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Altered Mental Status and Its Causes: Commonest Dilemma of Residents and Emergency Physicians

Jamal Azfar Khan, Hassaan Mehmood, Muhammad Irfan Khattak

Pakistan Naval Ship Shifa Hospital, Karachi Pakistan

ABSTRACT

Objective: To assess the frequency of the various medical conditions in patients presenting with altered mental status (AMS) in the Emergency Department of Pakistan Naval Ship (PNS) Shifa Hospital.
Study Design: Prospective longitudinal study.
Place and Duration of Study: Emergency Department, Pak Naval Ship Shifa Hospital, Karachi Pakistan from Feb-Jul 2021.
Methodology: Adult patients who have presented with altered mental status (Glasgow coma scale score less than 15) or who have the diagnosis "AMS" written in their notes were included in the study. Patients were observed in the wards until a definitive diagnosis could be made.
Results: Sixty patients presented with AMS at the Emergency Department of PNS Shifa, during the study period. The causes of AMS were sepsis (20, 33.33%), CVA (12, 20%), metabolic (hepatic/uremic) encephalopathy (8, 13.33%), diabetic complications (7, 11.66%), seizures (5, 8.33%), drug intoxication (4, 6.66%) and respiratory failure due to lung pathology (4, 6.66%). The overall mortality rate was 20%.
Conclusion: Sepsis is the most frequently encountered cause of altered mental state in emergency department patients, followed by CVA, metabolic encephalopathy, and diabetic complications.

Keywords: Consciousness disorder, Delirium, Emergency department, Glasgow coma scale, Sepsis.

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INTRODUCTION

Altered mental status (AMS) is a broad term that refers to a patient who is not fully conscious and unaware of time, place, and person.[1] It refers to mental states ranging from mild disorientation to profound coma.[2] AMS is a condition that frequently occurs in patients who present to hospital emergency departments (EDs). It is associated with an increased risk of death,[3,4] and thus must be taken seriously and managed promptly and methodically.[5]

Numerous medical conditions can manifest as confusion/disorientation in the patient.[6] The physician in the emergency department is responsible for determining the underlying pathology. This requires the physician to look for clues in the patient's history, examination, and proper investigations, as there are numerous possible causes of AMS.[7] However, if the physician is aware of medical conditions that frequently manifest as AMS in our setting, it will enable him to diagnose and manage them more effectively. Early diagnosis and management plan will save resources of the hospital and will lead to speedy disposal of indoor patients.

Correspondence: Dr Jamal Azfar Khan, Department of Medicine, Pakistan Naval Ship Shifa Hospital, Karachi, Pakistan
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While a substantial body of literature on the management of specific medical disorders manifesting as AMS, data on how an emergency physician should approach a patient with undifferentiated AMS in the emergency department are sparse.[8,9] In Pakistan, there is no published data on the causes of AMS in our hospitals. This information can be extremely beneficial in our overcrowded emergency departments by assisting emergency physicians in diagnosing such cases and directing initial/empirical management toward common underlying conditions.

This study aimed to determine the frequency with which various etiologies present with AMS in the emergency department of PNS Shifa Hospital.

METHODOLOGY

The prospective longitudinal study was conducted at the Emergency Department of Pakistan Naval Ship Shifa, Karachi Pakistan from February to July 2021. The ethical approval was taken from the PNS Shifa Ethical Review Committee (ERC/2021/MED/41). In addition, informed consent was taken from the patients and attendants. The sample size was calculated using the Raosoft online sample size calculator, with a 95% confidence level, 5% margin of error and AMS incidence of 8-30% reported in the previous international and local literature.[2,10,11] The calculated

sample size was 278. We performed consecutive sampling technique.

Inclusion Criteria: Adult patients with AMS (Glasgow coma scale score less than 15), who got "AMS key terms" documented in their notes, including confused, drowsy, delirious, disoriented, alteration/ loss of consciousness and coma were included in the study.

Exclusion Criteria: Patients younger than 12 years, trauma patients and diagnosed cases of dementia were excluded from the study.

Patients were followed throughout their hospital stay. Patients' age, gender, previous medical and drug history, presenting complaints, diagnosis, length of hospital stay, and outcome were recorded.

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23.0 and MS Excel 2016 software. Frequency and percentage were calculated for categorical variables. The chi-square test was used to analyze any association of the various aetiologies of AMS with mortality. The *p*-value ≤0.05 was considered significant.

RESULTS

During the study period, sixty patients with AMS presented to the Emergency Department of Pakistan Naval Ship Shifa Hospital. Their mean age was 55.0±13.2 years. There were 34(56.7%) male and 26 (43.3%) female patients. The mean hospital stay was 5.20±4.47 days, ranging from two to eleven days. The causes of AMS in patients were listed in Table-I. The overall mortality in AMS patients was 20%.

Table-I: Causes of Altered Mental State in Patients presenting at the Emergency Department (n=60)

Causes Of Altered Mental State	n (%)
Sepsis	20 (33.33)
CVA	12 (20.00)
Metabolic (uremic/ hepatic encephalopathy)	8 (13.33)
Diabetic complications	7 (11.66)
Seizures	5 (8.34)
Drugs	4 (6.67)
Respiratory failure	4 (6.67)

The patients with sepsis had the longest hospital stay (average of six days) and the worst outcome. In addition, 8(40%) patients with sepsis died, accounting for 66.6%(8 out of 12) of the total deaths in AMS patients.

The causes of AMS and the outcome of their stay in the hospital (expired/ discharged from the hospital) were shown in the Table-II. The chi-square test concluded that there was not enough evidence to suggest an association between the causes of AMS and mortality (*p*-value = 0.106) as shown in Table-II.

Table-II: Association between the Causes of Altered Mental Status and Mortality (n=60)

Causes of Altered Mental Status	Mortality		*p*-value
	No (n=48)	Yes (n=12)	
Sepsis	12(25.00%)	8(66.66%)	0.106
Cerebrovascular Accident	9(18.75%)	3(25.01%)	
Metabolic	7(14.58%)	1(8.33%)	
Diabetic complications	7(14.58%)	0	
Seizures	5(10.41%)	0	
Drugs	4(8.34%)	0	
Respiratory failure	4(8.34%)	0	

Since sepsis was the most common cause of AMS in our study, we elaborated it further by documenting the causes of sepsis as shown in Table-III.

Table-III: Causes of Sepsis in Patients who Presented with Altered Mental Status (n=20)

Causes of Sepsis	n (%)
Respiratory tract infection	11 (55.0)
Urinary tract infection	5 (25.0)
Central Nervous System-related infection (septic encephalopathy)	3 (15.0)
Undetermined	1 (5.0)

DISCUSSION

AMS is prevalent in the senior population. It has been reported that older patients are more likely to present with AMS, with approximately 10% of patients over the age of 65 having AMS at the time of presentation to the emergency department.[12] Our study found that the average age of patients presenting with AMS was 55 years, consistent with the previous research, as few young patients reported AMS in our setup.

The most common cause of AMS reported in our study was sepsis. Out of the septic patients, the vast majority (80%) did not have direct CNS infection (septic encephalopathy) but rather had sepsis-associated encephalopathy (SAE). SAE is a term used to refer to a state of diffuse cerebral dysfunction because of the body's response to an infection.[13] It worsens the prognosis in a patient suffering from sepsis.[14] Various studies report its prevalence to be 8 to 70% in critically ill patients,[15,16] and corroborate our results wherein SAE is the leading cause of AMS. Rahkonen *et al.* investigated the causes of AMS in the elderly. They discovered that infections were the most common cause, accounting for 43% of cases, followed by cerebrovascular diseases, cardiovascular diseases, and

medications.[17] Aslaner *et al.* also concluded in their multi-centre study in Turkey that infections were the leading cause of AMS, affecting 39.5% of patients.[18] Some other studies have also shown sepsis to be the leading cause of AMS, particularly in the elderly.[7,19] However, there is also an abundance of world literature which portrays sepsis as a minor cause of AMS, which contradicts our findings. Kanich *et al.* studied the aetiology of AMS in the emergency department. The most common etiologies for AMS were neurologic (28%), toxicological, traumatic, psychiatric and infectious.[8] In another study carried out in Turkey by Kekec *et al.* involving 790 patients of AMS, the most common aetiology was a cerebrovascular accident, followed by head trauma, metabolic/endocrine causes and cardiovascular pulmonary causes, whereas infections constituted only 3.8% cases.[20] Leong *et al.* identified the commonest causes of AMS to be neurological (34.4%), infectious (18.3%) and metabolic (12%).[21] Different communities likely have varying predispositions to infection-related illnesses, which may account for these differences.

In many studies, drugs are a significant contributor to AMS. According to a prospective study conducted by Xiao *et al.* 35% of cases of AMS were due to neurological factors, while 23% were due to intoxication.[22] According to the literature review by Sanello *et al.* the most common causes of AMS in the USA were neurologic (seizures, stroke/TIA), followed by toxicological causes.[6] In contrast, our study showed only 6.66% of patients had AMS due to drug intoxication. This could result from cultural differences, a lack of drugs in our society, or a lack of affordability. Additionally, alcohol consumption is strictly prohibited in Pakistan for religious reasons, and as a result, it is not readily available. Those who continue to use it frequently deny its existence.

Thus, we see that the most common causes of AMS vary according to the setup, the area, and the population. Therefore, a single study's findings cannot be generalized to every situation. Nevertheless, this etiological distinction highlights the importance of knowing the most common causes of AMS in our hospitals to prepare our emergency departments, physicians, and laboratories to diagnose and manage them appropriately.

As per our study, the most common cause of AMS is sepsis, a treatable condition. Therefore, this data can be used as a guide to making evidence-based recommendations for the emergency physician's approach towards patients with altered mental states. In addition, such a standardized approach may aid in the rapid diagnosis and result in financial and time savings.

The American College of Emergency Medicine has established a clinical policy for the initial evaluation and management of patients with AMS.[23] They recommend empirical antibiotics if the patient has AMS, fever, hypothermia or petechiae. This is because sepsis is not the most common cause of AMS in the USA. However, since sepsis is the most common cause of altered mental status in our setup, it is prudent to start empirical antibiotics in all patients with AMS. Furthermore, the financial and human costs of sepsis are very high.[24] It has been recommended that the concerned authorities develop management protocols "to optimize diagnosis and treatment" of septic patients.[25] Our study can serve as a guide for such a project. Multi-centre studies are required to develop recommendations for emergency department physicians or protocols for managing AMS patients in the ED.

LIMITATIONS OF STUDY

Our hospital is adjacent to a tertiary cardiovascular care hospital. As a result, many patients with cardiovascular diseases might have visited, skewing our findings. In addition, there was a possibility that infection prevalence varies by season. Therefore, a long- term study may yield different results.

CONCLUSION

Sepsis is the most frequently encountered cause of altered mental state in emergency department patients, followed by CVA, metabolic encephalopathy, and diabetic complications.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

JAK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

HM: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

MIK: Critical review, data interpretation, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investi-gated and resolved.

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