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Delirium in Elderly: Is Age the Sole Factor in Determining Prognosis?

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Abstract

Background: The importance of diagnosing delirium lies in the fact that it is potentially reversible and preventable. Delineating the clinical profile of delirium, assessing the outcome as well as observing any difference in prognosis based on age and gender could be beneficial in early intervention, thereby reducing the mortality of this clinical entity.

Aims and Objectives: To study the clinical profile and outcome of elderly patients admitted with delirium and to study the relationship of age and sex with the prognosis of delirium.

Results: During the study period, 65 patients were diagnosed as confirmed cases of delirium according to the Confusion Assessment Method. The majority were in the age group between 65 and 69 years. The mortality rate was 40%. There was no difference in mortality based on age. The majority was males, and the mortality also was higher for males. Patients who presented with only altered sensorium had higher mortality. 29% of people had a single cause for delirium while the remaining 71% had two or more causes. In the former group, the mortality rate was 47.4% and 37% in the latter group.

Conclusions: The outcome of delirium is grave. More than one cause for delirium need not necessarily cause a worse outcome. The presence of major risk factors determines the worse outcome. Age alone is not a determining factor in the outcome of delirium. There is no statistically significant difference in the outcome of patients with delirium based on their sex. The most common in-hospital outcome of delirium is a complete recovery.

Keywords: Altered Sensorium, Confusion, Delirium

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Introduction

Delirium is perhaps the most common neurobehavioral disorder seen in clinical practice. This syndrome was reported during Hippocrates'

time and is familiar to most physicians who see acutely ill patients. It is an acute decline in attention and cognition and is an increasingly frequent clinical syndrome among persons over 65 years. Delirium is a relatively acute decline in cognition that fluctuates over hours or days, the hallmark of which is a deficit of attention¹. It is defined as a transient, usually reversible, cause of cerebral dysfunction which manifests clinically with a wide range of neuropsychiatric abnormalities. The clinical hallmarks are decreased attention span and a waxing and waning type of confusion.

The importance of delirium for the physician is not only because of the life-threatening nature of the illness, the devastating cascade of events it

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leads to, causing increased morbidity, mortality and cost, but also because it is potentially preventable.

In contrast to dementia which is an impaired cognitive function in the setting of a normal conscious level², which is a chronic state of confusion, delirium is an acute confusional state. The prevalence of delirium at the time of admission to hospitals ranges from 14-24% and the incidence of delirium during hospitalisation ranges from 6-56% among general hospital populations^{3,4}. The mortality rates among hospitalized patients with delirium range from 22-76%⁵, as high as the rates among patients with acute myocardial infarction or sepsis.

Although the overall prevalence of delirium in the community is only 1-2%^{6,7}, the prevalence increases with age, rising to 14% among those more than 85 years old. It is essential to recognize this clinical syndrome early in its clinical course as it is potentially reversible if appropriate management strategies are promptly instituted.

We present a cross-sectional study of patients admitted to a tertiary hospital in Kerala, with the objective of studying the clinical profile of patients admitted with delirium and also to assess their prognosis based on age and gender.

Materials and Methods

This study was of 18 months duration and was conducted among elderly patients (65 years and above) admitted to General Medical ward with delirium. A diagnosis of delirium was made based on the Confusion Assessment Method (CAM). Exclusion criteria included 1) Patients less than 65 years of age, 2) Patients with pre-existing psychiatric illness and/ or those on anti-psychotic medications, 3) Patients with the history of previous neurological disease, including pre-existing dementia, 4) Patients having delirium of greater than 1-week duration, at the time of presentation to the hospital. [*Only patients with acute confusional state lasting less than or equal to 1 week were included. Those with dementia were excluded. Patients with an MMSE score 8 or less than or equal to 24 were considered to be having dementia and excluded from the study].

Study procedure: A prospective study was done on patients presenting with altered sensorium, to study the clinical profile and the usual aetiology in our community. A detailed history was taken which included the history of onset of symptoms, duration of symptoms, presence of fluctuation of symptoms or any diurnal variations, level of consciousness (alert/lethargic/comatose), altered behaviour, irrelevant speech, impaired

memory or altered sleep. Any history of fever, headache, vomiting, loss of consciousness, seizures or urinary incontinence was also enquired. The previous history of any similar complaints, trauma, surgery, other co-morbidities, intake of alcohol and drug history were also noted. Examination of the patient was carried out with special emphasis on the central nervous system examination. Mini-mental status examination (MMSE) and Glasgow Coma Scale (GCS) score were noted. CAM was used to determine delirium. CAM utilises a diagnostic algorithm to identify delirium.⁹ Haematological and biochemical investigations were carried out which included complete blood count with peripheral smear, Erythrocyte Sedimentation Rate (ESR), Random Blood Sugar (RBS), Renal Function Test (RFT), Liver Function Test (LFT), Serum electrolytes, Urine routine examination, Chest X-ray and ECG. In required cases, Arterial Blood Gas (ABG), Thyroid Function Test (TFT), CT/ MRI Brain and Cerebrospinal Fluid (CSF) study were done. Conditions like Congestive Cardiac Failure (CCF) were diagnosed clinically and only for confirmation; ECHO was done in clinically proven cases. Patients were followed up till discharge or death. Care of the patient was not altered or interfered with, in any way, as part of the study. Data were entered in MS Excel and analysed using SPSS trial version. Chi-square test was adopted in the study.

Results

Sixty-five patients satisfying the study criteria were included, as shown in [Table 1a, Table 1b]. Age of the patients ranged from 65 years to 86 years, 50.76% of whom were in the age group 65-69 years, 27.7% in the age group 70-74 years and 21.6% were aged 75 years and above. It was found that mortality of patients in the age group 65-69 years was 42.4%, whereas, in the age group 70-74 years and in those aged 75 years and above, it was 38.8% and 35.7% respectively, as shown in [Figure 1]. Majority of the patients (69%) were males and 31% were females, and mortality rates were 42.2% and 35% respectively.

15 out of 65 patients (23%) did not have any co-morbidities, whereas the remaining 50 patients (77%) had either one or more co-morbidities. 18 out of 65 patients (28%) presented with only altered sensorium (AS), 36 out of 65 patients (55%) presented with AS along with other symptoms while the remaining 11 patients (17%) did not have any fluctuation in consciousness. These are shown in [Figure 2]. In the first group, 55.6% died, and 44.4% of people survived. Out of 72 % of the people, who presented with either AS with other symptoms,

or other symptoms alone; the mortality rate was 34%, and the survival rate was 66% [p value of 0.193].

Table 1a: Clinical profile of delirium

Parameter	Number	Percentage
Age (n=65)		
65-69	33	50.7
70-74	18	27.7
75 and above	14	21.6
Sex (n=65)		
Male	45	69
Female	20	31
Presence of co-morbidities (n=65)		
Yes	50	77
No	15	23
Presentation (n=65)		
Only AS	18	28
AS plus others	36	55
Others	11	17
GCS score (n=65)		
Less than 14	30	46
≥ 14	35	54

Table 1b: Clinical profile of delirium

Parameter	Number	Percentage
Fever (n=65)		
Yes	17	26
No	48	74
Hyponatremia (n=65)		
Yes	41	63
No	24	37
Chest x-ray (n=65)		
Normal	21	32
Abnormal	44	68
Number of causes (n=65)		
1	19	29
2 or more	46	71
Outcome (n=65)		
Full recovery	34	52.3
Residual neurological deficits	2	3.1
Partial recovery	3	4.6
Death	26	40

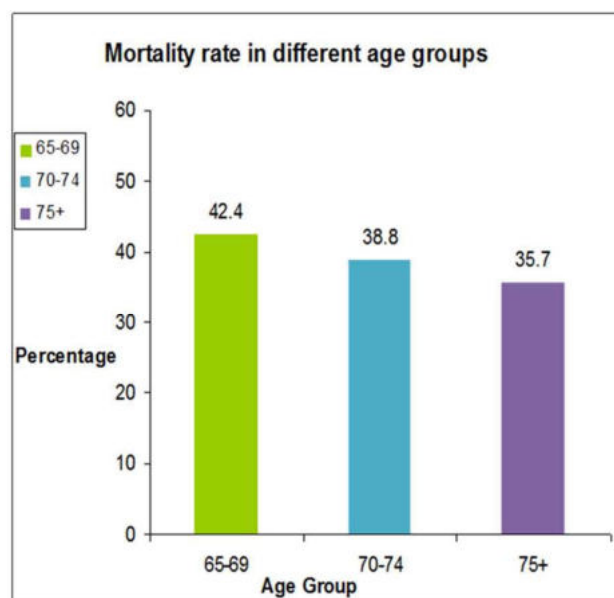


Figure 1: Mortality rate in different age groups

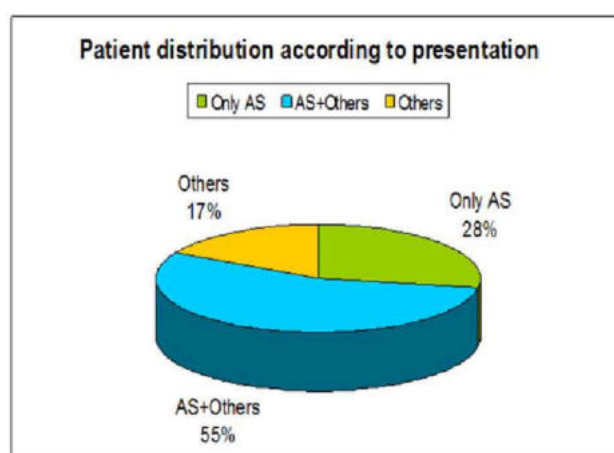


Figure 2: Distribution of patients according to presentation

Fever was a presentation in 26% of the patients of whom 35% died, and 65% survived (p-value of 0.863). 54% of the patients had a GCS score of 14, and 46% had a GCS score of less than 14. Of these, those in the former group had a better outcome (17% mortality, and 83% survival), whereas in the latter group 67% died and 33% survived [p value of 0.001]. 37% of the patients had normal serum sodium level, whereas 63% had hyponatremia (Serum sodium $<135\text{mEq/L}$). In the former group, 29.2% died and 70.8% recovered, whereas in the latter group 46.3% died and 53.7% recovered [p value of 0.271]. 32% of the patients had normal chest X-ray, and 68% had abnormal chest X-ray. In the former group, 24% died and 76% recovered, whereas in the latter group 48% died and 52% recovered [p value of 0.116].

The mean age of the patients who died (40% of the study population) was 70.35 years with a Standard Deviation of 6.22, and that of the patients who recovered (60% of study population) was 71.13 years with a Standard Deviation of 6.079 [p value of 0.616].

19 out of 65 patients (29%) had a single cause for delirium while the remaining 46 out of 65 patients (71%) had two or more causes for delirium. In the former group, the mortality rate was 47.3%, and the survival rate was 52.7%. In the latter group, the mortality rate was nearly 37%, and the survival rate was 63% [p value of 0.616], which is shown in [Figure 3].

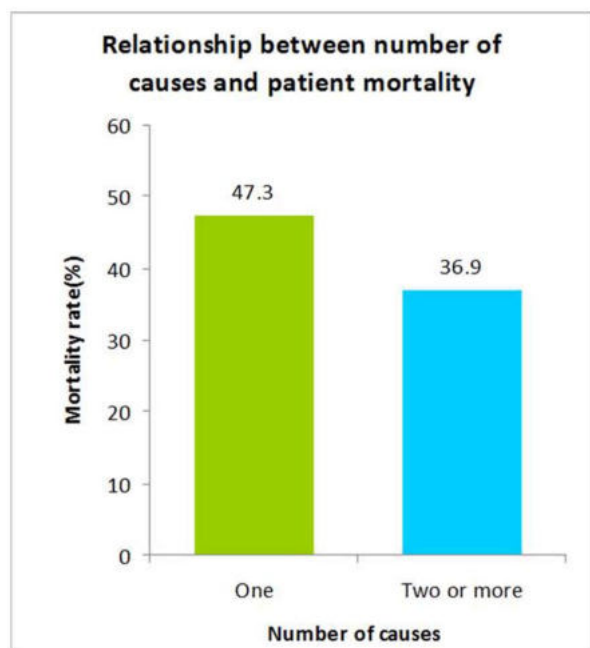


Figure 3: Relationship between number of causes and mortality

Most of the patients had multiple aetiology in the causation of delirium. The average number of aetiologies for the patients admitted with delirium was 1.64. 19 out of 65 patients (29%) had only one cause for delirium. 37 out of 65 patients (57%) had two causes for delirium, and 9 out of 65 patients (14%) had three or more causes for delirium.

The different aetiologies of delirium in our study are shown in [Table 2].

Sepsis (29.2%) and urinary tract infection (26.1%) were the most common causes of delirium in adults. The next common cause was hyponatremia (20%).

Complete recovery was seen in 34 out of 65 patients (52.3%) whereas in 3 out of 65 patients (4.6%) and 2 out of 65 patients (3.1%) there was partial recovery and residual neurological deficits,

respectively. 26 out of 65 patients (40%) in the study died, as shown in [Figure 4].

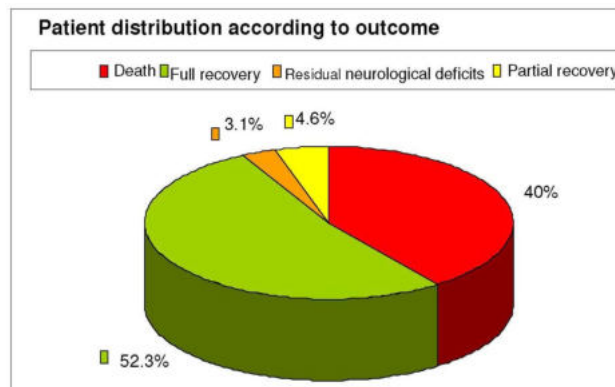


Figure 4: Distribution of patients according to outcome

Table 2: Aetiology of delirium

Cause	Number of cases	Percentage of cases
Sepsis	19	29.2
Urinary tract infection	17	26.1
Metabolic encephalopathy	14	21.5
Renal failure	10	15.3
Malignancy	8	12.3
Hepatic encephalopathy	7	10.7
Intra cranial bleed	4	6.1
Intra cranial infection	3	4.6
Multi Organ Dysfunction Syndrome	3	4.6
Respiratory failure	3	4.6
CCF	2	3
Hypoxic Ischaemic Encephalopathy	2	3
Normal pressure Hydrocephalus	2	3
Hepato renal Syndrome	2	3
Alcohol withdrawal	2	3
Other infections	2	3
Other causes	7	10.7

DISCUSSION

Delirium is a distressing condition, and its importance lies in the fact that it is a common, life-threatening and also potentially preventable clinical syndrome among elderly persons. No specific diagnostic test for delirium exists, and diagnosis is based on the basis of its essential clinical features. In fact, in 10-30% of elderly individuals presenting to the casualty, delirium is often the starting point of a life-threatening condition³.

In our study, the majority of the patients were in the age group of 65-69 years (50.7%). Mortality was more or less similar in all the age groups studied. But it should be mentioned that of the 65 patients studied, only 14 patients were above 75 years of age, and the mortality was 35.7% in this age group. Hence age alone cannot be taken as a determining factor in the outcome of delirium. The mean age of the patients in the study was 70.74 years. Majority of the patients in the study were males (69%). In a study conducted by Smaoui et al¹⁰, the mean age was 66.5 years. The majority (73.1%) were elderly patients (≥ 60 years). Sex-ratio (M/F) was 1.73. In another study done by Khurana et al¹¹, the mean age of the subjects was 70.87 ± 9.26 years and 70.81 ± 8.4 years amongst males and females, respectively. It was seen in our study that there was no significant difference in outcome according to the sex of the individual. The mortality rate was 42.2% among males, and 35% among females. Mortality rate was 40% in our study. This is in accordance with the mortality rate in the study conducted by Lima et al¹², in which, 33 out of 66 patients (50%) with delirium died.

Another observation in this series was that when the patient presented with altered sensorium alone, the mortality rate was significantly higher when compared to the mortality rate of those who presented with altered sensorium with other symptoms or those who presented with no fluctuation of consciousness. For patients who presented with only AS (28%), the mortality rate was 55.6%. Out of the remaining 72% of the people who presented with either AS with other symptoms, or other symptoms alone, the mortality rate dropped to 34%. The reason could be that when the patient presented with AS alone, the cause of it was intracranial bleed or systemic infections severe enough to cause death.

It was observed in this series that factors which were expected to have a significant bearing in the outcome of patients with delirium like fever, did not affect the outcome, which was contrary to what was expected.

Most of the patients had multiple aetiologies, the average being 1.64. As per the studies done by Solomon et al¹³, the average was 1.73. Thus, the average number of aetiologies was more or less the same. The most common aetiologies identified in this series were Sepsis (29.2%), Urinary Tract Infection (26.1%) and Hyponatremia (20%). Brück et al¹⁴ have observed in their study that, delirium, in intensive care unit patients, was commonly associated with sepsis. Khurana et al¹¹ also reported similar observations. According to them, the most common aetiologies associated with

delirium were sepsis followed by metabolic abnormalities and about 70% of their study population had 2 or more aetiologies.

In our study, a significant observation was that 37% of the patients who had normal serum sodium level were found to have a better outcome when compared to the outcome of the patients having hyponatremia. In the former group, the mortality rate was 29% whereas in the latter group shot up to 46%. According to Zieschang et al¹⁵, hyponatremia in hospitalized older patients is associated with a higher likelihood of delirium and an elevated in-hospital mortality.

It was seen that whether the patient presented with a single cause or multiple causes of altered sensorium, there was no statistically significant difference in the outcome [p value of 0.616]. 29% of the patients in the study had only a single cause for delirium, while the remaining 71% of the patients had two or more causes for delirium. In the study done by Francis et al¹⁶, 56% had a single cause for delirium. In our study, the rate of survival for patients presenting with only one cause for delirium was 53%, while the corresponding number, for patients presenting with two or more causes, was 63%.

This could probably be explained by the fact that those with a single cause may have had sepsis, malignancy or renal failure, which was severe enough to prove fatal.

Patients with a GCS score of less than 14 were found to have a worse outcome. 54% of the study group had a GCS score of 14 or above at the time of admission, and the remaining 46% had a GCS score of less than 14. It was seen that those in the latter group had nearly four times the mortality when compared to the former group, which was statistically significant [p value of 0.001]. The mortality rate was 17% in the former group and 67% in the latter group.

In the case of the in-hospital outcome, the most common outcome was complete recovery, which was seen in 52.3% of the people. This was in accordance with the data available in the literature¹⁷, which says that complete recovery is the most common outcome in delirious individuals. Death was seen in 40% of patients, partial recovery in 4.6% of patients and residual neurological deficits in 3.1% of patients.

Limitations

The limitations of the study were (i) lower than expected total number of study patients, the reasons for which could be because of the cut off age limit of 65 years in the inclusion criteria. We did

not lower the cut off for age limit because the incidence of delirium is more after 65 years as per worldwide data. As a result, patients less than 65 years of age admitted to the casualty with delirium had to be excluded. Other reasons for the lower than expected sample size were probably because the patients with underlying dementia were excluded and those with delirium of more than 1 week at the time of presentation were also excluded (ii) reduced number of patients in the 75+ age group in our study, because of which comparison of data across different age groups was not analysed (iii) inability to pinpoint the exact cause of death in the individuals who had multiple causes (iv) inability to tally the long-term outcome of the patients who survived (v) emphasis was given only for delirious patients above the age of 65 years and as a result, we were not able to study the causes of delirium in the younger population.

Conclusions

Delirium has 40% mortality, which is very high. Sepsis, urinary tract infection and hyponatremia are the most common factors causing delirium. Age and gender are not determining factors in the outcome of delirium. The mortality rate is higher in patients presenting with altered sensorium alone as well as in those having a GCS score of less than 14 on admission. An increase in the number of factors responsible for delirium has no bearing on the clinical outcome.

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Conflict of Interest: None declared

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