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Clinical predictors of mortality in non traumatic coma: A prospective observational study

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Abstract
Background: *Coma developed during ongoing course of an illness commonly result in poor prognosis. Early prognostication is crutial for treatment decisions. This study has been conducted to ascertain the clinical predictors associated with mortality in nontraumatic coma in a tertiary institute .*
Material and Methods: *This is a prospective observational study in adults with clinically confirmed cases with GCS (glass coma scale) score < 8 in the ICU of tertiary hospital. Detailed study of vital parameters, neurological sign and GCS score were recorded. Precise etiology was determined with clinical signs and relevant investigations. Outcome was determined within 30 days of onset of coma.*
Results: *Total cases were 124 (76 males and 48 females). Stroke was predominant etiological factor (34.68%) followed by Infections(14.52%), CLD(10.48%),CKD (4.84%), toxic(1.61%) and others (25.81%) which included epilepsy , hypercarbia, malignancy/ metastasis and snake bite. overall one month mortality was 50 (40.32)%. Clinical factors of association with significant outcome were GCS, abnormal respiration, abnormal papillary size and reflex, Delayed presentation to Hospital, High MBP on admission and papilloedma.*
Conclusion: *The significant clinical predictors of nontraumatic coma in one month period in the study were GCS<5,Abnormal respiratory pattern, Pupillary signs including Papilloedma and High MBP.*
Keywords- *Nontraumatic coma, Clinical predictors, Etiology, Mortality, Prognosis.*

Introduction

Non traumatic coma is one of the most common presentation in the emergency department dealt by physicians. The onset of coma specially during the ongoing course of an illness has poor prognosis and high mortality despite the fact that these cases are taken care of in ICU where the escalating cost becomes unbearable specially for poor people. As this tertiary hospital is located in the outskirts of city, we come across more cases from rural setup with poor financial background. The treating physicians/Intensivist must be prudent to draw a comparison between the cases demanding highly skilled care and still with poor outcome with almost no chance of independent recovery while

on other hand those cases who could gain high quality survival which is to be judged based on certain clinical predictors. This will ensure judicious utilization of available resources. This could also be helpful in taking decisions for further care and precisely informing patient's family members about likely prognosis. Number of published studies of adult patients presenting with coma has been surprisingly small in our country.[1] Consequently, the information about prognosis in coma as whether early symptoms and signs could be correlated with outcome, are good predictors of outcome. Owalabi et al[2]. Showed that GCS <5 , pupillary size, and sever hypertension are independent predictor of mortality in coma . Greer DM et al.[3] showed that papillary reaction and motor response and severe hypertension on admission are associated with poor prognosis. Hence the current study was undertaken to elaborate the factors including comprehensive study of relevant history and clinical features to predict the outcome in non traumatic coma cases in this institute.

Materials and Methods

Prior permission from institutional ethic committee was obtained and study was carried out over a period. This prospective observational study included 124 adult cases who were admitted in medical ICU of this tertiary institute which is well equipped. Study included all those nontraumatic coma cases who were of > 16 years of age (both males and females) and GCS < 8. All those cases with age < 16 years, GCS > 8, history of trauma, alcohol intoxication, coma in post anesthetic period, those refused by relatives were not included. The outcome was determined within 1 month of onset of coma by patient's survival or death.

The clinical sign studied were temperature, pulse , respiratory rate and pattern(Cheyne stokes, Apneustic , central Neurogenic hyperventilation, ataxic breathing), pupillary size and reaction , papilloedma, Occulocephalic reflex, corneal reflex , other brainstem signs and seizures were studied.

The etiology of coma was ascertained on the basis of history, detailed clinical signs and relevant investigations. The patients were monitored on a daily basis for outcome over a period of one month during which they were meticulously attended and treated with standard management protocol of ICU.

Data analysis

Analysis of data was carried out using the statistical package for social sciences (SPSS) programme for windows trial version 20 (SPSS Inc. Chicago, IL). Univariate analysis was carried out using Pearson's Chi square Test for categorical variables. Student t- Test for continuous variables. $P < 0.05$ was accepted as significant level.

The variables that were significant on univariate analysis were subjected to multiple logistic regression model and the covariates were adjusted for each independent variable to find independent predictor of in hospital mortality.

Results

A total no 124 patients (76 males and 48 females) were recruited for study. The study period was with effect from January 2015 to march 2016. 59 cases out of 124 were reported and admitted within 24 hrs in ICU while 65 cases reported after 24 hours of onset of coma. Among etiological factors in this study the strokes were predominant (34.68%) followed by infections (14.52%) , CLD (chronic liver diseases) 10.48 %, metabolic 8.06% (hypoglycemia, hyperglycemia, dyselectro-lemia), CKD(chronic kidney diseases) 4.84%, toxic 1.61% and other 32 cases (25.81%) (epilepsy 4 , hypercapnia 19, metastatic /malignancy 5 and snake bite 4).

During one month follow up, the overall mortality was 40.32% and survival 59.67%. Mortality was predominantly in increasing order with decreasing GCS score. Highest mortality was attributed to strokes followed by CNS infections, CLD, metabolic, CKD and toxic. Other associated etiological factors were – snake bite, epilepsy, hypercarbia and malignancy.

Table 1: Distribution of etiology of coma

	No	%
Infection	18	14.52
Toxic	2	1.61
metabolic	10	8.06
Stroke	43	34.68
CLD	13	10.48
CKD	6	4.84
other	32	25.81
Total	124	100.00

Table 2: Association between absolute GC score and outcome

| GCS at admission	Outcome					Total
	Survivors		Mortality			
	No	%	No	%		
3	20	27.03	29	58		49
4	15	20.27	11	22		26
5	12	16.22	5	10		17
6	16	21.62	3	6		19
7	11	14.86	2	4		13
Total	74	100	50	100		124

Table 3: Clinical parameters significantly associated with one-month mortality

	Death		Survival		OR(95% confidence interval)	P Value
Age	No	%	No	%		
>50	29	58	42	56.7		1.020
<50	21	42	32	43.2	0.972 (0.474 to 1.99)	
Sex						
Male	37	74	39	52.70		0.028S
Female	13	26	35	47.30	2.554 (1.171 to 5.569)	
MBP>140						
Abnormal	13	26	7	9.46		0.027
Normal	37	74	67	90.54	3.362 (1.233 to 9.166)	
GCS						
3 to 5	45	90	47	63.51	5.17 (1.83 to 14.60)	0.002
6 to 8	5	10	27	36.49		
Presentation to hospital						
>24 hours	34	68	31	41.89	2.948 (1.389 to 6.256)	0.008S
<24 hours	16	32	43	58.11		
Posture						
Abnormal	29	58	38	51.35	1.308 (0.63 to 2.69)	0.586
Normal	21	42	36	48.65		
Respiration						
Present	49	98	66	89.19	5.939 (0.72 to 49.06)	0.133
Not present	1	2	8	10.81		
pupil size						
Abnormal	34	68	30	40.54	0.32 (0.15 to 0.682)	0.019
Normal	16	32	44	59.46		
Pupil reflex						
Abnormal	33	66	29	39.19	3.117 (1.46 to 6.624)	0.005
Normal	17	34	45	60.81		
Papilloedema						
Present	16	32	4	5.41	8.235 (2.55 to 26.52)	<0.001
Not present	34	68	70	94.59		
Motor pattern						
Abnormal	35	70	48	64.86	1.264 (0.585 to 2.73)	0.688
Normal	15	30	26	35.14		
Seizures						
Abnormal	17	34	12	16.22	2.66 (1.13 to 6.23)	0.038
Normal	33	66	62	83.78		

Table 4: Result of multivariate logistic regression analysis for independent predictors of 1-month mortality

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.	
							Lower	Upper
Sex	1.187	.538	4.876	1	.027	3.277	1.143	9.398
MBP	2.098	.732	8.211	1	.004	8.147	1.940	34.208
Hospital admission	2.548	.634	16.155	1	.000	12.782	3.690	44.278
Pupil size	.378	.858	.194	1	.660	1.459	.271	7.848
Pupillary reflex	1.890	.930	4.133	1	.042	6.617	1.070	40.911
Papilloedema	1.043	.722	2.089	1	.148	2.839	.690	11.684
Seizure	.015	.620	.001	1	.981	1.015	.301	3.422
GCS	1.667	.665	6.290	1	.012	5.296	1.439	19.488
Constant	-5.593	1.106	25.577	1	.000	.004		

Variable(s) entered on step 1: sex, MBP, Hospital admission, pupil size, pupil reflex, papilloedma, seizure, GCS.
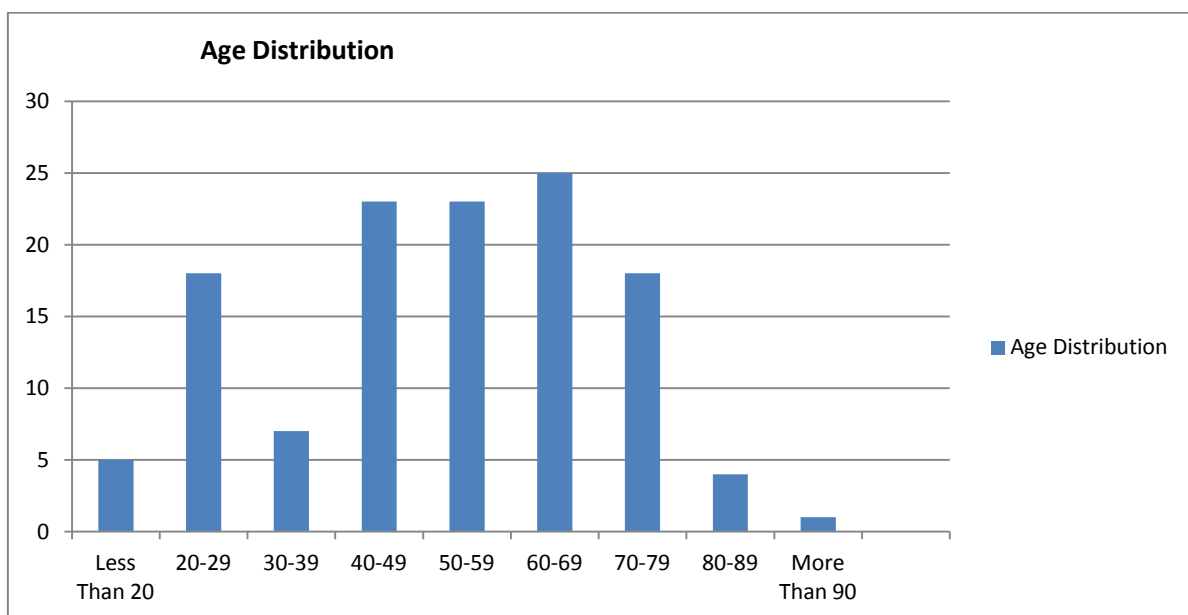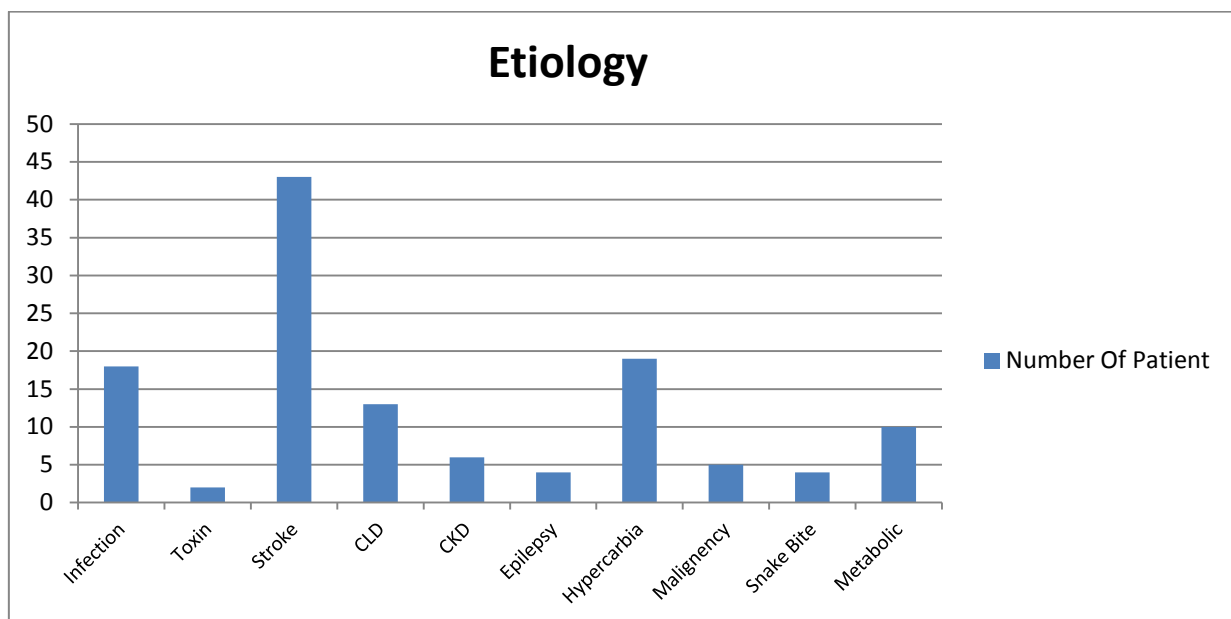
Discussion

Several multicentric Prospective studies with well equipped ICU services are reported from Developed countries[5] to determine the outcome in Nontraumatic Coma cases, however in developing countries, specially in India the number of published studies are few[1,4]. More so, compared to that of developed countries the well Equipped ICU services are limited in our country except in cosmopolitan cities. The ICU services are not adequate due to poor infrastructure which is challenging to Physicians and Intensivist. This underscores the need for bedside clinical variables as predictor of Inhospital mortality.

This is a prospective study of 124 patients of Coma(male-76, Female-48)with overall mortality of 40.32%. The most common cause of mortality was Stroke(34.68%) and the same cause was reported in most of studies reported earlier among adult group[1-6]. The second commonest etiology was CNS infection followed by chronic liver disease (Hepatic Coma),Metabolic Factors , Hypercarbia, Seizures, Toxins , Snake bite and CNS malignancy/ Metastasis. In some western literature second most common cause was Hypoxic Ischemic Coma.[5,8] CNS infection are the most common cause among pediatric population.[6,7]

GCS was very sensitive predictor of mortality. In GCS -3, the mortality was 58% and it was proportionately in decreasing order with corresponding increasing GCS score. The same is reported in almost all earlier studies and Meta analysis[1-6,9]

The mortality was significantly more in those cases who reported to hospital after 24 hours of onset of Coma (68%) while it was 32% in those who reported within 24 hours. Many previous studies suggested that duration of presentation to hospital of coma patient has significant negative correlation with mortality.[8,10 12]

Out of total number of 124 Coma cases admitted in this study at our tertiary care hospital, the 70% were in the age group of more than 40 years and 30 % are of below 40 years. We do not found any statistically significant correlation between age and mortality though mortality was high in advance age.

Other important clinical predictor of high mortality in Coma were abnormal Respiratory Pattern (Cheyne Stokes, Central Neurogenic Hyperventilation, Apneustic Breathing, Ataxic Breathing)with 98% mortality. Same pattern was also reported in previous studies.[8]

Brain stem signs were important clinical predictors in our study. In Coma cases with GCS-3, the brain stem signs(Occulocephalic reflex, Corneal reflex) were absent in 15 cases out of total mortality of 29. These all 15 cases did not survive. These results are similar to other studies.[7,8 10 11]

Other Important clinical predictor of mortality were Papilloedema68%, Abnormal Pupil size 68% and Pupil Reflex 66%, Abnormal Motor reflex with 70% mortality. Seizures 34%, Abnormal posture 58% and Abnormal MBP(Mean Blood Pressure) more than 140 mm of Hg has 74% mortality.

In this study the mortality was significantly high among Males(74%) compared to females (26%). This Gender based difference couldn't be explained.

Conclusion

The present study provide information on the relevant important clinical predictor of mortality in nontraumatic Coma cases. The mortality is found to be highest in intracranial cases (Stroke and Infection). Low GCS was associated with highest mortality so were the other factors like abnormal respiratory pattern, Delayed hospital admission, Pupillary size and Reflex, motor pattern , Papilloedema, seizures and abnormally high Mean Blood Pressure which were proved to be important and easily assessable tools for prognosis of Nontraumatic Coma cases to identify those cases who are likely to die and those having chances of recovery in Developing country.

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