

Aetiology and Prognosis of Non-Traumatic Coma

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ABSTRACT

BACKGROUND

Coma is a serious and common condition where there is severe derangement of neurological function, which needs immediate critical-care attention. Prognosis is good in patients with non-traumatic coma because of advances in medical care. Determination of the cause of non-traumatic coma is a challenge for the physician. It is important to discriminate between structural causes and non-structural causes. The simple clinical assessment of neurological function with special reference to the level of coma, focal neurological signs, and brainstem reflexes may predict the prognosis. Our study aimed to analyse the aetiology of non-traumatic coma and various factors that influence the prognosis.

METHODS

One hundred patients with non-traumatic coma were recruited in our study. History of illness was obtained through all the available sources and then the clinical examination was done at regular intervals with the special focus on Glasgow Coma Scale (GCS). All clinical findings were recorded as per the proforma in Excel sheet and analyzed with the Statistical Package for the Social Sciences (SPSS). All patients were followed till their recovery, discharge or death in our teaching hospital. Prognosis was correlated with aetiology, clinical features and GCS.

RESULTS

Out of 100 patients, 63 were male and 37 were female. Cerebro-Vascular Accident (CVA) was the commonest cause of coma (65%) followed by infections (20%) and metabolic disorders (10%). Onset of coma was significantly associated with the prognosis of non-traumatic coma and the mortality was more in patients with abrupt onset of coma ($p > 0.05$).

CONCLUSIONS

Cerebro-Vascular Accident is the major cause of non-traumatic coma, followed by infections. Mortality is high with intracranial aetiology when compared metabolic disorders. GCS score at the time of admission is the key predictor for the prognosis of non-traumatic coma. Status of brainstem reflexes will also help determining the prognosis.

KEYWORDS

Aetiology, Non-Traumatic Coma (NTC), Glasgow Coma Scale (GCS), Prognosis

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DOI: 10.18410/jebmh/2020/375

How to Cite This Article:

Raju JRSD. Aetiology and prognosis of non-traumatic coma. J. Evid. Based Med. Healthc. 2020; 7(34), 1810-1813. DOI: 10.18410/jebmh/2020/375

*Submission 11-05-2020,
Peer Review 16-05-2020,
Acceptance 16-06-2020,
Published 24-08-2020.*

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BACKGROUND

Coma is a serious and common condition which indicates severe derangement of neurological function. It needs immediate critical-care attention. With recent advances in medical management, prognosis is good in patients with non-traumatic coma. [1] Around 5% of the patients attending the emergency department are with altered mental state and 1% of the admissions at the emergency department are due to coma. [2] Coma is also a frequent cause for subsequent admission to the intensive care units. Less than 10 points on Glasgow Coma Scale (GCS) is considered as coma. [3]

The GCS was used accurately by experienced and highly trained users, but inexperienced users made consistent errors. The errors were such that they would not be detectable by studies that examine only interobserver agreement, and they were substantial, averaging in some cases more than one point on the four-point and five-point scales of the GCS. Also, the error rates were highest at the intermediate levels of consciousness, for which the detection of changes in condition is vital. [4] Coma, without a history of a traumatic event can be fatal if the aetiological components are not detected or treated adequately. [5]

There are nine univariate factors statistically associated with outcome were Glasgow Coma Scale score, systolic blood pressure, pulse pressure, horizontal and vertical gaze palsies, severity of weakness, presence of brainstem-cerebellar deficits, interval stroke course, and parenchymal haemorrhage size. [6] Most common aetiological factor for Non-traumatic coma in Ebunyi State University Teaching Hospital (EBSUTH), South Eastern Nigeria was infection with cerebral Malaria. So increased efforts in controlling infection can reduce the incidence of NTS. [7]

However, the determination of the cause of NTC is a challenge for the physician, it is important to discriminate between structural causes and non-structural causes of NTC by means of a Computer Tomographic (CT) scan. [8] Functional recovery did not depend on age but was to some degree related to the cause of coma (subarachnoid haemorrhage and other cerebrovascular disease having the worst recovery; hypoxia-ischemia, intermediate; and hepatic and miscellaneous causes, best) and especially to early clinical signs of brain dysfunction. [9]

Even with the well-defined emergency management and the recent developments in the investigations, the problem of predicting prognosis at an early stage still remains unresolved. The simple clinical assessment of neurological function with special reference to the level of coma, focal neurological signs; and brainstem reflexes may predict the prognosis.

Knowledge of the most frequent causes of NTC may improve the management of these comatose patients. Our study was conducted to analyse the aetiology of non-traumatic coma and various factors influencing its prognosis.

METHODS

One hundred patients were recruited in our study, with non-traumatic coma from the medical wards and acute medical care units at a tertiary care teaching hospital, located in East Godavari district of Andhra Pradesh. Institutional Ethical Committee clearance was obtained before starting the study. Our study period was from June 2018 to January 2020. Our sample comprised of 63 male and 37 female patients. The criterion for the selection of cases was the presentation of patients with loss of consciousness and without any psychologically understandable response to external stimuli or inner need. Patients in the age group below 12 years, with head injuries and coma related to general anesthesia were not included in our study. History of illness was obtained through all the available sources and then the clinical examination was done at regular intervals with the special focus on Glasgow Coma Scale (GCS). aetiology of coma, level of consciousness determined by eye opening, motor and verbal responses; duration of coma, clinical signs such as pupillary, corneal and oculovestibular reflexes were considered as prognostic indices.

At the end of 24 hours of admission into emergency room, patients were re-examined for spontaneous eye movements, oculovestibular response, motor withdrawal response and inappropriate verbal response. Important clinical signs such as brainstem reflexes were followed up throughout the course. All efforts have been made to confirm the clinical diagnosis by available investigations. Computer Tomographic scan was done in most of the patients and MRI scan as and when required.

All the clinical findings were recorded as per the pro-forma, with the help of MS office excel sheet and the data was further analyzed by the Statistical Package for the Social Sciences (SPSS) version 16. All the patients were followed till their recovery, discharge or death in our teaching hospital. Prognosis was correlated with aetiology, gender, clinical features and GCS.

RESULTS

In our study 20% of the patients were with the age less than 40 years. 25% of the patients were in the age group between 41 to 50 years, 30 % of the patients were in the age group between 51 to 60 years, 20 % were in the age group 61 to 70 years and 5 % of the patients were in the age group above 70 years.

Cerebro-Vascular Accident (CVA) was the commonest cause of coma observed in 65% of the patients in our study, followed by infections observed in 20% of the patients. Metabolic disorders include 10% of the patients (Table 1). Prognosis in terms of recovery or expiry of patient and in relation to the aetiology of non-traumatic coma was shown in table 2.

Aetiology	Number of Patients
Cerebro-Vascular Accident (CVA)	65
Infections	20
Metabolic disorders	10
Poison/toxins	3
Other causes	2

Table 1. Aetiological Groups among non-traumatic coma Patients

Based on the history of onset of coma patients were divided into two groups; abrupt onset and gradual onset. Onset of coma was statistically associated with the prognosis of non-traumatic coma and the mortality was more in patients with abrupt onset of coma ($p>0.05$). Prognosis was also related to the level of coma based on GCS at the time of admission. Mortality was more in the group where there was no response eye opening to stimuli and in the group where there was no response to verbal stimuli. Extensor posture was also associated with high mortality rate.

DISCUSSION

Our present study shown that the major aetiology for non-traumatic coma was Cerebro-Vascular Accident (CVA); which was similar to the studies done by Thacker et al,^[10] Sharma et al,^[11] Dhamija et al,^[12] in India and Plum et al.^[13] In our study non-traumatic coma was caused by metabolic disorders in 10 % of cases when compared to 21.8% in the study done by Bates et al,^[14] and 6% in another study done by Levy et al.

The GCS score at the time of presentation to the emergency room was between 3 and 9 in our study and it was used to categorize the severity of coma, similar categorization as also done in the study done by Sacco et al.^[15] In our study, patients with scores of 3 on GCS had an intra-cerebral hemorrhage and had 97.7% mortality when compared to 85.2%, 75% and 84% mortality in the studies done by Sacco et al,^[15] Thacker et al, et al, ^[10] and Dhamija et al,^[12] respectively.

In a study done by Schutte et al,^[16] patients with acute meningitis with a GCS above 12 had a recovery rate 96% when compared to 60% in our present study. Schutte et al,^[13] also observed that those patients with GCS less than 8 had only 15% recovery rate. Our study shown that GCS score of 3-6 was associated with a significantly higher hospital mortality rate than a GCS score of 7-10; which was similar in the studies done by Overell et al,^[17] Prabhakara et al,^[18] and Havlir et al,^[19]

Another parameter found useful in predicting prognosis of non-traumatic coma was the presence or absence of brainstem reflexes. In this study there were 17 cases with absent brainstem reflexes and associated with 100% mortality rate. It was also observed that the mortality rate was 31.3% in the patients with intact brainstem reflexes; these findings were in accordance to studies done by Levy et al. Overell et al,^[17] and Prabhakara et al.^[18]

Aetiology	Prognosis	Total	Gender	
			Male	Female
Cerebro-Vascular Accident (CVA)	Recovered	34	24	10
	Expired	31	17	14
	Total	65	41	24
Infections	Recovered	12	8	4
	Expired	8	5	3
	Total	20	13	7
Metabolic disorders	Recovered	8	4	4
	Expired	2	1	1
	Total	10	5	5
Poison / toxins	Recovered	2	2	0
	Expired	1	1	0
	Total	3	3	0
Other causes	Recovered	1	0	1
	Expired	1	1	0
	Total	2	1	1

Table 2. Prognosis of Patients with 'Non-Traumatic Coma' in Relation to Aetiology

CONCLUSIONS

Cerebro-Vascular Accident is the major cause of non-traumatic coma, followed by infections. There was no significant relation between the age group, and prognosis in patients with non-traumatic coma; but, the type of onset of coma is associated with prognosis. Mortality is high with intracranial aetiology when compared metabolic disorders. GCS score at the time of admission is the key predictor for prognosis of non-traumatic coma. Status of brainstem reflexes will also help in determining the prognosis.

I would like to thank the postgraduate students in my department for their help in reporting the cases throughout the study period and for helping with data entry.

Financial or Other Competing Interests: None.

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