Print ISSN: 2321-6379
Online ISSN: 2321-595X
DOI: 10.17354/ijss/2018/217

Original Article

Prevalence and Etiological Profile of Patients with Acute Confusional State

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Abstract

Background: Confusion is a mental and behavioral state of reduced comprehension, coherence, and capacity to reason. Confused patient is usually subdued, not inclined to speak, and is physically inactive. A state of confusion that is accompanied by agitation, hallucination, tremor, and illusions (misperception of environmental sight and sound/touch) is termed delirium, as typified by delirium tremens from alcohol or drug withdrawal.

Objective: The objective of the study was to study the prevalence and etiological profile of patients with the acute confusional state.

Materials and Methods: All patients of acute confusional state admitted in the emergency wing of the Postgraduate Department of Medicine, Government Medical College, Srinagar, were enrolled prospectively in the study. Informed consent was taken from the attendants of the patients for participation in the study. A proper history was taken from attendants and other available sources. A thorough general physical and systemic examination was done.

Results: Prevalence of acute confusional state in total hospital admission in medical wards was 19.7%. Most of the patients were in the 6th decade of life. A good number of patients 74.2% received the correct working diagnosis assessment (history and examination). 71% of patients presented within 24 h of onset of acute confusional state.

Conclusion: This study emphasized the great importance of early accurate diagnosis of acute confusional state, as correct diagnosis can lead to judicious management and save many valuable lives.

Key words: Behavioral state, Confusional state, Hallucination, Mental

INTRODUCTION

Acute confusional state, synonyms: Acute brain failure, acute organic reaction, delirium, and post-operative psychosis are defined as a transient disorder of cognition and attention accompanied by disturbances of the sleep-wake cycle and psychomotor behavior.[1] Confusion is a mental and behavioral state of reduced comprehension, coherence, and capacity to reason. Confused patient is usually subdued, not inclined to speak, and is physically inactive. A state of confusion that is accompanied by agitation, hallucination, tremor, and illusions (misperception of environmental sight and sound/touch) is termed delirium, as typified by delirium tremens from alcohol or drug withdrawal. States of reduced alertness and responsiveness represent a continuum that in its severest form is called coma, a deep sleep-like state from which patient cannot be aroused.[1] Acute brain failure, acute organic reaction, delirium, and post-operative psychosis are defined as a transient disorder of cognition and attention accompanied by disturbances of the sleep-wake cycle and psychomotor behavior.[2] Delirious patients are distractible, often hypersensitive to stimuli, and they cannot prioritize important from irrelevant environmental sounds or sights. Today, it is still the most common mental health issue for the elderly, affecting 14–56% of elderly hospitalized medical patients and 6–24% of nursing home patients.[3-5]

Access this article online

www.ijss-sn.com

Month of Submission : 06-2018
Month of Peer Review : 07-2018
Month of Acceptance : 08-2018
Month of Publishing : 08-2018

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It is very common, especially in the elderly and many of these patients subsequently do not return to their baseline function, and some even require institutionalization. It can occur acutely or subacutely, and symptoms fluctuate. In to 1–3rd of cases, acute confusional state can be avoided, and the lack of awareness leads to a large amount of morbidity and mortality and a burden on NHS costs in the west.[6] The role of medications may be suggested by a temporal relationship between onset of delirium and start of new medication. However, this is not always the case, and practitioners need to be aware of this. Medication lists should be thoroughly reviewed in delirium. The exact mechanism of delirium is unclear, but it is postulated that central cholinergic pathway blockade is a major factor.[7] This may explain why anticholinergic medications readily lead to delirious states. It may be that this factor along with the pharmacokinetic changes that occur later in life and comorbidities increase the susceptibility of elderly patients to drug-induced delirium.

Making an accurate assessment relies on a collateral history to determine the patients pre-morbid level of function. There are very useful cognitive function screening tools, for example, abbreviated mental test score and confusion assessment method. The mental tests should be performed regularly and on all high-risk patients. However, it may not be appropriate or possible to do these tests on a sick patient.

Aim and Objective

The aim of the study was to study the prevalence and etiological profile of patients with the acute confusional state.

MATERIALS AND METHODS

All patients of acute confusion state admitted in the emergency wing of Postgraduate Department of Medicine Government Medical College, Srinagar, shall be enrolled prospectively in the study. Informed consent shall be taken from the attendants of the patients for participation in the study.

Inclusion Criteria

A patient is deemed to have an acute confusional state if the attending physician caring identifies any one of the following criteria for the patient at the time of initial presentation:

- Glasgow coma scale score <15
- Mini-mental state examination scores <24.
- Quick confusional score <15.[8]
- Patient not alert and oriented to person, place, and or time.
- Diminished responsiveness to verbal or physical stimulation.
- Difficult to arouse, unable to remain awake, or conversant.
- Hallucinations, confusion, bizarre, or inappropriate behavior.

Exclusion Criteria

The following criteria were excluded from the study:

- Age <18.
- Any obvious evidence of trauma.
- Psychiatric disease.
- Patient with dementia.

A proper history was taken from attendants and other available sources. A thorough general physical and systemic examination was done. Baseline investigations (complete blood count, kidney function test, liver function test, blood sugar, arterial blood gas and electrolytes, chest X-ray, and electrocardiogram) were done routinely. Cranial computed tomography (CT) plain was done in every patient within 6 h of hospitalization. If required serum calcium, phosphorous, magnesium, blood, urine, and other relevant body fluid analysis were done in selected cases as and when required.

- The following were done as when required.
- EEG (awake record) were ever deemed necessary.
- MRI brain (1.5 Tesla) were ever deemed necessary.
- Cerebrospinal fluid analysis was done where deemed necessary.

Toxic screen was done in selected cases with a high index of suspicion of substance abuse or toxin exposure. Patients were assessed and followed up on a daily basis until he or she

a. Was discharged from the hospital.
b. Succumbs to illness.

OBSERVATIONS AND RESULTS

A total number of patients admitted during this period were 3202. Of these 631 patients were found to be in the acute confusional state. Hence, the prevalence of acute confusional state in our study was 19.7%.

Most of the patients were in the age group of 61–70 years (6th decade). Mean age was 60.0 years with standard deviation (SD) (17.80) for males with a maximum 105 years and minimum 18 years. For females, mean age was 61.8 years with SD (15.8) with a minimum of 18 years and maximum of 96 years. Median age was 62 years for males and 64 years for females. The distribution among sexes was fairly equal with 53.7% comprised by males and 46.3% comprised by female patients. However, there was more difference between the two sexes in the age group 71–80 years as shown in figure.

The mean Glasgow coma scale (GCS) was 10.5 (SD 2.45) with a minimum of 3 and maximum of 15 median GCS was 11. The frequency in various groups in descending order being 12–15 having 295 patients (46.8%), then 8–11 group having 230 patients (36.5%) followed by <8 group having 106 patients (16.8%).

Hypertension was seen in 242 patients (38%) of the subgroups. Hypertension was the highest in cerebrovascular accidents (CVA) (73.3%), diabetes mellitus was seen in 169 patients (26%). In various subgroups metabolic derangement group had 45.2% diabetes followed by sepsis (35.9%). The previous history of stroke was seen in 13% of CVA, history of similar episodes, i.e., history of similar type of acute confusional state in the past was present in 10% of patients. It was increasingly present in metabolic and seizure group patients in 19.1% and 15.6%, respectively. History of smoking was present in 127 patients (19%), i.e., 1 out of 5 patients was smoker. Out of various groups, smoking was present in 33.5% of CVA, 51.6% of CVS/shock, and 19.1% of the metabolic group.

On CT scan 224 patients reported normal. In 87 patients CT could not be done, either other diagnostic modalities took priority, or a therapeutic procedure precluded it from being done, and in other patients, consent could not be done after they had for example dramatic recovery, for example, hypoglycemia and poisoning.

The proportion of males in the CVA group is being 64.6% and females 35.4% and cardiovascular is being 71.0% in males and 29% in females. Conversely, the most common diagnosis in females was metabolic 85 patients of 292 patients (29.1%) followed by CVA 57(19.5%) and sepsis/infections 63 (21.6%) and most common diagnosis in males was CVA (30.7%) and then metabolic 72 (21.2%). Moreover, poisoning was more common in female sex and seizures were relatively equally distributed in both sexes.

In 6.4% patient's diagnosis did not match, in 19.4% of patients it matches partially, and in 74.2% of patients, it matched completely. We grouped together the completely and partially matched groups we found that a good number of patients, 93.6% received the correct working diagnosis after initial assessment (history and examination).

The accuracy in diagnosis was in CVA 147 patients (82.2%), seizures 81 patients (90.0%) and poisoning 8 patients (100%). Among the patients were the diagnosis based on history and clinical examination matched with the final diagnosis. In metabolic group, 102 patients (70.8%) were diagnosed initially, similarly ICSOL Group 5 patients (50.0%) were diagnosed correctly and intracranial infection Group 21 patients (60.0%) were diagnosed correctly. If we compare the proportions of correct diagnosis with CVA group most common group in our study, we find a significant difference in the correct diagnosis rate in the groups mentioned supra vide. Moreover, if we consider the initial diagnosis (based on history and examination) as benchmark, sepsis/infection was overdiagnosed, 144 patients were given label of infection/sepsis as against 102 as proven in the final diagnosis, *P* value significant (<0.0001).

CVA was seen in older age groups and was highest in the 6th decade of life in our study. 60 patients were in the age group 61–70 years of age and comprised 37.3% of the total. CVA was not seen below 30 years of age in our study, and 5 patients of 161 were young strokes in the age group of 31–40 years and comprised 3.1% of CVA group. Poisoning was exclusively seen in below 50 years of age group. In the age group, 18–30 years seizure disorder and positioning were most common and comprised 61.3% and 12.3%, respectively. In 31–40 years age group seizure disorder was seen highest and was 53.4%. In the age group 51–60 years and 61–70 years, CVA constitutes 42.3% and 37.3%, respectively. Metabolic causes and sepsis were 29.0% and 27% in age group 71–80 years.

Time delay in presenting to hospital after developing acute confusional state historically had a large range between 1 h and 360 h with a mean of 35.40 h (SD 70.14). Median delay was 11.5 h. The distribution of patients on the basis of this delay "acute confusional state delay group" as seen in table and figure above showed most patients presented in 12–24 h group 32.2%, followed by >24 h group 28.3%, then 6–11 h group 21.6%, and then <6 h group 17.9%. Sepsis/infections, and intracranial infections and ICSOL group were relatively late to present 58.1% of infections/sepsis, 50% of intracranial infections, and 68.8% of ICSOL presented after 24 h. $P = 0.0001$ (significant).

GCS was grouped into 3 groups <8, 8–12, and 12–15. The <8 groups had 63% mortality 67 (out of 106), 8–11 had 11% mortality 25 (out of 230), and 12–15 group had 4% mortality 12 (out of 295). The individual components E, V, M were again seen to be individually having prognostic value.

Etiology of ACS: Etiology of ACS had an immense impact on the mortality. Poisoning, intracranial infections, and seizures all had decreased mortality, whereas CVS/shock, sepsis, and CVA groups had significantly increased mortality.

DISCUSSION

This was a hospital-based cross-sectional study. Consecutive patients were taken. The study was conducted between

April 2011 and March 2012. Seasonal distribution of 631 patients was that 290 patients were taken from winter, 341 from summer. The patients were taken on random days, a total number of days in which the patients were entered was 365 days, and 631 patients with acute confusional state were identified. Minimum of one and maximum of ten patients with acute confusional state were identified per day. A total number of patients seeking attention during these 365 days were 3202. Hence, the percentage of patients with acute confusional state presenting to the emergency department (ED) was calculated as 19.7%. Iqbal *et al.*[9] and Holden *et al.*[10] showed in their study the number of study patients represented 21% and 23% of total ED census. Our study showed that 19.7% of patients were in acute confusional state which are consistent with their data. The small difference can be explained by the fact that we had excluded from trauma, psychiatric disease, and dementia.

Most of the entries were in the age group 61–70 years. Mean age was 60 years for males with SD 17.80 and for females it was 61.8 years with SD 15.8. The patients along with the respective percentages from a total of 631 patients in various age groups were 49 (7.8%) in 18–30 years age group, 45 (7.1%) in 31–40 years age group, 57 (9.0%) in 41–50 years age group, 116 (18.4%) in 51–60 years age group, 199 (31.5%) in 61–70 years age group, 107 (17.0%) in 71–80 years age group, 41 (6.5%) in 81–90 years age group, and 17 (2.7%) in >90 age group. In the study conducted by Kanich *et al.*,[11] there was a bimodal distribution for the frequency of age occurrence, with one peak in the middle-aged adult about 45 years old and another peak in elderly adults nearly 78 years old. The mean age of all patients presenting in the study was 49 years. Possibly the reason for the higher mean age in our study is that the largest group CVA and metabolic group were constituted by elderly patients and we had excluded the pediatric age group. The sex distribution was males were 339 (53.7%) and females 292 (46.3%). In the study conducted by Kanich *et al.*,[11] there were 57% males (180) and 43% females (137). In the study conducted by Nadeem *et al.*,[12] the sex distribution was 312 male (60.35%) and 205 female (39.65%) patients. In the study conducted by Wofford *et al.*,[13] which was done in elderly ED patients, the males were 32.2% (73) and females constituted 67.8% (154). Similarly, in a study conducted by George *et al.*[14] in elderly patients, the females again predominated, females being 54.4% (93) and males 45.6% (73). Overall, males predominate than females in our study, but if we see the sex distribution in the age group 71–80 years out of 107 patients, 50 (46.7%) were males and 58 (53.3%) were females. In the study conducted by Bates *et al.*,[15] males were 49.45% (153), females were 50.5% (157), but most comatose patients under 65 were men whereas women constituted the majority over the age of 65. Thus, it is inferred that in the studies from the west in the older age group the relative percentage of females in altered mental status patients increase as compared from overall percentage while such relation could not be seen in our study except in the age group 71–80 years.

The average hospital stay in days was 8.5 days (range, 1–42 days) and the average time in which patient remained in acute confusional state was 5.56 days. In the study conducted by Kanich *et al.*, the average hospital stay was 7.6 days (range of 1–234 days), whereas the mean for critical care was 4.6 days (range, 1–109 days).

Of the 631 patients, there were 104 deaths, the mortality being 16.5%, 429 (68.0%) patients had good recovery, and 98 (15.5%) patients had partial recovery. In the study conducted by Nadeem *et al.*,[12] 297 (57.4%) were discharged after recovery and 179 (34.6) died. 80 of 205 female patients died (39%) while 99 of 312 males had a fatal outcome (31.7%). In the study conducted by Nadeem *et al.*,[12] the outcome of 248 patients (90.84%) was established. 152 (61.29%) were discharged after recovery and 96 (38.71%) died. The remaining 25 (09.16%) patients were lost to follow-up. In the study conducted by Kanich *et al.*,[11] 91% of the patients lived, whereas 2% died in the ED and 7% died after admission to hospital.

In our study, the most common final diagnosis was CVA 161 patients (25.6%) followed by metabolic disturbances group 157 (24.9%), then Sepsis/infections 117 (18.5%), seizures 83 (13.0%), intracranial infections (meningitis, encephalitis, meningoencephalitis, and brain abscess) 32 patients (5.0%), then cardiovascular/shock group 31 (4.9%), ICSOL 16 (2.6%), poisoning 8 (1.3%), SDH 9 (1.5%), and unknown/miscellaneous 17 (2.7%).

In the study conducted by Kanich *et al.*,[11] the most common diagnoses accounting for AMS were neurologic (28%) then toxicologic (21%) followed by trauma (14%), psychiatric (14%), infectious (10%), endocrine/metabolic (5%), pulmonary (3%), oncologic (3%), cardiovascular (1%), gastrointestinal (1%), and renal (1%).

In the study conducted by Nadeem *et al.*[12] (17) 25.8% (30) had structural cause for coma. Nadeem *et al.* studied the etiology of coma with particular reference to the age and sex of patient, and the outcome. Their study revealed that metabolic coma was predominant cause in almost all age groups with structural coma progressively increasing with the age. Posioning were the common cause in patients under 30. The Leading causes among males were posioning, hemorrhagic CVA, ischemic CVA, renal failure and hepatic coma. Among females casual distribution revealed renal failure followed by hepatic coma and hemorrhagic CVA.

Out of the patients whose outcome could be determined 57.4% were discharged after recovery and 34.6 % died. They concluded that coma etiology has asignificant effect on prognosis, while such significance could not be assigned to age or sex. Out of 14 patients having diffuse cerebral pathology, half were due to infectious diseases 6% of the total, i.e. pyogenic meningitis in 4 patients, 2 had tuberculous meningitis, and 1 had cerebral malaria, 3 heat stroke, 2 patients with post-cardiac arrest coma (hypoxic coma), and one patient had status epilepticus.

In the study conducted by Abdullah *et al.*,[16] the causes were grouped into 12 categories, of which the leading cause of coma was found to be cerebrovascular disease followed by metabolic and infectious diseases. In our study, the most common diagnosis was CVA 161 (25.6%) followed by metabolic 157 (24.9%) and sepsis 117 (18.5%).

In the study by George *et al.*[14] in elderly patients having confusion as a part of their complaints, the causes of delirium as in descending order were infection 35% (75), metabolic 15% (34), CVA 11% (24), drug-related 11% (24), carcinoma 5% (10), ICSOL 0.5% (1), SDH 1% (2), fractures 5% (10), and miscellaneous 6% (12).

In the study conducted by Bates *et al.*,[15] various causes of coma out of 500 patients were hypoxia-ischemia in 210 (42%) patients, cardiac arrest in 150 (30%), brain infarct in 76 (15%), brain hemorrhage in 67 (13%), hepatic encephalopathy in 51 (10%), SAH in 38 (7.6%), other metabolic disturbances constituted 19 (3.8%), infection in 16 (3.2%), hypoglycemia in 12 (2.4%), and mass lesion in 11 (2.2%).

A much more contemporary review of coma by Huff[17] reported that 25% of the patients had head trauma, 16% of these patients experienced multiple trauma, and 9% had isolated cranial trauma. Nontraumatic intracranial masses, primary spontaneous intracerebral hemorrhages, accounted for 21%, other neurologic disorders, predominantly seizures made up 16% of the patient population. Patients with a medical condition mainly resuscitated cardiac patients and patients with sepsis accounted for 13% and 12%, respectively. Toxicologic causes were encountered in 6% of the patients and psychiatric causes in 3%. No conclusive explanation of coma was determined in 3% at the time of death.

According to O'Keefe and Sanson *et al.*,[18] the most common cause of AMS in elderly patients was metabolic/toxic (65%), structural (33%), and psychiatric (2%). In the study conducted by Wofford *et al.*,[13] the most common cause of acute cognitive impairment in elderly was infection 26.1% (40), followed by decreasing order by metabolic/toxic group 22.9% (35), cerebrovascular 20.2% (31), unknown 15.6% (24), miscellaneous 7.2% (11), trauma 6.5% (10), cardiac 6% (9), and medication-related 4.6% (2).

In the study conducted by Matuja *et al.*,[19] to determine the causes and early prognosis in 150 patients admitted in a medical coma, 16 patients had cerebral malaria, 16 meningitis, 7 diabetic ketoacidosis, and 6 drug overdosage. Other causes were 20 (13%) with cerebrovascular diseases, 30 (20%) hepatic failure, and 11 (8%) were miscellaneous and obscure causes. The cause of coma was an important indicator of prognosis.

In our study, the various conditions under CVA were hemorrhagic stroke 98 of 161 patients, ischemic stroke 52, SAH 9, and TIA 2 of total 161 CVA patients. In the ICH subgroup, the various sites of bleed were putaminal 55.1%, thalamic 21.4%, pontine 7.3%, cortical 5.1%, cerebellar 5.1%, ventricular 3.0%, and lobar 3.0%. In the study conducted by Abdullah *et al.*, hemorrhagic lesions seen in 57.0% versus 37% infarcts.

In our study, 220 patients had other coexistent problems which could have contributed to the acute confusional state apart from primary. Some had one coexistent problem; others 2–3 problems. The metabolic group had the highest number of coexistent problems, in 83 patients of the metabolic group the number of comorbid problems being 70 in this group, followed by sepsis, 50 patients (40 problems), then CVA group 41 patients (36 problems) and then CVS 15 patients (18 problems). On the other hand, most common coexistent complicating problems were renal impairment 73 (out of 180) followed by sepsis then hypoglycemia, seizures, and then dehydration. In the study conducted by George *et al.*, 42 patients (25%) had two or more equally contributory causes.

CONCLUSION

The study was designed to work out the prevalence, important etiological factors and clinical correlates of acute confusional state in our population, so as to help in pointing out important and common causes with age and sex distribution of acute confusional state in our setup, thus helping to keep in mind different diseases while we are confronted with a patient of acute confusional state. This randomized cross-sectional study with a limited number of study population may not reflect the exact situation of the condition in the community, but its nearness to the reality cannot be underestimated. Age is an important predictor of the etiology of acute confusional state. In the older age group, the acute confusional state is mostly due to stroke, electrolytic imbalance, or systemic infection. In younger age group, acute poisoning, central nervous system infection or seizures are the common etiology of acute confusional

state. It is important to note that, many causes of altered consciousness are completely reversible with prompt diagnosis and proper management, like-infections and metabolic abnormalities. This finding emphasizes the great importance of early accurate diagnosis of acute confusional state, as correct diagnosis can lead to judicious management and save many valuable lives.

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How to cite this article: Sumji S, Wani MI, Mohi-ud-Din M. Prevalence and Etiological Profile of Patients with Acute Confusional State. J Sci Stud 2018. Int J Sci Stud 2018;6(5):24-29.

Source of Support: Nil, **Conflict of Interest:** None declared.