FACTORS INFLEUNCING MORTALITY IN HEMORHAGIC STROKE

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Summary

Background

Mortality in hemorrhagic stroke is very high. The factors influencing it have not been well studied in Africans.

Objectives

The aim of this study was to determine the mortality rate in hemorrhagic strokes and the factors that influence it, such as Glasgow coma scale score and admitting blood pressure.

Methods

Patients with hemorrhagic stroke were evaluated and followed up for 90 days. Admission blood pressure and Glasgow coma scale score were obtained for each patient and these were related to the mortality.

Results

The total number of patients seen was 49. There were 34 males and 15 females with a male: female ratio of 2.3: 1. Overall mortality was 29 patients (59%).

The mortality in patients with Glasgow coma scale score >13 was 13.6%, in patients 9 -12 was 50%, in patients 8 and below was 83.3%. Mortality in patients with admitting normal to mild hypertension [DBP 90-99mmhg] was 63.6%, moderate hypertension [DBP100-110] was 25% and severe hypertension [DBP >111mmhg] 61.7%.

Conclusion

In hemorrhagic strokes, mortality is highest in patients presenting with Glasgow coma scale score 8 and below [83.3%] and at the two extremes of blood pressure i.e. normal to mild [63.6%] and severe hypertension [61.7%] respectively. Mortality peaked and was static at 30th day of admission.

KEYWORDS: Mortality, Glasgow Coma Scale Score, Blood Pressure

Introduction

Cerebrovascular accident or stroke is defined as rapidly developing focal or global neurological deficits lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.[1]

In a study done in north-east Nigeria, hemorrhagic stroke was seen in 37% of all stroke patients admitted,[2] whilst in Accra, Ghana it was 39%.[3] Among the patients that presented with hemorrhagic stroke in the south-east Nigeria study cerebral hemorrhage was 21% while subarachniod hemorrhage was 15%.[4] In our local environment (south-west), hemorrhagic stroke was reported to be 45%.[5] In the United states of America, it accounts for 15-30% of all strokes.[6] Generally strokes are responsible for about 2.4% of the disability adjusted life years (DALYS) world wide.[7]

The 30-day mortality rate for hemorrhagic stroke is reported to be around 40-80%. Approximately 50% of all deaths occur within the first 48 hours.[8]

Hemorrhagic strokes have a case fatality rate ranging from 30-80% for intracerebral hemorrhage and 20-50% for subarachniod hemorrhage.[9]

Mortality rate is closely related to the Glasgow coma scale score, size of the hematoma and site of the haematoma.[10, 11]

In some studies, there were other contributing factors related to mortality. These include low serum cholesterol and triglyceride levels obtained during the first hours after intracerebral hemorrhage.[11, 12]

Attention is now being drawn to the management of hemorrhagic strokes, with recent studies experimenting with recombinant tissue plasminogen activator (rtPA).[13]

The goal of this present study was to investigate mortality in hemorrhagic stroke in Nigerians and also to assess the effect of Glasgow coma scale score and admitting blood pressure on mortality in patients with hemorrhagic stroke.

Patients and Methods

This study was carried out at the Lagos University Teaching Hospital (LUTH) from April 2000 to July 2001. Patients were selected from the emergency Unit of the hospital (LUTH). They were 136 consecutively consenting patients of which 49 presented with hemorrhagic stroke following the World health organization (WHO)[14] criteria and the Siri-raj stroke score (SSS).[15]

Consent

Approval of the research by the Ethics Board of LUTH was obtained before commencing the study. Consent was obtained from the relations and subsequently patients themselves.

Inclusion Criteria

All patients who presented with acute stroke fitting the SSS and WHO criteria for hemorrhagic stroke admitted via medical emergency unit.

Exclusion Criteria

- All patients with clinical features of hemiplegia from other causes like subdural hematoma and brain tumors. However a few of our patients had computerized tomography done.
- Patients who presented with acute ischemic stroke by the WHO and SSS criteria.
- Patients who did not give their consent were also excluded.

Methods

A standard questionnaire was used to obtain all the relevant information in this cross-sectional study. The standard questionnaire included detailed aspects of the following; personal and clinical data, investigations, treatment, complications, WHO[14] criteria, SSS,[15] Glasgow coma scale score [16](GCSS) and Glasgow outcome scale score [17](GOSS). GCSS of each patient was obtained at presentation. The patients were followed up for 90 days and the GOS was used for outcome. Stroke patients were recruited and reviewed from the medical emergency within 24 hours by the investigator. Subsequent assessment was in the wards and scheduled medical out patient clinic.

Analysis

The sample size was based on the study objective which was to identify and monitor clinical parameters which can affect mortality in acute hemorrhagic stroke patients. For discrete variables, chi-square test with Yates 2 / 2 configuration table was used.

Results

In a population of 136 consecutively consenting stroke patients, 49 had hemorrhagic stroke following the WHO[13] and SSS[14] criteria.

The Characteristics of the Study Group

The age of the patients ranged from 22–86 years. There were 34 males and 15 females. The male: female ratio was 2.3: 1.

Outcome at 90 Days

Mortality in this study population peaked and at 30 days. Cumulative mortality was 4% in 24 hours; 35% in 7 days and 59% in 30 and 90 days respectively. Only 10% of the patients had good recovery at 90 days. [Table I]

Relationship Between Admission GCS and Mortality

There was a sharp and steep increase in mortality in the patients; from GCSS of ≥ 13, to GCSS of ≥ 9 and finally to GCSS of ≤ 8. Mortality in patients with GCSS of ≥ 13 was statistically significantly lower than overall mortality (p=0.001), whilst that for patients with GCSS of ≤ 8 was also statistically significant, but higher than overall mortality (p=0.001). [Table III]

Relationship Between Blood Pressure and Mortality

The two extremes of admission blood pressure were the highest in mortality.
Mortality in patients with moderate hypertension was the least. Though the patients in this group were few in number, it was however found to be statistically significant (P=0.001). [Table IV]

Causes of Death

Cerebral edema, a clinical diagnosis was the leading clinical cause of death in 55% of cases. Patients with concomitant diabetic keto-acidosis had a higher mortality than patients who had seizures. This is a clinical impression of the investigator. [Table V]

Discussion

In this hospital-based study of 49 hemorrhagic stroke patients, Glasgow coma scale score and blood pressure, were independent predictors of mortality as previously reported in other studies.[12,13] At the end of the study 10% of our patients had good outcome, the same percentage which has been documented in previous studies.[6]

Mortality in this study population was 4% in 24 hours; 35% in 7 days and 59% in 30 and 90 days respectively. The mortality within 24 hours was lower than that found in other studies, whilst the

7th day mortality was higher.[6,18] Our 30th day mortality fell within the 40%-80% range observed in most studies.[18] In our study, the 30th day and 90th day mortality were the same. This plateau between the 30th and 90th days has not been the findings in previous studies. However our patients were not followed up for a year.

Glasgow coma scale score was a strong predictor of mortality in hemorrhagic stroke.

We found that mortality in patients quadruples with deteriorating level of consciousness from mild, moderate to severe. This is in keeping with the results from previous studies.[10,11] 30th day mortality in patients with GCSS $\geq$13 was 13%, with GCSS $\geq$9 was 50%, and with GCSS $\leq$8 was 83% in this study. In our study, the 30th day and 90th day mortality irrespective of the GCSS at presentation were the same.

There has been a strong association between severe blood pressure and neurological complications seen in hemorrhagic stroke patients. The fact that we observed less in this study might be due to unavailability of post-mortem reports. Lack of autopsy was due to low autopsy rate in our environment, politics of request, religious bias and family members being obsessed with financial burial rites. In our opinion, the increased occurrence of mortality in mild (63.6%) and severe (61.8%) blood pressure groups were likely secondary to varying contributing factors to mortality. For the mild group, this might be attributed to pharmacological interventions on the way to the hospital i.e. intravenous hydralazine by a paramedical who wants to 'control' the blood pressure. For the severe group this might be due to probably higher incidence of moribund neurological complications seen more in hemorrhagic than ischemic strokes. This dual peak in mortality in the mild and severe blood pressure groups has not been reported by any group in any previous study and has not been observed in other reports.

Severe hypertension and low presenting GCS scores ≤ 8[13] when it coexists in hemorrhagic stroke qualifies for the worst group of patients.

Conclusion

In this hospital-based study of 49 consecutive patients with acute hemorrhagic stroke, Glasgow coma scale score and blood pressure, were independent predictors of mortality. Also mortality peaked within 30 days and subsequently remained static. 10% of the study population had good outcome.

Mortality was highest in patients presenting with severe coma and at the two extremes of blood pressure. The latter was attributed to different reasons. This mortality pattern was sustained when the two independent predictors were combined. This has not been reported in other studies.

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TABLES

Table I GLASGOW OUTCOME SCALE AT 90 DAYS

GLASGOW OUTCOME SCALE	NUMBER	PERCENTAGE
DEATH	29	59.2
PERSISTENT VEGETATIVE STATE	2	4.1
SEVERE DISABILITY	5	10.2
MODERATE DIABILITY	8	16.3
GOOD RECOVERY	5	10.2
TOTAL	49	100

Table II MORTALITY AND GCS ACCORDING TO FOLLOW – UP DAYS.

GCS	N Dead	Hours Alive	24 hours Alive/dead	7 days Alive/dead	30 days Alive/dead	90 days Alive/dead
≥ 13	3	13	13 / 0	13 / 0	10 / 3	10 / 0
≥ 9	6	12	12 / 0	7 / 5	6 / 1	6 / 0
≤ 8	20	24	22 / 2	12 / 10	4 / 8	4 / 0
Total	29	49	47 / 2	32 / 15	20 / 12	20 / 0

N = Total number of dead patients at the end of study

TABLE III RELATIONSHIP BETWEEN ADMISSION GCS & MORTALITY

GLASGOW COMA SCALE	TOTAL	DEATH	PERCENTAGE
≥ 13	13	3	13.6*
≥ 9	12	6	50
≤ 8	24	20	83.3+
OVERALL	49	29	59.2

*Lower than overall mortality $X^2 = 29.3$; p=<0.001

+Higher than overall mortality $X^2 = 21.2$; p=<0.001

TABLE IV RELATIONSHIP ADMISSION BLOOD PRESSURE & MORTALITY

BLOOD PRESSURE	TOTAL	DEATH	PERCENTAGE
MILD	11	7	63.6
MODERATE	4	1	25*
SEVERE	34	21	61.8
OVERALL	49	29	59.2

*Lower than overall mortality $X^2 = 19.2$; p=<0.001

TABLE V   CAUSES OF DEATH [CLINICAL IMPRESSION]

DISEASES	FREQUENCY %	
CEREBRAL OEDEMA	16	55.2
SEIZURES	2	6.9
DIABETIC KETOACIDOSIS	3	10.3
CHRONIC RENAL FAILURE	1	3.4
CARDIAC ARRTHYMIAS	2	6.9
SEPSIS	1	3.4
ACUTE PULMONARY OEDEMA	1	3.4
SEVERE UNCONTROLLED HYPERTENSION	1	3.4
UNKNOWN	2	6.9
TOTAL	29	100