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INFECTIONS AS CO-MORBIDITIES OF ACUTE CONFUSIONAL STATE IN ELDERLY PATIENTS: A STUDY FROM WESTERN RAJASTHAN

Medicine

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ABSTRACT

OBJECTIVE: The objective of this study was to study correlation of acute confusion with age, various infections as co-morbidities and the presenting symptoms among indoor patients admitted in medical ward of Mahatma Gandhi Hospital, Dr S N Medical College and Associated Hospitals, Jodhpur, Rajasthan, Western India.

SUBJECTS AND METHODS: This study was conducted on 180 patients of age 60 years and above having acute confusional state to OPD or to Emergency Department at Mahatma Gandhi Hospital, Dr S N Medical College and Associated Hospitals. A structured questionnaire was used to collect the socio-demographic, previous cognitive status, past medical history including drugs used , previous intellectual function, functional status, previous episodes of acute or chronic confusion, sensory deficits, etc. BP, pulse, temperature, SpO2 assessment of the subjects were done. A thorough neurological examination of the subjects using Glasgow Coma Scale was carried out. Lab investigation was carried out for the entire population for pre selected 13 types of infections. Assessment of confusion was done with previously validated CAM-S questionnaire.

RESULTS: In our study, the most common infection was pneumonitis followed by urinary tract infection. In the correlation study of infections with acute confusional state of the elderly patients, the p-value was obtained as 0.002 which is quite within the significant limits set for this work.

CONCLUSION: This study indicates a significant correlation of infections as co-moribitidies of acute confusional state in elderly patients.

KEYWORDS

INTRODUCTION:

Acute confusional state, also called as delirium is an acute, fluctuating syndrome of altered attention, awareness, and cognition. It is common in older persons in the hospital and long-term care facilities. The etiology of delirium is diverse and multifactorial. Delirium can have a widely variable presentation, and is often missed and underdiagnosed as a result. The decline in normal cognitive ability may be acute, or it may be chronic and progressive. In older persons, confusion is most likely to be a symptom of delirium or dementia, although it can also be associated with psychoses and affective disorders, specifically major depression.

Delirium may be a symptom of a potentially reversible medical emergency, such as hypoxia or hypoglycemia. It is characterized by an acute change in cognition and attention, although the symptoms may be subtle and usually fluctuate throughout the day. This heterogeneous syndrome requires prompt recognition and evaluation, because the underlying medical condition may be life threatening. Risk factors for delirium include visual impairment, previous cognitive impairment, severe illness, and an elevated blood urea nitrogen/serum creatinine ratio., correction of dehydration, and the minimization of unnecessary noise and stimuli.

The cardinal manifestations of delirium are a cognitive disturbance with impaired orientation, temporal fluctuation, and onset over a few hours or days. *Hyperactive delirium* is characterized by increased psychomotor activity, with agitation, vegetative disturbances, impatience, and (sometimes) aggression; *hypoactive delirium* is characterized by generalized slowing, so that the patient seems calm or even apathetic. The manifestations vary greatly across and even within individuals. There can be marked swings across the spectrum of psychomotor disturbance, ranging from agitation (hyperactivity) at one end to low drive (hypoactivity) at the other; each of the two main forms of delirium can be replaced by the other without warning. In most cases, the manifestations of delirium tend to fluctuate both in type and in severity, with lucid intervals in between.

Globally, the world has 11.2% of the population above 60 years of age with their proportion increasing with each decade.[1] According to Population Census 2011 there are nearly 104 million elderly persons (aged 60 years or above) in India with 71% reside in rural areas and 29% of elderly population are in urban areas.[2] As the population ages, the elderly comprise a higher proportion of patients overall.

Delirium or mental status change is a leading presenting symptom for acutely ill elderly persons. In ED patients over 70 years old, it has been reported that up to 40% have an alteration in mental status, with approximately 25% diagnosed as having delirium.[3] Levkoff et al. found that 24% of elderly patients from the community and 64% of those presenting from nursing homes were delirious upon hospital admission.[4] Delirium is common in hospitalised general medical patients. Upon admission, approximately 11–25% of hospitalised elder patients will have delirium (prevalent delirium).[5,6,7,8,9] An additional 29–31% of hospitalised older patients admitted without delirium will develop delirium (incident delirium)[10].

Delirium is a medical emergency requiring prompt evaluation and treatment. It is generally reversible if the underlying cause is discovered and addressed, and can be fatal if overlooked and untreated. Hospital mortality rates in patients with delirium ranges from 25 – 33%. Elderly patients who develop delirium during hospitalization have a 22 – 76% chance of dying during that hospitalization. Hospital mortality is very high in patients that develop delirium—it is as high as the mortality rate associated with acute myocardial infarction or sepsis.[11,12,13]

Patients with higher severity of illness are more likely to experience delirium.[14] Infections, such as a urinary tract infection or pneumonia, are probably some of the most common precipitants of delirium and may be present in 34–64% of the hospitalised patients with delirium.[15,16,17,18]

We need to discover the most cost-effective ways to maintain healthy life styles and everyday functioning in countries at different stages of economic development and with varying resources. An all-inclusive exhaustive survey of the health issues: diseases, disability, financial cost, mental and emotional support, healthcare availability is needed for complete management of the elderly. This needs a holistic analysis of Delirium and acute confusional state as its offshoot in elderly generations and various co-morbidities associated with it.

There is a lack of such comprehensive data from India. This study aims

to correlate age related acute confusion as the offshoot of Delirium with various infections as co-morbidities. This study also attempts to find out the clinical profile of confusional state in elderly patients in Western Rajasthan and how it affects the various conditions in medical wards as well as their prognosis.

MATERIALS AND METHODS:

The study was conducted on the old patients presenting with acute confusional state to OPD or to Emergency Department at Mahatma Gandhi Hospital, Dr S N Medical College and Associated Hospitals. 180 patients of age 60 years and above and of both genders were included in this observational study. Patients diagnosed with acute confusion according to CAM Instrument and algorithm were included in this study. Patients with frank psychosis, advanced dementia or incommunicability and grade 4 comatose were excluded from this study.

A structured questionnaire was used to collect socio demographic and clinical information from the subjects willing to participate in this study. Information about education, place of abode (community or nursing home), previous cognitive status and past medical history including previous hospitalizations and co-morbidiites regarding each subject was sought from family members and caregivers, and by inspection of previous medical and nursing notes. Drugs used by patients prior to hospitalization were recorded. Information pertaining to previous intellectual function, functional status, onset and course of confusion, previous episodes of acute or chronic confusion, sensory deficits was also compiled.

BP, pulse, temperature, SpO_2 assessment of the subjects were done. A thorough neurological examination of the subjects using Glasgow Coma Scale was carried out. Various lab investigations were conducted on all the subjects including Complete blood count, ESR ,Liver function tests, Renal function tests, Serum B12, Lipid profile, Chest X-ray, ECG, Urin analysis, Electrolytes , Blood Glucose and ketones. Lab investigation was carried out for the entire population for examining the existence of 13 types of infection in order to analyze it as co-morbidities for the occurrence of acute confusion state. All subjects were also examined for symptoms of delirium at admission along with other presenting symptoms (fever/shortness of breath/loss of movement/pain etc). This was followed by thorough general and systemic examination. All participants were monitored every 12 h until discharge or death. Assessment of confusion was done with previously validated CAM-S questionnaire and algorithm. This is a previously validated instrument with a sensitivity rate ranging 94–100% and a specificity rate ranging 90–95%.

All data was statistically analyzed using SPSS software. Parametric data were expressed as mean value ± standard deviation (SD) and categorical variables as percentage. The chi-square test was used for the comparison of dichotomous variables and the Fisher exact test for smaller variables. p value <0.05 was considered significant.

RESULTS:

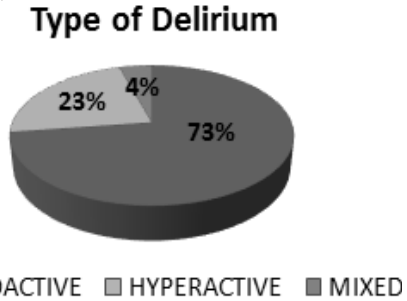
According to CAM criteria, a total of 180 elderly patients diagnosed with acute confusional state were chosen for this study. The primary parameters of CAM-S questionnaire included acute onset and fluctuating course in mental status from the patient's baseline, inattention or difficulty in focusing attention, disorganized or incoherent thinking and speech. Accordingly overall level of consciousness was classified. Following table summarises analysis of CAM questionnaire in the Study Population :

Table-1: Analysis of CAM Questionnaire in the Study Population

CAM-S Questionnaire		Male	Female	Total
Days	Day 1	73	57	130
	Day 2	29	21	50
Altered level of consciousness	Hyper alert	20	21	41
	Lethargic	70	53	123
	Stupor	5	3	8
	Vigilant	7	1	8
Inattention	66	55	121	
Disorganized thinking	56	54	110	

As seen in the Table, majority (72.22%) of the patients developed confusion on Day 1 of admission including 71.5% males and 73.1% females while the rest (27.78%) developed confusion on day 2 of admission. Inattention was present in 67.22% patients (64.7% males and 70.5% females). Disorganized thinking was present in 61.11% patients (54.9% males and 69.23% females). Majority (68.33%) of the patients were lethargic including 68.6% males and 67.9% females. 22.7% patients were hyper-alert (19.6% males and 26.9% females). 4.44% patients were in stupor while another 4.44% were vigilant.

Delirium of these subjects was categorized in three categories. Delirium was identified as hypoactive if the patient was hypoaroused, hypoalert or lethargic whereas it was identified as hyperactive if patients were hyperaroused, hyperalert, hallucinated, had delusions with disorientation. Delirium was identified as mixed type if the patient was having alternating features of the hyper- and hypoactive subtypes. Based on the CAM-S questionnaire, it was observed that hypoactive delirium was most common (72.77%) followed by hyperactive delirium (22.7%) while mixed Delirium was observed in 4.44% patients.

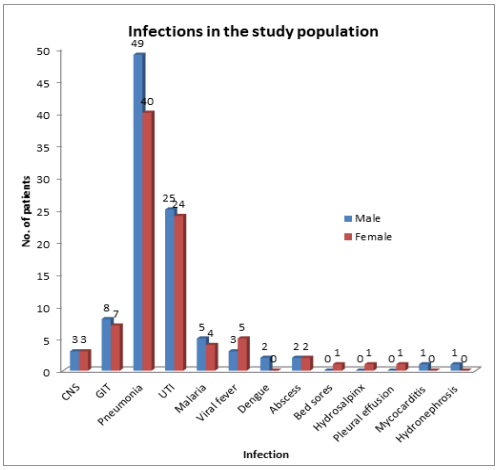


Out of 180 patients identified with acute confusional state, 102 were males and 78 were females. The mean age of males was 70.21±8.49 years while the mean age of females was 72.03±8.97 years. Predominantly affected group in both the genders was 60-70 years of age involving 60.56% of the males and 55.12% of the males. The overall age of the 180 patients was 71.7±8.72 years.

Clinical profile of these subjects with acute confusional state was examined based on 21 clinical symptoms. Altered behavior was observed as the most common symptom as present in the 95.56% of the subjects. Other common clinical symptoms included shortness of breath (35.56%), fever (31.11%), hemiparesis (9.44%) and seizures (7.78%). The spectrum of symptoms also included vomiting (3.89%), history of fall (3.33%), chest pain (2.78%), decreased oral intake (2.78%), abdominal distension (2.78%), slurring of speech (2.22%), diarrhea (2.22%), anasarca (2.22%), difficulty in walking (2.22%), loss of consciousness (1.11%), GI blood loss (1.11%), decreased urine output (1.11%), confusion (1.11%), vision abnormalities (0.56%), jaundice (0.56%) and opium intake (0.56%).

Neurological exam of the subjects had numerous findings. Most common finding was drowsiness found in 61.11% patients, followed by confusion (34.33% patients), agitation (26.11% patients), hemiparesis (17.22% patients) and seizures (7.78% patients). 22.78% patients had bilateral plantar mute and another 8.89% patients had bilateral plantar extensor. Less common signs included altered sleep pattern (1.11% patients), cerebellar signs (1.11% patients), neck rigidity (3.33% patients), speech difficulty (2.22% patients) and space cognition defect and monoparesis were found in one patient each.

To analyse infection as co-morbidities for acute confusional state , all the subjects were examined for major thirteen types of infections. The most common infection was pneumonitis found in 48.03% males and 51.2% females. Urinary tract infection was the second most common infection found in 24.5% males and 32.1% females. Other common infections included GIT infections (7.8% males and 8.9% females); malaria (4.9% males and 5.1% females); acute viral illness (2.9% males and 6.4% females). Less common infections included CNS infections (2.9% males and 3.8% females); abscess (1.9% males and 2.5% females) and dengue in 2.9% males. Bed sores, pleural effusion, myocarditis and hydronephrosis were found in one patient each.



DISCUSSION & CONCLUSION:

The present study was conducted at Mahatma Gandhi Hospital attached to Dr. S.N. Medical College, Jodhpur in a total of 180 elderly patients presenting with acute confusional state diagnosed according to CAM criteria. There is scarcity of data on confusion from India. Hence this study was planned to assess systematic clinical and investigative analysis of the symptom confusion, presented as a primary symptom or complaint in Emergency Department or developing acutely within 1 or 2 days as a consequence of some other insult.

In our study, out of 180 patients 102 were **males** and 78 were **females**. The mean **age** of males was 70.21±8.49 years while the mean age of females was 72.03±8.97 years. Predominantly affected group in both the genders was 60-70 years of age involving 60.56% of the males and 55.12% of the males. The overall age of the 180 patients was 71.7±8.72 years. (Table 1) In a study by Vishal Khurana et al[21] , the mean age of men was 70.87±9.26 and the mean age of women was 70.81±8.4 years. Male to female ratio was 1.27:1. The maximum number of cases belonged to the age group of 61–65 years. According to Population Census 2011, the sex ratio in elderly population is 1033 females to 1000 males. Despite the higher proportion of females in the population, there were fewer females in both studies, probably reflecting lesser access to medical care for females, Camus et al. in a case series of 183 elderly patients observed a mean age of 84.1[22] years.In a similar study by Rai et al[23] on 52 patients of acute confusional state had the mean age of our cohort was 65.04 ± 10.6 years.

In our study, altered behavior was the most common **symptom** presenting in the patients 95.56% of the patients. Other common complaints included shortness of breath (35.56%), fever (31.11%), hemiparesis (9.44%) and seizures (7.78%). The symptoms also included vomiting, history of fall, chest pain, decreased oral intake, abdominal distension, slurring of speech, diarrhea, anasarca, difficulty in walking, loss of consciousness, GI blood loss, decreased urine output, confusion, vision abnormalities, jaundice and opium intake. The wide spectrum of symptoms points to the fact that any disease/drug can lead to confusion in elderly and we need to be on high alert.

In our study, **neurological exam** of the patients had numerous findings. Most common finding was drowsiness found in 61.11% patients, followed by confusion (34.33% patients), agitation (26.11% patients), hemiparesis (17.22% patients) and seizures (7.78% patients). Less common signs included altered sleep pattern (1.11% patients), cerebellar signs (1.11% patients), neck rigidity (3.33% patients), speech difficulty (2.22% patients) and space cognition defect and monoparesis were found in one patient each. In a study by Sandberg et al[24] on 717 patients, the delirious patients presented a wide variety of symptoms including anxiety, psychomotor slowing, depressed mood, and irritability. 77% had pronounced emotional and 43% with pronounced psychotic symptoms. In a study by Ramirez-Bermudez et al[25] out of 222 patients with delirium 62.4% had no arousal disturbances; and 22.7% presented a coma or stupor state.

In our study, the most common **infection** was pneumonitis followed by urinary tract infection. In our analysis of **CAM-S Questionnaire**, majority (72.22%) of the patients developed confusion on Day 1 of admission while the rest (27.78%) developed confusion on day 2 of admission. Inattention was present in 67.22% patients. Disorganized thinking was present in 61.11% patients. Majority (68.33%) of the patients were lethargic. 22.7% patients were hyper-alert, 4.44% patients were in stupor while another 4.44% were vigilant. Based on the CAM-S questionnaire, hypoactive delirium was most common (72.77%) followed by hyperactive delirium (22.7%) while mixed was found in 4.44% patients. Our result was similar to Khurana et al[26] in which sixty-five percent of patient had the hypoactive type of delirium whereas 25% had hyperactive and 10% had mixed types. But the result varied from various studies in other countries. In the study by Sandberg et al[27] Nearly 26% were classified as having hypoactive, 22% as having hyperactive, and 42% as having mixed delirium, whereas 11% had neither hypo- nor hyperactive delirium.

In our study, the most common **infection** was pneumonitis followed by urinary tract infection. Other common infections included GIT infections, malaria; acute viral illness, CNS infections, abscess, dengue, bed sores, pleural effusion, myocarditis and hydronephrosis. The p-value was obtained as 0.002 which is quite within the significant limits set for this work. This indicates a significant correlation of infections as co-moribitidies of acute confusional state in elderly patients. A similar study by Sirisena et al[208] found most common infectious etiology to be UTI and pneumonitis.

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