Prevalence of Peripheral Arterial Disease in Diabetic Patients Attending in Family Medicine Outpatient Clinic in Suez Canal University Hospital

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Abstract

Objective: This study aimed to measure the prevalence of peripheral arterial disease in diabetic patients and to identify risk factors affecting the prevalence of PAD in diabetic patients.

Subjects and Methods: Descriptive, cross sectional study carried on 283 diabetic patients in family medicine outpatient clinic, all patients suspected to a questionnaire was used to collect data from diabetic patients (through structured interview) PAD was diagnosed according to Edinburgh Claudication Questionnaire.

Results: Associated chronic diseases (i.e. Hypertension, CHD, or both of them), special habits (smoking) and degree of diabetic control (HbA1c) were statistically significant independent positive predictors of prevalence of PAD while family history of CHD, duration of diabetic were statistically insignificant independent factors of occurrence of PAD. Conversely, obesity (BMI) and HDL cholesterol were highly statistically significant independent negative predictors of Prevalence of PAD.

Conclusion: Prevalence of PAD was 19.1%, Males are more prone than Females to be affected with PAD. Older aged diabetics were more prone to PAD; there is a strong relationship between abnormal lipid profile and occurrence of PAD.

Key Words: Peripheral arterial disease (PAD) – Diabetic patients – Family medicine.

Introduction and Rationale

Diabetes mellitus is a leading cause of death, illness, and disability. Its microvascular and naturo-pathic complications cause substantial morbidity: An even greater public health burden arises from the macro vascular complications of diabetes, which substantially increase the risk of death and morbidity from coronary artery disease, stroke, and peripheral vascular disease [1].

Peripheral arterial disease "PAD" is a condition characterized by atherosclerotic occlusive disease of the lower extremities. PAD is a major risk factor for lower-extremity amputation and is also accompanied by a high likelihood for symptomatic cardiovascular and cerebrovascular disease [3].

The most common symptom of PAD is intermittent Claudication, defined as pain, cramping, or aching in the calves, thighs, or buttocks that appears reproducibly, with walking exercise and is relieved by rest. More extreme presentations of PAD include rest pain, tissue loss, or gangrene; these limb-threatening manifestations of PAD are collectively termed “critical limb Ischemia” (CLI) [4].

The morbidity of PAD includes intermittent claudication, foot ulcers, gangrene, and amputation. Concurrent peripheral neuropathy with impaired sensation makes the foot susceptible to trauma, ulceration, and infection [4].
The true prevalence of PAD in people with diabetes has been difficult to determine, because most patients are asymptomatic, many do not report their symptoms, there is not uniform agreement on screening modalities, and pain perception may be blunted by the presence of peripheral neuropathy. For these reasons, a patient with diabetes and PAD may be more likely to present with an ischemic ulcer or gangrene than a patient without diabetes [5].

Family physician can play an important role in management of diabetes either through health promotion, good glycemic control; early detection of complication of diabetes, this can prevent complication of diabetes and subsequent morbidity and mortality [4].

It was decided to conduct a research to measure the prevalence of peripheral vascular disease in diabetic patient attending Family Medicine Outpatient Clinic in Suez Canal University Hospital and comparing this prevalence in well controlled diabetics with poorly controlled diabetics.

Subjects and Methods

Descriptive, cross sectional study carried on 283 diabetic patients carried in Family Medicine Outpatient Clinic in Suez Canal University Hospital from 2008-2009. A questionnaire was used to collect data from diabetic patients (through structured interview). The questionnaire contained four sections. First section was used to collect socio demographic data. Second section was for Clinical Assessment of Diabetes Mellitus, this section contained onset of the disease, associated chronic diseases, the presence of diabetic complications, management plan and Body mass index (BMI). Third section carried out for diagnosis of Peripheral Arterial disease according to Edinburgh Claudication Questionnaire, which has been shown to be 91 percent specific and 99 percent sensitive for diagnosing intermittent Claudication in symptomatic patients. Fourth section carried for laboratory studies which included degree of diabetic control (HbA1c), complete fasting lipid profile, serum Creatinine, and urinalysis for glucosuria and proteinuria.

Inclusion criteria:
- Patient with type 2 diabetes mellitus.
- Patient diagnosed as type 2 diabetics at least since 1 year.
- Patient who accept to participate in this study.

Exclusion criteria:
- Patient who refuses to participate in this study.
- Patient with type1 diabetes mellitus.
- Patient who has been diagnosed as type 2 diabetics since less than 1 year.

Results

The Socio-demographic criteria of the studied population (283 patients), we can notice that, smoking as special habits represents 9.9%, illiteracy represented 63.2%, most of families’ income is adequate in 92.2%, family history of DM was 75.3%, Hypertension was 33.6% and 19.4% of study population have a positive family history of coronary heart disease Table (1).

Table (1): Socio-demographic criteria in the studied cases.

<table>
<thead>
<tr>
<th>Socio-demographic criteria</th>
<th>Number</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special habits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Smokers</td>
<td>255</td>
<td>90.1</td>
</tr>
<tr>
<td>Smokers</td>
<td>28</td>
<td>9.9</td>
</tr>
<tr>
<td>Illiterate</td>
<td>179</td>
<td>63.2</td>
</tr>
<tr>
<td>Read and write</td>
<td>18</td>
<td>6.4</td>
</tr>
<tr>
<td>Intermediate</td>
<td>18</td>
<td>6.4</td>
</tr>
<tr>
<td>High</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Economic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough</td>
<td>261</td>
<td>92.2</td>
</tr>
<tr>
<td>Enough</td>
<td>19</td>
<td>6.7</td>
</tr>
<tr>
<td>More than enough</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Family history of DM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>213</td>
<td>75.3</td>
</tr>
<tr>
<td>Absent</td>
<td>70</td>
<td>24.7</td>
</tr>
<tr>
<td>Family history of HTN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>95</td>
<td>33.6</td>
</tr>
<tr>
<td>Absent</td>
<td>188</td>
<td>66.4</td>
</tr>
<tr>
<td>Family history of coronary heart disease</td>
<td>55</td>
<td>19.4</td>
</tr>
<tr>
<td>Absent</td>
<td>228</td>
<td>80.6</td>
</tr>
</tbody>
</table>

The clinical assessment of Diabetes Mellitus of the studied population (283 patients), 71% of patients have diabetes from less than 10years while 29% have it from above 10 years, 7.1% have both Hypertension and CAD disease as associated chronic diseases with diabetes, 66.8% have not complication from the disease however retinopathy represent 11% from all diabetic complication and regarding Body mass index (BMI), underweight represents 17.7% and both graded obesity represents 34.6%.

Fifty four diabetic patients were classified as having PAD thus the prevalence of Peripheral Arterial Disease on Diabetic Patients was 19.1%. Of patients with PAD Glycemic control was poor in 29 PAD patients, average in 22 PAD patients while good in three PAD patients.
There are significant relations between socio-demographic criteria and occurrence of PAD except in level of education, economic status and family history of DM.

Also there are significant relation between Clinical Assessment of PAD Patients, inform of significant relation between DM duration, body mass index (BMI), Association chronic diseases and diabetic complication, and occurrence of PAD.

Regarding the best fitting multiple regression models of risk factors affecting prevalence of PAD among total populations (283 patients). The table shows that Associated chronic diseases (i.e. Hypertension, CHD, or both of them), special habits (smoking) and degree of diabetic control (HbA1c) were statistically significant independent positive predictors of prevalence of PAD while family history of CHD, duration of diabetic were statistically insignificant independent positive of the occurrence of PAD. Conversely, obesity (BMI) and HDL cholesterol were highly statistically significant independent negative predictors of Prevalence of PAD; i.e. associated with poor diabetic control and decreased levels of HDL cholesterol.

Table (2): Best fitting multiple linear regression models of risk factors affecting prevalence of PAD among total populations (283 patients).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Beta Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.189</td>
<td>.051</td>
<td>4.282</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Associated chronic disease</td>
<td>.191</td>
<td>.055</td>
<td>3.116</td>
<td>.002</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>-.112</td>
<td>.016</td>
<td>-2.089</td>
<td>.038</td>
</tr>
<tr>
<td>Family history of coronary heart disease</td>
<td>.055</td>
<td>.055</td>
<td>.991</td>
<td>.322</td>
</tr>
<tr>
<td>First time of diagnosis</td>
<td>.069</td>
<td>.024</td>
<td>1.462</td>
<td>.145</td>
</tr>
<tr>
<td>HbA1c</td>
<td>.227</td>
<td>.027</td>
<td>4.626</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Special habits</td>
<td>.097</td>
<td>.059</td>
<td>2.142</td>
<td>.033</td>
</tr>
<tr>
<td>HDL</td>
<td>-.333</td>
<td>.003</td>
<td>-5.914</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

Discussion

In the present work the prevalence of PAD was 19.1% of the study population, and they was classified according to degree of glycemic control HbA1c to 5.6% good glycemic control, 40.7 average control and 53.7% having poor glycemic control.

The prevalence of PAD in the present study was in agreement with the previous studies as Beach, et al., [6] reported the prevalence was 22% in Washington (USA), Bekes, et al., [7] (Hoorn Study) reported the prevalence of PAD 20.9% in elderly Caucasian population, Fowkes, et al., [8] reported in the Edinburgh Artery Study that the prevalence of PAD in diabetic patients was 18% and Jue Li, et al., [9] reported overall the prevalence of PAD in diabetic patients was 16.7% and Rhee, et al., [10] reported in PAD-SEARCH which was the first international study to investigate the prevalence of PAD in Asian patients with type 2 diabetes with total of 6625 patients from Korea, China, Taiwan, Hong Kong, Indonesia, Thailand, and the Philippines that the prevalence of PAD was 17.7% by using the same criteria of diagnosis.

The prevalence of PAD in this study was different from the previous studies as Abdul Basit, et al., [11] reported the prevalence in Pakistan was 5.5%, In Arab countries as Saudi Arabia Sultan Al-Sheikh, et al., [12] conducted a study using the same criteria of diagnosis and reported that prevalence of PAD in diabetic patient was 11.7%, another 2 studies El Mahdi, et al., [13] reported the prevalence was 6.2% while Elbagir, et al., [14] reported the prevalence was 10% using the same criteria for diagnosis.

In our study after conducting multiple linear regression models to evaluate the most best fitting risk factors affecting the prevalence of PAD in diabetics, we found that associated chronic diseases in the form of HTN, CHD or both of them, special habits (smoking) and degree of glycemic control HbA1c have a positive predictors of prevalence of PAD Conversely, obesity (BMI) and HDL cholesterol were highly statistically significant independent negative predictors of Prevalence of PAD.

In The UK prospective diabetic study (UKPDS), it was reported that HbA1c as a predictor of glycemic control, HDL cholesterol, smoking and prior cardiovascular disease have independent risk factors for the prevalence of PAD in diabetic patients [15].

In another study Jue Li, et al., [9] reported that history of CHD, duration of diabetes mellitus,
smoking were independently risk factors for low ABI while high BMI was associated with high ABI.

Another study conducted to estimate Prevalence of and risk factors for peripheral arterial disease in Saudi Arabia reported that lipid disorders epically decreased HDL cholesterol, smoking, associated coronary heart disease were independent risk factors for the prevalence of PAD in diabetic patients [12].

Another study conducted to estimate Prevalence and Risk Factors of Peripheral Vascular Disease in a Selected South Indian Population reported that smoking and serum lipid levels, or history of CHD showed no association with PAD while only age was found to be the most significant risk factor for PVD [16].

In our study we found that there was a significant relation between duration of diabetes mellitus, occurrence of PAD, and associated coronary heart disease in diabetic patients.

Jue Li, et al., [9] reported statically highly significant relation between duration of diabetes mellitus and occurrence of both PAD and CHD in Chinese people with type 2 diabetes mellitus.

Abdul Basit, et al., [11] reported that increasing the duration of diabetes mellitus was a higher risk factor for all macro vascular complications for both sexes in Pakistan.

In our study we found that there was a highly significant relation between the usages of Non-pharmacological management plane, duration of diabetes mellitus. as we noticed that 60.97% of patient with diabetes of more than 1 0years duration doesn't use any method of Non-pharmacological management of diabetes mellitus while 79.78% of patients with patient with diabetes of less than 5 years duration use at least one of the Non-pharmacological management of diabetes mellitus [11].

This could be justified as patient compliance thus with increasing duration of the disease there will be more difficult to continue on diet control or exercise program, also increased number or illiteracy and low socio economic status in this study may play a role.

In our study we found highly significant relation between degree of glycemic control and the usage of non pharmacological drugs that 82.3% of patient with good diabetic control using at least one method of the Non-pharmacological management of diabetes mellitus in the form of diet control, exercise program or both of them while 72.7% of patients with bad glycemic control doesn't use any method of Non-pharmacological management of diabetes mellitus.

Boulé, et al., [17] undertook a systematic review and meta-analysis on the effects of structured exercise interventions in clinical trials of duration 8 weeks on HbA1c people with type 2 diabetes. Post intervention HbA1c was significantly lower in exercise than control groups.

Conclusion:

This study is a descriptive, cross-sectional study. It includes all diabetic patients attending Family Medicine outpatients' clinic, Suez Canal University Hospitals. A (283) diabetic patients (42 males and 241 females), 19.1 % of them was diagnosed as having PAD.

Males are more prone than Females to be affected with PAD. Older aged diabetics were more prone to PAD.

Associated chronic diseases in the form of HTN, CHD or both of them, special habits (smoking) and degree of glycemic control HbA1c have a positive predictors of prevalence of PAD Conversely, obesity (BMI) and HDL cholesterol were highly statistically significant independent negative predictors of Prevalence of PAD.

There is a strong relationship between abnormal lipid profile and occurrence of PAD.

References

6- BEACH K.W., BEDFORD G.R., BERGELIN R.O., MARTIN D.C., VANDENBERGHE N., ZACCARDI M. and STRANDNESS D.E.: Progression of lower-extremity


