Predictors of hospital outcome in acute cerebrovascular accidents

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Abstract

Background: Stroke is a major cause of death worldwide. There are many factors that can affect the clinical outcome in stroke patients. The predictors of hospital outcome of Sudanese patients with stroke are not known.

Objectives: To determine the predictors of hospital outcome among patients with acute stroke; and also to study the risk factors, prevalence and clinical presentations of stroke patients admitted to Omdurman Teaching Hospital (OTH).

Methods: This is a descriptive hospital-based study conducted in OTH during the period from Sept. 2011 to Feb 2012. One hundred and fifty patients with acute stroke were included. Data was collected by a structured questionnaire and analysed by the Statistical package for Social Science (SPSS).

Results: The prevalence of acute stroke was 4.7%. Ischemic stroke constituted 78.1% and haemorrhagic 21.9%. Hypertension was the commonest risk factor followed by diabetes. Weakness was the commonest clinical presentation followed by speech disturbance. The most common hospital complication was aspiration pneumonia which was seen in 16%. Mortality was high among patients who developed hospital complications; 80%, 75% and 62.5% mortalities were seen in those with sepsis, aspiration pneumonia and bed sore. Haemorrhagic stroke carried better prognosis than ischemic.

Conclusion: In stroke patients, weakness was the predominant presentation and hypertension was the commonest risk factor. Hemorrhagic stroke had good outcome. Development of sepsis, pneumonia and bed sore were related to high mortality rates.

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Introduction

Stroke is a leading cause of disability and the third leading cause of death[(1)]. According to the World Health Organization, 15 million people suffer from stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled[(2)]. The prognosis after acute ischemic stroke varies greatly, depending on the severity of the presentation, patient's premorbid condition, age, and post-stroke complications[(3).] Predictors of stroke outcome are helpful in planning future care and allocating limited resources. CT scan evidence of infarction early in presentation has been associated with poor outcome and was associated with increased risk of hemorrhagic transformation after thrombolysis[(4)].

Severe hyperglycemia is one of the factors that carries a poor prognosis and has a poor outcome and it affects the reperfusion in thrombolysis[(5).] It was reported that coma with bilateral brain stem stroke carries a grave prognosis[(6)]. Coma in acute middle cerebral artery infarction with certain MRI features were helpful in predicting progression to malignant stroke[(7)]. Severe dysphagia in a stroke patient requiring feeding gastrostomy at the time of discharge from neurorehabilitation is associated with an increased risk of death[(8)].

Objectives

The objectives of this study were to define predictors of hospital outcome in patients admitted with acute

cerebrovascular accidents (CVA) from presentation to discharge. We also looked at the incidence of acute CVA and the associated risk factors.

Methods

This is a hospital-based descriptive cross-sectional study. It was conducted in Omdurman Teaching Hospital (OTH). The study population were patients admitted with acute cerebrovascular accident (CVA) from September 2011 to February 2012. The data was collected by the investigator using a structured closed ended questionnaire. The study included all patients with acute CVA. Patients were excluded from the study if they did not satisfy the diagnosis; and when consent was not obtained. The study had been approved by the ethical committee of the Sudan Medical Specialization Board.

Results

During the study period, 3150 patients were admitted to Omdurman hospital. Of these patients, 150 had acute stroke. The incidence of stroke was 4.7%. The mean age of the study population was 61 years with age ranging from 23 to 100 years. Eighty-five patients (56.7%) were males. Diabetes mellitus (DM), hypertension (HTN) and Cardiovascular disease were seen in 49 (32.7%), 101(73.3%) and 40 (32.5%) patients respectively. The distribution of risk factors is shown in Table 1.

Cerebral ischemia and hemorrhage were reported in 118 (78.1%) and 32 patients (21.9%) respectively. DM was seen in 49 patients: Of those 44 (89.8%) had ischemic stroke. The total number of hypertensive patients was 101, 74 of them (73.3%) had ischemic stroke.

The frequency of clinical presentations and their relation to outcome is shown in Table2. Weakness, speech disturbance, loss of consciousness and confusion were seen in 147 (98%), 115 (76.7%), 98 (63.3%) and 52 (34.7%) respectively. Significant disability was seen in those with bulbar symptoms (39.1%), loss of consciousness (31.6%), speech disturbance (33%) and weakness (27%).

Mortality rates of 32.5% and 27.8% were seen among those with cardiovascular disease and smokers. Almost one third of patients with DM (34.7%) and HTN (31.7%) had significant disability. Excellent recovery (66.7%) was seen in patients with Rheumatic Heart disease (RHD). Aspiration pneumonia, bedsore and sepsis were associated with 75%, 62.5%, and 80% mortality respectively.

Mortality was similar in both ischemic and hemorrhagic stroke (13.6% and 12.6%) respectively. Significant disability was found in 29.6% in ischemic stroke. Good recovery (46.8) was seen among those with hemorrhagic stroke. Figure 1

Among those with ischemic stroke, middle cerebral artery, and lacunar infarcts were the commonest types, representing 66.9% and 11.1% respectively. These were associated with good outcome. Patients presenting with either total anterior or posterior circulation stroke were likely to have high mortality. Mortality was almost 100% among patients with both total anterior and posterior circulation stroke.

Discussion

Stroke is a major health problem and it is the third commonest cause of death worldwide. In the current study, the incidence of stroke among hospitalized patients was about 4.7%; this is nearly similar to the incidence reported in America and South East Asia of 4.8% and 4.5% respectively[9].

Most of the study population was males (65.7%). This is similar to what was published by Sokrab[10], who noted that 60% were males. The mean age of our patients was 61+1.8 years, which is similar to previous reports.

Cerebral ischemia was the predominant cause of stroke and occurred in 78.1% while hemorrhage occurred in 21.9%. This is comparable to what was reported by Sokrab's in 2000[10]. The interval between the two studies was too short to expect changes in the epidemiologic risk factors or a positive effect of any interventions. This can be contrasted to what was reported by Tull et al who found ischemia was 10-times more frequent than hemorrhage in Western countries[11].

Hypertension was the commonest risk factor followed by diabetes, cardiovascular disease and smoking. This is almost similar to Sokrab's findings. Since there has been no significant change in the prevalence of risk factors, it would be conceivable to see less change in the outcome. Other studies found that, hypertension and diabetes were common risk factors among Black Americans[12,13].

Poor hospital outcome and increased mortality were found more among patients with cardiovascular diseases and those with smoking history i.e., 32.5% and 27.5%respectively. Smoking was a poor predictor of hospital outcome in the study of Kumagai et al.[14]The influence of cardiovascular disease was similar to the finding of Cuadrado-Godia[15]. Blood clotting abnormality and patients with history of rheumatic heart disease had good hospital outcome. This could be related to the fact that these diseases were seen frequently among young patients. This is similar to what was reported by Tiamkao[16]. Weakness, speech disturbance and loss of consciousness were the commonest presenting manifestations. This is similar to what was reported from Jordan[17]. In this study, mortality was high among patients with bulbar symptoms (52%). This is similar to what was reported by Addington et al[18] and Gordon[19].

Development of complications like aspiration pneumonia, bedsores and sepsis (75%, 62.5% and 80%) respectively were highly linked to bad outcomes and mortality. This was reported by other workers[20-23].

In this study, hemorrhagic stroke had good hospital outcome when compared to the ischemic type. This can be explained by the fact that most of the patients with hemorrhagic stroke in the study were young and had mild to moderate cerebral hemorrhage, while most of those with ischemic stroke were elderly and had multiple risk factors. Chiu et al reported similar findings in his study; cerebral hemorrhage was an independent predictor of neurological outcome and was not associated with increasing mortality compared to ischemic stroke[24].

In patients with ischemic stroke, proximal MCA occlusion predominated (66.9%). Lacunars stroke had good hospital outcome. This was also reported by Arboix et al who found that lacunar infarction had good hospital outcome but had high recurrent rate in hypertensive and diabetic patients[25].

In the current study, partial anterior circulation was the commonest type, which had good outcome. It was reported that most of the patients with proximal MCA occlusion rapidly recruit sufficient collaterals and follow a clinical course similar to the patients with no proximal MCA occlusion, but subsequently with diminished collaterals, they are at high risk of worsening as seen in total anterior circulation stroke[26]. In this study, most of the patients with posterior circulation stroke had poor outcome. This was similar to what was reported by Caplan el at[27].

Conclusion

The prevalence of stroke in OTH was 4.7%. Hypertension was the commonest risk factor followed by diabetes mellitus. Hemorrhagic stroke and anterior circulation ischemic stroke subtype had good outcome. Posterior circulation had poor outcome. Patients who presented with confusion, loss of consciousness and bulbar symptoms had poor outcome as well as patients who developed hospital complications like sepsis, aspiration pneumonia and bedsores.

Table 1. Distribution of risk factors in stroke patients (n=150)

Risk factors	Total number of patients
Diabetes mellitus	49
Hypertension	101
Smoking	18
Cardiovascular diseases	40
History of Rheumatic Heart Disease	6
Blood clotting abnormality	3
Rhythm disturbance	19
Family history of stroke	45

Table 2. The Relation of clinical presentation to hospital outcome.

Clinical presentation	Complete recovery	Partial recovery	Significant disability	Mortality	Total
Weakness	42 (28. %)	45 (30%)	40 (27%)	20 (13%)	**147(98%)**
Convulsion	3	2	2	3	**10**
Loss of consciousness	21 (21%)	27 (27.6%)	31 (31.6%)	19 (19%)	**98(63.3%)**
Speech disturbance	26 (22.6%)	34 (29.6%)	38 (33%)	17 (14.8%)	**115(76.7%)**
Bulbar symptoms	0 (0.0%)	2 (8.7%)	9 (39%)	12 (52%)	**23(15.3%)**
Confusion	8 (15%)	11 (21%)	17 (32%)	16 (31%)	**52(34.7%)**

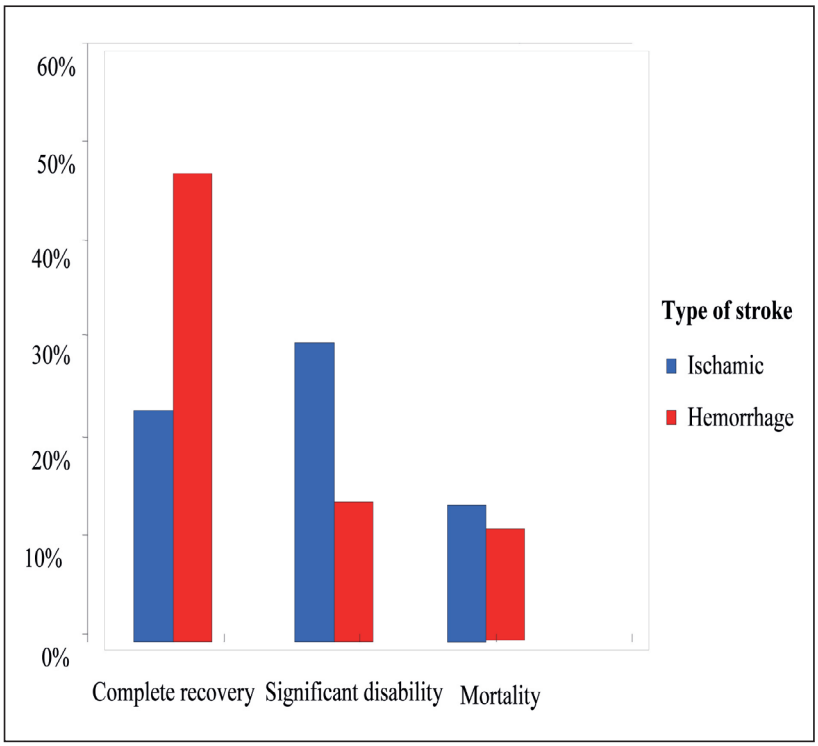

Figure 1: Management outcome of acute stroke patients in relation to stroke types

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