

Medical coma in a secondary health centre in Benin City, Nigeria: A 3-year review

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Abstract

Background: Medical coma is an emergency requiring prompt decision and immediate intervention. Knowledge of the commoner causes of coma would improve the treatment outcome.

Aim: The aim of our study was to describe the frequency and pattern of medical coma in a secondary health center in Benin City, Nigeria.

Methods: It was a retrospective review of the medical records of all comatose adult patients, admitted between January 2012 and December 2016 at the Central Hospital Benin. Demographic and clinical data were obtained from the medical records of each patient. Data was analyzed using statistical Package for Social Sciences (SPSS) version 21.

Results: Ninety patients presented in coma within the 3-year period under review and, this constituted 1.7% of all medical admissions. There were 49 (54.4%) males and 41 (45.6%) females with a mean age of 64.6 ± 17.0 years. The Glasgow coma score ranged from 3 – 8. The commonest cause of coma was stroke (57.9%), followed by metabolic and toxic causes (23.3%) and central nervous system infections (11.1%). The main presenting complains were sudden collapse (85.6%) and fever (31.6%). The most predisposing co-morbid conditions were hypertension (71.1%) and diabetes mellitus (24.4%).

Conclusion: Stroke was the most frequent cause of coma. With the high mortality associated with the comatose state, it is hoped that preventive measures to identify and treat risk factors for stroke be vigorously pursued.

Keywords: Coma, hypertension, infections, metabolic, stroke

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INTRODUCTION

Coma is a life-threatening emergency requiring prompt intervention for the preservation of life and good brain functioning.¹ It is defined as a prolonged state of unconsciousness, in which a person cannot be awakened, fails to respond normally to painful stimuli, light, sound, lacks a normal wake-sleep cycle and does not initiate voluntary actions.² Although there is no consensus on

the precise cut-off point to define coma, in general, a Glasgow Coma Scale of between 3 and 8 is used.^{1,3} Coma is a common cause of admission in the emergency unit, medical wards and intensive care unit. It accounts for significant morbidity and mortality.⁴ Approximately 5% of the patients presenting to the Emergency Department and 1% of the admissions at the Emergency Department are due to coma.⁵

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There are numerous causes of medical coma. Some of them are focal processes, in which there are localised abnormalities that exist only in one part of the brain while others are diffuse processes that affect large parts of the brain. Focal processes include haemorrhagic strokes, ischaemic strokes, brain abscesses and infections in the brain. Diffuse processes include various toxins, poisons, alcohol and drugs such as barbiturates, opiates, narcotics, sedatives, amphetamines, cocaine and aspirin, others are metabolic abnormalities including hyperglycaemia or hypoglycaemia, liver or kidney failure, hypoxia, electrolyte imbalance, infections such as meningitis, encephalitis, seizure disorders and hypertensive encephalopathy.⁶

Several studies in Africa, Asia and Europe have shown contrasting results about the medical causes of coma. Stroke and infectious diseases are more common in developing countries compared to developed countries.^{4,7-10} As coma represents a serious life-threatening medical condition, it is important to diagnose promptly the underlying causes of coma to provide urgent medical treatment.¹ Despite adequate and appropriate treatment, only about 15% of patients who became comatose from medical causes have a satisfactory neurologic recovery.^{7,11} Clearly, knowledge of the most frequent causes of coma may improve the management of these comatose patients. It is also necessary that health-care providers and policy makers know the common causes of medical coma for planning and resource allocation.¹²

Medical coma among adults has been reported in the North-west, the South-west and the South-east regions of Nigeria.^{4,7,13} So far, and to the best of our knowledge, there is a lack of data on the frequency and pattern of medical coma from the South-south region of Nigeria. We set out to review over a 3-year period, the frequency and pattern of medical coma from a secondary health centre in South-south Nigeria.

METHODS

This was a retrospective review of the medical records of adult patients in coma admitted into the medical wards of Central Hospital, Benin City, Nigeria, between January 2014 and December 2016. This hospital is a secondary level hospital located in the city centre. It is a state-owned specialist hospital with a neurology unit headed by a consultant neurologist.

Ethical approval was obtained from the Ethics and Research Committee of the Central Hospital, Benin City. The case-files of all the medical admissions were retrieved. Sorting of the

case-files of patients with coma was done. Next, relevant data were extracted using a standard pro forma. The data extracted included the patient demographics history, clinical features, general physical and neurologic examination, risk factors, cause of coma, Glasgow Coma Score (GCS < 8),¹⁴⁻¹⁸ laboratory investigative results such as complete full blood count, erythrocyte sedimentation rate, serum electrolytes, blood glucose levels, renal function tests, liver function tests, urine examination, electrocardiogram, chest X-ray, human immunodeficiency virus screening, cerebrospinal fluid examination (in cases of meningitis) and computed tomography scan brain (in cases of stroke). Medical records with incomplete, misleading, incorrect information or no correlation between laboratory result and diagnosis were not assessed. Patients who died while investigations were on going and diagnosis inconclusive were classified as undetermined cause of coma. The total number of hospital admissions over the study period was gotten from the records department.

Statistical analysis was performed using the SPSS version 21, Inc., Chicago, Illinois, USA. Means, median, standard deviation and range were used to present continuous variables, with comparison using the Student's *t*-test. Frequency and percentages were used to summarise categorical variables with Chi-square used to assess the association between the variables. The statistical significance level was at $P < 0.05$.

RESULTS

Over 5000 patients were admitted into the adult medical wards at Central Hospital Benin City from January 2014 to December 2016. Of these, 90 (1.7%) had presented in coma. The mean age of the comatose patients was 64.6 ± 17.0 years. Males accounted for 54.4% of the cases [Table 1].

The Glasgow Coma Score of the comatose patients ranged from 3 to 8 with a median of 5. The main presenting complaint was sudden collapse (85%). About 70.0% of the comatose patients were hypertensive, whereas 24.4% had diabetes mellitus. Over half (57.9%) of the comatose patient had suffered a stroke, whereas metabolic/toxic disorders and central nervous system (CNS) infections were present in 23.3% and 11.1% of patients, respectively [Table 2].

The mortality rate was 92.2%. Fifty (60.0%) deaths were from stroke while the other causes of coma accounted for one-third of the deaths Table 3. There was no significant association between patients age ($P = 0.72$) and gender ($P = 0.60$) with survival. The stroke patients

Table 1: Demographic and clinical characteristics of the 90 comatose patients

Variable	Frequency (%)
Sex	
Male	49 (54.4)
Female	41 (45.6)
Occupation	
Retired	44 (48.9)
Private sector	36 (40.0)
Civil servant	10 (11.1)
Social	
Alcohol	23 (25.6)
Smoking	10 (11.1)
Substance abuse	1 (1.1)
Presenting complaint	
Sudden collapse	77 (85.6)
Fever	28 (31.6)
Seizures	8 (8.9)
Neck pain	3 (3.3)
Neck stiffness	2 (2.2)
Co-morbidity	
High blood pressure	64 (71.1)
Diabetes mellitus	22 (24.4)
Retroviral disease	3 (3.3)
Kidney disease	3 (3.3)
Liver disease	1 (1.1)
Clinical findings	
Haemiplegia	33 (36.6)
Hemiparesis	18 (20.0)
Neck stiffness	3 (3.3)
Kerning sign	1 (1.1)
Facial nerve palsy	1 (1.1)

Table 2: Causes of coma in our centre (n=90)

Diagnosis*	Frequency (%)
Stroke	52 (57.9)
Intracerebral haemorrhage	47 (52.2)
Ischaemic	3 (3.3)
Subarachnoid haemorrhage	2 (2.2)
Metabolic/toxic	21 (23.3)
DKA	12 (13.3)
Hyperosmolar hyperglycaemic state	3 (3.3)
Uraemic encephalopathy	2 (2.2)
Acute alcohol intoxication	2 (2.2)
Hypoglycaemia	1 (1.1)
Seizure disorder from substance abuse	1 (1.1)
CNS Infections	10 (11.1)
HIV encephalitis	4 (4.4)
Meningitis	3 (3.3)
Cerebral toxoplasmosis	2 (2.2)
Cerebral malaria	1 (1.1)
Others	11 (12.2)
Sepsis	5 (5.6)
ALVF	2 (2.2)
Hypertensive encephalopathy	2 (2.2)
Undetermined	2 (2.2)

*Multiple aetiology present in 4 patients. CNS: Central nervous system, HIV: Human immunodeficiency virus, ALVF: Acute left ventricular failure, DKA: Diabetic ketoacidosis

in coma were more likely to die (odds ratio [OR] 3.78, 95% confidence interval [CI], 0.69–20.69, $P = 0.22$), while patients with coma from CNS infections (OR, 0.73, CI, 0.08–6.77, $P = 0.73$), and metabolic disorders (OR, 0.37, CI, 0.08–1.80 $P = 0.42$) were less likely to die.

DISCUSSION

The most important medical cause of coma in this study was stroke. Our finding is in keeping with those of studies done by Nwani and Nwosu,¹³ Obiako *et al.*,⁷ and Thacker *et al.*⁸ where stroke was also the most common cause of coma. The finding of stroke as the leading cause of coma in this study emphasises the need for health institutions and policymakers to invest deliberately on stroke diagnosis and treatment guidelines which would facilitate early diagnosis and the adequate institution of appropriate management. It is also important to maximise efforts on stroke awareness among the populace and to adopt a practical approach towards stroke prevention.

Metabolic and toxic causes constituted the second most common cause of coma in this study, pre-dominantly diabetic emergencies and in particular, diabetic ketoacidosis (DKA). This finding agrees with reports from other parts of Nigeria^{7,19,20} and elsewhere.²¹ A number of deaths due to DKA are attributable to the failure to carry out laid down management care, either from poor response of relatives to provide the necessary resuscitative materials, or due to poor monitoring from health-care personal arising from understaffed health services.

In this study, CNS infections were the third most common cause of coma and accounted for 11.1% of the causes of coma. This finding agrees with the study in Ibadan which also recorded 11.0%,⁷ but lower than 18.9% reported at Nnewi¹³ and even much lower when compared to the 28.9% reported in Kano⁴ where infections constituted the pre-dominant causes of coma. We also noted that considering the individual infections, in our study, only HIV encephalitis contributed up to 4.4%. The reason for this variance could be attributable to the fact that in South-south Nigeria where this study was done, there is massive campaign and coverage for childhood immunisation for various diseases which may confer long-lasting immunity. In addition, the campaign for vaccination against diseases such as meningitis, hepatitis B infection, in adult life and the need for persons to know their retroviral status, has had massive participation leading to reduced burden of these infections. The non-uniformity in classifying these infections in the various studies might explain the variations.

We found that only one (1.1%) patient had coma from cerebral malaria. This is in contrast to studies from other African countries, where cerebral malaria accounted for 22.7% of the causes of coma.²² In a study from Tanzania, cerebral malaria was the most common cause of coma,

Table 3: Mortality from the various causes of coma (n=83)

Disease condition	Frequency (%)
Stroke	50 (60.2)
Intracerebral haemorrhage	47 (56.6)
Ischaemic	2 (2.4)
Subarachnoid haemorrhage	1 (1.2)
Metabolic/toxic	18 (21.7)
Diabeticetoacidosis	10 (12.0)
Hyperosmolar hyperglycaemic state	2 (2.4)
Uraemic encephalopathy	2 (2.4)
Acute alcohol intoxication	2 (2.4)
Hypoglycaemia	1 (1.2)
Seizure disorder from substance abuse	1 (1.2)
CNS infections	9 (10.8)
HIV encephalitis	4 (4.8)
Meningitis	2 (2.4)
Cerebral toxoplasmosis	2 (2.4)
Cerebral malaria	1 (1.2)
Others	10 (12.0)
Sepsis	5 (6.0)
ALVF/stroke	2 (2.4)
Hypertensive encephalopathy	1 (1.2)
Undetermined	2 (2.4)

CNS: Central nervous system, HIV: Human immunodeficiency virus, ALVF: Acute left ventricular failure

and this was seen in 60% of the cases studied.⁹ The reason for the difference may be partly due to the intense all year round transmission of malaria in the study area, resulting in the development of partial malaria immunity from childhood that confers protection against severe disease during adolescent and adulthood.^{23,24} Furthermore, the intervention by the roll back malaria initiative in Nigeria leading to the distribution of long lasting insecticides treated nets as a cheap and effective means of protection, has led to the improvement in malaria control.

Other causes of coma in this study were acute left ventricular failure (ALVF) and hypertensive encephalopathy. ALVF was not found as a cause of coma in available literature, but could cause hypoxia and metabolic coma, while hypertensive encephalopathy constituted 0.5% and 3.6%, respectively, in studies in Ibadan and Nnewi.^{7,13}

The most pre-disposing underlying illness was hypertension, followed by diabetes mellitus, retroviral disease, kidney disease and liver disease. Consequently preventive measures to control these underlying risk factors in particular hypertension must be aggressively addressed.

In this study, there were slightly more males than females, with the highest number of patients in the seventh decade of life. This is in contrast to studies done in Tanzania and other studies in Nigeria which showed a much higher male preponderance especially in the fifth decade of life. Medical coma accounted for 1.7% of all medical admissions, during the period under review. This is much lower than figures reported from other studies in Nigeria which recorded 7.4%,¹³ 8.1%⁴

and 10%,⁷ respectively. The very low rate recorded in this study may be attributable to poor record keeping behaviour, lack of documentation of vital information, differences in methodology in the various studies in addition to the study site. Whereas our study site was a secondary level health-care institution, the other Nigerian studies were done in tertiary institutions which serve as referral centres and therefore have a preponderance of most severe illnesses. It is also noteworthy that ethnic, socioeconomic and dietary factors may be implicated in this variance.

The mortality rate from the medical causes of coma in this study was 92.2%. This is very high compared to other studies done in Nigeria which recorded 49%, 55.9%, and 76%.^{4,7,13} And even much higher when compared to a study from Europe 26.5%.¹⁰ This difference could be attributed to high proportion of coma from haemorrhagic stroke in this study which has a poor chance of survival compared to the Kano study, where the pre-dominant causes of coma were from metabolic and infective causes which have better recovery rates. Moreover, late presentation due to poverty and unwillingness on the part of the sick patients to make use of modern health facilities, inadequate workforce as well as lack of intensive care facility might have contributed to the very high mortality rate recorded in this study. The low mortality rate recorded by Forsberg *et al.*¹⁰ goes to emphasise the importance of managing coma patients in intensive care units which have good diagnostic and resuscitative facilities.

Limitation

This study was limited by its retrospective design.

CONCLUSION

Stroke was the most important cause of coma in the group studied, followed by metabolic causes and CNS infections. Therefore, a quick and proper workup in the diagnosis of stroke and other causes of coma in the emergency unit, wards and intensive care unit might improve the outcome of such patients. More importantly, primary preventive measures to identify and treat the common causes of coma must be vigorously pursued.

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Conflicts of interest

There are no conflicts of interest.

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