

# Epidemiological Aspects of Cerebrovascular Accidents in the Diabetic: Experience of the Medical Clinic II of the Hospital Center Abass Ndao of Dakar

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## Abstract

**Introduction:** The objective of our study was to describe the socio-demographic characteristics and cardiovascular risk factors (RVFs) of diabetic patients admitted for stroke in a department other than neurology. **Methods:** Retrospective cross-sectional study over a period of six (6) years (January 2010 and December 2016), performed at the Internal Medicine Department of the Abass Ndao Hospital Center in Dakar. **Results:** 79 adults with a mean age of 64.67 years, a female predominance (51.89%). The major risk factors found were arterial hypertension in 74.68% of cases, dyslipidemia in 32.35% of cases, smoking in 6.32% of cases. The reasons for consultation were a disorder of consciousness in 27.4% of cases, hemiplegia in 43.3% of cases, headache in 18.98% of cases, vertigo in 8.86% and dysarthria in 10.12% of the cases. Mean systolic blood pressure was 150 mmHg, mean diastolic blood pressure was 86 mmHg. The average blood glucose was 3 g/l. Strokes were associated with left ventricular hypertrophy in 30.55% of cases. Ischemic stroke accounted for 74.68%. The evolution was marked by a death in 20.25% (16) cases. **Conclusion:** Stroke is a major public health problem. Despite its predominance of women, they (stroke) affected 48.10% of men in our study when we know that in Africa the social activity is based on men. They remain a serious pathology in the diabetic by the high lethality.

## Keywords

Africa, Chronic Complications, Diabetes, Mortality

## 1. Introduction

Diabetes is a public health problem because of the medical, social, and financial implications [1]. The International Diabetes Federation (IDF) 2015 estimates report a prevalence of 8.8%. Prevalence in sub-Saharan Africa will increase from 4.8% to 5.7% [2]. In Senegal, prevalence data remain approximate. According to 2015 IDF estimates, 3.4% of the Senegalese population is diabetic [2]. Diabetes is a leading cause of blindness, kidney failure, heart attack, stroke and lower limb amputation [3]. Stroke (all-cause) is the second leading cause of death in the world [4] [5], and recent studies show that mortality rates for ischemic stroke or cerebral hemorrhage are much higher in developing countries than in the industrialized countries [6] [7]. Nevertheless prospective data in diabetics are rare on the management and the short and medium term evolution of these pathologies in sub-Saharan Africa [8] [9]. The objective of our study was to describe the socio-demographic characteristics and Cardiovascular Risk Factors for diabetic patients admitted to stroke in an internal medicine unit to help better identify prevention targets.

## 2. Material and Methods

This was a descriptive retrospective study from January 2010 to December 31<sup>st</sup> of 2016, performed in the internal medicine department of the Abass Ndao hospital center. It concerned diabetic patients of all ages admitted during the period of study for neurovascular accident documented by a systematic brain scan. Stroke was excluded from the study and not documented by cerebral computed tomography (CT) scans. The diagnosis of the stroke was clinical and paraclinical: Clinic: any patient presenting with neurological clinical abnormality lasting more than 24 hours; paraclinical: based on scan criteria. Non-hospitalized diabetic subjects, patients transferred or abused or with undocumented stroke were excluded. For this survey, we selected the following variables:

- Sociodemographic characteristics: sex, age grouped by slice and occupation, provenance;
- Study of diabetes mellitus: seniority, type of diabetes, nature of treatment, associated cardiovascular risk factors, level of glycemic equilibrium using fasting glucose and treatment of patients;
- A review of cardiovascular risk factors.

Those considered in this study, since all patients are diabetic, were: age (>55 years in men and 60 years in women), active smoking, sedentary lifestyle, blood pressure over 130 mmHg, obesity, dyslipidemia, micro albuminuria greater than 30 mg/24h, hypercholesterolemia > 2 g/l, hypoHDLemia < 0.35 g/l, hypertriglyceridemia. The lipid balance was performed during a checkup.

- The treatment: low sodium diet, drug treatment of diabetes and treatment of high blood pressure, platelet and antiplatelet therapy statins;
- Reasons for hospitalization: reasons mentioned in the medical file or in the reference bulletin for hospitalization;
- The study of pathologies associated with diabetes.

Paraclinical data: fasting blood glucose; serum creatinine; the lipid balance the hemogram. CRP, computed tomography.

- The hospital outcome: we examined patient records to assess three possible outcomes: discharge from hospital, transfer to another department and finally death during hospitalization.

For the collection of data, we used the patient's medical record as well as the data that existed in the patient's hospital registry.

The capture and exploitation were carried out by SPSS STATISTICS 18.0 software.

### 3. Results

Clinic: 79 patients met the criteria for inclusion. The sample consisted of 41 women (51.89%) and 38 men (48.10%) with a sex ratio of 0.92. The average age was 64.67 years with extremes [36 - 95 years]. Diabetes evolved for less than 5 years in 23.28% of patients and inaugural in 14.28%. All our patients had type 2 diabetes. The treatment was essentially insulin in 27.50% and oral anti-diabetics in 52.50%. Mean fasting blood glucose was 3.5mg/dl with extremes of 0.25 and HI. 62.67 patients had blood glucose (>2 mg/dl). The **Table 1** shows the partition of patients according to socio demographic characteristics.

Major risk factors were dominated by high blood pressure followed by dyslipidemia and tobacco 74.68% respectively; 32.35% and 6.32%. The reasons for consultation were mainly loss of consciousness in 27.84% of cases, hemiplegia in 43.03% of cases, headache in 18.98% of cases, vertigo in 8.86% and dysarthria in 10.12% of the cases. On clinical examination they all had motor deficits, average systolic blood pressure was 147 mmHg (60 - 240), average diastolic blood pressure was 86 mmHg (40 - 140). The **Table 2** shows the partition of patients according to clinical characteristic.

Para clinical: the electrocardiogram revealed a disturbance of the heart rhythm in 27.7% of cases, left atrial hypertrophy in 22.2% of cases and left ventricular hypertrophy in 30.55% of cases. Ischemic stroke was the dominant lesion type with 74.68% ischemic brain scan lesion and 12.65% normal CT scan and bleeding stroke 12.65% of cases. Immediate evolution: patients who had hemorrhagic stroke were all transferred to an intensive care unit and some ischemic stroke (15.18%). The evolution was marked by a death in 20.25% (16) cases. The **Table 3** shows the distribution of patients according to paraclinical characteristics.

### 4. Discussion

This retrospective study carried out at the internal medicine department of the Abass Ndao Dakar hospital, showed us an average age of patients admitted for stroke at 62.14 years. This average age is close to that of a predominantly black American population [8] with 62 years old. Other Africans [10] [11] [12] describe an average age ranging from 44.5 years to 61 years. In the African literature, there is a variability in prevalence by sex, either female or male: the majority of

**Table 1.** Partition of patients according to socio demographic characteristics.

Patients' characteristics	Number	Frequency %
Sex		
Masculine	38	48.10
Feminine	41	51.89
Age		
Average	64.67	
Extremes	[36 - 95]	
<40 years	1	1.26
[40 - 59]	21	26.58
>60 years	57	72.15
Address	72	
Dakar	68	86.07
Out of Dakar	4	5.55
Profession	46	
Retreated	13	28.26
Housewives	19	41.3
without	9	19.56
Others	5	10.86
Diabetes duration	63	
Inaugural	9	14.28
<5 years	15	23.28
[5 - 9 years]	8	12.69
>10 years	31	49.20
Diabetes treatment	40	
Diet alone	7	17.50
OAD	21	52.50
Insuline	11	27.50
Stemming		
Exeat	51	64.55
Transferred	12	15.18
deceased	16	20.25

studies favored a male preponderance with a ratio between 1.3 and 1.5 [13] [14] [15]. Ratios to 2 have been described [10], as well as a female preponderance with ratios between 0.82 and 0.97 [16] [17]. The predominance was female in our study with a sex ratio of 0.92. In Ivory Coast a Masculine predominance has already been described [18].

The major risk factors were dominated by arterial hypertension followed by diabetes and tobacco respectively 74.68%; 32.35% and 6.32%. Hypertension as the

**Table 2.** Partition of patients according to clinical characteristic.

Clinical characteristics	Number	Frequency %
Clinical signs		
Headaches	15	18.98
Disorders of consciousness	22	27.84
Dizziness	7	8.86
Hemiplegia	34	43.03
Hemiparesis	11	13.92
Aphasia	16	20.25
dysarthria	8	10.12
Paraplegia	1	1.26
Monoplegia	3	3.79
Balance disorder	2	2.53
Peripheral facial paralysis	4	5.06
Polyuria	21	26.58
Polydipsia	19	24.05
Fall	2	2.53
Ptosis	1	1.26
Amnesia	1	1.26
Constipation	1	1.26
vomiting	13	16.45
<b>RISK FACTOR</b>		
HTA	59	74.68
Tabac	5	6.32
Alcohol	3	3.79
Antecedents		
Hypertension	4	5.06
Amputation	4	5.06
Thrombophlebitis	2	2.53
<b>Glycemia</b>	67	
Average	3.5	
Extremes	025-HI	
>2 mg/dl	42	62.67
HI	3	4.47
Systolic blood pressure	75	
Average	14.93	
Extremes	6 - 24	
>140 mmHg	49	65.33
<b>Distolic Blood Pressure</b>	75	
Average	865	
Extremes	[4 - 14]	
>10 mmHg	22	29.33

**Table 3.** Distribution of patients according to paraclinical characteristics.

Paraclinical data	Number	Frequency %
ECG	36	
Normal	10	27.7
HVG	11	30.55
HAG	8	22.2
Rhythm disorder	10	27.7
Branch block	4	11.11
Ischemia-lesion	5	13.88
Doppler ultrasound	18	
par	7	38.88
abnormal	11	61.11
HVG	5	27.77
Computed tomography		
Sylvian artery	28	35.44
ACA	10	12.65
ACP	5	6.32
Jonctionnelle	2	2.53
<b>Type d'AVC</b>		
AIT	10	12.65
AVCI	59	74.68
AVCH	10	12.65
Ultrasound of supra aortic trunks	6	
Normal	3	50
Abnormal	3	50
Complete blood count	53	
Anemia	15	28.30
Leukocytosis	24	45.28
<b>CRP</b>	29	
Average	102.3	
Negative	4	13.80
Positive	25	86.20
<b>HBA1C</b>	12	
Average	8	
>7%	7	58.3
<b>Creatinine</b>	50	
Average	17.37	
>13 mg/l	13	26
<b>Bilan lipidique</b>	34	
Total cholesterol > 2 g/l	11	32.35
Hypo HDL	9	26.47
LDL > 1 g/l	22	64.70
Hypertriglyceridemia	2	5.88

main risk factor is described everywhere, both in Africa [10] [11] and in developed countries [19]. The frequency of risk factors would be different in black subjects with successively hypertension, smoking, diabetes, heart disease while in Caucasian subjects it would be smoking, hypertension, heart disease, alcoholism, diabetes [19].

For dyslipidemia, several major epidemiological studies have highlighted the link between lipid abnormalities and cardiovascular risk in type 2 diabetics. Thus, in the UKPDS [20] and the Strong Heart Study [21], cardiovascular risk is multivariate analysis, positively associated with LDL-cholesterol and negatively with HDL-cholesterol levels.

The reasons for consultation found (loss of consciousness, hemiplegia, headaches) in our study have already been written in the literature [22] [23]. In one large European cohort study has shown that diabetic subjects had more motor deficit and dysarthria, while aphasia and swallowing disorders were more common in non-diabetics [24].

In our study diabetes was unbalanced in 58% of patients. The elevation of glycated hemoglobin (Hb A1C) would also be correlated with a pejorative prognosis. In the UKPDS study, A1C elevation of 1% was associated with a 37% increase in stroke lethality [25]. Hyperglycemia is frequently observed in the acute phase of stroke and is life-threatening, exacerbating the risk of early death.

The deleterious mechanisms of hyperglycemia would include pro-coagulant action and decreased fibrinolysis, reduced reperfusion of ischemic tissue, and increased size of necrosis. Hyperglycemia increases reperfusion-related lesions, accounting for the greater frequency of hemorrhagic changes [26] [27]. In the search for emboligenic heart disease we found a heart rhythm disorder in 27.7% of cases. Coulibally *et al.* [11] in Mali and Bendriss *et al.* [28] in Morocco reported proportions of 19.7% and 17.3% respectively, while for Lazzaro *et al.* [29] it was slightly lower (6%). These differences are related to the mode of selection of the patients, the type, and especially the duration of recording. Thus a recording over a longer period (48 or 72 hours) makes it possible to significantly increase the probability of detection of atrial fibrillation [30]. Our lethality (25%) is concordant with that observed (10% to 60%) in the African literature [31]. This is due to the late management of patients in hospital structures. This rate is higher than in the West where rapid admission to the neurovascular unit reduces stroke mortality [32]. The limits of the study are constituted by the fact that it is about a study on file of patients. The collection of data was not exhaustive clinically and paraclinically. Microalbuminuria, arterial echo doppler in search of arterial disease and effective diabetic nephropathy and fundus were not performed in all patients because of the high cost of these central examinations.

## 5. Conclusion

Diabetes is a major risk factor for stroke. Hence, hyperglycemia should be treated early and effectively in the acute phase of stroke and all vascular risk factors associated with diabetes, including hypertension.

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