ORIGINAL ARTICLE

A Study of the Etiology, Clinical Profile, and Outcome of Nontraumatic Cases of Impaired/Altered Sensorium in Patients Attending the Emergency Department in a South Indian Tertiary Care Hospital

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Abstract

Introduction: Nontraumatic cases of impaired/altered sensorium continue to be one of the most frequent emergencies that casualties encounter. The patient's overall prognosis may depend on early clinical evaluation and etiological diagnosis. In order to make a more accurate and timely diagnosis, it is crucial to understand the etiological profile of comatose patients who arrive at a tertiary care facility, which can successfully predict the outcome.

Materials and methods: This prospective observational study was carried out in a South Indian tertiary care facility. A total of 126 patients with altered mental status of nontraumatic origin who arrived at the emergency room with Glasgow coma scale (GCS) scores below 10 were included in the study.

Results: Of the 126 patients, 48 (38.1%) were female and 78 (61.9%) were male. All patients were 52.65 ± 17.94 years old on average. The comorbidities observed in this study were hypertension (49.2%), diabetes mellitus (36.5%), alcoholism (33.3%), smoking (25.3%), coronary artery disease (CAD) (7%), chronic kidney disease (CKD) (9.5%), epilepsy (4.7%), and previous cerebrovascular accident (CVA) (9.5%). The presenting symptoms other than altered sensorium were fever (4%), vomiting (9.5%), headache (3%), motor weakness (16%), seizures (15.8%), and breathlessness (4.7%). About 36 patients (28.5%) had abnormal neurological examination, with motor weakness being the most common finding in 34 patients (27%). A brain magnetic resonance imaging (MRI) or computed tomography (CT) scan was performed on 104 patients (82.5%), and 50 patients (48%) had abnormal results. The commonest finding was cerebral and cerebellar infarction seen in 35 patients (33.6%). A number of 48 (38%) patients had abnormal electrocardiogram (ECG), 42 (33%) had nonspecific ischemic alterations, and six patients (4.7%) had atrial fibrillation. In our study, 46 patients (36.5%) had neurological causes of impaired/altered sensorium, 32 patients (25.4%) had metabolic causes, 18 patients (14.3%) had multifactorial causes, 14 patients (11.1%) had infections, and 16 patients (12.7%) had other causes [status epilepticus, drug overdose, organophosphate (OP) poisoning]. The commonest neurological cause was ischemic stroke, noted in 32 patients (69.5%), out of which 16 cases were posterior circulation strokes. About 14 cases had anterior circulation stroke. The remaining two cases presented with both anterior and posterior circulation strokes. The mortality rate was 36.5%. A number of 46 patients died out of 126 patients. Out of 46 patients, CVA was the most common cause of death, accounting for 20 cases (43.4%).

Conclusion: In this study, the duration of altered mental status, GCS score, level of altered consciousness, and etiology were found to be significant prognostic markers that correlated with outcome in nontraumatic cases with impaired/altered sensorium. Factors that offer early prognostic information can help with resource allocation decisions because the cost of intensive care has increased significantly. The prognosis can be predicted using a simple clinical evaluation of neurological function, paying particular attention to the degree of consciousness, focal neurological signs, and brainstem reflexes.

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Introduction

Nontraumatic cases with impaired or changed sensorium are among the most prevalent emergencies presenting in the casualty department.[1,2] The prognosis of these individuals has been the subject of numerous international studies, but only a small number of these studies have been conducted in India.[3,4]

A coma is characterized as a state of prolonged unconsciousness in which an individual cannot be awakened by external stimuli and internal need.[5,6] Various etiologies underlie the onset of nontraumatic cases of impaired/altered sensorium.[7–9] Early clinical evaluation and etiological diagnosis may be critical to the patient's overall prognosis.[10,11] Understanding the etiological characteristics of comatose patients who arrive at a tertiary care facility is crucial for making an early and more accurate diagnosis.[12,13] It is essential to recognize the key prognostic clinical indicators which can accurately predict the outcome.[14,15]

Our aim in this study was to determine the etiological profile of nontraumatic cases of impaired/altered sensorium presenting at the emergency department, and additionally, we aimed to evaluate their clinical characteristics and outcome patterns that may be helpful in predicting the overall prognosis.

Materials and Methods

This was a hospital-based prospective observational study conducted from November 2021 to November 2022. Following approval from the Institutional Ethics Committee, the study was carried out. Explicit written consent was taken from all patients. A total of 126 patients over the age of 18, regardless of gender, who arrived at the emergency room with altered mental status of nontraumatic origin and Glasgow coma scale (GCS) scores below 10 were included. Patients with psychiatric disorders and traumatic head injuries were removed from the study. The sociodemographic details, history, clinical examination, laboratory data, radiological data, and neurological investigations were registered.

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Statistical Analysis

The collected data were entered into a Microsoft Office Excel spreadsheet, and SPSS statistics software, database version 16.0, was used for analysis. Analysis was done using percentages and ratios. To ascertain the statistical difference between variables, Excel functions such as mean, standard deviation (SD), and Chi-squared test were utilized. Results were taken as significant if the *p*-value was <0.05.

Results

A total of 126 patients were registered in this study. There were 48 female patients and 78 male patients. The mean age of all patients was 52.65 ± 17.94 years.

The comorbidities observed in this study were hypertension (49.2%), diabetes mellitus (36.5%), alcoholism (33.3%), and smoking (25.3%). Other risk factors were coronary artery disease (CAD) (7%), chronic kidney disease (CKD) (9.5%), epilepsy (4.7%), and previous cerebrovascular accident (CVA) (9.5%). Only 22 patients (17.4%) had no known comorbidities at the time of presentation. About 48 patients (38%) presented to the emergency department within 6 hours. Twenty-six patients (21%) presented to the emergency department within 7–12 hours. Sixteen patients (12.6%) presented within 13–24 hours. Thirty-six patients (28.5%) presented only after 24 hours.

At the time of presentation, eight patients (6%) exhibited delirium, 60 patients (47.6%) were drowsy, 36 patients (28.6%) were stuporous, and 22 patients (17.5%) were in a coma. GCS score at the time of admission was 3–5 in 39 patients (31%), 6–8 in 56 patients (44.4%), and 9–12 in 31 patients (24.6%).

The presenting symptoms other than altered sensorium were fever (4%), vomiting (9.5%), headache (3%), motor weakness (16%), seizures (15.8%), and breathlessness (4.7%). About 36 patients (28.5%) had abnormal neurological examination, with motor weakness being the most common finding in 34 patients (27%). Other findings noted were neck rigidity in eight patients (6.3%), facial palsy in six patients (4.8%), gaze preference in 14 patients (11.1%), absent oculocephalic reflex in 20 patients (15.9%), and anisocoria in six patients (4.8%). Abnormal respiratory findings included crepitations and rhonchi noted in 30 patients (23.8%).

Laboratory parameters noted were anemia in 46 patients (36.5%), hyponatremia (Na^+ <135 mEq/L) in 10 patients (7.9%), hypokalemia (K^+ <3.5 mEq/L) in four patients (3.2%), hypoxia in eight patients (6.3%), hypoglycemia [random blood sugar (RBS) ≤70 mg/dL] in eight patients (6.3%), hyperglycemia (RBS ≥200 mg/dL) in 14 patients (11.1%), hypothyroidism [thyroid-stimulating hormone (TSH) >4 mIU/L] in two patients (1.6%), deranged liver function test (LFT) in six patients (4.8%), and deranged renal function test (RFT) seen in 12 patients (9.5%) (Table 1).

A brain magnetic resonance imaging (MRI) or computed tomography (CT) imaging was performed on 104 patients (82.5%), and 50 patients (48%) had abnormal findings. The commonest finding was cerebral and cerebellar infarction seen in 35 patients (33.6%). Other findings were intracerebral hemorrhage in 12 patients (11.5%), meningeal enhancement in two patients (1.9%), and intraventricular hemorrhage in one patient (0.9%). About 48 patients (38%) had abnormal electrocardiogram (ECG) findings, 42 patients (33%) had nonspecific ischemic changes, and six patients (4.7%) had atrial fibrillation.

In our study, 46 patients (36.5%) had neurological causes of nontraumatic coma, 32 patients (25.4%) had metabolic causes, 18 patients (14.3%) had multifactorial causes, 14 patients (11.1%) had infections, and 16 patients (12.7%) had other causes [status epilepticus, drug overdose, organophosphate (OP) poisoning]. The commonest neurological cause was ischemic stroke, noted in 32 patients (69.5%). Out of these, 16 cases were posterior circulation ischemic strokes. Fourteen cases had anterior circulation ischemic stroke. The remaining two cases presented with both anterior and posterior circulation ischemic strokes.

Other neurological causes were hemorrhagic stroke (26%) and posterior reversible encephalopathy syndrome (PRES) (4%). Metabolic causes in decreasing order of frequency were hyponatremia (37.5%), hypoglycemia (21%), hyperglycemia (18.7%), uremic encephalopathy (15.6%), and hepatic encephalopathy (6.2%). Among infections, tuberculosis (TB) meningitis was diagnosed in two patients, bacterial meningitis in four patients, COVID pneumonia with sepsis in four patients, scrub typhus infection in two patients, and postpartum sepsis in two patients. Other less common causes were status epilepticus in eight patients, drug overdose in six patients, and OP poisoning in two patients (Table 2).

The mortality rate was 36.5%. A number of 46 patients died out of 126 patients. Out of 46 patients, CVA was shown to be the most common cause of death in 20 cases (43.4%) (Table 3).

Discussion

This study observed that neurological causes were the most common causes of mortality in nontraumatic cases of impaired/altered sensorium, with ischemic stroke being the most common etiology.

There were 80 (63.5%) patients who were discharged. The duration of altered mental status, level of consciousness, GCS score, and etiology were found to be significant

Table 1: Abnormal laboratory reports

Lab investigation	*No. of patients*	*Percentage (%)*
Anemia	46	36.5
Hyponatremia	10	7.9
Hypokalemia	04	3.2
Hyperglycemia	14	11.1
Hypoglycemia	08	6.3
Hypothyroidism	02	1.6
Deranged LFT	06	4.8
Deranged RFT	12	9.5

LFT, liver function test; RFT, renal function test

Table 2: Etiology of nontraumatic cases of impaired/altered sensorium

Etiology		*No. of patients*	*Mortality (no. of patients)*
Neurological	CVA—ischemic stroke	32	10
	CVA—hemorrhagic stroke	12	10
	PRES	02	00
Metabolic	Hyponatremia	12	02
	Hypoglycemia	07	00
	Hyperglycemia/DKA	06	00
	Uremic encephalopathy	06	02
	Hepatic encephalopathy	02	02
Infections	Sepsis/MODS/CNS infections	14	04
Multifactorial	Multifactorial	18	12
Others	Drug overdose	06	00
	Status epilepticus	08	04
	OP poisoning	02	00

Table 3: Mortality of patients with different etiologies

Etiology	*No. of patients*	*Mortality (%)*
CVA	46	20 (43.4)
Metabolic encephalopathy	32	06 (18.75)
Infections including CNS infections	14	04 (28.5)
Multifactorial	18	12 (66.7)
Others	16	04 (25)
Total	126	46 (36.5)

Table 4: Prognosis of nontraumatic cases of impaired/altered sensorium

	Death	*Discharged*	*p-value*
Duration of altered mental status			
<6 hours (*N* = 48)	10	38	$p < 0.005$
7–12 hours (*N* = 26)	12	14	
13–24 hours (*N* = 16)	04	12	
>24 hours (*N* = 36)	20	16	
Level of consciousness			
Delirium (*N* = 08)	00	08	$p < 0.001$
Drowsy (*N* = 60)	04	56	
Stuporous (*N* = 36)	26	10	
Coma (*N* = 22)	16	06	
GCS score			
3–5 (*N* = 39)	32	07	$p < 0.001$
6–8 (*N* = 56)	14	42	
9–12 (*N* = 31)	00	31	

prognostic markers that correlated with the prognosis in nontraumatic cases with impaired/altered sensorium. Patients with shorter duration of altered mental status <6 hours ($p < 0.005$), greater conscious levels at admission, that is, delirium ($p = 0.001$), and GCS scores between 9 and 12 at presentation ($p = 0.001$) had better outcomes (Table 4).

Duration of symptoms for >24 hours, GCS score <5, stuporous and coma state of consciousness at admission had poorer prognosis with high mortality rate. Among etiologies, metabolic causes had overall good prognosis. Hypoglycemia patients recovered 100% with management. The mortality rate was highest in multifactorial causes (66.7%).

The results of our study are comparable with that of other studies on nontraumatic impaired/altered sensorium. John et al.,[16] in his study derived that the common etiologies of nontraumatic altered consciousness were neurological (38%), infectious (36%), followed by metabolic causes (33%). In a study by Hiremath and Shashidharan,[17] the commonest cause in patients with nontraumatic altered consciousness was intracranial causes (50%) followed by metabolic causes (44%). Nonetheless, central nervous system (CNS) infections were the most frequent cause of nontraumatic altered consciousness in 55% of patients in an Ethiopian investigation by Melka et al.[18]

Limitations of the Study

- Study sample is small.
- Subarachnoid hemorrhage (SAH) cases were not included in this study.
- Glasgow coma scale score is affected by many factors, which include language impairment, sedated state, coexisting orbital fracture, and hypoxic ischemic encephalopathy after cold exposure.
- Lack of follow-up of patients after discharge.

Conclusion

Timely detection and seeking medical attention within 6 hours of altered sensorium could lower mortality and improve outcomes. The duration of altered mental status, GCS score, level of consciousness, and etiology were the key prognostic markers in this study that correlated with prognosis in nontraumatic cases of impaired/altered sensorium. Factors that offer early prognostic information can help with resource allocation decisions because the cost of intensive care has significantly increased.

The prognosis can be determined by a simple clinical evaluation of neurological function, paying particular attention to the level of consciousness, focal neurological signs, and brainstem reflexes. The management of these patients is improved through comprehension of the most common causes of nontraumatic cases of impaired or altered sensorium.

References

1. Chandra SR, Suresh K, Sanuwatson R, et al. Encephalopathy in critically ill patients. J Assoc Physicians India 2012;60:30–34.
2. Edlow JA, Rabinstein A, Traub SJ, et al. Diagnosis of reversible causes of coma. Lancet 2014;384:2064–2076.
3. Yeolekar ME, Trivedi TH. Febrile encephalopathy: challenges in management. J Assoc Physicians India 2006;54:845–847.
4. Lamar CD, Hurley RA, Taber KH. Sepsis-associated encephalopathy: review of the neuropsychiatric manifestations and cognitive outcome. J Neuropsychiatry Clin Neurosci 2011;23:237–241.
5. Stevens RD, Pustavoitau A, Sharshar T. Acute encephalopathy. In: Bhardwaj A, Mirski MA. Current Clinical Neurology: Handbook of Neurocritical Care, 2nd edition. Totowa, NJ: Springer; 2010. p. 287.
6. Berisavac II, Jovanovic DR, Padjen VV, et al. How to recognise and treat metabolic encephalopathy in neurology intensive care unit. Neurol India 2017;65:123–128.
7. Leong LB, Jian KHW, Vasu A, et al. Prospective study of patients with altered mental status: clinical features and outcome. Int J Emerg Med 2008;1:179–182.
8. Kekec Z, Senol V, Koc F, et al. Analysis of altered mental status in Turkey. Int J Neurosci 2008;118:609–617.
9. Xiao HY, Wang YX, Xu TD, et al. Evaluation and treatment of altered mental status patients in the emergency department: life in the fast lane. World J Emerg Med 2012;3:270–277.
10. Nirhale S, Kanitkar SA, Bhate AS, et al. Study of etiological factors responsible for non-traumatic coma in geriatric population. Indian J Basic Appl Med Res 2015;5:814–817.
11. Sarin SM, Debabrata G, Das M. Study of etiological profile and outcome predictors in nontraumatic coma. Int J Med Res Health Sci 2016;5:122–126.
12. Weiss N, Regard L, Vidal C, et al. Causes of coma and their evolution in the medical intensive care unit. J Neurol 2012;259:1474–1477.
13. Bates D, Caronna JJ, Cartlidge NE, et al. A prospective study of nontraumatic coma: methods and results in 310 patients. Ann Neurol 1977;2:211–220.
14. Forsberg S, Hojer J, Ludwigs U. Prognosis in patients presenting with non-traumatic coma. J Emerg Med 2012;42:249–253.
15. Horsting MWB, Franken MD, Meulenbelt J, et al. The etiology and outcome of non-traumatic coma in critical care: a systematic review. BMC Anesthesiol 2015;15:65.
16. John B, Loomba V, John M. Etiology, clinical profile and outcome of encephalopathy in elderly. J Assoc Physicians India 2020;68:63–66.
17. Hiremath RS, Shashidharan P. A study of nontraumatic coma with respect to etiology and outcome. Int J Contemp Med Res 2016;3:1854–1858.
18. Melka A, Tekie-Haimanot R, Assefa M. Aetiology and outcome of non-traumatic altered states of consciousness in north western Ethiopia. East Afr Med J 1997;74:49–53.