

Prevalence of Peripheral Arterial Disease (PAD) in Type II Diabetics and its association with various risk factors

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ABSTRACT

Aim: To determine the frequency of Peripheral Arterial Disease (PAD) in Type II diabetic population and to evaluate its association with age, gender, hypertension, smoking and treatment modality of diabetes.

Methods: In this cross sectional study 130 diabetic patients were enrolled. Patients of both gender and age more than 30 years diagnosed with type II diabetes were included in the study. Patients with type I Diabetes Mellitus (blood fasting >126 mg/dl), hyperlipidemia (triglyceride >150 mg/dl or LDL >100 mg/dl), deranged creatinine (>1.1) or BMI of more than 30 were excluded from this study. For ankle brachial index (ABI) the measurements were done in supine position with a hand held doppler. ABI was calculated by dividing ankle systolic pressure by brachial systolic pressure of the same side. PAD was diagnosed when ankle-brachial index (ABI) was less than 0.9. A p-value of less than 0.05 was considered statistically significant.

Results: Out of total 130 cases, peripheral arterial disease was found in 35 (25.1%) patients. No statistically significant association of PAD was observed with age, gender, hypertension, smoking status or diabetes treatment modality

Conclusion: Peripheral arterial disease is quite common among people with type II diabetes in Pakistan. Creating public awareness of the disease and its complications is crucial so that the disease can be managed in its early stages.

Keywords: Peripheral arterial disease, Type II diabetes, Ankle-brachial index (ABI)

INTRODUCTION

Diabetes mellitus is a chronic ailment requiring persistent medical care with multipronged risk reduction strategies besides good glycemic control. Teaching patient self management skills is crucial in preventing acute complications and decreasing the risk of long-term complications¹. WHO ranks Pakistan 7th on diabetes mellitus prevalence list with an estimated overall prevalence of diabetes at 11.45%². One of the major complications seen in diabetic patients is peripheral arterial disease (PAD).

PAD is a slow progressive atherosclerotic occlusive disorder of arterial system and can involve any blood vessel but legs and feet are most commonly involved³. It progresses gradually over a period of years and may remain asymptomatic or manifest with history of intermittent claudication. People with intermittent claudication only forms a fraction of the total population with PAD. Ankle Brachial Index (ABI) is a simple yet efficient tool for objectively documenting the presence and severity of lower-extremity peripheral arterial disease. It is basically the ratio of ankle to brachial systolic blood

pressure measured with the help of a hand held Doppler .ABI is 95% sensitive and 100% specific against angiographically confirmed PAD and is the most widely used method for diagnosis of PAD.

PAD is one of the leading cause of lower limb amputation in diabetics.⁴ Creating public awareness of the disease and its complications is crucial so that the disease can be managed in its early stages. This higher prevalence of PAD in diabetics is partially attributed to co-existent cardiovascular risk factors, including hypertension, cigarette smoking, and dyslipidemia⁵ Peripheral arterial disease is relatively common amongst Pakistanis with type 2 diabetes. The prevalence of PAD is 9.5% in American diabetic population and 3.2 to 11.7% in Asian diabetic population. Studies show that the prevalence of PAD in Pakistani population is considerably higher than rest of the world. Recently, a local study by Nazar et al reported the prevalence of PAD in type 2 diabetics to be as high as 77.6%⁶ On the contrary, a recent multicentric study by Akram et al showed a prevalence of 31.5%.⁷ The number of diabetics is on the rise in Pakistan as a result of urbanization, physical inactivity and obesity. Keeping in view the high prevalence of PAD amongst Pakistani diabetic population, we decided to conduct this study with the aim of determining the frequency of PAD and to see

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the relationship with various risk factors in type II diabetic patients.

MATERIALS AND METHODS

This cross-sectional observational study was conducted from 1st July 2017 to 31st December 2017 at the Diabetes Clinic of Medical Unit III, Jinnah Hospital, Lahore. The sample size was calculated using Open Epi calculator with the statistical assumptions of 8% alpha error and 95 % confidence interval taking frequency of PAD amongst type II diabetics to be 31.5%⁷ and came out to be 130 patients for this study. Patients of both gender and age more than 30 years diagnosed with type II diabetes were included in the study. Patients with type 1 Diabetes Mellitus (blood fasting >126 mg/dl), hyperlipidemias (triglyceride >150 mg/dl or LDL >100 mg/dl), deranged creatinine (>1.1) and previous history of trauma to arterial vasculature were excluded after careful examination. After obtaining an informed consent, a detailed 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. Systolic pressures were measured at both dorsalispedis 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. A patient with an ABI of <0.9 was classified as having PAD.

Data was collected and recorded on a pre-designed proforma and analyzed by SPSS version 21.0. Categorical variables such as gender, age groups, BMI groups, HTN, smoking, hyperlipidemia and ABI were expressed as frequencies and proportions. Mean values with standard deviations were calculated for continuous variables such as age, duration of diabetes, BMI, duration of HTN and dyslipidemia. For categorical variables, differences between patients were tested using the chi-square test and p-value < 0.05 was taken as statistically significant.

RESULTS

Out of 130 patients who met the inclusion criteria, 81 were males (62.3%) and 49 were females (37.7%). Mean age was 56.32 ± 7.51 (30 – 69) years in the entire group, while it was 57.09 ± 5.1 years (range:

30 – 65) for men and 49.8 ± 9.7 years (range 33– 69) for women. The mean duration of diabetes in patients was 10.6±9.2 years. Majority of patients were on oral hypoglycemic management of Diabetes. Peripheral Arterial Disease was found in 35 (26.9%) patients on the basis of ABI. About half of the study subjects (48.6%) were hypertensive and 38.5% of subjects admitted to being smokers. Association of various factors with PAD was explored and no statistically significant association was observed (Table 3).

Table 1: Sex Distribution

Gender	n	%age
Male	81	62.3
Female	49	37.7
Total	130	100

Table 2: Frequency distribution of PAD on the basis of ABI

ABI	n	%age
Normal > 0.9	95	73.1
Abnormal (PAD) <0.9	35	26.9
Total	130	100

Table 3: Association of contributing factors in patients with and without peripheral arterial disease

Baseline characteristics	Peripheral Arterial Disease		P value
	Present	Absent	
Gender			
Male	66(81.5%)	15(18.5%)	0.79
Female	39(79.6%)	10(20.4%)	
Age group			
upto 45	16(66.7%)	8 (33.3%)	0.56
above 45	77(72.6%)	29(27.4%)	
Treatment of diabetes			
oral hypoglycemics	40(81.6%)	9(18.4%)	0.47
insulin	14(73.7%)	5(26.3%)	
Hypertension			
Present	48(76.2%)	15(23.8%)	0.34
Absent	46 (68.7)	21(31.3%)	
Current smoker			
Yes	40(80%)	10 (20%)	0.86
No	65(81.3%)	15(18.7%)	

DISCUSSION

Peripheral arterial disease (PAD) is characterized by narrowing and ultimately occlusionof the peripheral arteriesdue to atherosclerotic plaques.PAD is a considerable public health burden as it is associated with poor quality of life and high morbidity and mortality rates. 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 type II diabetics was 26.9%.This was in line with the previous local

studies conducted by Mahmood et al³ and Akram et al⁷ which reported the prevalence to be 25.1% and 31.6% respectively. However a recent local study in 2016 by Nazar et al⁶ reported the prevalence to be as high as 77.6%. Whereas Mohan et al reported a prevalence of only 3.9% in a large population of 4941 patients in South India⁸. This was probably due to too small of a sample size (73) for the study. Different methods of sampling, different sample size, difference in the diagnostic methods and different distributions of risk factors can be responsible for the reported variations of overall prevalence.

Important risk factors for the development of PAD are same as those for generalized atherosclerosis and include increasing age after 45 years, cigarette smoking, diabetes mellitus (DM), hyperlipidemia, and hypertension.⁹ Our study showed that there is no statistically significant association between the occurrence of PAD and gender (p value of 0.79). This was consistent with the findings of Akram et al⁷ that also displayed no statistically significant association. However, the results of study conducted by Ali et al⁹ clearly displayed a significant association between PAD and gender (p value of 0.0001). This disagreement might be due to a difference in other predisposing factors of PAD between females and males e.g., BMI. Our study also found no significant association between PAD and advancing age (p value of 0.56). This was consistent with the findings of Ali et al⁹ who also demonstrated no significant association between PAD and advancing age (p value of 0.324). Moreover on evaluation of association of hypertension with the occurrence of PAD in diabetic population, no association was noted that was consistent with the findings of Akram et al⁷ but not with that of Ali et al.⁹ Moreover, smoking and duration of diabetes are important risk factors for PAD but in this study this association was not statistically significant for these variables.

Possible limitations of our study included the fact that it was a single centre study with limited number of patients. Secondly there were no medical records to verify the duration of diabetes. Neither there was any data concerning the glycaemic control of the patient (HbA1c levels) so we could evaluate the association between PAD and level of glycaemic control.

CONCLUSION

Our study depicts a high prevalence of PAD among people with type II diabetes. However, no statistically significant association of PAD was observed with age, gender, hypertension, smoking status or diabetes treatment modality. PAD if not caught early can have debilitating consequences. Keeping in view the ever increasing number of diabetics in Pakistan, there is a dire need for creating public awareness of the disease and its complications so that the disease can be managed in its early stages.

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