Review Article

Clinical Characteristics and Hospital Mortality of Stroke in the Neurology Department of the Befelatanana University Hospital

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Abstract

Introduction: stroke-related mortality and morbidity remain high, especially in low-income countries. The objectives of this study were to determine the clinical characteristics, the brain CT scan characteristics and the intra-hospital mortality of strokes.

Materials and Methods: this is a descriptive, retrospective study over a period of 5 years, from July 2011 to June 2016. Included all patients hospitalized for stroke in the neurology department of Befelatanana University Hospital during this period with or without scanning evidence.

Results: 1272 patients were retained with an average age of 57.22 ± 10.1 years. The sex ratio was 0.96. Hypertension is the cardiovascular risk factor most frequently found at 82.40% of cases. In the majority of cases, moderate strokes with the median NIHSS value of 10 and the median Modified Rankin scale of 4 were observed. Seven hundred and forty-four patients (58.5%) had performed a brain CT scan. Intra-parenchymal hematomas represented 49.60% of cases and cerebral infarction 45.16%. The mortality was 13.36%. The main causes of death were neurological complications of a stroke at 43.52% of cases and pneumonia (31.17%).

Conclusions: Stroke morbidity and mortality remained high in our practice. The establishment of a Neuro Vascular Intensive Care Unit would improve the prognosis of this pathology.

Keywords: Brain CT Scan; Characteristics; Madagascar; Mortality; Stroke

Abbreviations

CT scan: Computerized Tomography Scanner

Introduction

According to the WHO, stroke is defined as the sudden onset of a focal neurological deficit of presumed vascular origin [1]. According to the anatomical nature, it is subdivided into three major groups: ischemic stroke (transient ischemic attacks, constituted ischemic attacks); cerebral thrombophlebitis and hemorrhagic stroke (intraparenchymal hemorrhage, subarachnoid hemorrhage) [1]. This pathology constitutes a real public health problem due to its frequency and severity, with high mortality and sequelae that reduce the functional autonomy of survivors [2]. In Madagascar, according to a study carried out in 2004 on the population of Tananarive, the annual incidence is 51 new cases per 100,000 inhabitants per year, with approximately one death every 36 hours and an annual mortality rate of 42.14% [3]. In order to

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update the data on the stroke in the Joseph Raseta Befelatanana University Hospital (CHUJRB) of Antananarivo, we conducted this study with the objectives of determining their clinical and scannographic profile and determining the in-hospital mortality rate of stroke.

Materials and Methods

This is a descriptive, retrospective study conducted at the Neurology Department of the CHUJRB of Antananarivo, over a period of 5 years, from July 1, 2011, to June 30, 2016. All patients diagnosed as strokes were included, with or without CT evidence, discharged alive or deceased. Transient ischemic attacks and incomplete patient records were excluded from the study. Demographic and clinical parameters of the patients, including age, sex; cardiovascular risk factors, as hypertension, diabetes, smoking, alcoholism, and previous stroke, were studied. The severity of the stroke was assessed by the Glasgow score, the National Health Institute of Stroke Score or NIHSS, and the Modified Rankin Score. Cerebral CT scans and the anatomical aspect of the lesions were analyzed. The overall mortality rate, the mortality rate per year and the main causes of death were evaluated. The analysis of the results was performed on Epi Info7© version 1.1.14 of the Centers for Disease and Prevention.

Results and Discussion

During the study period, we retained 1272 cases of stroke among 3380 hospitalized patients. Six hundred twenty four patients were male (49.1%) and 648 (50.9%) were female. The sex ratio were 0.96. The mean age were 57.22 ± 10.1 years [15-100 years]. Seven hundred twenty nine (57.31%) patients where under 60 years old. The main cardiovascular risk factors identified were high blood pressure in 1048 cases (82.40%); ethyl-smoking in 447 cases (35.20%), history of stroke in 220 cases (17.30%); diabetes mellitus in 66 cases (5.20%). At the clinical examination in admission mean systolic blood pressure (SBP) was 172.42 +/- 42.24, and means diagnostic blood pressure (DBP) was 90.20 +/- 22.34 mmHg. The average GCS score was 14 (at least 7 and maximum 15). The median NIHSS score was [2-24] and the Median Modified Rankin score was 4. The clinical manifestations were motor deficits in 1202 cases (94.49%); sensory disturbances in 487 cases (38.34%); urinary incontinence in 402 cases (31.64%); aphasia in 274 cases (21.54%); and damage to the cranial pairs in 198 cases (15.56%). Seven hundred and forty-four patients

(58.5%) had a brain CT scan. Intraparenchymal hematomas were found in 369 cases (49.60%); constituted ischemic accidents in 336 cases (45.16%); subarachnoid hemorrhages in 29 cases (3.90%); cerebral venous thrombosis in 10 cases (1.34%) (Table 1). The mean duration of hospitalization was 7.90 days. The mortality rate was 13.36%, i.e., 170 patients died. The annual mortality was 15.8% in 2011; 22.3% in 2012; 20% in 2013; 10.7% in 2014; 6.9% in 2015 and 4.9% in 2016 (Figure 1). The main causes of death were neurological complications in 74 cases (43.52%) (including cerebral commitments, intracranial hypertension, rebleeding, status epilepticus,) and inhalation or decubitus pneumonia in 53 cases (31.17%).

Parameters	Patients (N = 1272)
Men, n (%)	624 (49.1%)
Mean age (years)	57,22 ± 10,1 years [15 -100 years]
Patients < 60 years, n (%)	729 (57.31%)
High blood pressure, n (%)	1048 (82.40%)
Smoking, n (%)	447 (35.20%)
Previous stroke, n (%)	220 (17.30%)
Diabetes mellitus, n (%)	66 (5.20%)
Mean SBP (mmHg)	172.42 + /- 42.24
Average DBP (mmHg)	90.20 +/- 22.34 mmHg
Mean GCS	14
Median NIHSS score	10
Median Modified Rankin Score	4
Motor deficits, n (%)	1202 (94.49%)
Sensory disorders, n (%)	487 (38.34%)
Urinary incontinence, n (%)	402 (31.64%)
Aphasia, n (%)	274 (21.54%)
Cranial nerve involvement, n (%)	198 (15.56%)
Brain scan performed, n (%)	744 (58.5%)
Intra-parenchymal hematoma, n (%)	369 (49.60%)
Ischemic attacks, n (%)	336 (45.16%)
Subarachnoid hemorrhage, n (%)	29 (3.90%)
Cerebral venous thrombosis, n (%)	10 (1.34%)

Table 1: Demographic, clinical, scannographic characteristics of patients.

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Figure 1: Mortality rates by year from 2011 through 2016.

In the present study, our patients are relatively younger with an average age around 55 years and a significant proportion of patients under 60 years, in contrast to the results reported in developed countries, where patients are often older, around 80 years on average [4]. Concerning gender, we have an almost equal distribution of strokes in both genders. Male gender is one of the non-modifiable risk factors for stroke. However, the gender predominance varies according to the studies. A male predominance was found in a Nigerian study [5], whereas a female predominance was found by a Senegalese study [6]. High blood pressure is the most frequent cardiovascular risk factor, present in nearly eight out of ten patients in our study; this finding has been noted in most series in sub-Saharan Africa [5,7], which makes it the main risk factor for stroke in this part of the continent. Clinically, the high blood pressure observed in our study is well known from other studies [8,9]. It is common during the acute phase of stroke aIt is related to pre-existing hypertension or secondary to a regulation of cerebral perfusion pressure during an acute cerebral. Neurological deficits were moderately severe in our study with a median NIHSS score of 10 and a median Rankin score of 4. A Nigerian study found a median NIHSS score of 11 [10]. The clinical severity depends on the extent and location of the stroke, but also at the start of functional rehabilitation [1]. According to the types of neurological deficits, motor deficits were present in 9 out of 10 patients in our study, a result shared by other studies in Madagascar [11] or elsewhere [12]. According to the CT scan data, the proportion of patients who were able to perform a brain scan was 58.5% in our study. A cerebral CT scan should be performed urgently in the event of a suspected stroke [13]. The main factor that prevents the performance of an emergency brain scan remains financial in the context of Madagascar. According to WHO data, nearly 83% of stroke cases in Africa are not confirmed by CT scan, mainly due to lack of financial means and social security coverage [14]. However, we found that during our study period, the proportion of patients who had the brain scan increases, ranging from 41%, 48% in 2011 to 72.22% in 2016. This could be explained by the multiplication of CT scan centers in Antananarivo which promotes competition and contributes to the lowering of their cost. The CT nature is dominated by intraparenchymal hematomas (49.60%) and constituted ischemic strokes (45.16%), which differs from Western studies where cerebral infarctions predominate [12,15]. A higher proportion of hemorrhagic stroke is observed in developing countries [16] mainly by a poor prevention and management campaign of hypertension. We have an overall mortality rate of 13.36% during hospitalization. In the literature, the mortality rate from a stroke in the African population which is 22% and that of the world population is 9% [10]. The high mortality rates in developing countries could be due to the limited therapeutic means and reflect the difficulty for access to adequate care and the lack of technical support necessary for management. Nevertheless, we have a promising result by noting a decrease in the mortality rate per year during the period of our study ranging from 22.30% in 2012 to 4.90% in 2016. This decrease could be explained by an improvement in care as well as the increase of number of patients who were able to perform a brain scans. The causes of mortality were dominated by neurological complications (43.52%). The short-term prognosis of a stroke remains vital with 10 to 30% of mortality in the first 15 days due to cerebral edema and cerebral herniation [1]. Mortality rate due to pneumonia during stroke remain high in our study (31.17%). This is consistent literature, reporting that nearly 1 in 3 deaths in stroke patients being related to pneumonia [17]. In an American study, the presence of pneumonia during hospitalization was associated with 2.99 times more deaths [17]. Pneumonia is the most common cause of death among the medical complications of a stroke, essentially due to the hypoxia and hyperthermia that it causes. These are redoubtable of secondary cerebral aggression during stroke, thus requiring prevention and adequate management.

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Conclusion

This study showed that stroke affects younger subjects in our population with moderately severe cases and a high proportion of intra parenchymal hematoma. The most frequent clinical presentation was hemiplegia. Access to brain scans was limited and was performed in only about half of the cases. Mortality remained high and a showed a decreasing trend from 2011 to 2016. The increase in the number of patients having had a brain scan and the decrease in in-hospital mortality are assets and promising elements for continuing the efforts that have been made to improve the management of a stroke in Madagascar.

Conflict of Interest

Declarations of interest: none.

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