

Is there any Relationship of Age & Sex to the Etiology and Outcome of Medical Coma?

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As the diseases behave differently in males and females and even in different age groups, particular attention was made to classify and observe the distribution of various causes of coma according to age and sex of the patient in order to formulate our indigenous database for future reference. We studied the coma etiology with particular reference to the age and sex of the patient, and the outcome. All the 517 (312 male {60.35%} and 205 female {39.65%}) patients were divided into 7 groups according to decades from age 12 to 80 years. Patients older than 40 years predominated (318 {61.5%}). Metabolic coma was predominant cause in almost all age groups. Structural coma was increasing progressively with the age. Poisonings were the common cause in patients under 30, representing 35.85% of all comas in the age group 12-20, and 33.70% in the group from 21-30 years. In the next two decades (31-50 years), hepatic and renal failure predominated making up more than half of all causes. Leading causes among males were poisonings (69 cases), hemorrhagic CVA (48 cases), ischemic CVA (24 cases), renal failure (28 cases) and hepatic coma (35 cases). Similarly among females causal distribution revealed renal failure (34 cases), followed by hepatic coma (29 cases), and hemorrhagic CVA (26 cases). Out of the 476 (92%) patients whose outcome could be determined 297 (57.4%) were discharged after recovery and 179 (34.6%) died. Eighty out of 205 female patients died (39%), while 99 out of 312 males had a fatal outcome (31.7%). We conclude that coma etiology has a significant effect on prognosis, while such significance could not be assigned to age or sex.

Key words: Medical Coma, Age, Sex, Etiology, Outcome, Significance.

Coma and related disorders of consciousness are among the most important emergency presentations in tertiary care hospitals. As the level of care becomes higher, the percentage of patients in coma also increases.¹ It is important for the physician to understand the gravity of the situation, because any lapse in care can push the patient over this edge to the side of death as small delays may make the difference between life and death.²

The knowledge of coma etiology is crucial to the successful management of this very grave clinical situation and has important prognostic implications as well.³⁻⁴ There is lack of local literature on this topic. This deficiency forces emergency physician in Pakistan to rely on Western figures for coma etiology, which do not reflect our circumstances accurately.⁴ The prevalence of most diseases is influenced by geographical, cultural and racial factors, and by the law of averages, coma should be no different.⁴⁻⁶

However, factual proof of this is not available as yet. As the other diseases leading to morbidity and mortality may behave differently in males and females and even in different age groups, this trend may be seen in the etiology and outcome of medical coma. Particular attention was made to classify and observe the distribution of various causes according to age and sex of the patient in order to formulate our indigenous database for future reference.

Aims and objectives:

- 1) To correlate coma etiology with the age and sex of the patient.
- 2) To study the outcome of Medical coma and to correlate this with coma etiology, and age and sex.

Material and methods:

Inclusion Criteria

- ◆ Sustained impairment of consciousness occurring in patients older than 12 years of age due to causes other than trauma.

Exclusion Criteria

- ◆ Brief (episodic) impairments of consciousness lasting less than one hour, thereby falling under the definition of syncope.
- ◆ Traumatic coma.
- ◆ Patients falling in pediatric age group.
- ◆ Patients succumbing to their illness so rapidly that any diagnostic work up could not be performed.

This study was planned as a prospective, observational study, in which the participants were followed through out their hospital stay but no therapeutic interventions were performed as a part of the study protocol. The study was conducted in Medical Wards of Mayo Hospital, Lahore from January 2002 to December 2003. A total of 517 patients presenting in emergency ward with sustained impairment of consciousness were studied. A thorough history and examination was obtained for each case. The findings were then subjected to statistical analysis. All the patients were managed intensively, and as far as possible using available resources, optimally, during their hospital stay. The patients were followed through their hospital stay to determine the outcome after the current episode of coma. One of three possible outcome categories was established, recovery (discharge), death, and a category in which the proximate outcome remained unknown because they could not be followed up further, either due to

referral, or self discharge (by attendants) against medical advice.

Results:

The patients were divided into 7 groups according to decades from age 12 to 80 years (table 1). The greatest number fell in the 6th decade (51-60 years). Patients older than 40 years of age predominated (318 patients, 61.5%). However, there was a fairly even distribution of patients among all the age groups (table 1).

The distribution of etiological categories of coma in different age groups was studied and an interesting trend was revealed. While metabolic coma was predominant in almost all age groups (with the exception of the two groups older than 60 years), its proportion in each age group declined and that of structural coma increased progressively with age (table 2). Diffuse cerebral causes of coma were fairly evenly represented in all age groups. Psychogenic causes were only encountered in the first three age categories (table 2).

Taking specific causes into consideration poisonings were the leading cause in patients under 30, representing 35.85% of all comas in the age group 12-20, and 33.70% in the group from 21-30 years. In the next two decades (31-50 years), coma due to hepatic and renal failure predominated making up more than half of all causes. Hepatic coma (hepatic encephalopathy and fulminant hepatic failure) represented 24% and 21.6% of comas in age groups 31-40, and 41-50 respectively, and renal failure (both acute and chronic renal failure) also made up 26% and 21.6% of comas in these respective age groups. Cerebrovascular accidents (CVA), including both ischemic and hemorrhagic strokes, comprised an increasing population of cases beyond the 4th decade, representing 22.7%, 32.8%, 23% and 59.5% of comas in the age groups 41-50, 51-60, 61-70 and 71-80 respectively (table 2). The maximum number of deaths occurred in the 51-60 years category, with 82 patients out of a total of 137 in this group dying, making up 59.8% (table 3).

There were 312 male and 205 female patients in our series, making up 60.35% and 39.65% of the cases respectively. The leading causes among males were poisonings (69 cases), hemorrhagic CVA (48 cases), ischemic CVA (24 cases), coma due to renal failure (28 cases) and hepatic coma (35 cases), (table 4). Among females, the leading cause was renal failure (34 cases), followed by hemorrhagic CVA (26 cases), and ischemic CVA (20 cases). From the point of view of coma etiology, all the cases of heat stroke, respiratory failure and brain tumor occurred in males, and there was also preponderance of male patients in comas due to poisoning (83%), diabetic keto-acidosis (54.5%) as well as CVA (62.7%). Diseases with female preponderance included hyperosmolar non-ketotic diabetic coma (62.5%) and psychogenic (88.9%), (table 4).

The outcome of 476 patients (92%) with Medical coma was established in our study. The remaining 41 patients were lost to follow up either because of referred to a specialist unit (9 cases) or were discharged on request or left against medical advice (a common problem in our patients), (32 cases). Out of the 476 patients whose outcome could be determined 297(57.4%) were discharged after recovery and 179(34.6%) died (Table 3,4).

Eighty out of 205 female patients died (39%), while 99 out of 312 males had a fatal outcome (31.7%). In female patients, there was also more incidence of discharge against medical advice (22 patients) than males (19 patients), (Table 3).

Discussion:

Coma has been the subject of many studies from both diagnostic as well as prognostic point of view.^{3-5, 7-8} The significance of studies based on coma etiology lies in the fact that knowledge of the common causes of coma is a crucial time saving factor in the management. It was with this factor in mind that this was conducted as a primarily etiological study, though prognostic correlates were also evaluated. The principal objective of this study was the determination of coma etiology, its distribution according to age and sex in Pakistan and to detect any differences from the figures reported in Western series. Levy et al. observed that age was not a predictor of recovery in patients with Medical coma.¹⁰ Same was the observations in the present study. Similar patterns were seen in other studies.^{5,8} An attempt was made to study possible prognostic correlates of coma, as a subsidiary part of the study. The variables evaluated for a bearing on the outcome of coma including age, sex and etiology. An interesting aspect of our results was the relatively high number of patients with psychogenic coma: in our series there were 18 patients (3.42%) with coma due to this cause compared to 1.6% in Plum and Posner's series. Most of these patients were female and had 'coma' as a conversion reaction; this could be a reflection of the largely unrecognized undercurrent of psychiatric illness in our society.

These results were consistent with the findings of previous studies (Sacco et al, 1990). While the trend shown by these figures follows that of earlier studies (Gasporovic et al, 1995; Sacco et al, 1990; Bates 1991) an exact comparison is difficult because of a difference in the end-points used: while most of these studies consider a poor outcome to include death or persistent coma, thereby yielding much higher figures for an adverse outcome of coma, in our study the outcome of Medical coma was considered in absolute terms of death or otherwise. Thus in Sacco et al's series the overall poor outcome for coma due to Medical causes was 61%, with figures of 79%, 68%, 55% and 27% respectively for coma due to structural, metabolic, diffuse cerebral causes and poisonings.

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We concluded that coma etiology had a significant effect on prognosis, while such significance could not be assigned to age and sex.

Table 1: Category of coma in relation to age

Age (Yrs)	Total No.	Metabolic	Diffuse Cerebral	Structural	Psychogenic	Unknown
12-20	53	35	---	3	7	8
21-30	92	62	16	7	7	---
31-40	54	32	9	9	4	---
41-50	88	56	8	24	---	---
51-60	137	79	13	45	---	---
61-70	51	31	8	12	---	---
71-80	42	14	4	24	---	---
Total	517	309 (59.77%)	58 (11.22%)	124(24%)	18 (03.42%)	8 (01.52%)

Table 2: Etiology of medical coma in different ages

Etiology	Age Group (Yrs)						
	12-20	21-30	31-40	41-50	51-60	61-70	71-80
Poisoning	19	31	--	10	14	4	5
DKA	12	10	--	--	--	--	--
Unknown	8	--	--	--	--	--	--
CRF	4	--	9	15	10	3	4
Tuberculoma	3	--	--	--	--	--	--
Psychogenic	7	7	4	--	--	--	--
FHF	--	10	--	4	4	--	--
Status epilepticus	--	4	--	--	--	--	--
Heat stroke	--	4	9	--	--	--	--
CVA (H)	--	7	9	5	31	4	18
Pyogenic meningitis	--	4	--	4	4	--	4
Cerebral malaria	--	4	--	--	--	--	--
Hepatic encephalopathy	--	4	13	15	10	4	--
Sepsis	--	7	5	4	5	4	--
ARF	--	--	5	4	4	4	--
CVA (I)	--	--	--	15	14	8	7
Tuberculous meningitis	--	--	--	4	4	--	--
Brain tumor	--	--	--	4	--	--	--
DC (HYPO)	--	--	--	4	18	4	--
DC (HYPER)	--	--	--	--	4	4	--
Respiratory failure	--	--	--	--	10	4	4
Cardiogenic shock	--	--	--	--	5	4	--
Hypertensive encephalopathy	--	--	--	--	--	4	--
Total	53	92	54	88	137	51	42

DKA Diabetic Ketoacidosis ARF Acute Renal Failure
 CRF Chronic Renal Failure CVA (I) Cerebrovascular Accident (Infarct)
 FHF Fulminant Hepatic Failure DC (HYPO) Diabetic Coma due to Hypoglycemia
 CVA (H) Cerebrovascular Accident (Hemorrhagic) DC (HYPER) Diabetic Coma due to Hyperglycemia

Table 3: Outcome of coma in relation to age

Outcome	Age Groups (years)						
	12-20	21-30	31-40	41-50	51-60	61-70	71-80
Died	24	27	13	27	41	26	23
Discharged	19	57	41	57	82	25	14
Unknown	10	8	---	4	14	---	5
Total	53	92	54	88	137	51	42

Table 4: Relationship between etiology, sex and outcome

Etiology	Total Cases	Female Cases	Outcome			Male Cases	Outcome		
			Died	Discharged	Unknown		Died	Discharged	Unknown
Poisoning	83	14	3	11	---	69	13	55	1
CVA (H)	74	26	18	6	2	48	25	13	10
CVA (I)	44	20	8	6	6	24	11	9	4
Hepatic encephalopathy	46	17	12	4	1	29	24	5	---
CRF	45	25	13	9	3	20	5	15	---
Diabetic coma (Hypoglycemic)	26	14	---	14	---	12	---	12	---
Sepsis	25	12	7	5	---	13	5	8	---
ARF	17	9	1	8	---	8	---	8	---
Diabetic coma (Ketoacidotic)	22	10	1	9	---	12	4	8	---
Fulminant hepatic failure	18	12	10	2	---	6	5	1	---
Pyogenic meningitis	16	7	1	6	---	9	--	9	---
Psychogenic	18	16	---	7	9	2	--	2	---
Respiratory failure	18	---	--	---	---	18	3	15	--
Heat stroke	13	---	---	---	---	13	---	13	---
Diabetic coma: Hyperglycemic	8	5	---	5	---	3	---	3	---
Tuberculous meningitis	8	3	---	3	---	5	2	3	---
Cardiogenic shock	9	3	1	2	---	6	1	5	---
Unknown	8	5	4	1	---	3	1	2	---
Brain tumor	4	---	---	---	---	4	---	---	4
Cerebral malaria	4	1	1	---	---	3	---	3	---
Hypertensive encephalopathy	4	3	---	3	---	1	---	1	---
Tuberculoma	3	1	---	---	1	2	---	2	---
Status epilepticus	4	2	---	2	---	2	---	2	---
Total	517	205 (39.6%)	80 (39%)	103 (50.3%)	22 (10.7%)	312 (60.3%)	99 (31.7%)	194 (62.2%)	19 (6.1%)

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