

Association of Peripheral Arterial Disease (PAD) in Type 2 Diabetics with Various risk factors

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Abstract

Background:To find out the prevalence of Peripheral Arterial Disease (PAD) in Type 2 diabetic population and to evaluate its association with age, gender, hypertension, smoking and treatment of diabetes.

Methods: In this cross sectional study 78 diabetic patients were enrolled. Inclusion criteria was both gender and more than 30 years of age. Patients with type 1 Diabetes Mellitus (blood fasting >126 mg/dl) , hyperlipidemias (triglyceride >150mg/dl or LDL >100mg/dl), deranged creatinine (>1.1) or BMI of more than 30 were excluded from this study. BMI was .For ankle brachial index (ABI) the measurements were done in supine position with a hand held doppler. Systolic pressure were measured at both dorsalis pedis and posterior tibial artery. The higher of the two were used to calculate ABI. Systolic pressures were measured at brachial level as well. ABI was calculated by dividing ankle systolic pressure by brachial systolic pressure of the same side.

Results: Out of total 73 cases, peripheral arterial disease was found 77.6% patients. Association of various factors like hypertension, gender, age, diabetes treatment and smoking status with peripheral arterial disease was explored and no statistically significant association was observed with p values less than 0.05.

Conclusion: The concurrent occurrence of peripheral arterial disease was found to be markedly high in type 2 diabetic patients.

Keywords:Peripheral Arterial Disease, Diabetes Mellitus, Risk factors

diabetic patients is peripheral arterial disease (PAD). PAD is caused by partial or complete occlusion of arteries of the limbs due to atherosclerosis.⁴It progresses gradually over a period of years and may remain asymptomatic or present with history of intermittent claudication.⁵The absence of symptoms is due to the development of peripheral neuropathy in diabetic patients.⁶ It's one of the major causes for the development of foot ulcers in diabetic population.^{6,7} The prevalence of PAD is 9.5% in American diabetic population and 3.2 to 11.7% in Asian diabetic population.⁴

Ankle Brachial Index (ABI) is a simple, non-invasive, reliable test for the diagnosis of peripheral arterial disease. It is the ratio of ankle to brachial systolic blood pressure measured with the help of a hand held Doppler. PAD is said to be present if ABI is < 0.9 or >1.3.³ It is further classified as mild (0.69 to 0.9), moderate (0.4 to 0.69) and severe (< 0.4). However, if there is development of calcification in blood vessels it makes them non-compressible. In such cases the systolic pressures will be high leading to higher ABI.⁶It is 95% sensitive and 100% specific for the diagnosis of peripheral artery disease.⁴It is recommended by American Diabetes Association (ADA) to measure ABI in all diabetic patients of more than 50 years of age. It is also important to know the risk factors that lead to rapid development of PAD in diabetic population, so that adequate measures can be taken for the removal or control of these causative factors.⁷ There are number of factors that have been associated with PAD in diabetic patients. These include hyperlipidemias, hypertension, smoking, age and duration of diabetes.⁸⁻¹⁰

Patients and Methods

This cross sectional study was conducted on diabetic-II patients in diabetic management center, in duration of 6 months. The patients included in this were of both gender and more than 30 years of age and on oral hypoglycemic agents or insulin. Patients with type 1 Diabetes Mellitus (blood fasting >126 mg/dl) , hyperlipidemias (triglyceride >150mg/dl or LDL >100mg/dl), deranged creatinine (>1.1) were excluded

Introduction

Diabetes Mellitus, one of the most common non-communicable diseases of mankind, is characterized by hyperglycemia due to either deficiency or decreased effectiveness of insulin.^{1,2} There is high prevalence of diabetes in Pakistani population (7.6 to 11%) and is ranked 7th by International Diabetes Foundation.^{2,3} One of the main complication seen in

after careful examination. The sample size of this study was 78 type- 2 diabetic patients. Informed consent was taken from the diabetic patients who came to the diabetic clinic. History was taken regarding the type and duration of diabetes, current treatment (oral hypoglycemic agents or insulin), hypertension and smoking. Previous record was seen for any evidence of hyperlipidemia or abnormal creatinine to fulfill inclusion and exclusion criteria . Their BMI was also calculated .For ABI the measurements were done in supine position with a hand held Doppler (Life Doppler 300 ABI).Systolic pressure were measured at both dorsalis pedis and posterior tibial artery. The higher of the two were used to calculate ABI. Systolic pressures were measured at brachial level as well. ABI was calculated by dividing ankle systolic pressure by brachial systolic pressure of the same side.

Results

Total 78 diabetic patients included as study participants, 50 (65.8%) were males while 26 (34.2%) were females. The mean age of patients was 53.78 years±8.48 years The mean duration of diabetes in patients was 13.46±8.12 years. Majority of patients were on oral hypoglycemic management of Diabetes. Peripheral Arterial Disease was found present in 59(77.6%) patients. 52 (68.4%) compared to only 24 (31.6%) taking Insulin.

Table 1. Association of contributing factors in patients with and without peripheral arterial disease.

| Baseline characteristics | | Peripheral Arterial Disease Present No (%) | Peripheral Arterial Disease Absent No (%) | p-value |
|--------------------------|--------------------|--|---|---------|
| gender | males | 39 (83.0) | 8 (17.0%) | 0.36 |
| | females | 20(76.9%) | 6 (23.1%) | |
| age group | upto 45 | 10 (71.4%) | 4 (28.6%) | 0.26 |
| | above 45 | 49 (83.1%) | 10 (16.9%) | |
| treatment of diabetes | oral hypoglycemics | 42 (82.4%) | 9 (17.6%) | 0.38 |
| | insulin | 16 (76.2%) | 5 (23.8%) | |
| hypertension | present | 23 (82.1%) | 5 (17.9%) | 0.53 |
| | absent | 36 (80%) | 9 (20%) | |
| current smoker | yes | 1 (100%) | 0 (0%) | 0.80 |
| | no | 58 (80.6%) | 14 (19.2%) | |

Only 30 (39.5%) patients were known hypertensive. Only one patient (1.3%) was currently smoking. Association of various factors with PAD was explored and no statistically significant association was observed (Table 1).

Discussion

This study reports the prevalence of peripheral arterial disease in diabetic population of Pakistan on the basis of results of ABI. According to this study the prevalence of PAD in diabetics was 77.6%. In another study done by Akram et al the prevalence of PAD in Pakistani Diabetic population was found to be 31.6%³ it means there is increase in number of cases among diabetic population with the passage of time. In a study conducted in Chinese diabetic population the prevalence PAD was found to be 32.2%.⁴In a study conducted on Korean population the prevalence of PAD in diabetic patients was found to be 3.2%.⁴In a study conducted Li et al the prevalence of PAD in diabetic subjects was 5.2%.¹¹ A Malaysian study in diabetes patients in different ethnic groups of Malaysia by Rabia et al showed that PAD prevalence was 5.8% in Malays, 19.8% in Indians and 19.4% in Chinese.¹²

Our study showed that there is no statistically significant association between the occurrence of PAD and gender (p value of 0.36). The results of this study consistent with the findings of Akram et al that also displayed no statistically significant association. ³In a study conducted on Chinese diabetic population by Guan et al the prevalence rate was 18.3% among males and 20.4% among female patient with a non significant difference as per found in this study too ⁸

There was another research conducted on Indian population by Agarwal et al significant association of PAD and age was found in diabetic population.¹³In a study conducted by Guan et al on Chinese diabetic population of more than 50 years 19.47% of patients were found to have PAD.¹⁰ However, in our study there was no association found between the occurrence of PAD and advancing age in diabetics (71.4% in <45 years and 83.1% in > 45 years with p value of 0.26).The study conducted by Rabia et al in Malaysian population also showed no significant association of PAD with age in diabetic subjects.¹²

Moreover on evaluation of association of hypertension with the occurrence of PAD in diabetic population, no association was noted that support study by Akram et al that showed no significant association between history of hypertension and PAD in diabetics. Our study also revealed no significant association between

hypertension and PAD (with hypertension 82.1% and without 80% having p value of 0.53). Study directed at multiethnic population of Malaysia by Rabia et al also significant relationship was found between hypertension and PAD occurrence in diabetic patients (hypertensive patients with PAD 78.1% and without PAD 74.4%).¹² In another study done in Saudi diabetic population by Alzahrani et al hypertension was found to be significantly associated with PAD.¹⁴

Conclusion

The concurrent occurrence of peripheral arterial disease was found to be markedly high in Type 2 diabetic patients. No statistically significant association of PAD was observed with age, gender, hypertension, smoking status or diabetes treatment modality. Hence there is need to screen the diabetic patients for PAD at the time of presentation.

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