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Research Article

PREVALENCE OF ASYMPTOMATIC PERIPHERAL ARTERIAL DISEASE AND ITS ASSSOCIATION WITH AGE AND GENDER IN TYPE 2 DIABETES MELLITUS IN A TERTIARY CARE TEACHING HOSPITAL: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: The true prevalence of peripheral arterial disease (PAD) in individuals with diabetes has been difficult to determine because of the lack of symptoms and insensitive diagnosis. We estimated the prevalence of PAD and its association with age and gender in Type 2 diabetes mellitus (DM) who were asymptomatic for PAD.

Methods: Total 150 Type 2 DM patients were screened and examined for PAD using Ankle Brachial Index and Color Doppler. Prevalence of PAD was further studied and statistically analyzed to find its association with age and gender.

Results: Prevalence of PAD in our study was 16%. Out of total 150 Type 2 DM patients, 24 patients were diagnosed to have PAD by Color Doppler. The prevalence was 12.0% in the fifth and sixth decade followed by 3.3% in seventh and eighth decade and 0.7% in <40 years age group. Out of total 150 cases, there were 83 males and among them 15 (18.1%) had PAD and out of 67 females, 9 (13.4%) had PAD. After application of Chi-square test to the above observations, there was no statistically significant association of age and gender with PAD in our study population.

Conclusion: In the present study, the prevalence of PAD was 16%; 10% and 6% in males and in females, respectively. There was no statistically significant correlation of PAD with age and gender.

Keywords: Type 2 diabetes mellitus, Peripheral arterial disease, Prevalence.

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INTRODUCTION

Peripheral arterial disease (PAD) is a common manifestation of the atherosclerotic disease process affecting from 12% to 14% of the general population [1]. It is an is an important manifestation of systemic atherosclerosis [2].

Unlike other complications, it has received little attention in the Indian medical literature. There is significant difference in the reported prevalence of PAD and its associated risk factors between Indian and Western studies [3].

It is seen that approximately one-third patients with PAD have typical claudication. More than 50% of patients identified as having PAD on the basis of an abnormal Ankle Brachial Index (ABI) value do not have typical claudication or limb ischemia at rest but instead have other types of leg pain on exertion with reduced ambulatory activity and quality of life [2].

Framingham heart study revealed that 20% symptomatic patients with PAD had diabetes mellitus (DM) but this probably greatly underestimates the prevalence, given that many more patients with PAD are asymptomatic rather than symptomatic. Even for asymptomatic patients, PAD is a marker for systemic vascular disease involving coronary, cerebral, and renal vessels leading to an elevated risk of events such as myocardial infarction, stroke, and death [4].

The true prevalence of PAD in individuals with diabetes has been difficult to determine because of the lack of symptoms and insensitive means of diagnosis. The ABI has a high sensitivity and specificity for angiographically proven disease [5].

It is important for clinicians to assess patients for PAD to identify those with high cardiovascular risk and those at risk for amputation. Because of the lack of symptoms in the premorbid period, it is important to screen those at risk [6].

Known diabetic subjects had a higher prevalence of PAD compared with newly diagnosed diabetic subjects [7].

In the present study, we have screened 150 patients of Type 2 DM to find prevalence of asymptomatic PAD in them. We have studied association of PAD with age and gender in study cases.

METHODS

The present cross-sectional study was conducted in the Department of Medicine, R. D. Gardi Medical College and C. R. Gardi Hospital, Ujjain, M.P. after ethical approval from concerned institutional ethics committee IEC).

Total 150 patients of Type 2 DM who were selected by simple random sampling enrolled for the study in total duration of 1 1/2 year period.

All Type 2 DM patients attending Medicine Outpatient department and Inpatient Department of the hospital irrespective of age, sex, and duration of diabetes were included in the present study (Table 1).

Patients with symptoms such as intermittent claudication as exertional leg pain relieved by resting, patients with symptoms of ischemic limb, cutaneous ulceration, gangrene, and wound healing failure, Type-1 DM patients, and smokers were excluded from the study.

Total 150 patients who fulfilled study criteria were subjected to detailed history, thorough clinical examination, and laboratory investigations as per proforma especially designed for the study, which included examination of risk factors and detailed assessment of peripheralarterial system.

Statistical analysis

Statistical software, namely, SPSS 23.0 was used for the analysis of data and Microsoft Word and Excel have been used to generate graphs, tables, and descriptive statistics.

RESULTS

The data of the present study were tabulated as under.

Age-wise distribution of study cases

In the present study, maximum 115 (76.7%) cases were in the fifth and sixth decade followed by 28 (18.7%) in seventh and eighth decade while only 7 (4.7%) were of 40 years or below (Fig. 1 and Table 2).

The mean age with SD was 53.1±9.7 years.

Gender-wise distribution of study cases

Out of total 150 study cases, 83 (55.3%) males and 67 (44.7%) were females (Fig. 2 and Table 3).

Male to female ratio was 1.23:1.

Prevalence of PAD

In the present study of 150 cases, study cases were screened for PAD using ABI and Color Doppler. Using ABI 21 (14%) cases while using Color Doppler 24 (16%) cases were diagnosed to have PAD. Color Doppler is more sensitive diagnostic tool than ABI to diagnose PAD (Table 4).

Prevalence of PAD in our study was 16%. Out of total 150 Type 2 DM patients, 24 patients were diagnosed to have PAD by Color Doppler.

Prevalence of PAD and association with age

In the present study, the prevalence of PAD was 16%. The prevalence varied according to the age group in study cases. It was observed that the prevalence was 12.0% in the fifth and sixth decade followed by 3.3% in seventh and eighth decade and 0.7% in <40 years age group.

Out of 115 cases of fifth and sixth decade, 18 (15.7%) cases had PAD. Followed by out of 28, 5 (17.9%) in seventh and eighth decade. However, only one (14.3%) out of seven cases had PAD below 40 years of age (Fig. 3 and Table 5).

After application of Chi-square test to the above observations, the Chi-square value was 0.098 and p value was 0.952 which was more than 0.05. Hence, there was no statistically significant association of age with PAD.

Prevalence of PAD and association with gender

In the present study of 150 cases, there were 83 males and among them 15 (18.1%) had PAD and out of 67 females, 9 (13.4%) had PAD (Fig. 4 and Table 6).

After application of Chi-square test to the above observations, Chi-square value was 0.594 and p value was 0.441 which was more than 0.05. Hence, there was no statistically significant association of gender with PAD.

DISCUSSION

The present study "Prevalence of Asymptomatic PAD and its Association With Age and Gender in Type 2 DM in A Tertiary Care Teaching Hospital: A cross-sectional study was comprised of 150 cases of Type 2 DM who were asymptomatic for PAD. We studied prevalence of PAD using ABI and color Doppler in our study cases and its association with age and gender.

Age and gender

In the present study, of 150 study cases, maximum 15 (76.7%) cases were in the fifth and sixth decade while only 7 (4.7%) were 40 years or below. The mean age with SD was 53.1±9.7 years. The mean age with SD in males 53±9.5 years while that in females was 54.9±10.5 years.

Table 1: Criteria for the diagnosis of diabetes mellitus (The National Diabetes Data Group and World Health Organization)

Symptoms of diabetes plus random blood glucose concentration-11.1 mmol/L (200 mg/dL)
Fasting plasma glucose-7.0 mmol/L (126 mg/dL)
HbA1c>6.5% or
2 h plasma glucose concentration-11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test

Table 2: Age-wise distribution of study cases

Age groups (Years)	No. of cases	Percentage
<40	7	4.7
41–60	115	76.7
61–80	28	18.7
Total	150	100.0

Mean age with SD: 53.1±9.7 years

Table 3: Gender-wise distribution of study cases

Gender	No. of cases	Percentage
Male	83	55.3
Female	67	44.7
Total	150	100.0

Table 4: Diagnostic value of ankle brachial index and color Doppler

Diagnostic tools	Total no. of cases	No. of cases	Percentage
Positive ABI	150	21	14
Positive Color Doppler	150	24	16

Table 5: Association of age with PAD

Age group in Years	No. of cases	PAD not seen (%)	PAD seen (%)
<40 n=7	7	6 (85.7%)	1 (14.3%)
41–60 n=115	115	97 (84.3%)	18 (15.7%)
61–80 n=28	28	23 (82.1%)	5 (17.9%)
Total Chi-square=0.098 p=0.952	150	126 (84.0%)	24 (16.0%)

PAD: Peripheral arterial disease

Table 6: Gender-wise association of study cases with PAD

Sex	No. of Cases	PAD not seen (%)	PAD seen (%)
Male n=83	83	68 (81.9%)	15 (18.1%)
Female n=67	67	58 (86.6%)	9 (13.4%)
Total Chi-square=0.594 p=0.441	150	126 (84.0%)	24 (16.0%)

PAD: Peripheral arterial disease

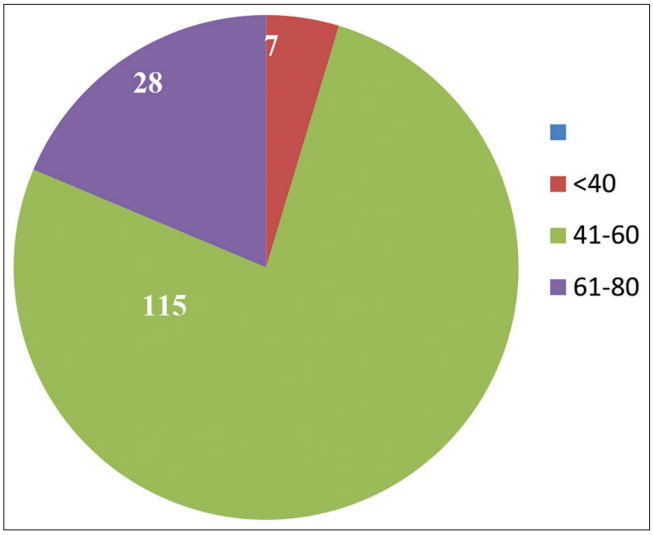

Fig. 1: Pie diagram showing age-wise distribution of study cases

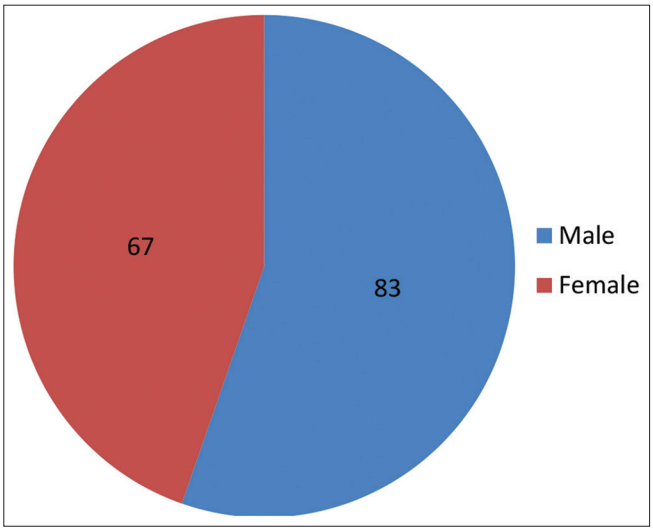

Fig. 2: Pie diagram showing gender-wise distribution of study cases

Out of total 150 study cases, 83 (55.3%) males and 67 (44.7%) were females. Male to female ratio was 1.23:1**.** Soyoye *et al.* [8] in 2016, in his study of 300 cases obtained mean age with SD 56.12±7.65 years.

Agarwal *et al.* [3] in 2012, in his study of 146 cases obtained mean age with SD 59±7.2 years and the same in males 60±7 years while in females, it was 59±7 years.

Male to female ratio 1.17:1 obtained by Agarwal *et al.* [3] in 2012 which was nearly similar to that obtained in the present study. Other authors, Padya *et al.* [9] in 2015 and Soyoye *et al.* [8] in 2016 obtained male to female ratio 2.1:1 and 1:1.27, respectively.

Prevalence of PAD and its association with age and gender of study cases

In the present study, the prevalence of PAD in study cases was 16% and among them 12.0% in the fifth and sixth decade followed by 3.3% in seventh and eighth decade and 0.7% in <40 years age group. After application of Chi-square test to the above observations, the Chi-square value 0.098 and p value 0.952 showing no statistically significant association of age with PAD.

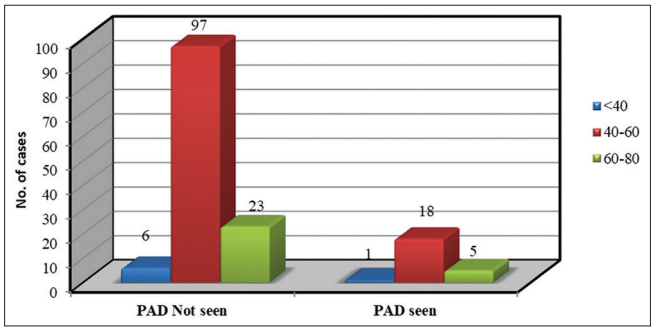

Fig. 3: Bar diagram showing association of age with Peripheral Arterial Disease in study cases

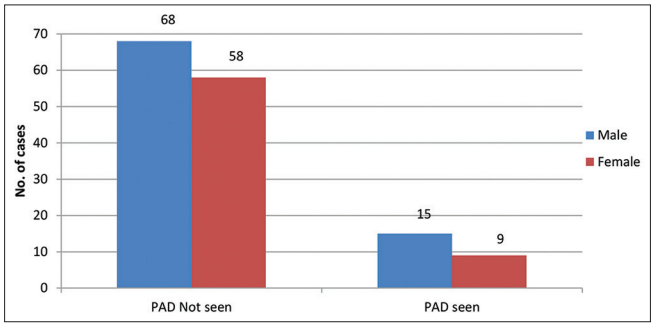

Fig. 4: Bar diagram showing gender-wise association with peripheral arterial disease in study cases

Table 7: Prevalence of PAD in various studies

S. No	Authors	No. of Cases	Prevalence of PAD (%)
1.	Agarwal *et al.*[3] (2012)	146	14.4
2.	Belli *et al.*[10] (2015)	100	16
3.	The fremantle diabetes study[11] (2006)	1294	13.6
4.	Rhee *et al.*[12] (2007)	6625	17.7
5.	Present study	150	16

In the present study, the prevalence of PAD in males was 10% while that in females 6%. Chi-square value 0.594 and p value 0.441. Hence, there was no statistically significant association of gender with PAD.

Various authors quoted the prevalence of PAD in their studies (Table 7).

CONCLUSION

In the present study, the prevalence of PAD was 16%; 10% and 6% in males and in females, respectively. Type 2 DM patients who are asymptomatic for PAD should be assessed and examined for PAD. There was no statistically significant correlation of PAD with age and gender.

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AUTHOR'S CONTRIBUTION

The concept of study was by Dr Shrijikumar C. Thakkar who also participated in protocol preparation, data collection, data Analysis, preparation of manuscript, its editing, and review. Dr Purvi Tanna participated in the literature search, data analysis with statistics, and

manuscript preparation. Dr Ruchi Baghel participated in protocol preparation and data analysis with statistic. Dr Sandeep Kumar Adwal participated in the literature Search and data analysis.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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