Original Article

Assessment of Altered Mental Status among Patients Admitted to Emergency Department: An Observational Study

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ABSTRACT:

Background: Altered mental status is broadly defined as a change in cognitive function or level of consciousness. For patients with altered mental status of any cause, follow-up with a neurologist is important because it often takes time for cognitive function to normalize, if it does at all, and issues regarding cognitive disability often need to be addressed. Hence; under the light of above mentioned data, we planned the present study to explore the etiologies and risk factors responsible for altered mental status (AMS) in an emergency department (ED). **Materials & methods:** The present study was a prospective study conducted on 250 patients of Altered Mental Status attending medical emergency department of Guru Nanak Dev Hospital, Amritsar. During this study investigations were performed according to the signs and symptoms of patients presenting to medical emergency department till the most appropriate etiology of Altered Mental Status was achieved. All the results were tabulated and compared as per standard statistical protocol. Data were entered in MS excel. Results were expressed in percentage. Univariate regression curve and chi-square test were used for assessment of level of significance. **Results:** Out of total 250 patients, 22.8 percent of the patients belonged to the age group of 51 to 60 years. 19.6 percent of the patients and 15.6 percent of the patients belonged to the age group of 41 to 50 years and 61 to 70 years respectively. 9.2 percent of the patients and 7.2 percent of the patients each belonged to the age group of 71 to 80 years, 11 to 20 years and 21 to 30 years. Metabolic, cerebrovascular and infective were the most common major category of diagnosis encountered in the present study. **Conclusion:** It is important for Emergency physicians to be knowledgeable about the etiologies of patients with AMS in general and special subgroups, including seasonal and epidemiological tendencies in the area.

Key words: Altered mental status, Emergency department.

INTRODUCTION

Altered mental status is broadly defined as a change in cognitive function or level of consciousness. It is a common reason for emergency department visits, hospitalization, and neurology consultation.[1] Altered mental status is a broadly inclusive term used to describe a patient with a change in either the content of consciousness or the level of arousal. Encephalopathy is also a nonspecific term, often used interchangeably with altered mental status, which implies a diffuse process causing a change in the level of arousal.[1]

Delirium is a more specific term, defined as an acute change in mental status characterized by a deficit in attention and a fluctuating course with either disorganized thinking or change in the level of arousal. Most changes in the content of consciousness, such as aphasia or neglect, are readily discernible upon examination, and such patients are usually easily triaged. Occasionally, however, a focal deficit may be misclassified as delirium by an inexperienced clinician; conversely, delirium may rarely be caused by a focal lesion. In addition, some processes may cause both focal deficits and delirium.[1-3]

The evaluation and management of altered mental status are broad and require careful history and physical examination to eliminate life-threatening situations. Changes in consciousness can be categorized into changes of arousal, the content of consciousness, or a combination of both. Arousal includes wakefulness and/or alertness and can be described as hypoactivity or hyperactivity, while changes in the content of consciousness can lead to changes in self-awareness, expression, language, and emotions.[4] For patients with altered mental status of any cause, follow-up with a neurologist is important because it often takes time for cognitive function to normalize, if it does at all, and issues regarding cognitive disability often need to be addressed. Patients with delirium are also at

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high risk for developing dementia and should be re-evaluated in the outpatient setting. Unfortunately, there are only a limited number of studies with regard to the diagnosis of AMS in the ED.[5] Hence; under the light of above mentioned data, we planned the present study to explore the etiologies and risk factors responsible for AMS in an ED.

MATERIALS & METHODS

The present study was a prospective study conducted on 250 patients of Altered Mental Status attending medical emergency department of Guru Nanak Dev Hospital, Amritsar. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients/attendants after explaining in detail the entire research protocol. During this study investigations were performed according to the signs and symptoms of patients presenting to medical emergency department till the most appropriate etiology of Altered Mental Status was achieved. All the results were tabulated and compared as per standard statistical protocol. Data were entered in MS excel. Results were expressed in percentage. Univariate regression curve and chi-square test were used for assessment of level of significance.

RESULTS

Out of total 250 patients, 22.8 percent of the patients belonged to the age group of 51 to 60 years. 19.6 percent of the patients and 15.6 percent of the patients belonged to the age group of 41 to 50 years and 61 to 70 years respectively. 9.2 percent of the patients and 7.2 percent of the patients each belonged to the age group of 71 to 80 years, 11 to 20 years and 21 to 30 years. Metabolic, cerebrovascular and infective were the most common major category of diagnosis encountered in the present study. Majority of the patients in the present study had diagnosis of Ischemia, found to be present in 18.4 percent of the patients. Hepatic encephalopathy, hypoglycemia, and Meningoencephalitis were responsible for occurrence of 15.2, 11.6 and 11.2 percent of the cases. Significant results were obtained while correlating the age-wise and gender distribution of patients with diagnosis (p- value < 0.05).

Table 1: Categorization of diagnosis into various categories

Diagnosis category	Diagnosis	Sub diagnosis category	Sub diagnosis
1	Cerebrovascular accidents	1a	Ischemic
		1b	Hemorrhagic
2	Metabolic	2a	Hepatic encephalopathy
		2b	Uremic encephalopathy
		2c	Hypoglycaemia
		2d	Carbon dioxide narcosis
		2e	Diabetic ketoacidosis or hyperglycaemic hyperosmolar state
		2f	Dyselectrolytemia
3	Infective	3a	Septic encephalopathy
		3b	Tuberculoma brain or Neurocystecercosis
		3c	Meningoencephalitis
4	Seizure disorder with or without SOL brain		
5	Drug intoxication and poisoning		
6	Others	6a	Hypertensive Encephalopathy
		6b	Demyelinating Lesions
		6c	Hypoxic Encephalopathy

Table 2: Distribution of patients according to different diagnosis code

Diagnosis code	Number of patients	Percentage of patients
1a	46	18.4
1b	19	7.6
2a	38	15.2
2b	17	6.8
2c	29	11.6
2d	9	3.6
2e	16	6.4
2f	6	2.4
3a	17	6.8
3b	6	2.4
3c	28	11.2
4	11	4.4
5	5	2
6a	1	0.4
6b	1	0.4
6c	1	0.4
Total	250	100

Table 3: Correlation of diagnosis with different age groups

Diagnosis code	Age groups (years)									Total
	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	
1a	0	3	2	11	11	8	8	3	0	46
1b	0	0	2	1	8	7	1	0	0	19
2a	2	0	12	11	10	1	2	0	0	38
2b	0	1	5	3	3	4	0	0	1	17
2c	1	2	1	4	9	8	3	1	0	29
2d	0	0	0	3	2	3	1	0	0	9
2e	6	2	1	1	3	1	1	1	0	16
2f	0	0	0	0	1	3	2	0	0	6
3a	0	1	3	4	3	3	2	1	0	17
3b	4	0	1	0	1	0	0	0	0	6
3c	0	7	8	5	5	0	1	2	0	28
4	3	1	1	3	0	1	2	0	0	11
5	1	1	0	3	0	0	0	0	0	5
6a	0	0	0	0	1	0	0	0	0	1
6b	0	0	1	0	0	0	0	0	0	1
6c	1	0	0	0	0	0	0	0	0	1
Total	18	18	37	49	57	39	23	8	1	250
Chi- Square Tests										
	Value		df		Asymptotic Significance (2-sided)				Exact Sig. (2-sided)	
Pearson Chi-Square	217.182		120		.000*				.000*	

*: Significant

Table 4: Correlation of diagnosis with different gender code

Diagnosis code	Gender		Total
	Male	Females	
1a	18	28	46
1b	12	7	19
2a	29	9	38
2b	7	10	17
2c	15	14	29
2d	7	2	9
2e	6	10	16
2f	1	5	6
3a	6	11	17
3b	6	0	6
3c	12	16	28
4	7	4	11
5	4	1	5
6a	0	1	1
6b	0	1	1
6c	0	1	1
Total	130	120	250
Chi- square test			
Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	34.339a	15	.003*

DISCUSSION

In the present study, a total of 250 patients were evaluated. Majority of the patients (42.4% patients) of the present study belonged to the age group of 41 to 60 years. 52 percent patients of the present study were males. Our results were in concordance with the results obtained by Xiao HY et al, who reported similar findings in their study. 1026 patients of their study were male (53.1%) and 908 female (46.9%); their age ranged from 14 to 97 years (average age 51.95±15.71 years). Almost 701 patients were <40 years (36.3%). Similar findings were also observed by Kanich W et al. The mean age of the study patients was 49 years with 57% male gender.[6, 7] 46% of the patients (115) patients in the present study had metabolic etiology, among which, the most commonly encountered was hepatic encephalopathy (15.2 % patients) and hypoglycemia (11.6 % patients), followed by cerebrovascular diagnosis etiology (65 patients) and diagnosis of infectious origin (51 patients). Meningoencephalitis was the most commonly observed infectious etiology encountered in the present study. Different authors from the past literature have reported different etiologic profile of patients diagnosed with altered mental status in their studies. In a study conducted by Xiao HY et al, neurological causes (stroke, head trauma, or mass lesion) accounted for 35.0% (n=641), whereas 65.0% originated from non-neurological factors (n=1190). For the elderly group, the top three causes of AMS were cerebrovascular disease (36.2%), system and organ dysfunction (19.4%), and infection (10.4%). For the middle-aged and young groups, the top three causes were drugs or toxic factors (34.9%), system and organ dysfunction (11.1%), and metabolic/endocrine factors (9.0%).[8]

In the present study, significant results were obtained while correlating various diagnoses with age-wise and gender-wise distribution of subjects (P- value < 0.05). Subsequent analysis revealed that the causative disease of AMS differ with the age group .i.e., metabolic diseases, trauma, and poisoning were often found in young people, whereas cerebral vascular disease, and organ/system failure were frequently seen in the eldery. In acute AMS, this pattern of age distribution was similar to Xiao et al and Kanich et al.[6- 8]

In the present study, the most common major category was metabolic followed by neurological. However; in a study conducted by Kanich W et al, the most common categories were neurologic (28%) followed by toxicologic (21%). Metabolic causes accounted for less than 5 percent of the cases.[6]

Magnetic resonance imaging of the brain (brain MRI) and electroencephalography (EEG) are occasionally performed in patients with acute brain dysfunction including delirium, but their optimal role in the ED is yet to be determined. In addition, these diagnostic modalities may not be readily available in all settings further limiting their use. Patients with cerebrovascular accidents involving the right parietal lobe can present with delirium as the sole manifestation and without any focal neurological findings.[9- 11]

The combined knowledge of the most frequent causes of AMS and the most useful diagnostic tools in the evaluation of AMS can assist the EP in the management of these demanding and potentially ill patients. Full emergency assessment and immediate life-saving interventions remain a challenge for emergency physicians.

CONCLUSION

Under the light of above obtained results, the authors conclude that it is important for Emergency physicians to be knowledgeable about the etiologies of patients with AMS in general and special subgroups, including seasonal and epidemiological tendencies in the area. AMS is an chief warning signal for ED patients because of its potentially fatal and reversible effects. Prompt evaluation and treatment are essential to decrease morbidity and mortality associated with AMS.

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