Peripheral Vascular Disease a Silent Assassin: Rising trend in State of Punjab

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ABSTRACT

Peripheral vascular disease is a major macrovascular complication of diabetes mellitus. This study was done to determine the prevalence of peripheral arterial disease in type 2 diabetes mellitus using the ankle brachial pressure index. An 12 MHz doppler probe was used in the arms and legs to assess the ankle brachial index (ABI) in 200 type 2 diabetes mellitus patients aged more than 40 years. Thorough history of patients including age, smoking history, history of symptoms of peripheral arterial disease, complete physical examination and routine investigations were collected at the time of enrolment for all subjects. A ratio of the highest blood pressure from the posterior tibial or pedal arteries of each leg to the highest blood pressure from the brachial arteries < 0.9 was considered abnormal. Abnormal ABIs were found in 33% (66/200) patients with type 2 diabetes mellitus. 45.5% patients had ABI 0.80–0.89, 33.3% patients had ABI 0.50–0.79 and 21.2% patients had ABI <0.5 Prevalence of peripheral vascular disease in type 2 diabetes mellitus is on rise in northern India so there is need to educate the patients regarding risk factor modification and importance of early intervention to prevent future progression of peripheral vascular disease.

Keywords Type 2 diabetes mellitus, Peripheral vascular disease

Introduction

Peripheral vascular disease is a major macrovascular complication of diabetes mellitus. [1] Because of unique involvement of distal pattern of vessels and invariable association with neuropathy, peripheral arterial disease in diabetics presents late, having already developed limb threating ischemia. [2] Ankle brachial pressure index is a non-invasive testing method which greatly increases the accuracy of clinical diagnosis for the presence of arterial disease and serves as objective index to follow the natural history of the disease. [3] Ankle brachial pressure index (ABI) is the most efficient, objective and practical means of documenting presence and severity of peripheral arterial disease. [4] In the present study 200 patients with type 2 diabetes mellitus were enrolled to find out prevalence of peripheral vascular disease using ankle brachial pressure index.

Material and Methods

200 patients aged more than 40 years, who are admitted in various units of Department of Medicine of Sri Guru Ramdas Hospital, Amritsar with type 2 diabetes mellitus were enrolled. Patients of type 1 diabetes mellitus, smokers, having ischemic heart disease, with history of hypertension before diagnosis of type 2 diabetes mellitus, previous history of cerebrovascular accident or heart disease were excluded from the study.

The ABI was measured with a blood pressure cuff and a doppler ultrasound sensor. The cuff was applied to both arms and ankles. The doppler probe was used to determine systolic blood pressure in both brachial arteries in the antecubital fossa, and in the right and left posterior tibial arteries and the right and left dorsalis pedis arteries. With an 12 MHz doppler probe we obtained the systolic arterial pressure when the first doppler signal was heard. The ABI for each leg was calculated as the ratio of the higher of the two systolic pressures (posterior tibial or dorsalis pedis) in the leg and the higher systolic pressure of either the left or right arm. The method used was in accordance with a recent consensus statement on measuring the ABI. An ABI <0.9 in either leg was considered abnormal, suggesting peripheral arterial disease; progressively lower ABI values indicate more severe obstruction. Thorough history of patients including age, smoking history, history of symptoms of peripheral arterial disease, complete physical examination and routine investigations including hemoglobin, total leucocyte count, differencial leucocyte count, fasting blood sugar, HbA1C levels, blood urea, serum creatinine, sodium, potassium, lipid profile, urine complete and ECG were done. Data was analysed using chi square test and univariate regression analysis.

Results

Abnormal ABIs were found in 33% (66/200) patients with type 2 diabetes mellitus enrolled in the present study. Out of this 45.5% patients had ABI 0.80–0.89, 33.3% patients had ABI 0.50–0.79 and 21.2% patients had ABI <0.5. Among these 66 patients having peripheral vascular disease females had higher percentage of peripheral arterial disease as compared to males 62.1% vs 37.9%(p<0.05). (Fig.1)

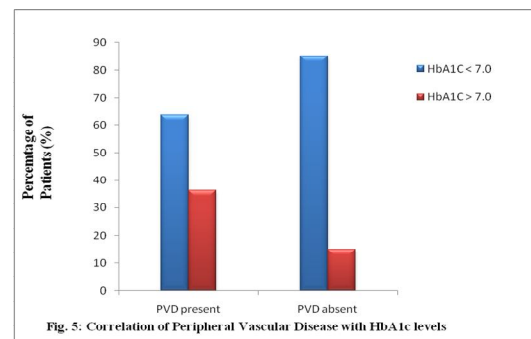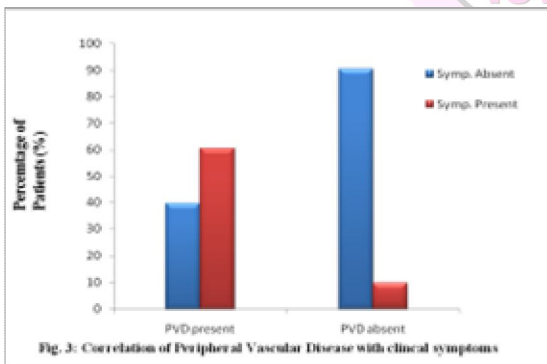Fig. 1: Gender specific prevalence of Peripheral Vascular Disease
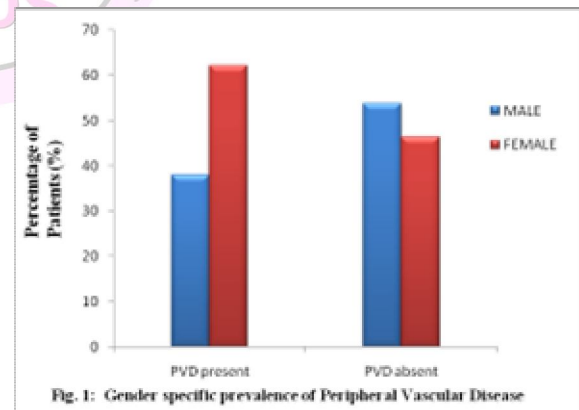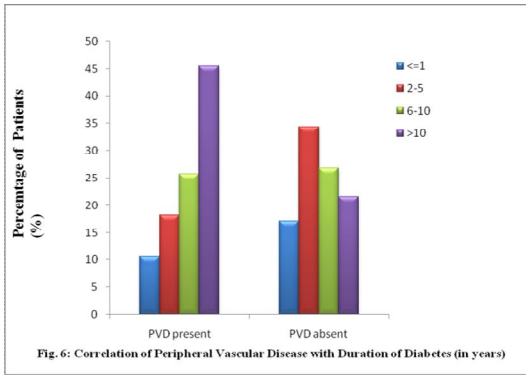
13.6% (9) patients belonged to age group of 40-49 years. 34.8% (23) patients belonged to age group of 50-59 years. 51.6% (34) patients belonged to age group 60 years and above. (Fig.2)
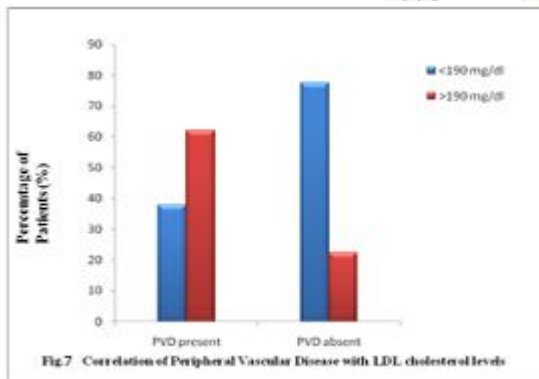
Fig. 2: Age wise distribution of Peripheral Vascular Disease

Fig. 4: Correlation of Peripheral Vascular Disease with Foot Ulcer
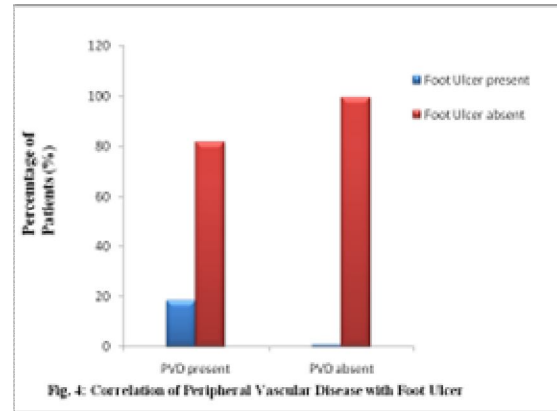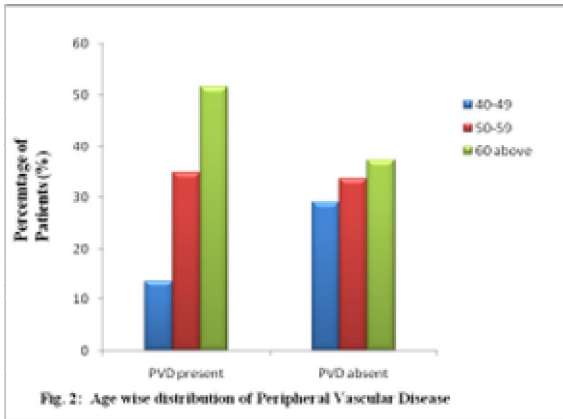
With increasing age the prevalence of peripheral arterial disease in type 2 diabetes showed an increasing trend (p<0.05). 39.4% (26) patients were asymptomatic while 60.6% (40) were symptomatic with symptoms of claudication, rest pain, lerish syndrome (p <0.001). 18.2% (12) patients had foot ulcer while 81.8% (54) patients had no such abnormality (p <0.001). (Fig.3, 4)

36.4% (24) patients had HbA1C levels >7 while 63.6% (42) had HbA1C levels <7. Overall patients with peripheral arterial disease had correlation with HbA1C levels as compared to patients without peripheral arterial disease (p<0.05). (Fig. 5) 10.6% (7) patients had duration of diabetes less or equivalent to one year. 18.2% (12) patients had duration of diabetes between 2 to 5 years. 25.8% (17) patients had duration of diabetes between 6 to 10 years while 45.4% (30) patients had duration of diabetes >10 years (p <0.001). (Fig. 6)

Fig. 3: Correlation of Peripheral Vascular Disease with clinical symptoms

Fig. 5: Correlation of Peripheral Vascular Disease with HbA1c levels

Fig. 6: Correlation of Peripheral Vascular Disease with Duration of Diabetes (in years)

62.1% (41) patients had serum LDL cholesterol levels >190 mg/dl. (Fig.7) Out of 134 patients of type 2 diabetes who had no evidence of peripheral arterial disease 22.4% (30) patients had serum cholesterol levels >190 mg/dl (p <0.001).

Fig.7 Correlation of Peripheral Vascular Disease with LDL cholesterol levels

Discussion

Correlation of peripheral vascular disease with gender distribution, age distribution, clinical symptoms, glycosylated haemoglobin, duration of diabetes, LDL cholesterol levels was done. This study showed that females had higher prevalence of peripheral arterial disease as compared to males. While assessing prevalence and risk factors for peripheral artery disease in an Asian population with diabetes mellitus Tavintharan S found that prevalence of PAD was more in female gender. [5] This study showed that with increasing age the prevalence of peripheral arterial disease in type 2 diabetes increased. Lekshmi RM et al while studying the peripheral arterial disease in community-based patients with diabetes in Singapore reported that, prevalence of peripheral arterial disease was positively associated with increasing age. [6] This study showed that high prevalence of symptoms pertaining to lower limbs was found in patients with peripheral arterial disease. This is in concordance with the study done by Buitron LV et al which showed that the presence of either signs or symptoms was more frequent in subjects with peripheral arterial disease. [7]

This study showed that all patients with peripheral arterial disease had higher levels of HbA1C as compared to patients without peripheral arterial disease. Adler AI et at studied potential risk factors for the development of peripheral arterial disease and reported that hyperglycemia was associated with an increased risk for peripheral arterial disease, independent of other risk factors. [8] This study also showed positive correlation of duration of diabetes with peripheral vessel disease. Papanas N, Tziakas D et al proved in their study that peripheral arterial occlusive disease in patients was associated with duration of diabetes mellitus. [9] This study showed that

peripheral arterial disease was positively correlated with LDL cholesterol levels. This is in concordance with the study done by Cacoub P et al which showed that LDL cholesterol levels and peripheral arterial disease are positively correlated. [10] The prevalence of peripheral arterial disease using ankle brachial pressure index in this study was 66 (out of 200 patients) that is 33%. (Fig.8) Hirsch AT et al conducted a multicentre, cross-sectional study and detected prevalence of 29%. [11] Mourad JJ et al in a prospective, observational, real-life, epidemiologic study (ELLIPSE) calculated the prevalence of peripheral arterial disease to be 41.1%. [12]

Fig. 8 Ankle brachial index stratification in patients having Peripheral vascular disease
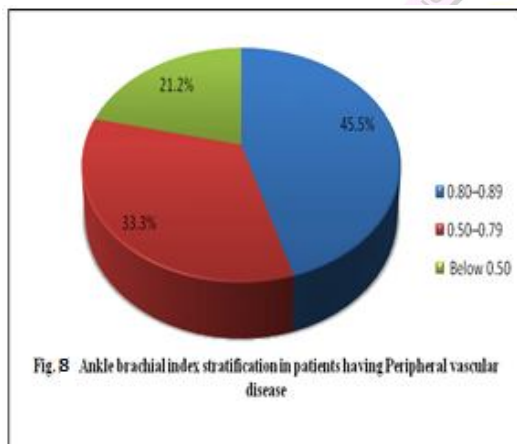
The prevalence of peripheral vascular disease in type 2 diabetes mellitus as measured by Ankle Brachial Pressure Index was 33% (66 out of total 200 patients). Hence this increasing trend of peripheral vascular disease requires patient education for risk factor modification and early intervention to prevent future progression.

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