Clinical profile of elderly patients presenting with altered mental status

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ABSTRACT

Background

The geriatric age group, defined as any individual above the age of 60 years, is expected to double from 7.7 per cent in 2001 to 12.30 per cent in 2025.,[1] Altered mental status is a challenging entity, where atypical manifestations poses greater challenge for diagnosis and treatment.

Aims

To analyze the clinical profile and etiology of elderly patients presenting with altered mental status.

Methods

A prospective, descriptive study of 247 elderly patients who presented with altered mental status were admitted to the wards/ICU. Detailed history was obtained from the attender, including comorbid conditions, activities of daily living, polypharmacy, physical disabilities. Comprehensive geriatric assessment, MMSE, GCS was performed and documented. Laboratory, radiological and other investigations were reviewed in order to make a conclusive diagnosis and care plan and patients were followed up, until discharge from the hospital.

Results

247 elderly patients were included with a mean age was 71 years out of which 86.4 per cent had comorbidities and 14.17 per cent had psychiatric illness. 37 per cent consumed alcohol and 33.19 per cent were on medication with probable cause delirium. (78.3 per cent). The mean GCs was 9.68. The most common etiology were metabolic disturbances (60.7 per cent), followed by septic etiology (30.7 per cent), cerebrovascular disease (12.55 per cent), delirium (10 per cent The mortality rate in this study was 13.9 per cent.

Conclusion

Majority patients had one or more comorbid conditions, drowsiness being the most common (68.01 per cent). 14.5 per cent had focal neurological deficits. Metabolic and septic encephalopathy were the most common. 20.6 per cent had multiple causes of altered mental status. Septic encephalopathy with a worst outcome (23.07 per cent) deaths.80.5 per cent of patients were discharged.

Key Words

What this study adds:

Treatable causes of altered mental status should be addressed at the earliest to reduce morbidity and mortality.

As most metabolic and septic causes can be corrected at the earliest to improve overall out comes.

Polypharmacy should be reviewed at regular intervals and titrated to reduce side effects

1. What is known about this subject?

Many studies have shown neurological as leading followed by sepsis or infection, metabolic and miscellaneous as a cause for altered mental status

2. What new information is offered in this study?

[In this study metabolic encephalopathy as a leading cause secondary to CVA, Sepsis, drugs. which if corrected early can reduce the days in

3. What are the implications for research, policy, or practice?

[There is an urgent need to interpret the view of changing etiological trend for hospital admission in elderly to reduce morbidity and mortality]

Background

Altered mental status is a blanket term which is frequently encountered scenario of brain dysfunction ranging from delirium to coma[2]. For 10 per cent of emergency visits annually. Out of which 41-60% are elderly. Diagnosis in younger patients is, toxicological or organ specific.[5] where as in elderly it's More of like needle in a haystack, with high mortality rates. Hence the urgency in diagnosis. In elderly it is largely ranges from encephalopathy to delirium. Encephalopathy is defined as global alteration of brain function due to underlying physiological or systemic derangement. Delirium is an acute disturbance in attention

an awareness, that tends to fluctuate in severity, and maybe accompanied by disturbance in cognition or thought process, as a result of underlying medical condition, which cannot be explained[10,26]. It is often a serious but reversible disorder that affects around 50 per cent of the elderly population. There are over 24 delirium assessment tools, the most commonly used being Confusion Assessment Method or CAM. (available in 12 languages). There are different versions that have been adapted for ICU/ED/nursing home use.

Sample frame

Prospective, descriptive study from a period of October 2018 to September 2020 of all elderly patients admitted in Ramaiah Hospitals with altered mental status[1].

Methodology

• Demographic data and a detailed history, including a history of head trauma, drug abuse, seizures, comorbid conditions, regular medications and physical limitations was taken from the informant. Comprehensive geriatric health assessment including general physical examination, systemic examination, neurologic examination was performed.

• Patients were investigated and managed as per treating physician's protocol. Data thus collected was analyzed. s

Recruitment methods

Inclusion criteria

Elderly men and women, above the age of 60 years, presenting with altered mental status

determined by any one of the following: positive Confusion Assessment Method- ICU test, Glasgow Coma Scale score of less than 15, diminished alertness, disorientation with respect to time, place, person, difficulty in arousal, diminished responsiveness to verbal stimuli, agitation, hallucinations, were included in this study.

Exclusion criteria

1. Elderly patients with history of pre-existing cognitive deficits, such as dementia were excluded.

Sample size calculation

247 subjects from the literature review, Khurana. study has observed that the most common etiological factors for delirium were sepsis (36.5 per cent) and metabolic abnormalities (35 per cent).

In the present study, expecting similar results, with 95% confidence level and 17 per cent relative precision, the study requires a minimum of 247 subjects[2].

*SS=Z2 * (p)*(1-p)C2*

Data collection and analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data

was represented in the form of frequencies and proportions. Chi-square test or Fischer's exact test (for 2x2 tables only) was used as test of significance for qualitative data.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs

P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests[3].

Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

247 elderly patients with altered mental status were admitted and out of which 76 women (30.8 per cent) and 171 men (69.2 per cent) and the male to female ratio was 2.24:1showing male predominance, except in the 90-99 years sub-group[4].

According to presentation of altered mental status, patients were classified as having decreased responsiveness (68.01 per cent), isorientation (29.95 per cent), agitation (52,21.05 per cent), inappropriate behaviour (9.71 per cent) and hallucinations (4.85 per cent), in decreasing order of frequency Table 1.

24 (10 per cent) of the patients were found to be in delirium, detected by a positive CAM ICU test. Among them, the hypoactive type (79 per cent) predominated over the hyperactive (16 per cent) and mixed types (5 per cent) Table 2.

History regarding, trauma, seizures and other Comorbid conditions which was about 15.3 per cent, 10.1 per cent and 84.6 per cent respectively Table 3.

Alcohol consumption was present in 37 per cent of the subjects. Other drugs known to be associated

with delirium was being taken by 82 patients (33.19 per cent) Table 4.

Vital parameters were as follows.

Tachycardia noted in 54 patients (21.8 per cent), bradycardia in 16(6.4 per cent) with mean heart rate of 85.5, Hypertension was observed in 46 patients (18.6 per cent), hypotension in 12 (4.85 per cent) with a Mean systolic and diastolic blood pressures were 127.04 and 75.85 mmHg respectively. Tachypnoea was present in 71 patients, (28.7 per cent) and hypoxia was seen in 40 patients (16.19 per cent). 52 patients (21.05 per cent) had fever (temperature of 99F and above)[6-8].

Patients with focal neurological deficits (14.5 per cent), signs of raised ICP (such as papilledema, irritability, cranial nerve palsies) 6.07per cent and meningism (4.04 per cent). Focalneurological deficits (14.5 per cent) include dhemipar (69.4 per cent), aphasias (55.5 per cent), asymmetric pupils

(40 per cent), cranial nerve palsies(27.7 per cent) and hemiplegia(14 per cent). Mean GCS at admission was 9.68.26 per cent required intubation at admission Table 6. Supplementary laboratory parameters which can further decrease alertness. Anemia seen in (18 per cent), vitamin B12 deficiency (24 per cent), metabolic acidosis (28.3 per cent) type 1 respiratory failure (8.09per cent), type 2 respiratory failure (2.8 per cent), and mixed acidosis(1.6 per cent), in order of decreasing frequency [9,10].Neuroimaging finding contributing to altered mental status Table 5. Abnormal Chest X-rays findings were abnormal in 20 per cent of patients [25].

Findings included pulmonary edema, lung consolidation, infiltrates-bilateral, unilateral and miliary infiltrates which probably can contribute to hypoxia Table 6.

USG was grossly abnormal in 50 patients, revealing shrunken kidneys (24 per cent), significant prostatemegaly (16 per cent), cystitis(12 per cent), pyelonephritis(2 per cent) and sub-acute, intestinal obstruction(1.2 per cent) [11-13]. EEG was done in 18 patents and the most common finding Table 7.

LP CSF, similarly, was performed in those in whom meningitis/encephalitis was suspected or in whom reaching a diagnosis was challenging, yielding positive results in 20 patients Table 8.

Cultures were positive in 30 per cent of patients with septic encephalopathy of which urine was (38.1 per cent), blood (23.6per cent) and both blood and urine cultures positive in 10.9 per cent. commonest organism was E.coli (52.7 per cent).

Among the diagnosis, common was metabolic encephalopathy (150, 60.7 per cent), septic encephalopathy (76,30.7 per cent), cerebrovascular disease (12.55 per cent), neuro-infection (8.09%), drug induced (4.4per cent) and lastly seizures (4.04per cent) Table 9.

Among metabolic encephalopathy, the diagnosis in decreasing order of incidence was as follows Table 10.

Among septic encephalopathy, the source was most common urosepsis 39 per cent then community acquired pneumonia (CAP), 30 per cent other infections

such as cellulitis, diabetic foot or acute gastro enteritis make up 30 per cent Table 11.

Cerebrovascular disease was most common cause and was about 12.55 per cent, of which Acute bleeds Were (52 per cent) and acute infarcts (48 per cent). 20.6 per cent of patients had multiple etiologies Table 12. The most common combination was Septic and Metabolic encephalopathy. Urosepsis with hyponatremia, Sepsis with recurrent hypoglycemia, CKD with Dyselectrolytemia, followed by CVA with metabolic derangement. 81 per cent of patients were discharged. 13 per cent of patients

succumbed to their illnesses and 6 per cent were discharged against medical advice.

Higher mortality was seen in CVA group (24.1 per cent), followed by septic encephalopathy (23.07 per cent) and metabolic encephalopathy (8.8 per cent) Table 13.

Discussion

Altered mental status a common complaint encountered as OPD and emergency basis where elderly is about 5-10% Table 14.Behavioural changes like sometimes can be the prominent symptom which interferes in activities of daily living In our study of 247 elderly patients with a mean age of 71 yrs Table 15. The mean age in Khurana. study was 70.8 years and in Aslaner and Han, were 72 and 74 years respectively[5,16]. Majority of patients fall into young -old category (60-69), with a male predominance (69.2 per cent).similar pattern was observed in two other Indian studies conducted by Khurana in Bangalore[15].

A possible explanation include, the socioeconomic and cultural factors whereby males are more likely to be hospitalized for the same illness than females, second being that male sex has been established as a predisposing factor for delirium[13].

Comorbid information regarding all patients was collected from the informant, 84.5 per cent of patientshad at least one comorbid condition and type 2 diabetes was most common. 10.93 per cent had multiple comorbid conditions making them prone to poly pharmacy Table 16. Study done by Han, hearing impairment was independently associated with delirium[16]. Immobility with varying cause in elderly patients associated to delirium[18,19].

In our study, the most common causes of altered mental status were metabolic and septic and cerebrovascular accident encephalopathy, 60.7 per cent, 30.7 per cent and 12.55 per cent respectively[17].

Among the metabolic cause hypernatremia (22 per cent), hepatic encephalopathy (19 per cent) and hypoglycemia (16 per cent). Similar distribution of etiology was noted in a study conducted by Venkatesh et al. In JSS Hospital Mysore, with hypoglycemia, hyponatremia and hepatic encephalopathy[14]. In our country other decreasing order of frequency was hyperpnoea, hypernatremia, hyperglycea, uremia, cardiovascular causes, hyperkalemia and hypocortisolism.

In septic encephalopathy, urinary tract infections (39 per cent) and community acquired pneumonia (30 per cent) were the most common. A study conducted by Aslaner, where UTI and pneumonia were among the most common diagnoses overall. Among the altered mental status Cerebrovascular disease accounts for 12.55 Per cent cases out of acute hemorrhagic strokes (52 Per cent) than acute

infarcts (48 Per cent). In a study conducted by Ojaghihaghighi. It was observed that agitation was prevalent among 79.9Per cent of hemorrhagic stroke patients, whereas it was only 6.7Per cent in those with ischemic stroke[25].

Neuro-infection included meningitis (75 Per cent) and encephalitis (25 Per cent), of which Tuberculous etiology (46.6 Per cent) was most commonly observed in this study, followed by viral (40 Per cent) and bacterial (13.3 Per cent). Drugs and intoxication included alcoholwithdrawal/intoxication, benzodiazepine overdose (4.45 Per cent) case Table 14. The multifactorial nature of altered mental status with multiple etiology (20.6 per cent). A similar result was seen in two studies by Aslaner (19.3 per cent) and another study by conducted by Khurana.

Delirium was detected in 10% of the patients using the CAM ICU score when compared to other studies conducted by Han. (8.3 per cent) and Hustey. (7 per cent) in patients presenting with altered mental status in the ED [16,20]. The hypoactive type was predominantly noted (79 per cent) and seen in many studies conducted by those by Marcantonio ER. and Yang[21-24]. Indian study done by Khurana had a similar pattern with 65% cases being the hypoactive variety[15]. 81 per cent patients were successfully treated and discharged, 5.7 per cent were discharged against medical advice and 13.4 per cent succumbed to their illness comparing to the mortality rates of other similar studies conducted varied from 9-23.9 per cent[22, 23].

Conclusion

In conclusion, altered mental status is a broad diagnosis with an even broader spectrum of causes, including several reversible causes. It

occurs quite frequently in the vulnerable elderly population and if left untreated, it could result in

Higher rates of mortality. Hence, altered mental status must be viewed with a high index of suspicion and approached as an emergency.

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Acknowledgements

Figures and Tables

Table 1: showing distribution of subjects according presentation.

	N	%
Drowsy /unresponsive	168	68.01
Agitation	52	21.05
Disorientation	74	29.95
Inappropriate behaviour	24	9.71
Hallucinations	12	4.85

Table 2: Table showing distribution of subjects according to type of delirium.

Type of delirium	N	%
Hypoactive	19	79
Hyperactive	4	16
Mixed	1	5

Table 3: Frequency distribution of comorbidities among the subjects.

	Frequency	Percent (%)
None	38	15.4
T2DM	119	48.2
Hypertension	72	29.14
Seizure disorder	2	0.8
IHD	21	8.5
CVA	9	3.6
CKD	12	4.8
CLD	10	4.0
Copd	7	2.8
Malignancy	4	1.6
Old TB	1	0.4
AF	7	2.8
Hypothyroidism	16	6.4
Hyperthyroidism	2	0.8
BA	2	0.8
RA	2	0.8
RHD	1	0.4
Psoriasis	1	0.4

Table 4: showing distribution of significant drugs   associated with delirium, according to class.

Significant Drug History	Frequency	Percent %
None	165	66.8
Benzodiazepines	30	12.15
Beta blockers	15	6.07
NSAIDS	11	4.45
TCA	10	4.05
Lithium	1	0.4
Barbiturates	2	0.81

Atypical antipssychotics	4	1.62
Opiods	5	2.02
Digoxin	2	0.81
Steroids	2	0.81
Total	247	100.0

Table 5: Distribution according to GCS, above or below 8.

	Frequency	Percent%
<=8	61	24.7
>8	186	75.3
Total	247	100.0

Table 6: Frequency Distribution of MRI/CT Brain finding among the subjects.

MRI/CT Brain	Frequency	Percent%
None	49	19.8
CSVD	62	25.1
Age related	87	35.2
Infarct	26	10.5
Bleed	18	7.2
Space occupying lesion	5	2
Others	11	4.4

Table 7: Distribution of subjects according to chest x-ray.

	Frequency	Percent%
Normal	197	79.76
Abnormal	50	20.24
Total	247	100.0

Table 8: Distribution of subjects according to EEG was slowing of background waves.

EEG	Frequency	Percent %
None	229	92.7
Slowingof background waves	13	2.4
Normal	3	1.2
Spike wave pattern	2	8
total	247	100

Table 9: Distribution of type of neuro-infection.

Type of neuro infection	Frquency	Percent%
Meningitis	15	75
Encephalitis	5	25

Table 10: Distribution of subjects according to Diagnosis.

	Frequency	Percent%
Metabolic	150	60.7
Sepsis	76	30.7
CVA	31	12.55
Neuro-infection	20	8.09
Drugs	11	4.45
GTCS	10	4.04

Table 11: Distribution of subjects according to type of metabolic abnormality.

Hyponatremia	30	20
Hepatic encephalopathy	25	16.67
Hypoglycemia	22	14.67
Hypercapnoea	15	10
Hyperglycemia	14	9.3
Uremia	14	9.3
Hypernatremia	12	8
Cardiovascular	10	6.67
Hypercalcemia I	5	3.33
Hypocortisolism	3	2

Table 12: Distribution of subjects according to outcome.

Outcome	Frequency	Percent%
Discharge	200	81.0
Death	33	13.4
DAMA	14	5.7
Total	247	100.0

Table 13: showing top 3 etiology of altered mental status in various studies.

	Study title	Most 1st	Common 2nd	Etiology 3rd
Our study	Clinical profiling of elderly Patient presenting with altered sensorium	Metabolic	Septic	CVA
Khurana	Evaluation of delirium in elderly : a hospital based study	Sepsis and infectio	Metabolic abnormalities	CVA
Aslaner et aL	Etiologies and delirium rates of elderly ED patients with acutely altered mental status :A multi center prospective study	Infection	Neurological disease	Metabolic
Kanich et al	Altered mental status : evaluation and etiology in ED	Neurologic	Toxicologic	Trauma /psychiatric

Table 14: DSM V criteria all the criteria should be met.

1.	Disturbance in attention and awareness
2.	Disturbance develops acutely and tends to fluctuate in severity
3.	At least one additional disturbance in cognition
4.	Disturbances are not better explained by pre-existing dementia
5.	Disturbances do not occur in the context of a severely reduced level of
6.	Arousal/coma
7.	Evidence of underlying organic cause/causes

Table 15: Glasscow coma scale.

Behavior	Response	Score
Eye opening	✓ Spontaneously	3
	✓ To speech	2
	✓ To pain	1
	✓ No response	0
Best verbal response	✓ Oriented to time, place, person	4
	✓ Confused	
	✓ Inappropriate words	3
	✓ Incomprehensible sounds	2
	✓ No response	1
		0
Best motor response	✓ Obeys commands	6
	✓ Moves to localised pain	5

	✓ Flexion withdrawal from pain		4
	✓ Abnormal flexion (decorticate)		3
	✓ Abnormal extension		2
	✓ No response		1
			0
Total score	✓ Best response		15
	✓ Comatose		<8
	✓ Totally unresponsive		3