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Study of etiological profile and outcome predictors in nontraumatic coma

***Sarin S. M.[1], Gowsami Debabrata[2] and Das Marami[3]**

[1]Dept of Medicine, Academy of Medical Sciences, Pariyaram, Kerala, India
[2]Dept of Medicine, Gauhati Medical College, Guwahati, Assam, India
[3]Dept of Neurology, Gauhati Medical College, Guwahati, Assam, India
Corresponding Email: sarinsm@gmail.com

ABSTRACT

To study the etiological profile of non traumatic coma patients and identify the clinical factors those are predictive of the outcome Prospective observational hospital based study where non traumatic comatose patients of age more than 13 with GCS ≤8 over a period of 12 months were studied. Patients were examined with detailed history, systemic examination and necessary investigations. Initial and 24 hour GCS scores recorded and patients were followed up for 2 weeks to record Glasgow outcome score. Data was analysed using necessary statistical tools Commonest cause for non traumatic coma is cerebrovascular accident followed by metabolic encephalopathy and infections. Total mortality was 58.75% with highest mortality among cerebrovascular accident cases (69.44%). Total duration of coma had significant negative correlation with outcome score(r=-0.2604). Initial and 24 hr GCS score have significant positive correlation with the outcome score. Multivariate regression analysis showed that out of GCS parameters only motor response had significant predictive contribution to outcome. Low GCS≤5, abnormal pupillary response and absent dolls eye response had high positive predictive value for mortality of comatose patients. CVA is the commonest cause of Non traumatic coma in tertiary care centre and it has the worst prognosis among its causes. Prolonged duration of coma, initial and 24 hr GCS score, motor response and brain stem reflexes have high predictive value in the functional outcome of comatose patient.

Key words: Non traumatic coma, Outcome, Etiological profile

INTRODUCTION

Coma is an important presentation of patients at any emergency department. Early clinical assessment and etiological diagnosis may prove to be vital in overall prognosis of the patient. It is essential to know about the etiological profile of comatose patients presenting at a tertiary care centre so that a more well informed and early diagnosis can be made in such patients.

The initial presentation of a comatose patient definitely will determine the ultimate prognosis and it is important to identify the key prognostic clinical indicators which can successfully predict the outcome. The prediction of prognosis will be beneficial as management of such patients can be expensive and tiresome affair to the caregivers, medical fraternity and the society as a whole. This is of great relevance in middle and low income group countries especially for better effective utilisation of limited resources.

In this study we aimed to identify the etiological profile of patients presenting at emergency department with non traumatic coma and also try to assess their outcome pattern and clinical factors that can be useful in the prediction of overall prognosis.

MATERIALS AND METHODS

This is a prospective observational hospital based study which was conducted in a tertiary care centre for a period of 12 months. All patients who presented to the emergency department and was admitted in the hospital in a coma with

Glasgow Coma Scale (GCS) of ≤ 8 at the time of presentation and age more than 13 years were included in the study. Patients with history of trauma and head injury or with previous psychiatric disorders were excluded from the study.

Selected patients were initially resuscitated at the emergency department as per protocol and he or she was stabilised with respect to airway, breathing and circulation. Alongside the initial stabilisation a detailed history was taken from all possible witnesses including relatives and emergency personnels. A thorough general and systemic examination was done after the stabilisation according to the validated proforma with special attention to neurological findings. Before starting the patient on IV fluids blood samples were collected for basic blood investigations. Necessary radiological and special investigations including CSF analysis were done according to the clinical requirement. Informed written consent from responsible bystanders was taken before the data collection.

Follow up of the patients were done regularly with recording of GCS score twice, at the time of presentation and after 24 hours of presentation. Patients were followed up for a period of 2 weeks of hospital stay and outcome recorded at the end of follow up period or at the time of discharge/death, whichever is earlier, by Glasgow Outcome Score(GOS). Glasgow outcome score graded the outcome from 1 to 5 in which 1 being mortality and 5 being good recovery.

Statistical Analysis:
The descriptive variables including the age/sex distribution, clinical presentation, etiological profile and outcome were represented by percentages and mean. The clinical variables were analysed with regard to the patient outcome score by various statistical methods including Fisher exact test and Multiple regression analysis. For all statistical evaluation a two tailed probability value of <0.05 was considered to be significant.

RESULTS

Total of 80 patients who presented at emergency department of the tertiary care centre during the study period fulfilling inclusion and exclusion criteria were included in the study. Out of the 80 cases 74% (59) were males and 26% (21) were females. Mean age of the study population was calculated as 47.61 with majority of patients falling in middle age group between 30-60 years (63.75%). Apart from unconsciousness, major presenting complaints included vomiting, fever, headache, behavioural changes, seizure and alcohol/substance abuse. 37.5% had past history of hypertension whereas 17.5% had history of diabetes mellitus. 41.25% of study population had smoking habits and 28.75% had history of chronic alcohol abuse.

Etiological profile and Outcome: Out of the 80 patients, most common cause of non traumatic coma was Cerebrovascular accident (CVA) accounting for 45% (36) of the cases. This was followed by metabolic encephalopathy, CNS and other infections, septicaemia and poisoning. Detailed etiological profile is provided in Table 1.

Table 1: Etiological profile for coma in the study population

Etiology	Number of patients(80)
Cerebrovascular accidents	36(45%)
Intracranial Haemorrhages	33
Cerebral Infarcts	3
Metabolic encephalopathy	17(21.25%)
Hypoglycaemia	7
Uraemic encephalopathy	3
Hepatic encephalopathy	3
Others	4
CNS Infections	10(12.5%)
Viral meningoencephalitis	7
Pyogenic Meningitis	2
Tuberculous meningitis	1
Other infections	6(7.5%)
Complicated Malaria	4
Septicaemia	2
Poisoning	4(5%)
Organophosphorous	3
Others	1
Other causes	7(8.75%)
Status epilepticus	4
Dilated cardiomyopathy with shock	1
Complete Heart block with hypoxic brain injury	1
Subacute sclerosing panencephalitis	1

58.75% (47) of the patients expired within the follow up period. Out of the 41.25% (33) patients survived, 20% (16) had normal to near normal recovery and 21.25% (17) survived with moderate to severe disability. Outcome of patients with different etiologies are given in Table 2. Data shows highest mortality among patients with cerebrovascular accident and lowest among patients with metabolic encephalopathy.

Table 2: Mortality of patients with different etiologies

Etiology	Number of patients	Mortality
Cerebrovascular Accident	36	25(69.44%)
Metabolic encephalopathy	17	6(35.29%)
Infections including CNS infections	16	11(68.75%)
Poisoning	4	2(50%)
Others	7	3(42.86%)
Total	**80**	**47(58.75%)**

Prognostic indicators:
Duration of coma at the time of presentation to the emergency department was found to be having significant negative correlation to overall outcome with Pearson correlation coefficient r as -0.2604 (p=0.0197). Patient presenting <12 hours to the hospital has lower mortality rates of 43.58% whereas those presented after 48hrs had 100% mortality.

Initial GCS score at presentation was analysed for association with mortality using Fisher exact test and GCS score was found to be having significant association with mortality(p=0.0029). Correlation of both GSC scores at presentation and after 24 hrs were analysed with the Glasgow outcome score (GOS) and it was found that both the values had highly significant correlation with GOS, r being 0.446 and 0.824 respectively (p<0.0001). 24 hour GCS score was having higher correlation to the outcome (GOS) score than the initial GCS.

Among the individual variables of GCS score namely eye response, verbal response and motor response, after a multivariate regression analysis with respect to outcome score (GOS) only motor response showed significant predictive contribution to the final outcome (Table3).

Table3: Multivariate regression test, contribution of individual variable of GCS score

Variables	t ratio	p value	Significance
Constant	1.291	0.2006	No
Eye response	1.509	0.1354	No
Verbal response	1.808	0.0746	No
Motor response	2.663	0.0095	Yes

Low GCS score (≤5), abnormal pupillary response and absent dolls eye response were found to be having significant predictive value in mortality of comatose patients. Abnormal pupillary response had high sensitivity, specificity and positive predictive value in the prediction of mortality (0.766, 0.848 and 0.878 respectively). Low GCS (≤5) and absent dolls eye response also had high specificity and positive predictive value in predicting mortality even though these parameters had comparatively lower sensitivity (0.446 and 0.340 respectively).

DISCUSSION

Non traumatic coma is one of the most important presentations to a medical emergence department and early diagnosis and treatment is absolutely crucial in the overall prognosis of patients. Although studies about non traumatic coma are available in the international literature such studies of adult population in India seems to be deficient. In this study we provide the etiological profile of non traumatic coma patients presenting to a tertiary care centre in India and also delineate the important clinical factors that will help us to predict the prognosis of a comatose patient at presentation.

Our data shows that most common cause of non traumatic coma is Cerebrovascular accident especially intracranial haemorrhage. This is followed by metabolic encephalopathy and infections including CNS infections, complicated malaria and septicaemia. Most of the international studies have similar etiological profile with cerebrovascular accident being the commonest cause[1,2]. But similar studies in paediatric population as expected showed a completely different picture with CNS infections being the commonest etiology of non traumatic coma[3,4,5].

Overall mortality of patients in our study was 58.75%. Those with good near normal recovery come around 20% whereas the rest suffer from moderate to severe disability. International studies also show similar mortality figures. *Levi DE et al* [6]showed mortality at 61% whereas some other studies like *Beth Hamel et al*[1]and *Glasgow 7 surveillance program*[2]showed higher mortality figures.

Out of the various etiologies cerebrovascular accident (69.44%) had the highest mortality followed by infections (68.75%) and poisoning (50%). Metabolic encephalopathy as expected showed comparatively lower mortality rates (35.29%). *Levy DE et al*[6]showed mortality of CVA cases to be 74% and *Ralph L Sacco et al*[7]places it at 66%. These are all in accordance to the results in our study.

Apart from the etiology of coma, factors that influence the overall prognosis of a patient will be his initial clinical presentation and extend of neurological involvement. We analysed the association of various clinical factors in predicting the outcome of patients. Accordingly duration of presentation of comatose patients was found to be having significant negative correlation with the outcome and those who presented to the hospital <12 hours had comparatively lower mortality rates. Many previous studies also suggested that prolonged duration of coma definitely worsens the prognosis and coma for more than 3 days had significantly poor prognosis[6,8].

Both initial GCS score and 24 hr GCS score was found to be having significant correlation with the final outcome and the later was found to be having more stronger correlation. This emphasizes the importance of routine monitoring of GCS status of the critically ill comatose patient and its prognostic value. A lower GCS score of ≤5 was found to be having higher mortality rates and can be used as a useful predictive parameter with high specificity and positive predictive value. Other studies in both adult and paediatric age group also have clearly demonstrated the significance of GCS in prognostication[1,4,5,7].

Out of the individual parameters of GCS scoring motor response was the only factor which was found to be having independent predictive capacity by multivariate regression model. Most of the international studies also recorded the same observations that motor response have significant say in functional outcome of comatose patients[1,4,9,10]. Interestingly a study from India, *Nayana PC Prabha et al* [5]conducted on paediatric population showed a different result. Their study observed that verbal response was the one that is significantly contributing to functional outcome. Most of the important international studies have categorically denied that verbal response never appears as an important predictor of outcome. More systematic and larger studies might be needed to ascertain the value of verbal response in predicting the functional outcome of such patients.

Abnormal brainstem reflexes like pupillary response and dolls eye response also was found to be having significant value as a prognostic tool in comatose patients. These are also in accordance with the previous study results[1,4,6,9] and emphasizes the importance of detail clinical examination in management of critically ill patients. Our study was conducted in a tertiary care centre and thus the etiological profile of patients presenting at a peripheral health care facility may be slightly different. Study also has a limitation that the follow up period was comparatively short. But even after such limitations this study gives us strong indicators regarding the outcome patterns and prognostic predictors similar to other longer international studies.

CONCLUSION

This study provides the etiological profile of patients presenting to medical emergency department with non traumatic coma and also gives the outcome pattern of various etiologies. It also emphasizes that clinical factors like duration of coma, GCS score, motor response and brain stem reflexes can give you important prognostic indications regarding the ultimate outcome of such patients. Such knowledge of expected functional outcome is very relevant in resource limited countries and will help us to better plan and utilise the available resources in a more useful manner.

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