



# Stroke in Sub-saharan Africa: Observations from Donka National Hospital

Vamala Guillavogui<sup>1</sup>, Djibril Sylla<sup>2</sup>, Foksouna Sakadi<sup>3,\*</sup>, Seylan Diawara<sup>1</sup>, Nestor Onikoyamou<sup>1</sup>, Abdel-madjid Zakaria Zakaria<sup>3</sup>, Kezely Beavogui<sup>1</sup>, Amara Cisse<sup>4</sup>

<sup>1</sup>Neurosurgery Department, Donka National Hospital, Conakry, Guinea

<sup>2</sup>Department of Medical and Surgical Emergency, Donka National Hospital, Conakry, Guinea

<sup>3</sup>Neurology Unit, National Reference Teaching Hospital, Ndjamen, Chad

<sup>4</sup>Neurology Department, Ignace Deen National Hospital, Conakry, Guinea

## Email address:

vamalagui@yahoo.fr (Vamala G.), docteurdjibril@yahoo.fr (Djibril S.), foromo1983@gmail.com (Nestor O.),

seylandiaw@gmail.com (Seylan D.), fokasaka@gmail.com (Foksouna S.), aboutingui2@gmail.com (Abdel-madjid Z. Z.),

drkezely@gmail.com (Kezely B.), amaracisse69@yahoo.fr (Amara C.)

\*Corresponding author

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**Abstract:** *Introduction:* Stroke is a major public health problem, the consequences of which are as much medico-social as they are economic. The main objective is to make a socio-demographic, clinical, therapeutic and prognostic assessment in the short term in a medico-surgical emergency department in Guinea. *Material and Methods:* This was a descriptive retrospective study lasting 2 years from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2015 inclusive. All complete medical records of patients hospitalized for stroke confirmed by brain scan were included in this study. Sociodemographic, clinical, para-clinical, therapeutic and evolutionary data were collected. *Results:* During the 2 years out of 1321 patients hospitalized in the intensive care unit, strokes represented 7.3% of cases. The average age was 67.2 years old with the extremes of 30 and 99 years old. We had a male predominance of 59 men versus 38 women with a sex ratio of 1.55. The most common cardiovascular risk factors were high blood pressure (74.23%), diabetes (22.68%), and age (89.69%). The Glasgow Score was between 3 - 8/15 in 49 patients or 50.52%. The death rate was 14.4%. *Conclusion:* The management of serious strokes in intensive care units in emergency rooms considerably reduces short-term mortality and neurological sequelae of patients.

**Keywords:** Stroke, Epidemiology, Prognosis, Intensive Care Unit, Guinea

## 1. Introduction

The World Health Organization (WHO) defines stroke as the rapid development of localized or global clinical signs of brain dysfunction with symptoms lasting more than 24 hours, which can lead to death for no other apparent cause than 'a vascular origin [1]. This disease is a major public health problem, the consequences of which are as much medico-social as they are economic [2].

Stroke is the leading cause of acquired motor disability in adults, the second leading cause of dementia after Alzheimer's disease and the third leading cause of death after

cardiovascular disease and cancer [3]. In Africa, this situation is particularly worrying and remains in some hospitals the leading cause of hospitalization [4, 5].

Globally 1, 6 million people had a case of stroke in 2005, including 5.7 million deaths [6]. In the United States, ischemic stroke is the second leading cause of death in people over the age of 60, with an estimated 795,000 new strokes each year. In France around 40,000 deaths each year and 30,000 patients with serious sequelae at 1 year [7].

Stroke takes a heavy toll on the development of the economy of Sub-Saharan Africa (SSA), increasingly affecting young people [8]. Controlling modifiable risk factors could significantly reduce the occurrence of these

conditions [9-11].

Support remains difficult, due to the lack of human resources, the insufficiency or absence of an adequate technical platform and the lack of awareness [12].

We report a series of stroke cases for the purpose of a socio-demographic, clinical, therapeutic and prognostic assessment in the short term in a medical-surgical emergency department in Guinea.

## 2. Material and Methods

This was a descriptive retrospective study lasting 24 months from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2015 inclusive. It brought together all the medical records of patients admitted for stroke to the intensive care unit of the medical-surgical emergency department of Donka National Hospital during the study period. All complete medical records of patients hospitalized for stroke confirmed by brain CT scan were included in this study. Sociodemographic, clinical, para-clinical, therapeutic and evolutionary data were collected and analyzed using the SPSS 2.0 software. Biological and biochemical data, electrocardiogram results, heart and supra-aortic Doppler ultrasound have been extracted and analyzed in some patients. The Chi2 test allowed us to make statistical comparisons between the different variables. Any P value <0.05 was considered statistically significant.

The procedures followed met the requirements of the hospital. The approval of the hospital's ethics committee had been received and the anonymity of the information was preserved.

## 3. Results

Out of 1321 files collected, 97 had met the selection criterion, ie a hospital frequency of 7.3% of cases with a predominance of men (59 men and 38 women). The mean age of the patients was 67.2 years old with extremes of 30 and 99 years old. The most common age group was 60-69 years old with 29.9% of cases. Households (32.4%), civil servants (29.9%) and shopkeepers (19.6%) were the most common occupations. The most common clinical signs were loss of consciousness (100%), motor deficit (93.8%), central facial paralysis (40.21%), convulsive seizures (28.82%), stiffness neck (15.46%) and aphasia (10.33%). On admission, the Glasgow score was 3 to 8 in 50.5% of cases, 9 to 12 in 37.1% of cases and 12 to 14 in 12.4% of cases.

Age, high blood pressure and diabetes were the most common risk factors with successively 89.7%, 74.2% and 22.7%. Ischemic strokes were the most common with 72 cases (74.2%) against 25 (25.8%) of hematomas (intraparenchymatous and cerebrum-meningeal). The management was mainly medical dominated by saline and oxygen therapy with 100% of cases each followed by analgesics (80.4%), antihypertensives (23.7%) and antiepileptics (22.7%).

Oxygen therapy was provided to all of our patients with

the aim of combating cerebral hypoxia and hypercapnia.

In this study 23 patients (23.71%) received antihypertensive treatment.

Insulin was administered in 16 patients or 16.49% due to hyperglycemia.

The antiplatelet agent was administered in 14 patients or 14.43% for secondary prevention.

The gastric bandage was administered in 45.05% of our patients.

The analgesic-antipyretic was used in 78 patients, or 80.4%. Anticonvulsants (Diazepam and gardenal) were administered to 12.37% of patients with the aim of stopping symptomatic epileptic seizures.

After an average hospital stay of 8.2 days, 85.6% of patients were transferred to the neurology and neurosurgery departments with general stationary (52 cases) or improving (31 cases) and 14.4% were died in the intensive care unit.

## 4. Discussion

Over the past 20 years, recent African reviews have never ceased to point out the increasing frequency of strokes in Sub-Saharan Africa countries with high mortality rate. This motivated the importance of the creations of intensive care unit in hospital environment and the sensitization on the modifiable risk factors [8]. We retrospectively report 97 cases of suspected severe stroke, hospitalized in the intensive care unit of the medico-surgical emergency department of the Donka National Hospital between January 2014 and December 2015; ie a hospital frequency of 7.3% of cases. This frequency is lower than that reported by SQUARE D *et al.* [13] who had found 12%. The average age of our patients was 67.2 years. This figure is slightly higher than the data of African literature [9, 14] which reports an average age of around 57 years, however in Africa, strokes are increasingly found in young people. We report serious cases of stroke which would probably explain our mean age [15; 16]. The male predominance was found in our series however N'GORAN Y. N. K *et al.* [17] reported female predominance with a female/male sex ratio of 1.2. The most common socio-professional layers were those exposed to daily stresses. However, civil servants and shopkeepers have more stable economic situations.

Ischemic strokes were the most common type of stroke with 72 cases (74.2%) against 25 (25.8%) of intracerebral and cerebro-meningeal hematomas. These results report a predominance of cerebral infarctions. Chiasseu Mbeumi MT *et al.* [4] in Cameroon as well as Barry SD *et al.* in Guinea [18] found 60% and 69.8%, respectively, of cerebral infarction. Epidemiological studies in developed countries [6, 7] report 80% to 85% of cerebral infarctions against 20% to 15% of intracerebral hematomas. It seems obvious that intracerebral hematomas are more common in Africa.

Hypertension was the second risk factor, accounting for 74.23% of patients. This result is comparable to that reported by GUIRASSY M. L. [19] or 83.3% and significantly higher than that of HOUESSOU C. U. O [20] or 64.70%.

According to the literature, hypertension is considered the main risk factor for stroke (ischemic or hemorrhagic), more than half of strokes occur in a context of chronic hypertension [4].

Diabetes found in 22.68% of cases; this result is superimposable on that of GBILIMOU D. 20.69%. The risk of stroke in diabetics is 1.5 per year and diabetes is the cause of macrovascular complications (stroke) [21].

Obesity found in 17.53% of our patients; this result can be superimposed on that of DIALLO M. A. B. et al. [22] or 15.11% and lower than those of DAMOROU F. et al. [23] who reported in their study 60.44% high blood pressure and 45.76% obesity.

Patients hospitalized in a comatose state were the most observed with Glasgow scores between 3 -8/15. This high rate of comatose could be explained by the non-follow-up of patients and the administration of diuretics which can degrade their picture before their admission to the intensive care unit of the emergency at Donka National Hospital. All our patients have benefited from a standard management protocol consisting of oxygen therapy and saline, associated in most cases with an analgesic. Anticonvulsants (Diazepam and gardenal) have been given to patients who have experienced seizures.

Patients are referred to inpatient departments based on their clinical improvement status. We recorded 14.43% of deaths (14 cases). Our results are close to N'GORAN Y. N. K and all [17] who recorded 17% of deaths in their studies in the emergency room. Improving the technical platform could reduce this mortality and raise awareness of cardiovascular risk factors.

The failure of our study is based on the absence of scores that can track patients' progress or their vital prognoses such as the National Institutes of Health Stroke Scale, the modified Rankin score and the Intra Cerebral Hemorrhage score.

## 5. Conclusion

The management of serious strokes in intensive care units in the emergency room considerably reduces short-term mortality and neurological sequelae of patients. However, the technical platform is insufficient in our context for the realization of thrombolysis.

## Appendix

**Table 1.** Distribution of patient medical records according to cardiovascular risk factors.

Cardiovascular risk factors	Frequency	Percentage (%)
Hypertension	72	74,23
Age	87	89,69
Diabetes	22	22,68
Obesity	17	17,53
Tobacco	6	6,11
Dyslipidemia	8	8,25
Alcohol	2	2,06

**Table 2.** Distribution of patient medical records according to state of consciousness.

Glasgow Score	Effective	Percentage (%)
3 - 8	49	50,52
9 - 12	36	37,11
12 - 14	12	12,37
Total	100	100

**Table 3.** Distribution of patient medical records by treatment.

Treatment	Frequency	Percentage (%)
Salted Serum 0.9%	97	100
Analgesics	78	80,41
Antiplatelet drugs	14	14,43
Antihypertensives	23	23,71
Antidiabetic drugs	16	16,49
Oxygen therapy	97	100
Antiepileptics	22	22,68

## References

- [1] DENIS M. MODULE INTERPROFESSIONNEL DE SANTE PUBLIQUE 2002; PEC des AVC, Ecole nationale de la santé publique de Renne; Page 1.
- [2] Bertrand C.: Evaluation de la prise en charge des AVC aux urgences du CHIVA: Adéquation avec des recommandations et les indicateurs de qualité; proposition de protocole. Thèse de médecine 2013.
- [3] Collège des Enseignants de Neurologie. Neurologie: 3<sup>e</sup> édition. 2012 Elsevier Masson SAS.
- [4] Chiasseu Mbeuni MT, Mbahe S. Etude descriptive des accidents vasculaires cérébraux à Douala Cameroun. Médecine tropical 2011; 71: 492-494.
- [5] ELISEE T.: Profil épidémiologique, clinique et évolutif des AVC au CHU du point G. Thèse de médecine, Bamako 2007.
- [6] Furie K. Epidemiology and Primary Prevention of Stroke. Continuum (Minneapolis Minn). 2020 Apr; 26 (2): 260-267. doi: 10.1212/CON.0000000000000831. PMID: 32224751.
- [7] Boursin P, Paternotte S, Dercy B, Sabben C, Maïer B. Sémantique, épidémiologie et sémiologie des accidents vasculaires cérébraux [Semantics, epidemiology and semiology of stroke]. Soins. 2018 Sep; 63 (828): 24-27. French. doi: 10.1016/j.soins.2018.06.008. PMID: 30213310.
- [8] E. SAGUI, LES ACCIDENTS VASCULAIRES CÉRÉBRAUX EN AFRIQUE SUBSAHARIENNE; Med Trop 2007; 67: 596-600; <https://www.researchgate.net/publication/266499602>
- [9] A. Pascal Kengne, Craig S. Anderson, The neglected burden of stroke in Sub-Saharan Africa; Journal compilation & 2006 International Journal of Stroke Vol 1, November 2006, 180-190.
- [10] Ruth Bonita, Robert Beaglehole; Stroke Prevention in Poor Countries Time for Action; Stroke. 2007; 38: 2871-2872; DOI: 10.1161/STROKEAHA.107.504589.
- [11] Myles D Connor, Richard Walker, Girish Modi, Charles P Warlow; Burden of stroke in black populations in sub-Saharan Africa; Lancet Neurol 2007; 6: 269-78; DOI: 10.1016/S1474-4422(07)70002-9.

- [12] Rufus Akinyemi, Fred Sarfo, Foad Abd-Allah, Yomi Ogun, Mofou Belo, Patty Francis and al.; Conceptual framework for establishing the African Stroke Organization; International Journal of Stroke 0 (0) 1–7, 2020 World Stroke Organization Article reuse guidelines: [sagepub.com/journals-permissions](https://sagepub.com/journals-permissions). DOI: 10.1177/1747493019897871.
- [13] SOUARE D.: Profil épidémiologique et clinique des accidents vasculaires cérébraux à l'hôpital régional de Labé. Thèse de doctorat en Médecine Guinée, 2012; P80.
- [14] Rozec B, Blanloeil Y, Cinotti R, Guillon B, Desal H.: Accidents vasculaires cérébraux postopératoires. Ann Fr Anesth Reanim 2011, doi: 10.00239/ANNFAR 2011.03.24.
- [15] CHARAIN: accident vasculaire cérébral ischémique du sujet jeune. Thèse de médecine, Royaume du Maroc 2013.
- [16] ARNAUD S.: Accident vasculaire cérébral de la personne âgée. Thèse de médecine, Université de Pierre et Marie Curie – Paris VI 2009.
- [17] N'GORAN Y. N. K., TRAORE F., TANOM., KRAMOHK. E., KAKOU J. B. A, KONINC., KAKOUMG.: Aspects épidémiologiques des accidents vasculaires cérébraux (AVC) aux urgences de l'institut de cardiologie d'Abidjan (ICA). Pan African Medical journal. 2015; 21: 160 doi: 10.11604/pamj.2015.21.160.6852.
- [18] S. D. Barry, K. Conde, A. K. Bah, A. T. Balde, M. L. Toure, N. R. Tassiou, F. Sakadi et al., Facteurs pronostiques des accidents vasculaires cérébraux ischémiques au service de neurologie du CHU de Conakry, en Guinée; NPG Neurologie - Psychiatrie – Gériatrie; Volume 21, Issue 123, June 2021, Pages 163-169; <https://doi.org/10.1016/j.npg.2020.09.004>.
- [19] GUIRASSY M. L.: Accidents Vasculaires Cérébraux Graves: Aspect épidémiologiques, cliniques et paracliniques au Service de Neurologie de l'hôpital National Ignace Deen CHU de Conakry. Thèse de Médecine, FMPOS, UGANC 2017: P87.
- [20] HOUESSO C. U. O.: Aspect épidémiologique et cliniques, des Accidents Vasculaire Cérébraux à l'hôpital Régional de Kindia. Thèse de médecine, Guinée; page 93.
- [21] GBLIMOU D.: Aspects clinique et prise en charge des accidents vasculaires cérébraux au service de médecine générale de l'hôpital préfectoral de Coyah. Thèse de Médecine, FMPOS, UGANC 2016: P77.
- [22] Diallo M. A. B: les accidents vasculaires cérébraux: aspect épidémiologiques cliniques et pronostic à l'hôpital Régional de Labé. Thèse de Doctorat en Médecine Guinée, 2015; P89.
- [23] DAMOROU F., TOGBOSSI E., PESSINABA S., KLOUVI Y., BALOGO A., BELO M., SOUSSOU B. Accidents vasculaires cérébraux (AVC) et affections cardio-vasculaires emboligènes. Mali Médical 2008; XXIII (1): 31–33.