Clinical, Biological and Ct Predictors of In-Hospital Mortality in Ischemic Stroke Patients in Central Africa

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Abstract

Background: Stroke is a major public health problem, its management remains a challenge for the medical professionals. We investigated the clinical, simple biological and tomographic determinants of outcome in patients suffering of ischemic stroke.

Materials and methods: This prospective study was conducted at Kinshasa university hospital from January 2011 to June 2014. A total of 104 consecutive patients with first-ever ischemic stroke confirmed by computed tomography examination were enrolled for the study. The parameters of interest were clinical, routine biochemical and radiological data within the 3 first days of symptom onset. Logistic regression was used to identify independent determinants of mortality risk.

Results: The average age of patients was 62 ± 14 years old with 68% of male. Among the 22 patients (21%) who died, in univariate analysis, factors associated with lethality were the Glasgow score <9, higher elevated erythrocyte sedimentation rate >40 mm/1h, higher leukocytosis >10.000 elements/mm3 and non-lacunar brain infarct. On multiple logistic regression analysis, higher elevated erythrocyte sedimentation rate (OR 1.8; 95% CI 1.22 to 89.35; p=0.032), lesion located in infra-tentorial area (OR 4.7; 95% CI 1.50 to 16.38; p=0.017) and hemorrhagic infarct (OR 10.6; 95% CI 2.21 to 77.89; p=0.005) were essentially independent determinants of ischemic stroke mortality.

Conclusion: The study seems to determine factors associated with mortality in patients suffering from cerebral infarction. Glasgow score and routine biomarkers may be useful in low setting area to assess mortality in ischemic stroke patient.

Keywords: Ischemic stroke; Predictors of mortality; Central Africa

Introduction

Stroke is a leading cause of mortality and a long-term disability with an enormous economic burden by over the world [1-3] and Democratic Republic of the Congo (DRC), where chronic hypertension, diabetes mellitus, heavy alcohol consumption and cigarette smoking cannot be neglected as factors associated [4]. The management of stroke remains a serious problem for professional healthcare in most African centers because of time delay and lack of neuro-imaging facilities [5]. In recent years elsewhere, studies concerning prognosis of ischemic stroke has been done. The data on admission concerning clinical, biological markers of inflammation as C-reactive protein, interleukin and cytokines, and radiological were analyzed [6-10]. Some published studies indicate that Ischemic stroke patients with systemic inflammation exhibit clinically poorer outcome [7,11,12]. In rural practice, these biochemical markers may not be always available or are very expensive. The main objective of the present study was designed to investigate easily identifiable clinical, biological data associated with computed tomographic lesion to predict outcome for patients suffering from ischemic stroke.

Materials and Methods

A total of 104 patients of Bantu ethnicity of Central Africa, aged >18 years old, regardless of sex, consecutively admitted to our hospital with clinical diagnosis of stroke and ischemic lesion on computed tomography scan from January 2011 to June 2014 were enrolled in the study. The patients were explored from 1 to 3 days following the onset of symptoms. Patients with time delay admission were excluded. Clinical data as Glasgow coma scale (GCS) and conventional inflammatory biomarkers easily used in a low resource setting such as erythrocyte sedimentation rate (ESR) and white blood cell (WBC) count were collected and recorded with computed tomographic subtypes of ischemic stroke (lacunar hypodense lesion of ≤ 25 mm diameter or no lacunar > 25 mm) including 78% of middle cerebral artery stroke. The CT examinations were performed with a helicoidal machine (Hitachi, Eclo, Japan), in the usual way cuts 10 mm spaced 5 mm without injection of contrast material. The ERS was evaluated by means of Westergren's tube method, and the WBC count by New-Bawer cell technique. Poor GCS on admission was defined as 3-8 of a top score of 15.

Statistical Analysis

The statistical analysis was performed using commercially available software (SPSS version 21). Univariate analysis with the chi-squared test and the Student’s t-test were applied to analyze the statistical significance difference between two groups of patients who died and those who survived. A probability value of P<0.05 was considered as statistically significant difference. Significant variables during univariate analysis were included in the multivariate logistic regression analysis with stepwise procedure.

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The study was approved by the local research ethics committee.

Results

Out of the 104 first-ever ischemic stroke patients, 22 (21.2%) died. Clinical and biomarker data of the 2 groups of patients (survival vs. died) are presented in (Table 1). Note that the GCS, the ESR, the number of white cell were statistically different in the 2 groups. CT data of the 2 groups are summarized in (Table 2). Parameters associated with mortality in univariate analysis are shown in (Table 3). Parameters associated with mortality on multiple logistic regression analysis are summarized in (Table 4).

Discussion

The predictors of mortality in the acute phase in patients suffering from ischemic stroke have been attributed to a variety of parameters available in clinical practice. These parameters are: clinical as poor GCS from ischemic stroke have been attributed to a variety of parameters associated with mortality on multiple logistic regression analysis are presented in (Table 3). Parameters associated with mortality in univariate analysis are shown in (Table 4). The predictors of mortality in the acute phase in patients suffering from ischemic stroke have been attributed to a variety of parameters available in clinical practice. These parameters are: clinical as poor GCS from ischemic stroke have been attributed to a variety of parameters associated with mortality on multiple logistic regression analysis are presented in (Table 3). Parameters associated with mortality in univariate analysis are shown in (Table 4).
Limitations of the study and Future research directions

In this study conducted in a tropical area, first, common causes of inflammation increasing ESR and WBC count as infectious diseases were not excluded. Second, the systemic inflammatory status prior to the time of stroke onset was not assessed and Rong suggest that this status is a key determinant of acute outcome and long-term prognosis [11]. Third, the volume of ischemic lesion known as associated with a poor prognosis was not measured. For future study, each of these biases should be taken into consideration to allow an estimate of the significance and robustness of the findings under tropical climate. However, this study accesses the highlights of clinical and easy biomarkers using CT scan explorations. It may have an important clinical implication suggesting the use of Siriraj and GCS with routine biomarkers using CT scan explorations. It may have an important clinical implication suggesting the use of Siriraj and GCS with routine biomarkers using CT scan explorations. It may have an important clinical implication suggesting the use of Siriraj and GCS with routine biomarkers using CT scan explorations. This study conducted in Central Africa settings revealed simple determinants associated with mortality in ischemic stroke as poor GCS and routine biomarkers levels especially ESR and WBC count. Given some limitations of the present study, investigations are warranted to confirm the present suggestion in African lack neuro-imaging facilities centers.

Conclusion

This study conducted in Central Africa settings revealed simple determinants associated with mortality in ischemic stroke as poor GCS and routine biomarkers levels especially ESR and WBC count. Given some limitations of the present study, investigations are warranted to confirm the present suggestion in African lack neuro-imaging facilities centers.

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