

Aetiology and Short-term Outcome of Altered Level of Consciousness among Patients in Medicine Department of a Tertiary Hospital

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Abstract:

Background: Altered level of consciousness is a very common medical emergency resulting in considerable mortality & morbidity. Accurate diagnosis & prompt management can reduce the complications to a great extent. There are various aetiologies of impaired consciousness including infective & metabolic causes as well as cerebrovascular accidents. This study described clinical outcomes of the patients relating to specific aetiologies of the illness.

Objectives: To explore the common aetiologies of altered consciousness & to determine the clinical outcomes of the patients after one month in a tertiary level hospital of Bangladesh.

Methods: This hospital based prospective observational study was conducted in Medicine department of Dhaka Medical College Hospital (DMCH) from December 2013 to May 2014. Sample size was 100 & the data was collected by structured questionnaire. Purposive sampling method was applied using inclusion & exclusion criteria. Statistical analysis of the result was obtained by using SPSS-16.

Results: The mean age of the study patients was found 48.7 years with range from 19-92 years. Majority (58%) of the patients were male. Stroke was identified as the commonest (39%) aetiology of impaired consciousness followed by meningo-encephalitis (19%), septicemia (10%) & poisoning (10%). Among metabolic encephalopathy diabetic ketoacidosis was 3%, hypoglycemia 1% and hepatic, uremic & hypertensive encephalopathy was 3%, 4% & 1% respectively. Overall death rate was higher among patients with stroke (26%), ICSOL (50%), ADEM (50%) than those with meningoencephalitis (5.3%), septicemia (20%) & poisoning (10%).

Conclusion: Infective & metabolic causes of impaired consciousness showed better outcome than structural & vascular aetiologies of brain.

Keywords: Altered level of consciousness, Stroke, ADEM.

Introduction:

Altered level of consciousness includes a spectrum of disorders that range from mild confusion to deep coma.¹ The common aetiologies are divided into two broad groups: structural causes and medical causes. Structural causes include vascular (Stroke, Cerebral vein thrombosis) and those causing raised intracranial pressure (Hydrocephalus, tumour, cyst and abscess). Medical causes are anoxia, hypothermia/hyperthermia; metabolic (DKA, Uraemia and Hypoglycemia);

dyselectrolytemia; infection (sepsis, meningitis, encephalitis); toxins & psychogenic.²

It was shown in the literatures that metabolic and infective causes of altered consciousness provide the best outcome, whereas if it is associated with structural damage, such as cerebrovascular disease or subarachnoid haemorrhage, tends to have the poorest outcome.³ Current epidemiological studies rarely focus on altered state of consciousness with very few literatures in the context of developing countries like ours. It was estimated that over 8% of admissions in the emergency wards of large municipal hospitals in the UK are due to conditions that cause a disorder of consciousness among which death rate is about 12%.⁴ Another survey study conducted over a 3 years' period at department of Medicine in a tertiary care hospital of Thailand, showed that impaired consciousness is a major problem which accounts about 4-10% of all patients admitted in the emergency department⁵

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In a study done at Chittagong Medical College Hospital, cerebral malaria topped the list of the causes comprising

31% of the patients. This was followed by stroke 21%, meningitis 15%, acute poisoning 13%, hepatic encephalopathy 10%, hypovolumic shock 6%, septicemic shock 2% and hypoglycemic shock 2%.⁶ Another study conducted in a tertiary hospital of northern part of Bangladesh showed stroke (44%), meningitis (16%) and acute poisoning (12%) as to the common causes. Other causes included – hypoglycemia (6%), cerebral malaria (5%), hepatic encephalopathy (5%), electrolyte imbalance (3%), renal failure with uremic encephalopathy (3%), respiratory failure and DKA (2% each), ICSOL and septicemia (1% each). In consideration of in-hospital outcome of the patients, stroke patients comprised of the highest death rate (31.8%) in comparison to other infective and metabolic aetiologies of the illness.⁷ Our study was designed to assess the outcome of such patients over a period of one month at a tertiary hospital in the capital city of Bangladesh. Our aim is to explore the common causes of impaired consciousness (GCS<15) among the admitted patients and to assess the mortality and morbidity of these patients within a period of 1 month based on the specific aetiologies.

Materials & methods:

Our study was observational, prospective, hospital based conducted over 100 patients admitted in medicine department of a tertiary hospital. The sampling method was purposive and included all consecutive patients of impaired consciousness over a period of six months. The patients who were selected as cases of altered level of consciousness, fulfilled one or more of the following criteria⁸

- GCS < 15
- Disorientation about time, place & person.
- Diminished or absent response to verbal or physical stimuli.
- Somnolence.
- Inability to maintain arousal
- Hallucinations
- Confusion or other abnormal behavior.

All patients of age >18 years irrespective of sex with informed written consent from guardians were included. Patients with past history of Cerebrovascular disease (CVD), epilepsy, syncope, a known psychiatric disease, using psychotropic drugs or impaired consciousness persisting more than seven days were excluded. The most commonly used tool for measuring level of consciousness objectively “Glasgow Coma Scale (GCS)” was used. Meticulous history was taken regarding symptoms (onset and duration) and detailed clinical examination was performed in each patient. A structured case record form was prepared containing age, sex, onset of illness, previous medical illness and grading of

unconsciousness. Appropriate and necessary investigations (serum electrolytes, blood sugar, complete blood count, liver, renal and thyroid functions, chest x-ray, Ultrasonogram, cranial computed tomography and cerebrospinal fluid studies) were done to find out exact aetiology of the illness as well as to determine the future outcome or progression of the disease. Patients were followed up throughout their hospital stay up to discharge & once again after one month for evaluation of clinical outcome after receiving treatment. Outcome was assessed by three variables: Improvement, Improvement with residual disability and Death. The study was approved by institutional ethical committee. Statistical analyses were carried out by using the statistical Package for Social Sciences (SPSS) version 16.0 for Windows. P values of <0.05 were considered as statistically significant. Confidence interval was set at 95%.

Results:

Majority (42%) of the patients belonged to age group 46-60 years which was 25 (43.1%) in male and 17 (40.5%) in female. Mean age was found 50.3±16.3 years in male patients & 46.5±14.9 in case of female patients. Male to female ratio was 1.4:1 (Table I).

Table I

Age & sex distribution of the study patients (n=100)

Age (in years)	Sex				P value
	Male(n=58)		Female(n=42)		
	n	%	n	%	
≤30	10	17.2	7	16.7	
31-45	8	13.8	12	28.5	
46-60	25	43.1	17	40.5	
61-75	13	22.4	5	11.9	
>75	2	3.5	1	2.4	
Mean±SD	50.3	±16.3	46.5	±14.9	0.236 ^{ns}
Range (min, max)	(19, 92)		(19, 77)		

ns= not significant

In most of the cases (40%), onset of illness was sub-acute i.e. it took 6-24 hours to reach in a state of impaired consciousness. 38% of the patients gradually developed altered level of consciousness which took more than 24 hours, while 22% abruptly experienced the illness (Table II).

Table II

Distribution of the study patients according to onset of altered consciousness (n=100)

Onset of the illness	Number of patients	Percentage
Abrupt/ Acute (<6 hrs.)	22	22.0
Sub-acute (6-24 hrs.)	40	40.0
Gradual (>24 hrs.)	38	38.0

More than half (53%) of the patients had GCS 6-10 followed by 27% GCS 3-5 and 20% had GCS 11-14 at the time of presentation. The mean GCS was found 7.67±3.1 (Table III).

Table III

Distribution of the study patients according to grading of consciousness (n=100)

GCS grading	Number of patients	Percentage
GCS (3-5)	27	27.0
GCS (6-10)	53	53.0
GCS (11-14)	20	20.0
Mean±SD	7.67	±3.1
Range (min, max)	(3,	14)

39% patients were diagnosed as stroke; among them 25 (43.1%) were male and 14 (33.3%) were female. Stroke was followed by meningo-encephalitis (19%), septicemia (10%) & poisoning (10%) as causes of impaired consciousness (Table IV).

Among 39 stroke patients 6 (15.4%) completely improved, 10 (25.6%) died and 23 (59%) improved with residual disability. Death rate was higher among patients of hemorrhagic stroke (36%) compared to those of ischemic stroke (13%). A total 19 patients had meningo-encephalitis, among them 16 (84.2%) patients improved, 1 (5.3%) expired and 2 (10.5%) improved with disability (Table V).

A total 10 patients with stroke had died; among them 3 (30%) patients died within 24 hours of hospital admission, 5 (50%) patients within 2-7 days, 1 (10%) within 8-14 days and 1 (10%) patient died within 15-30 days of hospital admission. One patient with meningo-encephalitis died on third day after hospital admission. Two patients of septicemia patient died within 2-7 days (Table VI).

Out of 23 patients of stroke with residual disability, 13 (56.5%) had been suffering from focal neurological weakness (in the form of hemiparesis/hemiplegia). When they were followed up after one month. 2 patients of meningo-encephalitis developed multiple cranial nerve palsy and 1 patient of ICSOL developed complete blindness (Table VII).

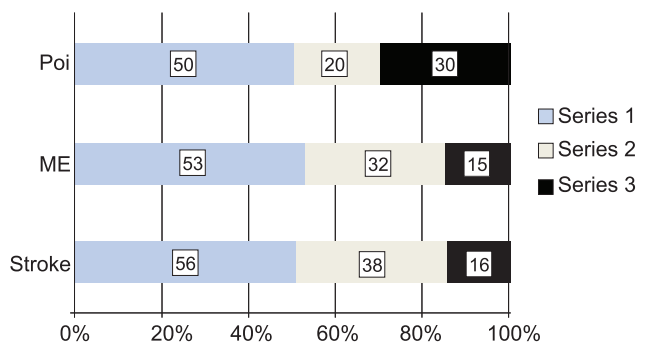


Fig 1: Different varieties of stroke, meningo-encephalitis and poisoning.

Table IV

Distribution of the study patients according to aetiology of altered consciousness (n=100)

Diagnosis	Sex				Total patients (n=100)	
	Male(n=58)		Female(n=42)		n	%
	n	%	n	%		
Stroke	25	43.1	14	33.3	39	39
Meningo-encephalitis	10	17.2	9	21.4	19	19
Septicemia	4	6.9	6	14.3	10	10
Poisoning	7	12.1	3	7.1	10	10
Diabetic ketoacidosis	2	3.4	1	2.4	3	3
Dyselectrolytemia	1	1.7	2	4.8	3	3
Hypoglycemia	0	0.0	1	2.4	1	1
Uremic encephalopathy	1	1.7	2	4.8	3	3
Hepatic encephalopathy	3	5.2	1	2.4	4	4
Status epilepticus	2	3.4	0	0.0	2	2
ICSOL	1	1.7	1	2.4	2	2
Hypertensive encephalopathy	1	1.7	0	0.0	1	1
Thyrotoxic crisis	0	0.0	1	2.4	1	1
Acute disseminated encephalomyelitis (ADEM)	1	1.7	1	2.4	2	2

ME : meningo-encephalitis , Poi : poisoning

Stroke: series 1 = haemorrhagic, series 2 = ischaemic, series 3 = subarachnoid haemorrhage

Meningo-encephalitis: series 1 = bacterial, series 2 = viral, series 3 = tuberculous

Poisoning: series 1 =unknown, series 2 =sedative, series 3 = organophosphorus.

Table V
Clinical outcomes of patients with altered consciousness (n=100)

Diseases	Outcomes					
	Improved (n=55)		Death (n=19)		Improved with disability (n=26)	
	n	%	n	%	n	%
Stroke	39	6	15.4	10	25.6	23 59.0
Meningo- encephalitis	19	16	84.2	1	5.3	2 10.5
Septicemia	10	8	80.0	2	20.0	0 0.0
Poisoning	10	9	90.0	1	10.0	0 0.0
Diabetic ketoacidosis	3	3	100.0	0	0.0	0 0.0
Dyselectrolytemia	3	3	100.0	0	0.0	0 0.0
Hypoglycemia	1	1	100.0	0	0.0	0 0.0
Uremia	3	2	66.7	1	33.3	0 0.0
Hepatic encephalopathy	4	3	75.0	1	25.0	0 0.0
Status epilepticus	2	1	50.0	1	50.0	0 0.0
ICSOL	2	0	0.0	1	50.0	1 50.0
Hypertensive encephalopathy	1	1	100.0	0	0.0	0 0.0
Thyrotoxic crisis	1	1	100.0	0	0.0	0 0.0
ADEM	2	1	50.0	1	50.0	0 0.0

Table VI
Occurrence of death after admission into hospital (n=19)

Cause of death	Total	Occurrence of death							
		<1 day		2-7 days		8-14 days		15-30 days	
		n	%	n	%	n	%	n	%
Stroke	10	3	30.0	5	50.0	1	10.0	1	10.0
Meningo- encephalitis	1	0	0.0	1	100.0	0	0.0	0	0.0
Septicemia	2	0	0.0	2	100.0	0	0.0	0	0.0
Poisoning	1	1	100.0	0	0.0	0	0.0	0	0.0
Acute renal failure	1	1	100.0	0	0.0	0	0.0	0	0.0
Status epilepticus	1	1	100.0	0	0.0	0	0.0	0	0.0
ICSOL	1	0	0.0	1	100.0	0	0.0	0	0.0
Hepatic encephalopathy	1	0	0.0	1	100.0	0	0.0	0	0.0
ADEM	1	0	0.0	1	100.0	0	0.0	0	0.0

Table VII
Pattern of disability during follow up after one month (n=26)

Cause of disability	n	Pattern of disability									
		Aphasia		Dysarthria		CN palsy		Hemiparesis/ Hemiplegia		Blindness	
		n	%	n	%	n	%	n	%	n	%
Stroke	23	5	21.7	3	13.04	2	8.7	16	69.56	0	0.0
ME*	2	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0
ICSOL	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0

*Meningo-encephalitis

Discussion:

Altered level of consciousness is a very common emergency presentation with considerable mortality and morbidity. This prospective observational study was carried out with an aim to observe the short-term clinical outcomes of the patients within one month.

In our series unconsciousness due to CVD was common in the elderly and older age group and acute poisoning, meningo-encephalitis; hepatic encephalopathy had been common in younger age groups which was consistent with Ziaul Huq's series.⁷

Out of all respondents in our series, Male-female ratio was 1.4:1. In Ziaul Huq's series the ratio was 1.7:1.⁷ In Higashi et al series incidence of coma in male was 62.18% and in female 37.82%.⁹ The male predominance of the study may be due to the fact that females are mostly neglected in our society and they usually do not get proper attention during their illness and also due to religious and social ground, they appear less commonly before medical facilities than males.

In our series the commonest cause (39%) was stroke. In Ziaul Huq's series commonest cause of unconsciousness was also stroke (44%).⁷ But, in Amdadul Haque's series cerebral malaria was the commonest cause (31%).⁶ That study was conducted in southern part of Bangladesh where malaria is endemic. In a study Melka et al found the commonest cause of unconsciousness in Ethiopia was due to infections 111 (55%). Geographical variation might play an important role for the inconsistency of our findings with that of Melka et al.¹⁰

In our study population Hypertension, Diabetes Mellitus (DM), Ischemic Heart Disease (IHD), Chronic Kidney Disease (CKD) and Chronic Liver Disease (CLD) were identified as previous medical illness. Among them Hypertension and DM were most common comprising of 26% and 17% respectively of total study patients, which contributed mostly as risk factors of CVD or stroke. Therefore, in many cases previous medical illnesses were responsible for presenting conditions of the patients.

Similar to study done by Levy et al haemorrhage and infarction constitute major percentage of our stroke patients.¹¹ Regarding infective cause, our series was similar to Ziaul Huq's series where pyogenic cause was the commonest (52.6% vs 50%).⁷ Regarding poisoning the common cause was unknown poisoning whereas in other series insecticide poisoning was common in other parts of our country.^{6,7}

Out of all stroke patients one-fourth died and more than half survived with residual disability and majority of the patients

had focal neurological weakness in the form of hemiparesis or hemiplegia, when they were followed up at a period after one month. In case of meningo-encephalitis 84.2% completely improved after treatment during hospital stay where clinical outcome was quite satisfactory. Out of septicemic patients 80% completely improved during discharge from hospital. 90% patients of poisoning completely recovered within 48 hours of hospital admission. All the patients suffered from DKA, electrolyte imbalance, hypertensive encephalopathy and thyrotoxic crisis fully recovered from emergency life-threatening situation within 72 hours of hospital admission. Early diagnosis was the key factor that helped rapid recovery of all these patients in hospital setting. In case of ADEM, the diagnosis was slightly delayed due to lack of investigation facilities. The prognosis was worst in case of ICSOL.

Overall structural lesions (ICSOL and ADEM) and vascular accidents (stroke) of brain bear poorest outcome among all the etiologies of impaired consciousness. This finding is almost consistent with that of Ziaul Huq's⁷ series but was different from Melka et al¹⁰ where infective causes topped the list followed by metabolic derangements and structural neurological lesions.

The limitation of the study is that it was conducted with small sample size. Follow-up period was also very short. Therefore, the outcome of this study fails to represent the actual scenario of the total patients with altered consciousness in medicine department. Results of this study should be proved in larger trial.

Conclusion:

Altered level of consciousness is a very common emergency presentation in medicine department. It poses really a diagnostic and therapeutic challenge for the physicians to save valuable lives of the patients. This study included 100 patients among which stroke, meningo-encephalitis, septicemia, acute poisoning, diabetic ketoacidosis, dyselektrolytemia and acute renal failure with uremic encephalopathy and hepatic encephalopathy were identified as major causes of altered consciousness. All the patients were followed up throughout the period of hospital stay and once again after one month. Taking various outcomes into consideration, it can be concluded that proper clinical evaluation & early intervention saved the valuable lives of many patients diagnosed as meningo-encephalitis and septicemia. Poisoning and metabolic derangements also bear favorable outcome. On the contrary, structural and vascular lesions of brain proved to have poorest outcome in this study.

Diagnostic facilities specially imaging techniques must be available and affordable to general people so that these lesions can be identified at the earliest possible time after admission, because, successful treatment and prognosis depends on the identification of specific etiology.

Conflict of interest: None.

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