

Original article:

Study to correlate of findings of Ankle Brachial Index with duration of diabetes, serum lipid profile and HbA1c

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Abstract:

Introduction: Peripheral arterial disease is defined as a clinical disorder in which there is stenosis or occlusion in the arteries of the limbs. With better understanding of the process of atherosclerosis in type 2 Diabetes mellitus, avenues for treatment have increased. Modification of lifestyle and effective management of the established risk factors such as smoking, dyslipidaemia, hyperglycaemia and hypertension retard the progression of the disease and reduce cardiovascular events in these patients. With this back ground the present study was conducted to assess to know whether ABI finding were correlated with duration of diabetes, serum lipid profile and HbA1c.

Materials and methods: The study was conducted in Dr. D Y. Patil Medical College and Research Centre, Pimpri, Pune-411018. Period of study: The study was conducted from July 2013 to September 2015, over a period of 2 years. Approval of Institute Ethics committee was obtained before the start of study. All recruited patients were interviewed to obtain socio demographic and medical history. Origin, duration and progression of the condition were recorded on the sheet. After history taking all patients were examined for general and systemic examination.

Results: Among cases with PVD, all (100.0%) were having hypertension while it was present in 57.1% cases without PVD. On application chi square test, it was found not significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases. Among cases with PVD, all (100.0%) were having hypertension while it was present in 57.1% cases without PVD. On application chi square test, it was found not significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases.

Conclusion: Among cases with PVD, all (100.0%) were having DM since more than 10 years while duration of DM varied from less than 5 year to more than 15 years in cases without PVD. However on application chi square test, it was found non significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases.

Keywords: Peripheral arterial disease, hypertension

Introduction:

Peripheral arterial disease is defined as a clinical disorder in which there is stenosis or occlusion in the arteries of the limbs. Atherosclerosis is a leading cause of Peripheral arterial disease (PAD). ¹There is increased risk of PAD in cigarette smokers and in persons with diabetes mellitus, hypercholesterolemia and hypertension. The risk of atherothrombotic

events in patients with PVD increases when concomitant diabetes is present. Diabetic arteriopathy, which includes endothelial dysfunction, inflammation, hypercoagulability changes in blood flow and platelet abnormalities, contributes to the early evolution of these events. With better understanding of the process of atherosclerosis in type 2 Diabetes mellitus, avenues for treatment have

increased. Modification of lifestyle and effective management of the established risk factors such as smoking, dyslipidaemia, hyperglycaemia and hypertension retard the progression of the disease and reduce cardiovascular events in these patients.^{2,3}With this back ground the present study was conducted to assess to know whether ABI findings were correlated with duration of diabetes, serum lipid profile and HbA1c.

Materials and methods:

This was a cross sectional descriptive study.

Place of study: The study was conducted in Dr. D Y. Patil Medical College and Research Centre, Pimpri, Pune-411018 . Period of study: The study was conducted from July 2013 to September 2015, over a period of 2 years.

Ethical Approval: Approval of Institute Ethics committee was obtained before the start of study.

Sample Size: Considering the patients flow of young IHD cases in the hospital and study duration the sample size was kept at 40 cases

Inclusion Criteria: Diagnosed case of type 2 DM irrespective of age, sex & duration Diabetes

Exclusion criteria : Patients with one or more of the following characteristics were excluded from the study.

- Smokers
- Coarctation of aorta
- Vasculitis syndromes
- Valvular heart diseases
- Deep vein thrombosis

Data collection

All recruited patients were interviewed to obtain socio demographic and medical history. Origin, duration and progression of the condition were recorded on the sheet. After history taking all patients were examined for general and systemic examination. ABI was measured for all patients. Lipid profile of all patients was done. Lipid profile was done according to standard laboratory protocol followed in the hospital. All patients also underwent ECG test. Standard protocols were followed to obtain ECG readings. For the measurement of ABI following methodology was followed.

Results:

Table 1: Occurrence of PVD according to the Age of patients

Age Group	No. of Diabetes patients	PVD	%	P value
31 - 40 yrs	2	0	0.0%	0.679
41 - 50 yrs	21	2	40.0%	
51 - 60 yrs	15	3	60.0%	
61 - 70 yrs	2	0	0.0%	
Total	40	5	100.0%	

Among cases with PVD, 54.3% were in 51 to 60 year of age and 40% were in 41-50 year of age. So age wise distribution was not significantly difference. On application chi square test, it was not significant (p>0.05), thus age was not associated with PVD in DM cases.

Table 2: Duration of Diabetes and PVD

Duration of DM	No. of Diabetes patients	PVD Patients	%	P value
<5 years	17	0	0.0%	0.087
5-10 years	4	0	0.0%	
10-15 years	5	1	20.0%	
≥15 years	14	4	80.0%	
Total	40	5	100.0%	

Among cases with PVD, all (100.0%) were having DM since more than 10 years while duration of DM varied from less than 5 year to more than 15 years in cases without PVD. However on application chi square test, it was found non significant ($p > 0.05$), thus presence of hypertension was not associated with pres Table 14: Correlation of PVD with Hypertension

Hypertension	PVD				Total	%	P value
	Present	%	Absent	%			
Present	5	100.0%	20	57.1%	25	62.5%	0.064
Absent	0	0.0%	15	42.9%	15	37.5%	
Total	5	100.0%	35	100.0%	40	100.0%	

Among cases with PVD, all (100.0%) were having hypertension while it was present in 57.1% cases without PVD. On application chi square test, it was found not significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases.

Table 3: Correlation of PVD with Hypertension

Hypertension	PVD				Total	%	P value
	Present	%	Absent	%			
Present	5	100.0%	20	57.1%	25	62.5%	0.064
Absent	0	0.0%	15	42.9%	15	37.5%	
Total	5	100.0%	35	100.0%	40	100.0%	

Among cases with PVD, all (100.0%) were having hypertension while it was present in 57.1% cases without PVD. On application chi square test, it was found not significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases.

Discussion:

Peripheral Vascular Disease (PVD) is clinically identified by intermittent claudication and/or absence

of peripheral pulses in the lower legs and feet. These clinical manifestations reflect decreased arterial perfusion of the extremity. With the use of blood pressure measurements of the extremity (ankle and brachial), PVD can be identified noninvasively before clinical manifestation.^{4,5}

In male 23.1% cases were taking OHA and Insulin both while in female they were 14.3%. In male 65.4% cases were taking OHA while in female they

were 71.4%. In male 11.5% cases were taking insulin while in female they were 14.3%. On application chi square test, it was not significant ($p>0.05$), thus duration of DM was not associated with gender.

In male diabetes was under control in 61.5% cases. In female DM was under control in 50.0% cases. On application chi square test, it was not significant ($p>0.05$), thus control of diabetes mellitus was not associated with gender in DM cases. In male regular treatment taker were 73.1% and in female regular treatment taker were 71.4. On application chi square test, it was not significant ($p>0.05$), thus regularity of treatment was not associated with gender in DM cases.

In male cases patients having more than 30 BMI were 73.1% In female the same were 71.4%. Out of total 40 cases, only 15% had normal BMI range. 7.5% were undernourished. On application chi square test, it was not significant ($p>0.05$), thus duration of DM was not associated with gender. Hypertension, smoking, and hyperlipidemia, which are frequently present in patients with diabetes, contribute additional risk for vascular disease. PVD in diabetes is compounded by the presence of peripheral neuropathy and by susceptibility to infection. These confounding factors in diabetic patients contribute to progression of PVD to foot ulcerations, gangrene, and ultimately to amputation of part of the affected extremity. Among cases with PVD, all (100.0%) were having DM since more than 10 years while duration of DM varied from less than 5 year to more than 15 years in cases without PVD. However on application chi square test, it was found non significant ($p >0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases. Among cases with PVD, mean duration of DM was 18.74 years with standard deviation of 3.33

years. In cases without PVD mean duration of DM was 8.53 years with standard deviation of 5.28 years. Application chi square test indicate that the difference was significant ($p <0.01$), thus PVD was more common in patients having diabetes since long. Among cases with PVD, all (100.0%) were having IHD – Angina while it was there in 20% cases without PVD. On application chi square test, it was found significant ($p <0.05$), thus presence of IHD - Angina was significantly associated with presence of PVD in DM cases.

Among cases with PVD, 20.0% were having TIA/stroke while it was absent in all cases without PVD. On application chi square test, it was found significant ($p <0.05$), thus presence of TIA/Stroke was associated with presence of PVD in DM cases. Among cases with PVD, all (100.0%) were having hypertension while it was present in 57.1% cases without PVD. On application chi square test, it was found not significant ($p >0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases. Among cases with PVD, all (100.0%) were having uncontrolled DM while in cases without PVD 34.3% had uncontrolled DM and 65.7% had controlled DM. On Application of chi square test, it was found significant ($p <0.05$), thus in controlled DM cases presence of PVD was significantly higher in DM cases. Among cases with PVD, only 20% were taking regular treatment of DM while in cases without PVD 80% were taking regular treatment. On Application of chi square test, it was found significant ($p <0.05$), thus cases with PVD were taking DM treatment more irregularly compare to cases without PVD. Among cases with PVD, all had abnormal lipid profile while in cases without PVD 77.1% had abnormal lipid profile. On Application of chi square test, it was found non

significant ($p > 0.05$), thus present of PVD were not associated with lipid profile.⁶

Age, sex, diabetes, hyperlipidemia, hypertension, and cigarette smoking are significant risk factors for PVD^{7,8,9}. In patients with diabetes, vascular disease, ABI, current smoking, and arm systolic blood pressure were identified as significant independent risk factors for PVD.⁸ Surprisingly, serum lipid levels, platelet function measures, platelet factor and platelet survival were not associated with progression of PVD.¹⁰ However, the platelet-derived specific protein, beta-thromboglobulin, was associated with progression of vascular disease, suggesting that

platelet activation has a role in disease progression, but the mechanism(s) of platelet activation was not apparent from the other platelet studies performed.^{11,12,13}

Conclusion:

Among cases with PVD, all (100.0%) were having DM since more than 10 years while duration of DM varied from less than 5 year to more than 15 years in cases without PVD. However on application chi square test, it was found non significant ($p > 0.05$), thus presence of hypertension was not associated with presence of PVD in DM cases.

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