitus	Yes	47	47.00%
	No	53	53.00%
Hypertension	Yes	59	59%
	No	41	41%
Coronary artery disease	Yes	20	20%
	No	80	80%

Cerebrovascular Vascular Accident	Yes	20	20%
	No	80	80%
Chronic Kidney Disease	Yes	23	23%
	No	77	77%
Congestive Cardiac Failure	Yes	5	5%
	No	95	95%
Chronic Obstructive Pulmonary Disease	Yes	8	8%
	No	92	92%
Chronic Liver Disease	Yes	7	7%
	No	93	93%
Malignancy	Yes	8	8%
	No	92	92%

Table 5: Number of patients and percentage of patients in each of the precipitating factors for delirium

Precipitating factors		**Number of patients**	**Percentage (%)**
Drugs	Yes	9	9%
	No	91	91%
Hypoxia & Pulmonary Compromise	Yes	37	37%
	No	63	63%
Major surgery	Yes	0	0%
	No	100	100%
Dehydration	Yes	9	9%
	No	91	91%
Metabolic/Endocrine	Yes	49	49%
	No	51	51%
Infections	Yes	29	29%
	No	71	71%

Table 6: Number of patients and percentage of patients in each of the infectious precipitating factors for delirium

Infection		**Number of patients**	**Percentage (%)**
Respiratory	Yes	28	28.00%
	No	72	72%
Urinary Tract Infection	Yes	11	11%
	No	89	89%
Skin/Subcutaneous	Yes	19	19%
	No	81	81%

Table 7: Number of patients and percentage of patients in each of the metabolic/endocrine derangement

Metabolic/Endocrine precipitating factors		**Number of patients**	**Percentage (%)**
Hypoglycemia	Yes	6	6%
	No	94	94%
Hyperglycemia	Yes	8	8%
	No	92	92%
Hyponatremia	Yes	28	28%
	No	72	72%
Hypernatremia	Yes	3	3%
	No	97	97%
Hypercalcemia	Yes	1	1%
	No	99	99%
Uremia	Yes	23	23%
	No	77	77%

Table 8: Number of patients and percentage of patients in each category based on MMSE score on admission

MMSE Score on admission	**Number of patients**	**Percentage (%)**
Severe cognitive impairment	29	43.30%
Mild cognitive impairment	37	55.20%
No cognitive impairment	1	1.50%
Total	67	100%

Table 9: Number of patients and percentage of patients in each category based on MMSE score on discharge

MMSE score on discharge	Number of patients	Percentage
Severe cognitive impairment	10	14.90%
Mild cognitive impairment	37	55.20%
No cognitive impairment	20	29.90%
Total	67	100%

Table 10: Distribution of patients and percentage according to their clinical diagnoses

Diagnosis	Total	Percentage (%)
Dementia	13	13%
Alcohol withdrawal	1	1%
Hepatic encephalopathy	4	4%
CO2 narcosis	6	6%
Community acquired pneumonia	12	12%
Diabetic Ketoacidosis	4	4%
COVID encephalopathy	1	1%
Dengue shock syndrome	1	1%
Malignancy	7	7%
Hyperosmolar nonketotic coma	3	3%
Hypoglycemic encephalopathy	5	5%
Hyponatremia	16	16%
Hypothyroidism	4	4%
Hypoxic encephalopathy	1	1%
Hypernatremia	3	3%
Intracranial bleed	8	8%
Sepsis	16	16%
Uremic encephalopathy	17	17%

Table 11: Number of patients and percentage of patients admitted in the ICU

ICU admission	Number of patients	Percentage (%)
Yes	74	74%
No	26	26%
Total	100	100%

Table 12: Number of patients and percentage of patients discharged

Discharged	Number of patients	Percentage (%)
Yes	67	67%
No	33	33%
Total	100	100%

Table 13: Number of patients and percentage of patients that expired

Mortality	Number of patients	Percentage (%)
Yes	33	33%
No	67	67%
Total	100	100%

Table 14: Clinical diagnoses and outcome of the patients (requirement of ICU, discharge and mortality)

Diagnosis	ICU required		Discharged		Mortality		Total
	Yes	No	Yes	No	Yes	No	
Dementia	4	9	12	1	1	12	13
Alcohol withdrawal	0	1	1	0	0	1	1
Hepatic encephalopathy	2	2	3	1	1	3	4
CO2 narcosis	6	0	6	0	0	6	6
Community acquired pneumonia	10	2	9	3	3	9	12
Diabetic Ketoacidosis	4	0	2	2	2	2	4
COVID encephalopathy	1	0	1	0	0	1	1
Dengue shock syndrome	1	0	1	0	0	1	1
Malignancy	7	0	1	6	6	1	7
Hyperosmolar nonketotic coma	3	0	0	3	3	0	3
Hypoglycemic encephalopathy	3	2	3	2	2	3	5

Hyponatremia	11	5	11	5	5	11	16
Hypothyroidism	3	1	3	1	1	3	4
Hypoxic encephalopathy	1	0	0	1	1	0	1
Hypernatremia	3	0	0	3	3	0	3
Intracranial bleed	7	1	2	6	6	2	8
Sepsis	15	1	11	5	5	11	16
Uremic encephalopathy	14	3	10	7	7	10	17

Table 15: Correlation of various variables in the study with dementia

Variable	Dementia		p value	Odds ratio
	Yes	No		
ICU required				
Yes	4	70	0.000**	0.108
No	9	17		
Discharge				
Yes	12	54	0.032*	7.333
No	1	33		
Mortality				
Yes	1	32	0.037	0.143
No	12	55		
MMSE Score at Discharge				
Severe cognitive impairment	3	7	0.032*	-
Mild cognitive impairment	10	27		
No cognitive impairment	0	20		
Chronic liver disease				
Yes	3	4	0.015*	6.225
No	10	83		
Hyponatremia				
Yes	0	28	0.016**	-
No	13	59		
Uremia				
Yes	0	23	0.035*	-
No	13	64		

Discussion

This study aims to assess the prognostic factors and outcomes of delirium, a common condition among hospitalized elderly patients. Research conducted by Fortini *et al.* [1] established a significant correlation between male gender and delirium, reporting an odds ratio of 2.187. Similarly, Inouye *et al.* [2] identified male sex as a key predisposing factor. Additional studies, including those by Nagese *et al.* [3] and Kim *et al.* [4], also reported a higher incidence of delirium in males. In alignment with these findings, our study observed a notable sex disparity, with a difference of approximately 22% between male and female patients. Advancing age is recognized as a crucial predisposing factor for delirium, particularly in individuals over 65. Patients hospitalized for more than five days in medical wards are at a significantly higher risk. The prevalence of delirium within the general population increases with age, reaching approximately 14% among those aged 85 and above. An Indian study similarly identified advanced age as a risk factor for delirium in intensive care unit (ICU) patients. In this study, individuals aged 60-69 years accounted for 44% of the total study group, surpassing the proportions seen in the 70-79 and 80+ age groups. Many epidemiological studies are conducted in high-income countries where life expectancy is greater than in our region, where it was recorded at 68.56 years in 2016. This discrepancy in life expectancy, along with social determinants such as healthcare accessibility, hospital referrals, and logistical challenges in seeking medical care, influences the age distribution observed in our study.

Dementia and cognitive impairment have been extensively validated as predisposing factors for delirium, with previous studies reporting relative risks ranging from 2.3 to 4.7 for dementia and 2.1 to 2.8 for cognitive impairment. The prevalence of delirium in dementia patients varies widely between 22% and 89%. In our study, delirium was observed in approximately 9% of elderly individuals with dementia or cognitive impairment, predominantly affecting those aged 60-74. Due to the cross-sectional nature of this study, data on dementia and cognitive decline were primarily gathered from caregivers' accounts and past medical records. Functional impairment and disability are among the most significant risk factors at the time of hospital admission, with a relative risk of 4.0. In our study, nearly 30% of participants exhibited functional impairments, a statistically significant finding. Elie *et al.* [5] highlighted visual and hearing impairments as additional risk factors for delirium, with odds ratios of 1.9 and 1.7, respectively. In our study, special sensory impairments were noted in 20% of patients. A prior history of delirium is another key predisposing factor, carrying an odds ratio of 4.1. Our findings indicate that 10% of patients had previously experienced delirium. Additionally, alcohol misuse is consistently recognized as a risk factor, with a reported risk ratio of 5.7. Elie *et al.* [5] similarly documented alcohol abuse as a significant contributor, with an odds ratio of 3.3. Consuming more than three units of alcohol daily has been associated with an increased likelihood of delirium (OR 3.23). In our study, 22% of patients had a history of alcohol abuse, a statistically significant finding (p-value = 0.015, OR = 6.225).

The presence of severe medical conditions or multiple comorbidities significantly raises the risk of delirium, with a risk ratio of 3.5. A greater burden of chronic illness, particularly conditions such as hypertension and stroke, is associated with a higher likelihood of developing delirium across various populations. In our study, comorbid conditions were present in 86% of participants. Stroke and hypertension have been identified as notable risk factors for delirium, particularly in surgical patients. Lee *et al.* [6] emphasized the role of hypertension as a significant risk factor in medical patients, a finding consistent with our study, where systemic hypertension emerged as the most common comorbidity, followed by diabetes. Additionally, cerebrovascular accidents were observed as a predisposing factor in 20% of patients.

In hospitalized medical patients, key contributors to delirium include polypharmacy, the use of psychoactive medications, and the application of physical restraints, which have been linked to a risk increase of up to 4.5 times. In this study, medications were identified as a contributing factor to delirium in 9% of cases. Delirium associated with sepsis is the most prevalent form of delirium observed in ICU patients, affecting nearly half of those diagnosed with sepsis. Infection serves as a major precipitating factor for delirium, carrying a relative risk of 3.1. Within this study, sepsis was found in 29% of patients, acting as a key trigger for delirium. Among infection-related cases, individuals aged 60-69 and males were more frequently affected. Respiratory infections emerged as the leading infectious cause, followed by urinary tract infections and skin and subcutaneous infections. A study conducted by Jayaswal *et al.* [7] determined that hypoxia (SaO2 <90%) is a significant contributing factor to delirium (p = 0.007). In the early stages, cerebral hypoxia typically presents as either hypoactive or mixed-type delirium. Hypoxia and pulmonary dysfunction were found to be major risk factors in 37% of cases in this study. Dehydration, recognized as both a predisposing and precipitating factor, was present in 26.4% of delirium cases in a previous study. In this research, dehydration was identified as a contributing factor in 9% of patients. Vascular events including conditions such as stroke, myocardial infarction, critical limb ischemia, pulmonary embolism, heart failure, and arterial embolism were reported in 37.9% of patients in a separate study. In this study, vascular events were responsible for delirium in 20% of cases, with stroke being the most frequent underlying cause. Toxic etiologies, such as medication side effects and substance withdrawal (including alcohol withdrawal), accounted for delirium in 22% of patients. Metabolic imbalances also played a significant role in delirium onset, contributing to 43.7% of cases. Electrolyte and fluid imbalances were detected in 36.5% of patients during initial assessment and increased to 45.7% at the final assessment, as reported by Magny *et al.* [8]. Elevated serum urea has been identified as a critical trigger, carrying a relative risk of 5.1. In this study, uremia was the most frequently observed metabolic precipitant (17%), a statistically significant finding (p-value = 0.035). Hyponatremia followed closely, affecting 16% of patients, with statistical significance (p-value = 0.016).

To determine patient outcomes, all medical ward admissions were screened using the Mini-Mental State Examination (MMSE) on admission and at discharge. Of 100 patients, 66% scored less than 24, indicating cognitive impairment. 67% of patients in the study group survived to discharge. There was an improvement in 19% of the patients in their MMSE scores at discharge, and 20% of the patients improved with no cognitive impairment. In the study by Melissa K. Andrew *et al.* [9], mortality was 30%. The adjusted relative risk of death was 1.80, as per a study by K. Rockwood *et al.* [10]. In our study, mortality was 33%, and 67% of patients were discharged, which is statistically significant (p-value of 0.032). Brianna K. Rosgen *et al.* [11] found that 10% of patients required ICU admission. In our study, 26% of patients required ICU admission, 67% were discharged, and mortality was 33%.

Yoshimura *et al.* [12] in their study found 21% had hepatic encephalopathy as cause of delirium (65). In our study, 4 patients had hepatic encephalopathy as a cause of delirium. Amongst them, 2 (50%) patients required ICU admission, 3 (75%) patients got discharged and 1 (25%) patient expired. Jäckel *et al.* [13] found 41% of patients had uremia in their study. In our study, 16% of the patients had uremic encephalopathy (66). The number of patients admitted in ICU as dementia being the cause of delirium was 4 (4%) which is statistically significant (p value of <0.05 with odd's ratio of 0.108). Out of 13 patients of dementia, 12 (92%) got discharged which is statistically significant (p value of 0.032 with odd's ratio of 7.333) and 1 (8%) patient expired which is statistically significant (p value of 0.037 with odd's ratio of 0.143). 1% of the study population had dengue shock syndrome who got discharged. Out of 6 patients of carbon dioxide narcosis, all 6 patients required ICU admission. All patients got discharged and none expired. 1 patient of COVID-19 encephalopathy was included in the study group and the patient got discharged. Out of 12 patients of community-acquired pneumonia, 10 patients required ICU admission. 9 patients got discharged and 3 patients expired. In the study by Kuswardhani *et al*. [14], 33% of the patients had delirium due to pneumonia (67). Out of 16 patients of hyponatremia, 11 patients required ICU admission. 11 patients got discharged and 5 patients expired. Miller *et al* in their study found that 18% of the elderly (age > 60 years) had hyponatremia as cause of delirium (68). Out of 4 patients of diabetic ketoacidosis, all 4 patients required ICU admission. 2 patients got discharged and 2 patients expired. Out of 7 patients of malignancy, all 7 patients required ICU admission. Only 1 patient got discharged and the remaining 6 patients expired. All 3 patients of hyperosmolar non-ketotic coma required ICU admission and all 3 patients expired. Out of 5 patients of hypoglycemic encephalopathy, 3 patients required ICU admission. 3 patients got discharged and 2 patients expired. 1 patient of hypoxic encephalopathy was included in the study group and the patient got discharged. Out of 5 patients of hypoglycemic encephalopathy, 3 patients required ICU admission. 3 patients got discharged and 2 patients expired. All the 3 patients of hypernatremia required ICU admission and all 3 expired. Out of 8 patients of cerebrovascular accident, 7 patients required ICU admission. 2 patients got discharged and 6 patients expired. Out of 16 patients of sepsis, 15 patients required ICU admission. 11 patients got discharged and 5 patients expired. 1 patient of alcohol withdrawal was included in the study group and the patient got discharged.

Conclusion

In this study, the majority of the participants were male and predominantly fell within the 60-69 age range. Delirium is often the result of multiple contributing factors, with both predisposing and precipitating elements playing a role. Among predisposing factors, underlying medical comorbidities were the most frequently observed, followed by functional impairment and alcohol use. Systemic hypertension emerged as the most common predisposing medical condition linked to delirium, followed by diabetes mellitus, chronic kidney disease, coronary artery disease, and cerebrovascular events. Cognitive impairment was less prevalent as a predisposing factor in this study. However, functional impairment and special sensory deficits, including vision and hearing impairments, were consistently observed across all age groups and demonstrated statistical significance. A history of alcohol abuse was present in

both sexes but was more prevalent in males, where it was identified as a statistically significant risk factor. Metabolic disturbances were the most frequently observed precipitating factor for delirium in this study, followed by hypoxia and pulmonary dysfunction. Among metabolic causes, uremia was the leading precipitant, followed by hyponatremia. The role of medications—such as psychoactive drugs, sedative-hypnotics, and polypharmacy was less pronounced as a contributing factor in this study. Respiratory and urinary tract infections accounted for nearly two-thirds of infection-related cases. Additionally, vascular events were identified in one-fifth of patients, with cerebrovascular accidents being the most prevalent, followed by acute coronary syndrome. Toxic factors, including substance withdrawal and alcohol withdrawal, were found to be significant contributors to delirium in both sexes. The Mini-Mental State Examination (MMSE) score correlated strongly with patient outcomes. The majority of study participants fell into the mild cognitive impairment category, followed by those with severe impairment. At discharge, an improvement in MMSE scores was noted in 19% of patients, and 20% of patients showed no residual cognitive impairment. In this study, 26% of patients required ICU admission, 67% were discharged, and the overall mortality rate was 33%. Among those requiring ICU care, the most common causes were uremic encephalopathy, hyponatremia, and sepsis. Patients with dementia as an underlying condition had better outcomes at discharge, followed by those with hyponatremia and sepsis. Mortality was highest among patients with uremic encephalopathy, followed by those who had suffered cerebrovascular accidents and malignancies.

Declarations

Human Subjects

Consent for treatment and open access publication was obtained or waived by all participants in this study. Lokmanya Tilak Municipal Medical College and General Hospital issued approval EC/96/2021. The IEC-II hereby approves the proposal entitled Protocol version no. 1.4 "ACUTE CONFUSIONAL STATE IN ELDERLY: PROGNOSTIC FACTORS AND OUTCOME".

Animal Subjects

All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of Interest

None

Funding Statement

All authors have declared that no financial support was received from any organization for the submitted work.

Financial Relationships

All authors have declared that they have no financial relationships at present or within the previous three years 9 of 10 with any organizations that might have an interest in the submitted work.

Other Relationships

All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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