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Profile of Cardiovascular Diseases of Diabetics Admitted in Fann and Dantec Cardiology Departments

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Abstract

Introduction: Cardiovascular diseases (CVD) are the most important cause of morbidity and mortality in type 2 diabetes (T2D). The objective of this study was to describe the profile of cardiovascular diseases of diabetics admitted at the cardiology departments of Aristide Le Dantec and Fann hospitals. **Patients and Methods:** This was a retrospective, descriptive and analytical study conducted on January 1st and December 31st, 2020 at the Dantec and Fann cardiology departments in Dakar. We studied epidemiological, diagnostic, therapeutic and evolutionary data. The data 7 was analyzed with STATA 14 software. **Results:** Of the 1483 patients hospitalized in both cardiology departments, one hundred and thirty-three (133) were diabetic, the hospital frequency was 9.01%. The average age was 62.3 ± 11.2 years. The sex ratio (M/F) was 0.8. Almost half (47.4%) of patients had a duration of diabetes greater than 10 years. Cardiovascular risk factors were dominated by physical inactivity (84.2%), menopause (81.9%) and hypertension (64.7%). Heart failure was the most common clinical manifestation with 45.1%. The prevalence of acute coronary artery disease in our study was 37.59%, followed by lower limbs peripheral arterial disease (9.7%) and stroke (3%). Concerning the treatment, 119 patients were on anti-diabetic treatment. Most patients were on aspirin (79%), cholesterol-lowering drugs (78.95%) and ACE inhibitor (77.44%). Percutaneous coronary intervention was performed in 19 patients. 12.03% of patients diabetics died during hospitalization. **Conclusion:** Cardiovascular events are common during type 2 diabetes. Their management is important to avoid complications that can be fatal.

Keywords

Diabetes, Cardiovascular Diseases, Senegal

1. Introduction

Diabetes is a common disease whose prevalence continues to increase. Although the 2015 STEPS [1] survey showed a prevalence rate of diabetes at 3.4% in Senegal, the fact remains that this condition will be a real public health problem in the coming years. Indeed, according to the International Diabetes Federation (IDF), the prevalence of diabetes in Africa is increasing, reaching or exceeding that found in developed countries. In addition, Africa also has the highest proportion of undiagnosed diabetes estimated at least 78% [2]. People with diabetes in Africa tend to have chronic complications including cardiovascular (coronary failure, stroke, lower limb peripheral arterial diseases). Cardiovascular complications are thus the main cause of morbidity and mortality in type 2 diabetes regardless of sex. These factors lead to patients with type 2 being considered vascular patient.

More than 80% of diabetes deaths are due to cardiovascular disease and occur mainly in low- and middle-income countries [3].

Given the lack of data on diabetes and its cardiovascular complications and the increasing prevalence, a better knowledge of the epidemiology of cardiovascular disease in diabetics is necessary.

Thus, we proposed to conduct this study whose general objective was to determine the profile of cardiovascular diseases in diabetics hospitalized at the Cardiology departments of the Aristide Le Dantec Hospital and the Fann Hospital.

The specific objectives were to determine epidemiological profiles of patients, describe the clinical and paraclinical aspects of patients and study the therapeutic and evolutionary aspects of patients.

2. Methodology

The study was carried out in Dakar at the level of the cardiology departments of the Aristide Le Dantec Hospital and the Fann National University Hospital.

This was a retrospective, descriptive and analytical study conducted on diabetic patients hospitalized in these two facilities between January 1st and December 31st, 2020.

We included all diabetic patients defined by [4] fasting glucose ≥ 7 mmol/l (126 mg/dl); random glucose level of 11.1 mmol/l (200 mg/dl) associated with at least one typical symptom of diabetes mellitus; glucose level of 11.1 mmol/l (200 mg/dl) 2 h after ingestion of 75 g glucose and HbA1c ≥ 6.5% and diabetic patient known under treatment.

The parameters studied were socio-demographic data, cardiovascular risk factors, and clinical and paraclinical data. Therapeutic management (medical and interventional) and intra-hospital progression were also evaluated.

The data collected were captured through an electronic questionnaire developed with ODK Collect version 17. The data were analyzed with STATA 14 software.

This study was conducted in accordance with the principles of the Helsinki Declaration. To respect patient confidentiality, an anonymity number was assigned to each patient.

3. Results

Of the 1483 patients hospitalized in both cardiology units during the study period, one hundred and thirty-three (133) were diabetic, representing a hospital frequency of 9.01%. The average age was 62.3 ± 11.2 years. The 60 - 69 age group was the most represented (n = 42; 31.6%). The predominance was female (n = 72; 54.1%) with sex ratio (M/F) of 0.85. Almost all patients 95.5% (n = 127) resided in urban areas. Socio-professional activities were dominated by housewives (n = 48; 36.1%), followed by retirees (n = 25; 18.8%). Married persons represented 79.8% of the study population. Eighty-one patients were educated.

Almost all patients were type 2 diabetics (n = 132; 99.3%). Almost half (47.4%) of patients had a diabetes duration exceeds 10 years. The characteristics of pre-admission diabetics are presented in Table 1. Cardiovascular risk factors were dominated by physical inactivity (84.2%), menopause (81.9%), hypertension (64.7%), obesity (22.5%) and dyslipidemia (21.8%). The majority of patients (40.6%) had accumulated 4 cardiovascular risk factors.

Reasons for hospitalization were dominated by heart failure syndrome with 45.1% followed by chest pain syndrome with 38%. The main characteristics of patients are summarized in Table 2.

Fasting blood glucose averaged 1.6 ± 0.6 with extremes of 0.6 and 4 g/l. Seventy-five patients (72.12%) had fasting blood glucose above 1.26 g/l. The mean glycated hemoglobin level was 8.32 ± 2.33. Glycemic imbalance was noted in 94 patients (90.3%). Hyper LDL cholesterolemia was found in half of patients (50.46%). At elctrocardiogram, subepicardial lesion was noted in 32 patients (24.24%) and necrosis Q-wave in 30% of cases. Cardiac Doppler ultrasound showed kinetic disturbances in 58.91% of cases (n = 76). Coronary angiography, performed in 30 patients, found a predominance of three-vessel lesions in 42.8% of patients. Lower extremity arterial Doppler ultrasound was performed in 3 patients, all of whom had significant stenosis.

45.1% of patients had heart failure. Ischemic heart disease was the most common etiology with (n = 28; 21.05%) followed by hypokinetic dilated cardiomyopathy (18; 13.53%) then hypertensive heart disease (14; 10.53%). The prevalence of acute coronary artery disease was 37.59%, followed by lower limbs PAD (9.7%) and stroke 3% of cases.

Concerning treatment, 119 patients were on anti-diabetic treatment. Most patients were on aspirin (79%) cholesterol-lowering drugs (78.95%), ACE inhibitors (77.44%), diuretics (63.15%) and beta-blockers (45.86%). Percutaneous coronary intervention (PCI) was performed in 19 patients. Of these, 14 had primary PCI, 2 had rescue PCI and 3 had programmed PCI. Twelve percent (12.03%) of patients died during hospitalization.

Table 1. Distribution of patients by diabetes data at admission.

Diabetes Data		*Absolute frequency (n)*	*Relative frequency (n)*
Type of diabetes	Type 1 diabetes	1	*0.8*
	Type 2 diabetes	132	*99.2*
	Total	**133**	*100.0*
Duration of diabetes	Less than 5 years	41	*30.8*
	5 - 10 years	29	*21.8*
	Superior to 10 years	63	*47.4*
	Total	**133**	*100.0*
Medical treatment	Yes irregularly	101	*75.9*
	Yes regularly	9	*6.8*
	No	23	*17.3*
	Total	**133**	*100.0*
Types of drugs	Oral antidiabetics	70	*63.6*
	Insulin	26	*23.6*
	Insulin + oral antidiabetics	11	*10.0*
	Not specified	3	*3.7*
	Total	**110**	*100.0*
Traditional treatment	Yes	9	*6.8*
	No	124	*93.2*
	Total	**133**	*100.0*
Diet	Yes irregularly	98	*73.7*
	Yes regularly	11	*8.3*
	Non	24	*18.0*
	Total	**133**	*100.00*

Table 2. Main general characteristics of the population.

Data	Workforce/Value	Percentage (%)
Number	133	100
Middle age	62.3 ± 11.2	-
Sex-ratio M/F	0.85	-
Admission symptoms		
Heart failure	60	45.1
Chest pain	50	38

Continued

Glycemic profile		
Mean fasting glucose	1.6 ± 0.6	-
Average HbA1c	8.32 ± 2.3	-
Cardiovascular disease		
Heart failure	60	45.1
ACS	50	37.59
Stroke	4	3
PAD	13	9.7
PCI	19	38
Mortality	12	12.03

HbA1c: Glycated hemoglobin, ACS: Acute Coronary Syndrome, PAD: Peripheral Artery Disease, PCI: Percutaneous Coronary Intervention.

4. Discussion

The frequency of diabetic patients in our study was 9%. It was lower than that found by the team of Abduelkarem *et al.* in Libya which was 18.8% [5]. By against, Donadji *et al.* had found a hospital frequency much lower, at 3.98% in Ndjamena [6]. The average age of patients was 62.3 years. National studies have shown that the average age of diabetic patients is generally between 55 and 65 years [7] [8]. In contrast, in France, the average age of diabetic patients was higher (64 years) [9]. Most African series [7] [8] [10] found a female predominance as found in our study.

Globally, type 2 diabetes accounts for 90% of all diabetes cases. In our study, 99% of patients had type 2 diabetes. These results are consistent with the study of Djiby *et al.* and Ka where the type 2 diabetic population was 82.4% and 75% respectively [7] [11].

Patients had a mean diabetes age of 8.86 ± 2.3 years and unbalanced diabetes with a mean glycated hemoglobin level of 8.32 ± 2.33. Type 2 diabetes is known to be associated with cardiovascular risk factors. The majority of patients (40.6%) had 4 cardiovascular risk factors. This could be explained by the fact that diabetic patients are often older, female and half of them were either unemployed or retired [12].

Heart failure is a common and serious complication of diabetes in Africa. In our series, more than half (45.1%) of patients had heart failure as reported by Ouedraogo *et al.* [13]. The prevalence of acute coronary artery disease was 37.59%. These findings are corroded by the work of Dyane *et al.* in Morocco and Diédhiou [10] [14]. Dyane and Diedhiou found coronary artery disease in 29% and 32.8%. Other cardiovascular complications found were lower limbs PAD (9.7%) and stroke (3% of cases). These results are consistent with those obtained by Diedhiou *et al.* in Senegal [14] and Belhadj *et al.* in Algeria [15].

Therapeutically, anti-diabetic were administered in almost all patients (119 patients). Most patients were under conventional medical treatment (aspirin, cholesterol-lowering drugs, diuretics and betablockers). The use of these drugs follows the recommendations. PCI was performed in 19 patients due to lack of financial means. Twelve percent (12.03%) of patients died. Diabetes-related mortality statistics are rare in Africa and generally fragmentary. The hospital mortality rate was 16.4% according to Donadji *et al.* [6].

5. Conclusion

Cardiovascular events are common during type 2 diabetes. Early detection and optimal management are important to avoid life-threatening complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] WHO's STEPwise Approach to Chronic Disease Risk Factor Surveillance. https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/data-reporting/senegal/steps/senegal_2015_steps_fs.pdf?sfvrsn=10edbc32_3&download=true https://www.scirp.org/journal/paperinformation

[2] Diop, S.N. and Diédhiou, D. (2015) Diabetes Mellitus in Sub-Saharan Africa: Epidemiological and Socio-Economic Aspects. *Medicine of Metabolic Diseases*, **9**, 123-129. https://doi.org/10.1016/S1957-2557(15)30030-4

[3] Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B.B., *et al.* (2022) IDF Diabetes Atlas: Global, Regional and Country-Level Diabetes Prevalence Estimates for 2021 and Projections for 2045. *Diabetes Research and Clinical Practice*, **183**, Article ID: 109119. https://doi.org/10.1016/j.diabres.2021.109119

[4] Saeedi, P., Petersohn, I., Salpea, P., Malanda, B., Karuranga, S., Unwin, N., *et al.* (2019) Global and Regional Diabetes Prevalence Estimates for 2019 and Projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Research and Clinical Practice*, **157**, Article ID: 107843. https://doi.org/10.1016/j.diabres.2019.107843

[5] Abduelkarem, A.R., El-Shareif, H.J. and Sharif, S.I. (2010) Prognostic Indices for Hospital Mortality among Libyan Diabetic Patients. *Practical Diabetes International*, **27**, 392-395. https://doi.org/10.1002/pdi.1528

[6] Dionadji, M., Oumar, A., Nodjito, M. and Ibrahim, A. (2015) Prevalence of Medical complications among Diabetics Hospitalized at the National Reference General Hospital of Ndjamena. *Health Sciences and Disease*, **16**. https://www.hsd-fmsb.org/index.php/hsd/article/view/553

[7] Djiby, S.O.W., Diedhiou, D., Diallo, I.M., Ndour, M.A., Ndiaye, A., Cisse, M.K., *et al.* (2018) Study of Cardiovascular Risk Factors in Type 2 Diabetic Patients at the Marc Sankalé Centre in Dakar. *African Journal of Internal Medicine*, **5**, 43-49.

[8] Mbaye, A., Babaka, K., Ngaïde, A.A., Gazal, M., Faye, M., Niang, K., *et al.* (2018) Prevalence of Cardiovascular Risk Factors in Semi-Rural Area in Senegal. *Annales de Cardiologie et d'Angéiologie* (*Paris*), **67**, 264-269. https://doi.org/10.1016/j.ancard.2018.04.005

[9]   Detournay, B., Raccah, D., Cadilhac, M. and Eschwege, E. (2005) Epidemiology and Costs of Diabetes Treated with Insulin in France. *Diabetes & Metabolism*, **31**, 3-18.

[10] Khadija, D., El Ansari, N., El Mghari, G., Anzid, K. and Cherkaoui, M. (2013) Characteristics of the Association Type 2 Diabetes and High Blood Pressure in the Subject Aged 65 and over. *Pan African Medical Journal*, **14**, 100.

[11] Ka, O. (2021) Profile of Diabetics Hospitalized in the Internal Medicine Department of the Ndamatou Hospital in Touba, Senegal. *Mali Public Health*, **11**, 19-25. https://doi.org/10.53318/msp.v11i2.2181

[12] Pathé, P.D. (2006) Pr BA Mohamed Lemine. Cardiologist, Mission Officer, Survey Coordinator, 156.

[13] Ouedraogo, S. (1997) Etude des atteintes cardio-vasculaires au cours du diabète sucré au centre hospitalier national Sanon Souro de Bobo-Dioulasso. Thèse de doctorat en médecine, Université Ouagadougou, Ouagadougou, No. 15.

[14] Diédhiou, D., Sow, D., Diallo, I.M., Diouara, A., Ndour, M.A., Ndour-Mbaye, M., *et al.* (2017) Decentralized Management of Diabetes Mellitus by General Patrician. *Open Journal of Internal Medicine*, **7**, 25-35. https://doi.org/10.4236/ojim.2017.72003

[15] Belhadj, M., Arbouche, Z., Brouri, M., Malek, R., Semrouni, M., Zekri, S., *et al.* (2019) BAROMETER Algeria: National Survey on the Management of People with Diabetes. *Medicine of Metabolic Diseases*, **13**, 188-194.