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Research Article

Prevalence of Peripheral Artery Disease in A Group of Diabetic Patients with A High Cardiovascular Risk Using the Ankle-Brachial Index at the Bafoussam Regional Hospital

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Abstract

Background: Peripheral artery disease (PAD) is a disease process resulting from obstruction of large peripheral arteries, commonly due to atherosclerosis. It is common among diabetic patients and may lead to amputations if poorly managed.

Objectives: We sought to determine the prevalence of Peripheral Artery Disease in a group of diabetic patients with a high cardiovascular risk among Cameroonian subjects.

Methods: A cross-sectional study was conducted from January 2017 to May 2017 in Bafoussam. Our sample size was 80 participants. The PD 120 Pocket Doppler was used to measure the Ankle-brachial Index.

Results: Our sample's mean age was 62.8 years years and ranged from 50 to 80 years. Hypertension was the most common risk factor in our population (97.5%). PAD (ABI < 0.90) was found in 37.5% of our subjects. We found out that a history of at least 10 years diabetes since its screening, tobacco smoking and obesity significantly influence the occurrence of atherosclerotic lesions (p = 0.00015, 0.04 and 0.03 respectively).

Conclusions: This study suggests that a history of at least 10 years of diabetes duration is the main factor influencing the occurrence of atherosclerotic lesions.

Keywords: Atherosclerosis; Ankle-Brachial Index; Peripheral Artery Disease

Introduction

Peripheral artery disease (PAD) is an important global health problem and associated with considerably high morbidity and mortality [1]. It is a disease process resulting from obstruction of large peripheral arteries, exclusive of the coronary and intracranial cerebrovascular system, commonly due to atherosclerosis, occurring more frequently in diabetic patients [2]. Diabetes and smoking are the strongest risk factors for PAD and the risk of PAD in diabetic patients is increased by age, duration of diabetes, and presence of peripheral neuropathy. Other well-known risk factors are hypertension and hyperlipidemia [3]. The early screening of PAD is made by the measurement of the Ankle-Brachial Index (ratio of the systolic blood pressure at the ankle to the systolic blood pressure in the upper arm) is a simple method used to screen PAD and to evaluate cardiovascular risk in the general population [4] It also determines the severity of PAD in diabetic patients. An ABI less than 0.9 indicates PAD [4]. In Cameroon, ABI measurement is not yet commonly used in the diagnosis of PAD and we found no study on the prevalence of PAD in the grassland areas. We therefore proposed to carry-out a study on the prevalence of PAD in diabetic patients with a high cardiovascular risk using the ABI at the Bafoussam Regional Hospital.

Methods

In a cross-sectional study, we recruited 80 diabetic subjects, with a history of at least 10 years of diabetes, having at least one other cardiovascular risk factor. Participants were recruited amongst patients consulting at the diabetic unit of the Bafoussam Regional Hospital from January 2017 to May 2017. Included in our study were consenting study patients aged 50 years and above with a history of at least 10 years exposure to type 2 diabetes and fulfilling at least one of the following criteria; hypertension, tobacco smoking, obesity. We excluded: patients with important leg edema, incomplete information, those with amputated limbs or with ulcers on their limbs. For each subject we collected clinical data (age, sex, history of high blood pressure, diabetes, and smoking) through an interrogation and consultation of the subject's medical record; anthropometric data was also gotten (the abdominal circumference). We then perform the measurement of the ABI using a pocket vascular Doppler.

Ankle-brachial index measurement

All measurements were performed in a quiet room by the same operator who was specially trained. The subject was asked to lie down for 10 -15minuite in the supine position after which the pressure cuff was placed and the doppler prob at the level of the right arm, it was then inflated at 30mmhg above the point where the pulse was no longer audible and the value of the systolic blood pressure was recorded. This procedure was repeated on the left arm, left ankle and right ankle and the ABI was obtained by dividing the mean ankle systolic pressure on the mean arm systolic pressure (ABI= mean ankle SBP/mean arm SBP).

It is important to note that the systolic blood pressure of both arms and ankles was measured precisely at the level of the brachial, anterior and posterior tibial arteries respectively.

Data analysis

Data was analyzed using Microsoft Excel. Univariate Analysis was used to determine the mean, SD and range of quantitative variables. Pearson's chi square test was used to show the independence of qualitative variables and Student's t – test for equality of means in the case where the distribution of the variables were normal. Statistical significance was set at the 5% interval.

Results

Of the 80 participants studied, 56% were females and 44% were males. The mean age of the study population was 62.8 years and ranged from 50 to 80 years. We sorted out 4 cardiovascular risk factors namely; diabetes, hypertension, obesity and tobacco smoking.

All the 80 subjects were diabetes for at least 10 years with the mean duration of 12.94 years.

The prevalence of arterial hypertension in our study was 97.5%.

17.5% accounted for both active smokers and those who stopped smoking less than 3years ago.

18.8% of our study population presented with central obesity.

The mean ABI of our studied population was 0.9±0.3, the average being higher in males (0.9 ± 0.2 against 0.9± 0.1 in females). This difference was not significant. We obtained an ABI < 0.90 in 37.5% of subjects and the difference existing between the abnormal ABI values and gender was not significant (p = 0.771).

Cardiovascular risk factors	Pad Normal	Total	OR (IC à 95%)	P
Type 2 diabetes >10 years, n (%)	30 (37.5) 50 (62.5)	80 (100)	26.961(5.847-204.118)	0.0001
Hypertension, n (%)	28 (36.2) 50 (61.3)	78 (97.5)	1.024 (0.855-7.075)	0.60
Tobacco smoking, n (%)	4 (5) 10 (12.5)	14 (17.5)	4.398 (1.032-19.677)	0.04
Obesity, n (%)	5 (10) 15 (15)	13 (25)	4.169 (1.114-16.443)	0.03

Table 1: Ankle-brachial index distribution according to cardiovascular risk factors.

Discussion

The main objective of this study was to determine the prevalence of PAD in diabetic patients with different risk factors and identify factors influencing the Ankle-brachial index in the studied population. At the end of our study, we noted the prevalence of peripheral artery disease at 37.5%.

Relationship between cardiovascular risk factors and PAD

Diabetes is one of the major risk factors of PAD as it leads to changes in the structure of blood vessels. Longstanding diabetes mellitus is associated with the development of atherosclerotic lesions. Diabetes is not only a qualitative risk factor, it is also a quantitative risk factor as each 1% increase in glycosylated hemoglobin is associated with a 25% increase in the risk for PAD [5]. Diabetes is associated with a risk of amputation 10 fold that of non-diabetic patients [5].

PAD was positively correlated to tobacco smoking. Pernette., *et al*. reported a high prevalence of PAD among smokers 29.3% [8]. Selvin., *et al*. in the united states of America obtained a higher prevalence, 32.8% [9]. Kingue., *et al*. in a Cameroonian population found a prevalence 23% [10]. We however obtained a lower prevalence, PAD was more severe in those who smoked more and for a longer period of time than in those who smoked less.

Conclusion

In this study we found a statistically significant link between abdominal obesity defined by an absolute waist circumference (> 94 cm in men and > 80 cm in women) and PAD. 18.8% of our study population presented with central obesity. This result is lower than that obtained by Kingue., *et al*. in the general population of Cameroon, 23.5% [7] and also lower than that obtained by Pessinaba., *et al*. in Senegal 64% [6]. Despite having selected patients, it remains possible to see false positive and negative because it is a screening tool and not for diagnosis. Thorough cardiovascular exploration will be done on those suffering from PAD.

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