A clinical study of adult patients in altered mental status presenting to emergency without history of head injury

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Abstract

Background: Nontraumatic coma is a serious condition requiring swift medical or surgical decision making upon arrival at the ER. Hence knowledge of the most frequent etiology of nontraumatic altered mental state (AMS) and associated mortality might improve the management of these patients.

Objective: To study clinical profile of adult patients in altered mental status presenting to emergency without history of head injury

Methods: A Prospective Clinical Study was carried out among 50 patients in altered mental status. "Plum and Posner and Teasdale and Jennette" "(Glasgow coma scale)" criteria for evaluating function of brainstem and forebrain was used to assess the neurologic condition of the patients. Patients were followed daily for outcomes as per Jenner and Bond criteria.

Results: Males were more than females (64% vs. 36%). Most common etiology of AMS was infections (34%) followed by metabolic in 30% of cases, neurologic in 26% of cases and toxins or drugs in 10% of the cases. Overall mortality rate in the present study was 32%. In different etiologic groups, most common cause of mortality was neurologic causes in 46.2% of the cases. Mortality was affected significantly by age > 50 years, Glasgow coma score of < 5 and absence of reflexes ($p < 0.05$).

Conclusion: Patients with altered mental status should be evaluated for infectious, metabolic, neurologic and toxic causes as these are common in the present study. Elderly patients, patients with low coma scores, with neurologic causes and absent reflexes are more at risk of mortality. Sample size is very small to make any reasonable conclusions. But this study can be a pilot for a largely study which can be undertaken

Key words: Coma, stupor, altered mental status, emergency, head injury

Introduction

"*Altered mental status (AMS) comprises a group of clinical symptoms rather than a specific diagnosis, and includes cognitive disorders, attention disorders, arousal disorders, and decreased level of consciousness*."[1]

Altered mental status (AMS) is commonly observed condition in emergency department, especially among elderly patients. But the term AMS is not very specific, as it is also called with variety of names like lethargy, disorientation, altered behaviour, disorientation etc.[2]

This confusion in the nomenclature has devastating effects on this condition as it cannot be properly documented and hence cannot be studied specifically leading to problems in the research of this condition. The course and severity of AMS is also variable. Acute and minute changes in the status of brain are usually seen over days or even hours. These are due to some medical illness which can harm the life of patients. Chronic changes in the status of the brain take place over months or years and are not harmful to the life of the patients as the acute ones are.[3]

Psychiatric illnesses rarely contribute to AMS. The physician should rule out the acute conditions before

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he can consider AMS as of psychiatric origin.[4]

A variety of disease processes can lead to AMS. Therefore, the treatment forms also differ for AMS. In emergency departments, it is difficult to find out the causes of AMS due to limited time availability. So, if they have handy guidelines in such cases, the immediate treatment can be worthy. Due to paucity of data on AMS, exact prevalence of AMS is difficult to know. One study from California found that 27% of cases in the emergency department had abnormal Glasgow Coma Scale (GCS).[5] Other studies point out that the prevalence may range from 1-10%.[6-8]

A study of patients in Altered mental status, especially in coma in the western world is a matter of great controversy involving the financial burden it costs on the society and ethical demand of doing everything for the patient who would be in a vegetative state. But in India, it is not such a practical problem yet as the interest is to gauge an outcome whether it is the death or the recovery with or without deficits as the outcome.[9]

Nontraumatic coma is a serious condition requiring swift medical or surgical decision making upon arrival at the ER. Hence knowledge of the most frequent etiology of nontraumatic AMS and associated mortality might improve the management of these patients. Till now there are very few studies which have assessed the causes and outcome of altered mental status due to nontraumatic causes. This is to add the data to the existing studies to comprehensively evaluate patients with altered mental status.

METHODOLOGY

Source of Data: Patients in altered mental status admitted into MNR Hospital emergency in the department of medicine.

Sample size: 50

Study design: A Prospective Clinical Study

Study duration: Two years (from September 2016 to September 2018)

Ethical considerations: Institution Ethics Committee permission was obtained. Informed consent was taken from the patient if the patient is in a state to give the same or the nearest relative was informed about the details of the study and consent taken

Inclusion criteria:

1. Adults with AMS
2. Willing to participate

Exclusion criteria:

1. Age less than 15 years
2. Pregnancy
3. Head injury patients
4. Transient post-ictal confusion

Methodology:

Complete thorough history and clinical examination was carried out for all patients. "Plum and Posner and Teasdale and Jennette" "(Glasgow coma scale)" criteria for evaluating function of brainstem and forebrain was used to assess the neurologic condition of the patients.[10]

The score of 5 was assigned if verbal response was oriented, 4 for confused, 3 for inappropriate, 2 for Incomprehensible and 1 for none. The score of 4 was given if eye opening was spontaneous, 3 for eye opening upon command, 2 for eye opening on pain stimulus and 1 for none. The score of 6 was given if motor response was obeying, 5 for localizing, 4 for withdrawal, 3 for flexor, 2 for extensor, and 1 for none[10].

Total score was added up of all response scores and lower the score, deeper the coma.

Patients were followed for outcomes as per Jenner and Bond criteria[11] like death, persistence of the vegetative state i.e. the patient is apparently awake but not aware of the surroundings, severely disabled patient like the patient is conscious but dependent on others, moderate type of disability in which the patient is independent but disabled and finally recovered well.

The patients were followed on a daily basis till the patient recovered completely or any of the above-mentioned outcome was achieved including death.

Statistical analysis: The data was entered in the Microsoft Excel worksheet and analysed using proportions. Yates corrected chi square test was applied to find the significantly related factors of altered mental status. P value < 0.05 was taken as statistically significant.

Results

Table 1: Age and gender Distribution

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
12-20	1	3.1	2	11.1	3	6
21-30	4	12.5	3	16.7	7	14
31-40	10	31.3	4	22.2	14	28
41-50	6	18.8	2	11.1	8	16
51-60	6	18.8	3	16.7	9	18
61 and above	5	15.6	4	22.2	9	18
Total	32	64	18	36	50	100

Males were more than females (64% vs. 36%). Most commonly affected age group was 31-40 years which constituted 28% of the cases followed by 51-60 years (18%) and 61 and above age group (18%). (table 1)

Table 2: Distribution as per etiology of altered mental status

Etiology groups	Number	Percentage
Infective	17	34
Metabolic	15	30
Neurologic	13	26
Toxins and drugs	5	10
Total	50	100

Among 50 cases studied, 17 (34%) were of infectious etiology, 15 (30%) were due to metabolic causes, 13 (26%) were of neurological etiology and the remaining 5 were due to drug or toxins intoxication. Out of the 17 infective, cerebral malaria and HIV meningitis were leading causes with 4 cases each. Hepatic encephalopathy followed by Uremic encephalopathy accounted for 5 (10%) and 3 (6%) cases each among metabolic causes of altered mental status. Ischemic cerebrovascular accidents (10%) were more than haemorrhagic strokes (6%) in neurological causes. (Table 2)

Table 3: Etiology and outcome of altered mental status

Etiology	N	Outcome			
		Death		Recovery with functional disability/ good recovery	
		No.	%	No.	%
Infective	17	4	23.5	13	76.5
Metabolic	15	4	26.7	11	73.3
Neurologic	13	6	46.2	07	53.8
Toxic	5	2	40	03	60
Total	50	16	32	34	68

Chi-square=2.1005; p=0.55108; not significant

In the present study metabolic and infective etiology of altered sensorium showed comparatively good outcome with complete recovery. Cerebrovascular accidents due to bleed had poor outcome resulting in death. Out of 17 cases of infective etiology there were 4 deaths and among 15 cases of metabolic etiology 4 died. Deaths in infectious etiology can be attributed to presentation to the hospital in advanced stage of the infection. The patients who showed good recovery were anticipated to do so on 2nd and 3rd day of admission itself based on the brainstem clinical signs. This helped us to go ahead with required cost-effective treatment like higher antibiotics in infective aetiology, dialysis in uraemia and drug induced Coma. (Table 3)

Table 4: Age and outcome of altered mental status

Age (years)	N	Outcome			
		Death		Recovery with functional disability/good recovery	
		No.	%	No.	%
Up to 50	32	6	18.75	26	81.25
> 50	18	10	55.55	8	44.45
Total	50	16	32	34	68

Chi-square=7.1717; p=0.0074; Significant

The death rate in patients of age up to 50 years was 18.75% and in patients above 50 years of age was 55.55%. this difference was found to be statistically significant. (Table 4)

Table 5: Coma score and outcomeof altered mental status

Coma score	N	Outcome			
		Death		Recovery with functional disability/good recovery	
		No.	%	No.	%
Up to 5	13	12	92.3	01	7.7
> 5	37	4	10.8	33	89.2
Total	50	16	32	34	68

Chi-square=29.3628; p=0.0001; Significant

The death rate in patients having Glasgow coma score of up to five was very high with 92.3% compared to only 10.8% among those with score of more than five. This was found to be statistically significant. (Table 5)

Table 6: Neuro-ophthalmologic signs and outcome of altered mental status

Neuro-ophthalmologic signs		Outcome				Chi square	P value
		Death		Recovery with functional disability/good recovery			
		No.	%	No.	%		
Oculocephalic reflex	Absent	13	86.7	2	13.3	24.4293	< 0.0001
	Present	3	8.6	32	91.4		
Oculovestibular reflex	Absent	14	93.3	1	6.7	37.0448	< 0.0001
	Present	2	5.7	33	94.3		
Pupillary reflex	Absent	14	87.5	2	12.5	33.3072	< 0.0001
	Present	2	5.9	32	94.1		
Corneal reflex	Absent	15	88.2	2	11.8	37.4338	< 0.0001
	Present	1	3.1	32	96.1		

The death rate was 86.7% in those with absent oculocephalic reflexes compared to 8.6% in those with present reflexes. The death rate was 93.3% in those with absent oculovestibular reflexes compared to 5.7% in those in whom the reflexes were present. Similarly, the death rate was more with absent pupillary and corneal reflexes compared to those with present reflexes. All these differences were found to be statistically significant. (Table 6)

Discussion

In the present study, males were more (64%) than females (36%). Xiao HY et al[12] also reported that males were 53.1% and females were 46.9%. Similarly Melka A et al[13] observed that 60.4% were males and 39.6% were females and 52.3% males and 47.7% females in a study by Kekec Z et al[14] and 64% males and 36% females in a study done by Jali SN et al.[15] Thus all these studies find that the altered mental status condition is more common in males compared to females though there may not be a significant difference.

We noted that 34% of cases of altered mental status were due to infectious etiology. But Xiao HY et al[12] observed that only 9.1% of cases were due to infectious etiology; whereas Melka A et al[13] observed that 55% were due to infections. But again, Leong LB et al[16] found it to be only 18.3%; only 3.8% by Kekec Z et al,[14] 10% to be infectious by Kanich W et al[17] and infectious etiology in 24% by Jali SN et al.[15]

Metabolic disturbances as cause of altered mental status was found to be 30% in the present study. Similar findings were reported by Melka A et al[13] (22.5%) and Jali SN et al[15] (28%). But a lower rate as etiology of AMS was reported by Xiao HY et al[12] (7.9%), Leong LB et al[16] (12%), Kanich W et al[17] (5%) and Kekec Z et al[14] (6.1%).

We observed that in 26% of the cases of AMS, the etiology was of neurologic in origin. Similar findings were reported by Xiao HY et al[12] (35%), and Kanich W et al[17] (28%). But a higher preponderance was seen from studies like Leong LB et al[16] (34.4%), and Kekec Z et al[14] (71.6%).

We also found out that in 10% cases of AMS, toxins and drugs were responsible. This rate was 23% as reported by Xiao HY et al,[12] Melka A et al[13] (3.5%), Kekec Z et al[14] (1.5%). Thus, etiology of AMS varied in different studies. It may be due to variation in sample size, representativeness of each cause specific selection of patients and study settings.

The overall mortality in the present study was 32% which is higher than that reported by Xiao HY et al[12] (8.1%), Leong LB et al[16] (11%), Kekec Z et al[14] (20.1%) and lower than that reported by Melka A et al[13] (60.4%).

Cause specific mortality rates in the present study has shown that there was no statistically significant difference. Mortality in the infectious etiology group was 23.5%, metabolic was 26.7%, neurologic group was 46.2% and toxins and pharmacologic was 40%. Similar findings were reported by Jali SN et al[15] who found that mortality in the infectious etiology group was 24% and in the metabolic group was 28%.

We also found that mortality in the patients with age more than 50 years was significantly more (55.6%) compared to mortality in patients with age less than 50 years (18.8%). Similar findings were also reported Jali SN et al[15] who found that mortality in patients above 60 years of age was 62.5 years. Xiao HY et al,[12] also reported that the death rate was significantly more in AMS patients of age more than 60 years (10.8%) compared to patients of age less than 60 years (6.9%).

In the present study it was noted that the death rate in cases of absent reflexes like oculocephalic reflex (86.7%), oculovestibular reflex (93.3%) pupillary reflex (87.5%) and absent corneal reflex (88.2%) was significantly higher compared to those AMS patients in whom these reflexes were present. Jali SN et al[15] also reported in their study that death rate was significantly higher i.e. 96.6% in patients with absent oculocephalic reflexes.

Conclusion: Patients with altered mental status were mostly males and older in age. Infectious etiology was the most common etiology of altered mental status in the present study. Overall mortality was 32% and it was affected by increasing age, Glasgow coma score of less than five, absence of cardinal reflexes like oculocephalic, oculovestibular, pupillary and corneal reflexes. Sample size is very small to make any reasonable conclusions. But this study can be a pilot for a largely study which can be undertaken

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