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Research Article

Prevalence of asymptomatic peripheral vascular disease in patients with type 2 diabetes by color Doppler study

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ABSTRACT

Background: A diagnosis of peripheral vascular disease in patients with diabetes mandates a multifaceted treatment approach, involving aggressive risk factor modification, anti-platelet therapy and revascularization procedures.
Objective of the study is to study the prevalence of asymptomatic Peripheral vascular disease in patients with type 2 diabetes mellitus by color Doppler study and to correlate it with risk factors and ischemic heart disease.
Methods: A total of 40 patients of type 2 diabetes mellitus patients attending outpatient department at Mamata General Hospital, Khammam during the period of August 2008 to August 2009 were selected randomly and a cross sectional analysis was done. The initial history was directed towards obtaining details regarding age/sex of the patient, symptoms/duration of type 2 diabetes, diet/treatment compliance, glycemic control based on HbA1c, presence of hypertension, habit of smoking, family history, symptoms suggestive of limb ischemia, past history of diabetic foot lesions, assessment of physical activity.
Results: The prevalence of asymptomatic peripheral vascular disease in type 2 diabetes mellitus was found to be 30%. Age more than 50 years, male sex, smoking, duration of type 2 diabetes mellitus more than 10 years, poor glycemic control (HbA1c > 8%), increased waist hip ratio, overweight and obesity (BMI > 25 kg/m^2), increased waist circumference, increased serum cholesterol, increased serum LDL, increased serum Triglycerides, decreased serum HDL, hypertension, abnormal ECG, poor physical activity were found to be risk factors for peripheral vascular disease and they were statistically significant. But the factors like family history of diabetes, diet/treatment compliance were not found to be statistically significant.
Conclusions: Age more than 50 years, male sex, smoking, duration of type 2 diabetes mellitus more than 10 years, poor glycemic control (HbA1c > 8%), increased waist hip ratio, overweight and obesity (BMI > 25 kg/m^2), increased waist circumference, increased serum cholesterol, increased serum LDL, increased serum Triglycerides, decreased serum HDL, hypertension, abnormal ECG, poor physical activity were found to be risk factors for peripheral vascular disease.

Key words: Diabetes, Physical activity, Peripheral vascular disease

INTRODUCTION

Peripheral vascular disease is a chronic, lifestyle limiting disease and is an independent predictor of cardiovascular ischemic events.[1,2] Diabetes mellitus type 2 is one of the important risk factors for peripheral vascular disease. Epidemiological studies have confirmed an association

between diabetes and an increased prevalence of Peripheral vascular disease.[3,4]

Despite the recognition that Peripheral vascular disease is associated with a marked increase in the risk of ischemic events, this particular manifestation of systemic atherosclerosis is largely under diagnosed and undertreated.[5] Patients with diabetes and Peripheral vascular disease are at higher risk of lower extremity amputation than those without diabetes.[6]

Only one third of patients with Peripheral vascular disease have classical claudication symptoms and the remaining patients are asymptomatic or have atypical symptoms. Hence color Doppler study becomes invaluable non-invasive screening method for early detection of the disease.[7]

Early diagnosis and treatment of Peripheral vascular disease in patients with diabetes is critically important in order to reduce the risk of cardiovascular events, minimize the risk of long term disability and improve quality of life.[2]

A diagnosis of Peripheral vascular disease in patients with diabetes mandates a multifaceted treatment approach, involving aggressive risk factor modification, anti-platelet therapy and revascularization procedures.[8,9]

Atherosclerotic disease in one vascular bed indicates possible disease in others.[10] The risk of atherosclerotic disease is markedly increased among individuals with diabetes. The increased risk is independent of and additive to other cardiovascular risk factors. Atherosclerosis causes most of the death and disability in patients with diabetes, particularly in the type 2 diabetic patient population.[11]

The current study is intended to study the prevalence of asymptomatic Peripheral vascular disease in patients with type 2 diabetes mellitus by color Doppler study and to correlate it with risk factors and ischemic heart disease.

METHODS

A total of 40 patients of type 2 diabetes mellitus patients attending outpatient department at Mamata General Hospital, Khammam during the period of August 2008 to August 2009 were selected randomly and a cross sectional analysis was done.

Inclusion criteria

All type 2 diabetes mellitus patients with duration of diabetes >7 years.

Exclusion criteria

Patients with type 1 diabetes mellitus.

Patients with type 2 diabetes mellitus with asymptomatic Peripheral vascular disease.

Institutional Ethics Committee permission was obtained. Individual informed consent was taken.

The initial history was directed towards obtaining details regarding age/sex of the patient, symptoms/duration of type 2 diabetes, diet/treatment compliance, glycemic control based on HbA1c, presence of hypertension, habit of smoking, family history, symptoms suggestive of limb ischemia, past history of diabetic foot lesions, assessment of physical activity.

Clinical examination included height, weight, body mass index (BMI), waist hip ratio, waist circumference, screening for foot lesions, blood pressure recording and detailed examination of all peripheral pulses.

Investigations included fasting and post lunch blood sugar levels, HbA1c, complete urine examination, fasting lipid profile, 12 lead electrocardiography and color Doppler sonography of lower limb arterial system.

Primer of biostatistics was used for statistical analysis. Yates corrected chi square test was used for all tables. P value of less than 0.05 was considered as significant.

RESULTS

In the present study, among 40 patients of diabetes mellitus type 2, 12 were found to have asymptomatic peripheral vascular disease through color Doppler evaluation. These 12 patients were designated as group I and remaining as group II.

Table 1: Prevalence of asymptomatic peripheral vascular disease in type 2 diabetes mellitus.

Groups	Number of patients	Percentage
Group I	12	30%
Group II	28	70%

The prevalence of asymptomatic peripheral vascular disease in type 2 diabetes mellitus was found to be 30%.

Age more than 50 years, male sex, smoking, duration of type 2 diabetes mellitus more than 10 years, poor glycemic control (HbA1c >8%), increased waist hip ratio, overweight and obesity (BMI > 25 kg/m^2), increased waist circumference, increased serum cholesterol, increased serum LDL, increased serum Triglycerides, decreased serum HDL, hypertension, abnormal ECG, poor physical activity were found to be risk factors for peripheral vascular disease and they were statistically significant.

Table 2: Distribution of various characteristics in group I and group II.

Characteristics		Group I	Group II	P value
Age (years)	< 50	05	27	<0.001
	> 50	07	01	
Sex	Male	11	08	<0.001
	Female	01	20	
Smoking	Yes	08	03	0.001
	No	04	25	
Duration of diabetes	< 10 years	01	22	<0.001
	> 10 years	11	06	
Glycemic control	Poor (HbA1c >8%)	10	04	<0.001
	Good (HbA1c <7%)	02	24	
Hypertension	Yes	08	06	0.017
	No	04	22	
Obesity	Yes	10	08	0.004
	No	02	20	
Waist hip ration	Abnormal	09	07	0.009
	Normal	03	21	
Waist circumference	Abnormal	09	08	0.018
	Normal	03	20	
Serum cholesterol	>200 mg/dl	10	07	0.002
	<200 mg/dl	02	21	
Serum triglycerides	>150 mg/dl	10	10	0.016
	<150 mg/dl	02	18	
Serum LDL	>130 mg/dl	10	11	0.027
	<130 mg/dl	02	17	
Serum HDL	Abnormal	06	25	0.021
	Normal	06	03	
ECG abnormalities	Present	09	09	0.032
	Absent	03	19	
Physical activity	Poor	08	07	0.033
	Good	04	21	
Family history of diabetes	Present	07	24	0.137
	Absent	24	04	
Diet/treatment compliance	Poor	06	08	0.347
	Good	06	20	

But the factors like family history of diabetes, diet/treatment compliance were not found to be statistically significant.

DISCUSSION

Diabetes is an important risk factor for peripheral vascular disease. Hypertension, smoking, dyslipidemia are frequently associated in patients with diabetes contributing additional risk for vascular disease.[12] Peripheral vascular diseases in diabetes are compounded by the presence of peripheral neuropathy and by susceptibility to infection. These factors contribute to progression of peripheral vascular disease to ulceration, gangrene and ultimately to amputation of affected extremity.[6]

Diabetes accounts for nearly 50% of all non-traumatic amputations in United States. By the time, it may require more costly resources to improve circulatory health of the extremity. Mortality and morbidity is increasing in patients with peripheral vascular disease. Hence prevention is an important component in the management of peripheral vascular disease.[2]

The introduction of color Doppler adds a new dimension to the assessment of peripheral vascular disease, as it is fairly sensitive and specific in detecting peripheral vascular disease. The purpose of screening diabetic patients with risk factors for peripheral vascular disease is to anticipate future complications thus getting an early chance to assess its progression.[7]

In the present study, 12 patients (30%) were found to have peripheral vascular disease by color Doppler study. This value is higher than that reported by Mohan V et al[12] who studied 726 south Indian type 2 diabetes patients with more than 25 years duration and found to have 15.4% prevalence of peripheral vascular disease by color Doppler and this value is lesser than that reported by Beks PJ et al[13] which reported 41.8% prevalence of peripheral vascular disease by color Doppler.

In the present study, 58.33% of patients with peripheral vascular disease were above 50 years of age and 3.57% of the patients without peripheral vascular disease were above the age of 50 years. This is in agreement with the findings reported by Premlatha G et al[14] who reported an association of peripheral vascular disease with an age of more than 50 years.

We found that 91.6% of patients with peripheral vascular disease were males and this finding is in agreement with Alcolado JC et al[15] which support the fact that male sex is an independent risk factor for peripheral vascular disease.

91.6% of patient with peripheral vascular disease had duration of diabetes more than 10 years in the present study. Al-Delaimy WK et al[16] reported similar findings.

In the present study, 83.3% and 66.67% of patients with peripheral vascular disease had worse glycemic control and smokers respectively. Similar observation was reported by Adler AI et al.[12]

We found that increased serum cholesterol, increased serum low density lipoprotein, increased serum triglycerides and decreased serum high density lipoproteins were significantly associated with peripheral vascular disease. Similar observation was reported by Alder AI et al.[12]

Present study reported that overweight/obesity, central obesity in the form of increased waist hip ratio and increased waist circumference were independent and significant risk factors for peripheral vascular disease. Similar finding was reported by Katsilambros NL et al.[17]

In the present study, 66.67% of patients with peripheral vascular disease were having hypertension and 21.42% of patients without peripheral vascular disease were hypertensive and this difference was statistically significant. Similar findings were reported by Adler AI et al.[12]

We found that physical activity was associated with peripheral vascular disease and similar finding was reported by Adler AI et al.[12]

Abnormal ECG finding was associated with peripheral vascular disease as reported by Mohan V et al.[18]

CONCLUSION

Age more than 50 years, male sex, smoking, duration of type 2 diabetes mellitus more than 10 years, poor glycemic control (HbA1c >8%), increased waist hip ratio, overweight and obesity (BMI >25 kg/m^2), increased waist circumference, increased serum cholesterol, increased serum LDL, increased serum Triglycerides, decreased serum HDL, hypertension, abnormal ECG, poor physical activity were found to be risk factors for peripheral vascular disease.

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