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Prevalence and Correlates of Macrovascular Complications at Type 2 Diabetes Diagnosis in a Tertiary Hospital in Yaoundé, Cameroon

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Abstract

Introduction: The presence of vascular complications at type 2 diabetes (T2D) diagnosis is a heavy burden for developing countries. We aimed to determine the prevalence and correlates of macrovascular complications at T2D diagnosis in Yaoundé, Cameroon. **Materials and Methods:** We conducted a cross-sectional study at the Essos Hospital Center in Yaoundé from January 2017 to June 2021. We recruited patients newly diagnosed with T2D who, simultaneously, with assessed macrovascular complications including stroke, myocardial infarction (MI) and arterial foot ulcer (AFU). Correlates were investigated using Chi square test and logistic regressions. The significance level was set at 5%. **Results:** In all, 286 newly diagnosed diabetic patients (51.7% being men) were included. The mean age was 52.6 ± 12.3 years. Prevalent cardiovascular risk factors at diabetes diagnosis were a dyslipidemia (63.6%), sedentary lifestyle (57.7%) and family history of type 2 diabetes (51.6%). The prevalence of macrovascular complications was 17.5% with 8.4% stroke, 5.6% myocardial infarction and 3.4% arterial foot ulcer. Hypertension was associated with all macrovascular complications ($p < 0.05$). High glycated hemoglobin and age ≥ 50 years were associated with stroke while tobacco and obesity were associated with MI and AFU respectively. **Conclusion:** Macro-

vascular complications are frequent at type 2 diabetes diagnosis and are represented by stroke and myocardial infarction in our study, highlighting the importance of cardiovascular risk evaluation and reduction in people with diabetes right from diagnosis.

Keywords

Diabetes Mellitus, Macrovascular Complications, Cameroon

1. Introduction

Diabetes mellitus remains a global public health problem. According to the International Diabetes Federation (IDF), the number of people with diabetes aged 20 to 79 years was 537 million in 2021 with a projected growth of 11.3% by 2030 [1]. Type 2 diabetes (T2D) accounts for about 90% of diabetes, with higher prevalence in low- and middle-income countries (LMICs) [1]. It is a progressive pathology fraught with macrovascular and microvascular complications. Macrovascular complications include stroke, myocardial infarction (MI) and diabetic arterial foot disease, arrhythmias, sudden death [2]. The pathophysiological mechanism is the process of atherosclerosis, which combines chronic inflammation of the arterial walls, oxidation of Low Density Lipoprotein (LDL) particles, oxidative stress, and atherosclerotic plaque formation [3]. Abnormalities in endothelial and vascular smooth muscle cell function, as well as a propensity to thrombosis, contribute to atherosclerosis and its complications [4]. The metabolic abnormalities that characterize diabetes, such as hyperglycemia, increased free fatty acids, and insulin resistance, each provoke molecular mechanisms that contribute to vascular dysfunction. These include decreased bioavailability of nitric oxide (NO), increased oxidative stress, disturbances of intracellular signal transduction, and activation of receptors for advanced glycation end products AGEs [4]. In addition, platelet function is abnormal, and there is increased production of several prothrombotic factors. Several studies have reported the prevalence of macrovascular complications in patients with type 2 diabetes. In Africa, Mbanya *et al.* in a 2003 meta-analysis found 5% - 8% of coronary heart disease, and 1.5% - 7% of lower limb amputations [5]. In Cameroon, Tamba *et al.* found 5% stroke, 17.1% arterial foot and 23.6% coronary heart disease [6]. These complications remain the most frequent causes of morbidity and mortality in patients with type 2 diabetes [7] [8]. The insidious, low-symptoms evolution of type 2 diabetes and its late diagnosis in Africa increase the risk of uncovering type 2 diabetes during a macrovascular complication with dire consequences in LMICs. These consequences include increased management costs, greater psychological impact on patients and their families, increased risk of morbidity and mortality and reduced life expectancy for patients [9]. The need of data on newly T2D diagnosed people and to tailor diabetes policies motivated us to conduct this study,

the aim of which was to determine the prevalence and correlates of macrovascular complications at the time of diagnosis of type 2 diabetes.

2. Methodology

2.1. Type of Study

We conducted a cross-sectional study with prospective data collection in the Department of internal medicine and dietetics of Essos Hospital Center (Yaoundé, Cameroon) from January 2017 to June 2021. Essos Hospital Center is a reference hospital in Yaoundé, the Capital City of Cameroon, with nationwide coverage. The department of Internal Medicine and Dietetics has two sections (in-patient and out-patient sections). The in-patients section has 43 beds shared across all disciplines of Internal medicine and blood glucose levels are taken from all patients regardless of their initial diagnosis. Diabetic patients will be cared for by the endocrinologist with the participation of medical staff (internists, general practitioners). Out-patients were diabetic patients referred to an endocrinology consultation for specialized care. The study was offered to patients with the participation of general practitioners on duty in the department. As soon as the diagnosis of diabetes is confirmed, a systematic assessment is requested from the patient including a renal and liver assessment, a lipid profile, a uric acid dosage, a fundus examination and resting electrocardiogram. The assessment can be completed according to the clinical presentation.

Inclusion criteria: we included all patients hospitalized or seen in an endocrinology consultation for new onset type 2 diabetes. The diagnostic criteria for diabetes used were those of the 2017 American Diabetic Association (ADA), namely fasting blood glucose ≥ 1.26 g/l on 2 occasions and/or HbA1C ≥ 6.5% and/or random blood glucose ≥ 2 g/l with symptoms of hyperglycemia [10].

Exclusion criteria: we excluded patients with type 1 diabetes, patients already being treated for type 2 diabetes and patients refusing to participate in the study.

Using the 19.05% prevalence of macrovascular complications found in India by Taneja *et al.* [11] and considering a study power of 95%, the estimated sample size was 237 patients.

2.2. Data Collection

Clinical data

We used a pre-designed and pre-tested questionnaire validated by expert endocrinologist for data collection. It included socio-economic profile (age, sex, occupation, education level, marital status), vital and anthropometric parameters (blood pressure, body mass index [BMI], abdominal circumference), and circumstances of diabetes discovery. We collected associated cardiovascular risk factors, namely: pre-existing or new hypertension defined as blood pressure ≥ 140/90mm Hg at rest for at least 10 minutes on at least two occasions [12]. Overweight and obesity were defined by a BMI ≥ 25 kg/m^2 and 30 kg/m^2 respectively and visceral obesity by an abdominal circumference > 94 cm in men

and >80 cm in women [13]. Dyslipidemia was defined as triglyceridemia ≥ 1.50 g/l and/or high density lipoprotein (HDL) cholesterol values < 0.40 g/l in men (<0.50 g/l in women) and/or low density lipoprotein (LDL) cholesterol > 1 g/l [12] [13]. Smoking was defined as active consumption and/or cessation of less than 03 months. A sedentary lifestyle was defined as a lack of moderate-to-intense physical activity of at least 150 minutes per week or less than 75 minutes of intense activity per week [14]. Family history of type 2 diabetes was also recorded.

Biological data

Blood glucose levels were measured using a glucometer giving plasma blood glucose values and/or at the biological analysis laboratory at Essos Hospital using the enzymatic end-point method. Total cholesterol, HDL cholesterol and triglycerides were determined using the enzymatic colorimetric end-point method. LDL cholesterol concentration was calculated using the Friedewald formula. Glycated hemoglobin (HbA1c) was determined by SEBIA capillary electrophoresis and/or high-performance liquid chromatography.

Assessment of macrovascular complications

The macrovascular complications at type 2 diabetes diagnosis investigated included stroke, myocardial infarction and arterial foot ulcer. Stroke was defined as a neurological deficit attributed to a vascular (ischemic or hemorrhagic) origin in the central nervous system and documented by brain imaging [15]. Myocardial infarction was defined by symptoms of ischemia and/or electrocardiographic changes (ST-segment modification or pathological Q wave) and/or echographic (akinesia or hypokinesia) signs [10] [16]. The expertise of cardiologist was required for the evaluation of patients with a myocardial infarction. Arterial foot ulcer was defined as any ulcerated lesion on a foot. Arterial terrain was defined by a systolic pressure index < 0.9 [17] [18] and confirmed by arterial doppler ultrasound and/or angio scan of the lower limbs.

2.3. Ethical Considerations

The institutional ethics committee of Essos Hospital approved the study. All patients included in the study gave their consent and signed a consent form. For disabled patients, a family representative signed the form.

2.4. Statistical Analyses

Data were entered and analyzed using Epi info version 7.2.5 software. Quantitative variables were expressed as mean ± standard deviation (SD) when normally distributed, or as median (Q1-Q3) for skewed variables. Categorical variables were presented as proportions. The Chi square test was used to look for associations between variables. Logistic regressions were used to investigate the correlates of macrovascular complications. A $p < 0.05$ value was considered statistically significant.

3. Results

The study was proposed to 350 patients with newly discovered type 2 diabetes.

In all, 20 potential participants refused to sign the consent form and 44 were unable to undergo further investigations. We thus retained 286 patients (Figure 1).

3.1. Characteristics of the Study Population

The study population was made up of 51.7% men with 38.5% of participants working in the private sector. Mean age was 52.6 ± 12.3 years. Median blood glucose and glycated hemoglobin levels were 3 (2.06 - 3.92) g/l and 10 (8.3 - 12.2)%, respectively. Median body mass index was 28.5 (25.6 - 32.7) kg/m^2. We noted a statistically significant difference between gender and blood glucose values and profession (Table 1).

3.2. Circumstances of Discovery of Type 2 Diabetes

Type 2 diabetes was discovered in the context of a macrovascular complication and fortuitously in 17.5% and 38.1% of patients, respectively. There was a statistically significant difference between gender and circumstances of discovery of T2D like cardinal syndrome and fortuitously discovery (Table 2).

3.3. Cardiovascular Risk Factors at Diagnosis of Type 2 Diabetes

The cardiovascular risk factors (CVR factors) most frequently found at the time of diagnosis of type 2 diabetes were dyslipidemia, sedentary lifestyle and family history of type 2 diabetes with 63.6%, 57.7% and 51.6%, respectively. New hypertension was found concomitantly with type 2 diabetes in 15.7% of patients, and obesity in 32.9%. Among patients with dyslipidemia, 75.3% of cases of elevated LDL were noted. There was a statistically significant difference between gender and cardiovascular risk factors such as obesity, overweight, tobacco and family history of T2D (Table 3).

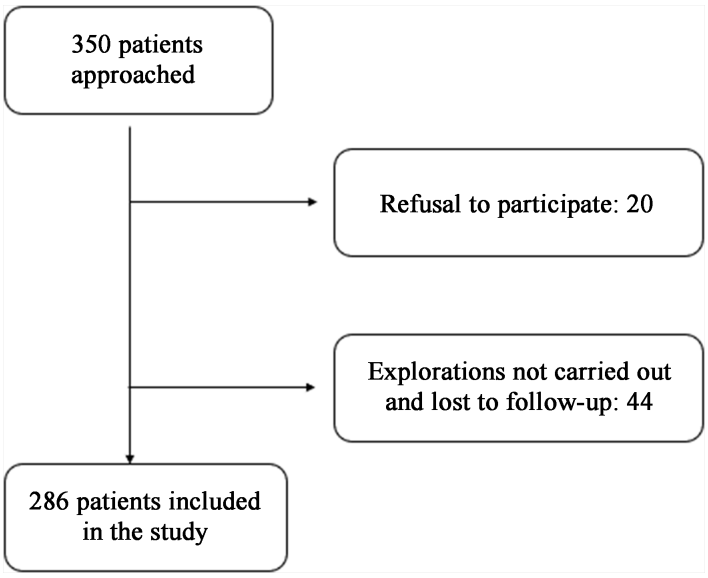

Figure 1. Patient flow.

Table 1. Characteristics of the study population.

Variables	Total N = 286	Female n = 138 (48.3%)	Male n = 148 (51.7%)	p
Mean Age (SD), years	52.6 (12.3)	53.8 ± 12.5	51.5 ± 12.1	0.12
Profession, n (%)				
Without	90 (31.5)	69 (76.7)	21 (23.3)	<0.01
Retired	33 (11.5)	11(33.3)	22(66.7)	
Public sector	53 (18.5)	20 (37.7)	33 (62.3)	
Private sector	110 (38.5)	38 (34.5)	72 (65.4)	
Clinical data, Median (Q1-Q3)				
BMI, Kg/m^2	28.5 (25.6 - 32.7)	30.3 (26.4 - 33.6)	27.8 (24.9 - 30.8)	1
Abdominal circumference, cm	94.5 (90 - 102)	96 (90 - 103)	93.5 (90 - 100.5)	0.17
Systolic blood pressure, mmHg	132 (119 - 145)	133 (120 - 147)	129 (118.5 - 139.5)	0.45
Diastolic blood pressure, mmHg	84 (74 - 91)	79 (70 - 91)	84.5 (75 - 93)	0.22
Biological data, Median (Q1-Q3)				
Glucose values (g/l)	3 (2.06 - 3.92)	2.82 (2.01 - 3.53)	3 (2.08 - 4)	0.01
HbA1c values (%)	10 (8.3 - 12.2)	9.9 (8 - 12.3)	10.2 (8.5 - 12)	0.54
Total cholesterol (g/l)	1.89 (1.3 - 2.2)	1.92 (1.34 - 2.25)	1.76 (1.3 - 2.1)	0.40
HDL cholesterol (g/l)	0.37 (0.26 - 0.51)	0.45 (0.27 - 0.6)	0.32 (0.26 - 0.41)	0.05
LDL cholesterol (g/l)	1.09 (0.76 - 1.51)	1.2 (0.85 - 1.52)	0.86 (0.60 - 1.37)	0.24
Triglycerides (g/l)	1.4 (0.88 - 2.2)	1.32 (0.88 - 1.81)	1.72 (0.85 - 2.44)	0.51

SD: standard deviation, BMI: Body Mass Index, HbA1c: Glycated hemoglobin.

Table 2. Circumstances of discovery of type 2 diabetes.

Circumstances of discovery	Total N (%)	Female n (%)	Male n (%)	p
Macrovascular complication	50 (17.5)	27 (9.4)	23 (8.1)	0.679
Infection	23 (8)	9 (3.1)	14 (4.9)	0.303
Cardinal syndrome	154 (53.8)	64 (22.4)	90 (31.4)	0.014
Fortuitously	109 (38.1)	63 (22)	46 (16.1)	0.011

3.4. Prevalence of Macrovascular Complications

The prevalence of macrovascular complications in our study was 17.5%, with 8.4% of strokes, 5.6% of myocardial infarction and 3.4% of arterial foot ulcer. In this study, all strokes were ischemic strokes. There was no statistically significant difference in the distribution of macrovascular complications by gender (Table 4).

Table 3. Cardiovascular risk factors at diagnosis of type 2 diabetes.

CVR Factors	Total N (%)	Female n (%)	Male n (%)	p
New hypertension	45 (15.7)	22 (7.7)	23 (8)	0.37
Pre-existing hypertension	90 (31.5)	49 (17.1)	41 (14.4)	0.08
Overweight	51 (17.8)	19 (6.6)	32 (11.2)	0.04
Obesity	94 (32.9)	59 (20.6)	35 (12.3)	0.0003
Family history of type 2 diabetes	148 (51.7)	62 (21.7)	86 (30)	0.02
Sedentary lifestyle	165 (57.7)	86 (30.1)	79 (27.6)	0.05
Tobacco	20 (7)	3 (1)	17 (6)	0.001
Dyslipidemia	182 (63.6)	89 (31.1)	93 (32.5)	0.38
HDL < 0.5 (Women)	2(1.1)	2 (1.1)	/	-
HDL < 0.4 (men)	2 (1.1)	/	2 (1.1)	
LDL > 1	137 (75.3)	72 (39.6)	65 (35.7)	
TG > 1.5	28 (15.4)	13 (7.1)	15 (8.2)	

CVR: cardiovascular risk, HDL: High density lipoprotein, LDL: Low density lipoprotein, TG: triglycerides.

Table 4. Prevalence of macrovascular complications.

Variables	Total N (%)	Female	Male	p
Macrovascular Complications	50 (17.5)	26 (9.1)	24 (8.4)	0.679
Stroke	24 (8.4)	13 (4.5)	11 (3.9)	0.17
Myocardial infarction	16(5.6)	9 (3.1)	7 (2.5)	0.17
Arterial foot ulcer	10 (3.4)	5 (1.7)	5 (1.7)	0.25

3.5. Distribution of Macrovascular Complications by Age Group

Stroke was more common in patients over 60 years old, while arterial foot ulcer predominated in patients 40 to 50 years old. Two complications, myocardial infarction and stroke were more common in patients aged 50 to 60 years old (**Figure 2**).

3.6. Correlates of Macrovascular Complications

Using the Chi square test, we noted a statistically significant association between hypertension and the three macrovascular complications ($p < 0.05$). Furthermore, age greater than 50 years old was associated with stroke ($p = 0.003$) and myocardial infarction ($p = 0.003$) while smoking was associated only with myocardial infarction ($p = 0.02$) (**Table 5**).

After logistic regression, correlates of macrovascular complications ($p < 0.05$) were smoking (MI: OR 0.11 [CI 95%: 0.01 - 0.91)]), age ≥ 50 years old (Stroke:

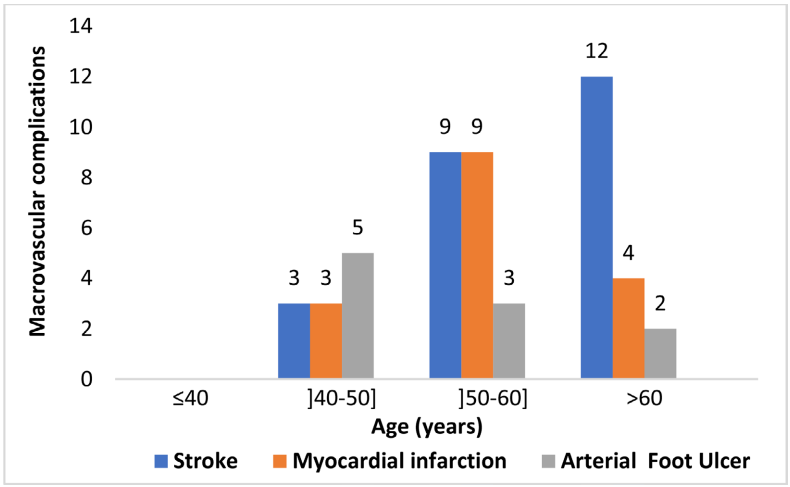

Figure 2. Macrovascular complications by age group.

Table 5. Correlates of macrovascular complications using Chi square test.

Variables	Stroke *Yes vs No*	Myocardial Infarction *Yes vs No*	Arterial foot Ulcer *Yes vs No*
Age ≥ 50 years *Yes/No*	0.003	0.003	0.54
Gender *Female vs Male*	0.17	0.17	0.25
BMI ≥ 30 kg/m² *Yes vs No*	0.22	0.12	0.08
Blood sugar ≥ 2.5 g/l *Yes vs No*	0.32	0.21	0.63
Tobacco *Yes vs No*	0.21	0.02	0.34
Sedentary lifestyle ***Yes vs No***	0.14	0.23	0.38
Dyslipidemia *Yes vs No*	0.18	0.18	0.3
Hypertension *Yes vs No*	0.02	0.009	0.007

BMI: Body Mass Index.

OR 1.07 [CI 95%: 1.02 - 1.12]) and high glycated hemoglobin (Stroke: OR 1.40 [CI 95%:1.12 - 1.74]). Moreover, obesity was associated with arterial foot ulcer (p = 0.03). There was a non-significant association between gender, dyslipidemia, blood glucose and different complications (Table 6).

4. Discussion

Our study investigated the prevalence and correlates of macrovascular complications at type 2 diabetes diagnosis in an adult population. We included 286

Table 6. Correlates of macrovascular complications using logistic regression.

Variables	Stroke		Myocardial infarction		Arterial foot ulcer	
	OR (IC 95%)	p	OR (IC 95%)	p	OR (IC 95%)	p
Gender Male vs Female	1.79 (0.59 - 5.49)	0.29	1.25 (0.20 - 7.70)	0.80	1.32 (0.20 - 8.40)	0.76
Age < 50 vs ≥50 years	1.07 (1.02 - 1.12)	0.005	1.03 (0.96 - 1.10)	0.33	1.06(0.97 - 1.16)	0.16
Tobacco Yes vs No	0.40 (0.07 - 2.22)	0.29	0.11 (0.01 - 0.91)	0.04	0.00	0.99
Dyslipidemia Yes vs No	0.81 (0.23 - 2.76)	0.74	0.00	0.99	1.66 (0.16 - 16.48)	0.66
Hypertension Yes vs No	0.59 (0.16 - 2.15)	0.43	2.35 (0.22 - 24.36)	0.47	0.53 (0.03 - 9.35)	0.67
Sedentary lifestyle Yes vs No	1.34 (0.43 - 4.14)	0.60	2.67 (0.43 - 16.55)	0.29	0.67 (0.09 - 4.97)	0.69
BMI < 30 vs ≥30 kg/m^2	0.96 (0.86 - 1.07)	0.50	1.03(0.90 - 1.19)	0.59	0.85(0.73 - 0.99)	0.03
Blood glucose < 2.5 vs ≥2.5 g/l	0.71(0.43 - 1.89)	0.198	0.86(0.41 - 1.83)	0.70	1.01(0.55 - 1.85)	0.96
HbA1c < 7% vs ≥7%	1.40 (1.12 - 1.74)	0.003	0.96 (0.64 - 1.43)	0.84	0.79 (0.56 - 1.13)	0.21

BMI: Body Mass Index, HbA1c: Glycated hemoglobin, OR: Odd ratio. Logistic regression was adjusted with the sex variable.

patients seen in the internal medicine department (inpatient and outpatient) of Essos Hospital Center in Yaoundé. Our main findings were a prevalence of 17.5%, with 8.4% of stroke, 5.6% of myocardial infarction, and 3.4% of arterial foot ulcer. Correlates were hypertension, smoking, age ≥ 50 years old, glycated hemoglobin and obesity.

Our study population was predominantly male, with a mean age of 52 ± 12.3 years, which is in line with reports from the literature [11] [19] [20]. This was a relatively young population in full professional activity. Diabetes was discovered in 38.1% of patients fortuitously (systematic company-required health and wellness programs, routine check-up), which means that prevention policies need to be stepped up by raising awareness among the population in our context, who do not think about screening for chronic pathologies. In addition, type 2 diabetes was discovered concomitantly with a macrovascular complication in 17.5% of patients. This represents a heavy psychological and socio-economic burden for patients and their families, increasing the cost of managing the disease and reducing the validity of patients, which can lead to job loss in our context. A sedentary lifestyle was found in 57.7% of our patients, probably due to their professional status. Our patients were mostly employed in the private sector (38.5%), which may lead to restrictive working hours limiting the effectiveness of regular physical activity. This finding suggests that physical activity should be promoted in the workplace. Over and above the recognized metabolic effects of physical activity, when practiced in the workplace it improves professional performance and social relations [21]. Unrecognized hypertension was found in 15.7% of patients, and 31.5% had hypertension prior to the diagnosis of diabetes. Sosale *et al.* in India found a 23% prevalence of patients with hypertension in their study population [12]. The coexistence of diabetes and hypertension is associated with a six-fold increased risk of cardiovascular events com-

pared with healthy individuals, and an increased risk of cardiovascular events and death from all causes [22]. The prevalence of macrovascular complications in our study was 17.5%. In the literature, the prevalence of macrovascular complications varies from study to study. Uddin *et al.* in Pakistan and Bonora *et al.* in Italy found 9%, while Morkos *et al.* in the USA, Gedebjerg *et al.* in Denmark, and Taneja *et al.* in India found 13%, 17% and 19.05%, respectively. These differing results may be attributed to sample sizes and patient recruitment methods in the different studies. Macrovascular complications were dominated in our study by stroke and MI. This has a negative impact in developing countries, especially as cardiovascular disease is the leading cause of disability and mortality among people living with diabetes worldwide [23].

Studies show a 4.4-fold higher mortality rate among diabetics compared with non-diabetics, and reduced life expectancy after myocardial infarction [24]. The long pre-diabetic period and the presence of risk factors could explain the high prevalence of cardiovascular complications as soon as type 2 diabetes is diagnosed. The precarious socio-economic context, late diagnosis of diabetic disease, and ignorance of the population increase the risk of complications at the time of diagnosis of type 2 diabetes. Early detection, awareness of cardiovascular risk factors and optimal initial management of patients could reduce the risk of these complications. The correlates of macrovascular complications were hypertension, age ≥ 50 years old smoking, high glycated hemoglobin and obesity. These are the same factors found in the literature [25] [26]. Our study highlighted the heavy burden of type 2 diabetes associated with a complication in our context, and the importance of early diagnosis and control of cardiovascular risk factors.

5. Limitations of Our Study

This was a monocentric study, with recruitment methods particularly limited for the diagnosis of myocardial infarction. We didn't have access to specific screening techniques such as myocardial scintigraphy or the systematic performance of stress tests on all patients, which would have had an impact on our sample.

6. Conclusion

Macrovascular complications are frequent at type 2 diabetes diagnosis and are represented by stroke and myocardial infarction in our study. This exacerbates the long-term psychological and socio-economic impact of type 2 diabetes, underscoring the need to intensify prevention policies. A multicenter study could be conducted to generalize our results.

Highlights

- Macrovascular complications are frequent in our context at the time of diagnosis of type 2 diabetes
- Stroke and myocardial infarction are the main macrovascular complications at diagnosis of type 2 diabetes.

- Type 2 diabetes remains an incidental finding in the general population
- Correlates of macrovascular complications are hypertension, age ≥ 50 years old, smoking, high glycated hemoglobin and obesity.
- Need to increase awareness and screening policies for type 2 diabetes and cardiovascular risk factors.

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Authors' Contributions

Francine Mendane Ekobena, Martine Claude Etoa Etoga and Mesmin Dehayem drafted the study protocol and manuscript. Carole Laurence Ngo Yon supervised the cardiological analyses, Pauline Ngo Balôgôg conducted the biological analyses. Guy Dieudonné Mvogo conducted the statistical analyses. André Pascal Kengne, Eugene Sobngwi and Jean Claude Mbanya supervised the study. All authors read and approved the manuscript.

Conflicts of Interest

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

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Questionnaire

I. Identification

Number: |___| **Age:** |___| **Sex**: Male |___| Female |___| **Date**: ……/…../20…
Marital status: Married |___| Single |___| Widower |__| Cohabiting couple |__|
Profession: Without|___| Public sector |___| Private sector |__| Student |__| Retired |__|
School level: None |___| Primary |___| Secondary |___| University |___|

II. History of Type 2 Diabetes

Circumstances of discovery: fortuitously|___| Cardinal syndrome |___| Infection|___| Complications|___|
If complication (To specify): Ischemic stroke |___| Hemorrhagic stroke |___|
myocardial infarction|___| Arterial Foot Ulcer |___|
Others Circumstances of discovery……

III. Cardiovascular Risk Factors at Time of Diagnosis of Type 2 Diabetes

Newly High Blood pressure |___| Previous High Blood pressure |___|
Overweight |___| Obesity|___|
Family history of type 2 diabetes |___| Sedentary Lifestyle |___|
Tobacco |___| Hyperuricemia |___|
Dyslipidemia |___| If dyslipidemia (To specify): Hypo HDL|___| Hyper TG |___|
Hyper LDL|___|

IV. Clinical Parameters at Time of Diagnosis of Type 2 Diabetes

Glycaemia: |____| g/l Height |____| cm
Weight |____| kg Body mass index |____| kg/m^2
abdominal circumference |____| cm Oxygen saturation |____|%
Blood pressure |____|mmHg Control blood pressure |____| mmHg after 15 minutes of rest
Cardiac frequency|____| Systolic pressure index |____|
Urine strips: glycosuria|___| Cetonuria |___| Leucocyturia |___| Nitrites|___| Albuminuria |___|

V. Biological Parameters at Time of Diagnosis of Type 2 Diabetes

HA1c |____|%, Urea |___| g/l, Creatinemia |___| g/l,
SGPT |___| IU/l SGOT |___| IU/l
Uric acid |___| mg/l, Total Cholesterol |___| g/l, HDL cholesterol |___| g/l,
LDL cholesterol |___| g/l Triglyceridemia |___| g/l,
Troponin us |___| ng/l, CPKmb |___| IU/l

VI. Morphological Assessment

Brain scan: yes |___| No |___|, if yes, results……
Arterial Doppler Ultrasound of lower limbs: yes |___| No |___|, if yes, results……
Angio scan of lower limbs: yes |___| No |___|, if yes, results……
Electrocardiogram yes |___| No |___|, if yes, results……
Echocardiography: yes |___| No |___|, if yes, results……

VII. Summary of Macrovascular Complications

Ischemic stroke:	Yes |___|	No |___|
Hemorrhagic stroke:	Yes |___|	No |___|
Arterial foot ulcer:	Yes |___|	No |___|
Myocardial Infarction:	Yes |___|	No |___|