

CLINICAL PROFILE AND PREVALENCE OF RISK FACTORS OF PERIPHERAL VASCULAR DISEASE IN CHITTOOR- A CROSS-SECTIONAL STUDY

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Abstract

Introduction: Peripheral arterial disease (PAD) is a complete or partial obstruction of blood flow in arteries excluding the cerebral and coronary arteries. The most common causes are atherosclerosis, thrombosis, thromboembolism, and some secondary causes like diabetes mellitus, smoking etc. PVD presents with a variety of symptoms and it is associated with many risk factors. In this study we aim to analyze the clinical profile and the risk factors of PVD.

Aims and objectives: To investigate the clinical and demographic profile of patients with peripheral vascular disease and to identify the various risk factors for PVD in this population

Methodology: The study was a hospital based cross-sectional study. A total of 62 patients were recruited. A detailed history and clinical examination was done. The severity of PVD was determined on the basis of Ankle Brachial Pressure Index (ABPI) . Doppler studies were performed on both upper and lower limbs and the ABI was calculated.

Results: Majority of the subjects were males and belonged to the older age group (57-66yrs). Most of them had history of smoking, diabetes and hypertension. A large proportion of patients were obese. 85.5% of the patients had ABI<0.9. Patients with ABI <0.9 were found to have a significantly higher mean weight, height, WHR, LDL and RBS than people with normal ABI.

Conclusion: Patients with PVD have a wide range of clinical symptoms and many comorbidities. As a result, they have a risk for various complications. Identification and prevention of risk factors is very crucial to the treatment of the disease and to avoid complications.

Introduction

Peripheral artery disease (PAD) is an important global health problem and contributes to notable proportion of morbidity and mortality. It is a disease process resulting from obstruction of large peripheral arteries, exclusive of the coronary and intracranial Cerebrovascular system, commonly due to atherosclerosis.^[1] This condition remains under diagnosed and undertreated, and it is a very important public health problem in all countries. The clinical presentation of the patients with PVD is varied. The most common type of

presentation is claudication pain due to thrombosis of the blood vessels of the lower limbs. The main risk factors for PVD include smoking diabetes, hypertension, hypercholesterolemia. The presence of three or more risk factors increases the risk of PVD ten times and smoking alone increases that risk two to four times.^[2] Studies show that patients with symptomatic PVD with no prior myocardial infarction (MI) or stroke had around 2 times higher risk of cardiovascular events than those with prior MI or stroke but without symptomatic PVD.^[3] The prevalence of PVD is increasing mostly due to the presence of complications like Diabetes mellitus, obesity and sedentary life style. Studies have shown that the majority of PVD patients do not have typical claudication^[4]. Asymptomatic disease is defined as absence of exertional leg symptoms in the presence of an ankle-brachial index (ABI) < 0.90, while atypical symptoms are defined by leg symptoms present at rest and exercise^[5]. In this study we aim to investigate the clinical profile of PVD patients. The prevalence of various risk factors for PVD will also be assessed.

Aims and Objectives:

1. To investigate the clinical and demographic profile of patients with peripheral vascular disease
2. To identify the various risk factors for PVD in this population

Materials and Methods:

The study was conducted on the OPD patients attending the Government General Hospital, Chittoor. It is a hospital based cross sectional study. Ethical clearance was obtained from the Institutional Ethical Committee. An informed ethical consent was taken from the study participants. A total of 62 patients were recruited for the study.

The history of hypertension, diabetes, Coronary Artery Disease (CAD), smoking and alcohol intake was taken. Anthropometric measurements like height, weight and BMI was determined. Waist and hip circumference were measured using standard techniques and the WHR was calculated^[6]. The blood pressure was recorded using a mercury sphygmomanometer in sitting posture^[7]. The severity of PVD was determined on the basis of Ankle Brachial Pressure Index (ABPI)^[8]. Doppler studies were performed on both upper and lower limbs and the ABI was calculated. Blood tests like lipid profile was done in the morning after overnight fasting. Random Blood sugar testing was also done.

Inclusion criteria: All adults residing in Chittoor town with age 18 years and above attending the OPD with symptoms of PVD were included in the study.

Exclusion criteria: Bilateral upper/lower limb amputees/absence of limbs, critically-ill patients, pregnant and lactating women and the patients with history of cerebrovascular accidents were excluded from the study.

Statistical analysis:

Data was entered in MS excel and analysed using SPSS version 22.0 software.

Results:

A total of 62 individuals were included in the study. In our study, majority of the subjects (56.5%) were males (Table-1). Most of the study population were between the age group 57-66 years (29.0%)(Table-2). 33.9% of the subjects were consuming alcohol(Table-3), Majority of the patients had an ABI of <0.9 (85.5%). 54.8% had a history of smoking(Table-4), and among the smokers, 82.1% of patients had an ABI of <0.9. Only 3.2% of the population had a

history of MI(Table-6). 91.9% of our study population were known cases of hypertension(Table-7), The proportion of people with a history of Diabetes in our study population is 92.0%(Table 8). A large proportion – 83.9% of the study population were obese (BMI>25kg/m²). A further 8.1% had normal BMI. 4.8% were overweight leaving behind a measly 3.2% of the population in the underweight BMI group.(Table 9). The Prevalence of ABI in the study population was 85.5% with ABI value between 0.8 – 0.9 & 14.5% between 0.4 – 0.8.(Table-10). In our study only 33.9% of the subjects consumed alcohol, but 81% of the subjects who consumed alcohol had an ABI<0.9 (Table 12). 54.8% of the study population had a history of smoking, and 64.7% of them had an ABI of <0.9. 91.9% of the population had a history of hypertension and 92% of the patients had a history of diabetes. 83.9% of the study population were obese, they had BMI> 30(Table 9). 85.7% of patients aged older than 60 years had an ABI < 0.9. Patients with ABI <0.9 were found to have a significantly higher mean weight, height, WHR, LDL and RBS than people with normal ABI(Table 16) and the relation was significant.

Table 1: Sex distribution in the study population

Gender	Frequency, n	Percentage (%)
Female	27	43.5
Male	35	56.5
Total	62	100.0

Table 2: Age distribution of the study population

Age (yrs)	Frequency, n	Percentage (%)
37 - 46	9	14.5
47 - 56	17	27.4
57 - 66	18	29.0
67 - 76	11	17.7
77 - 86	6	9.7
87 - 96	1	1.6
Total	62	100.0

Table 3: Description of Study Population by Alcohol Consumption

Alcohol Consumption	Frequency, n	Percent
No	41	66.1
Yes	21	33.9
Total	62	100.0

Table 4: Description of Study Population by Smoking Habits

Smoking	Frequency	Percent
No	28	45.2
Yes	34	54.8
Total	62	100.0

Table 5: Physical Characteristics of the study population

Characteristics	Weight(kg)	height (cm)	BMI(kg/m ²)
Mean	74.55	160.85	28.739
Median	75.50	160.00	29.200
Std. Deviation	13.334	7.803	4.5620

Range	67	35	26.6
Minimum	31	145	14.7
Maximum	98	180	41.3

Table 6: Prevalence of MI in the study population

H/o MI	Frequency	Percent
No	60	96.8
Yes	2	3.2
Total	62	100.0

Table 7: Prevalence of hypertension in the study population

H/o Hypertension	Frequency	Percent
No	5	8.1
Yes	57	91.9
Total	62	100.0

Table 8: Prevalence of diabetes mellitus in the study population

H/o Diabetes	Frequency	Percent
No	5	8.0
Yes	57	92.0
Total	62	100.0

Table 9: Description of the Study Population based on the Body Mass Index

BMI (WHO Asia-Pacific)	Frequency	Percent
Underweight (<18.5)	2	3.2
Normal (18.50-22.99)	5	8.1
Overweight (23.00-24.99)	3	4.8
Obese (>25.00)	52	83.9
Total	62	100

Table 10: Prevalence of ABI in the Study Population

ABI(Ankle Brachial Index)	Frequency	Percent
0.8 - 0.9	53	85.5
0.4 - 0.8	9	14.5
Total	62	100.0

Table 11: ABI by Age Groups

Age Distribution (Years)	ABI		Total
	<0.9	≥0.9	
37 –46n, (%)	5 (55.6%)	4 (44.4%)	9 (100.0%)
47 – 56n, (%)	10 (58.8%)	7	17 (100.0%)

		(41.2%)	
57 – 66n, (%)	16 (88.9%)	2 (11.1%)	18 (100.0%)
67 – 76n, (%)	9 (81.8%)	2 (18.2%)	11 (100.0%)
77 – 86n, (%)	4 (66.7%)	2 (33.3%)	6 (100.0%)
87 – 96n, (%)	1 (100.0%)	0 (0.0%)	1 (100.0%)

Age group 70-79 contained the maximum proportion of people with probable PAD

Table 12: ABI by Alcohol Intake

Alcohol intake	ABI		Total
	<0.9	≥0.9	
No	28 (68.3%)	13 (31.7%)	41 (100.0%)
Yes	17 (81.0%)	4 (19.0%)	21 (100.0%)
Total	45 (72.6%)	17 (27.4%)	62 (100.0%)

Table 13: ABI by Smoking

Smoking	ABI		Total
	<0.9	≥0.9	
No	23 (82.1%)	5 (17.9%)	28 (100.0%)
Yes	22 (64.7%)	12 (35.3%)	34 (100.0%)
Total	45 (72.6%)	17 (27.4%)	62 (100.0%)

Table 14: Bivariate analysis for PVD

Factors	ABI < 0.9	ABI ≥ 0.9	Odds ratio (95% confidence interval)	P value
Gender				
Male, n (%)	23 (65.7%)	12 (34.3%)	2.30 (0.70 – 7.59)	0.168
Female, n (%)	22 (81.5%)	5 (18.5%)		
H/O smoking				
Yes	22 (64.7%)	12 (35.3%)	2.51 (0.76 – 8.30)	0.126
No	23 (82.1%)	5 (17.9%)		
H/O DM				
Yes	43 (75.4%)	14 (24.6%)	0.22 (0.03 – 1.43)	0.089
No	2 (40%)	3 (60%)		
H/O HTN				
Yes	41 (71.9%)	16 (28.1%)	1.56 (0.16 – 15.05)	0.698
No	4 (80%)	1 (20%)		
H/O alcohol				
Yes	17 (81%)	4 (19%)	0.51 (0.14 – 1.81)	0.290
No	28 (68.3%)	13 (31.7%)		
Age				
<60 years	21 (61.8%)	13 (38.2%)	0.27 (0.77 – 0.95)	0.035
>60 years	24 (85.7%)	4 (14.3%)		

Age is found to be a significant risk factor for peripheral arterial disease in bivariate analysis.

Table 15: ABI by Alcohol consumption among men

Alcohol among men	ABI < 0.9	ABI ≥ 0.9	Odds ratio (95% confidence interval)	P value
Yes	14 (77.8%)	4 (22.2%)	0.32 (0.7 – 1.39)	0.122
No	9 (52.9%)	8 (47.1%)		
Total	23 (65.7%)	12 (34.3%)		

Table 16: Comparison of means with PVD patients

Exposure ABI	ABI (n)	Mean (SD)	P Value
Age	< 0.9 (45)	61.22 (12.24)	0.185
	>0.9 (17)	56.53 (12.50)	
Weight	< 0.9 (45)	72.02 (13.64)	0.014
	>0.9 (17)	81.24 (10.05)	
Height	< 0.9 (45)	159.38 (6.66)	0.014
	>0.9 (17)	164.76 (9.37)	
WHR	< 0.9 (45)	0.82 (0.08)	0.017
	>0.9 (17)	0.89 (0.12)	
BMI	< 0.9 (45)	28.25 (4.70)	0.173
	>0.9 (17)	30.03 (4.04)	
TC	< 0.9 (45)	195.73 (25.04)	0.584
	>0.9 (17)	190.88 (43.24)	
TG	< 0.9 (45)	162.56 (44.26)	0.188
	>0.9 (17)	146.18 (40.63)	
LDL	< 0.9 (45)	89.96 (21.62)	0.023
	>0.9 (17)	76.76 (14.10)	
HDL	< 0.9 (45)	63.02 (15.76)	0.494
	>0.9 (17)	66.47 (21.86)	
RBS	< 0.9 (45)	154.87 (20.65)	0.026
	>0.9 (17)	142.41 (14.35)	
CRP	< 0.9 (45)	3.04 (2.10)	0.104
	>0.9 (17)	2.15 (1.48)	

People with an abnormal ABI were found to have a significantly higher mean weight, height, WHR, LDL and RBS than people with normal ABI.

Discussion:

A total of 62 study participants were enrolled in our study to investigate the clinical profile and the relation of various risk factors with PAD. In our study, the prevalence of PAD was high in the age group of 57-66 years, which was similar to a study done by Allison MA, et al; ^[9] In our study only 33.9% of the subjects consumed alcohol, but 81% of the subjects who consumed alcohol had an ABI<0.9 . It shows that alcohol is directly related to PAD. 54.8% of the study population had a history of smoking, and 64.7% of them had an ABI of <0.9. So, smoking is also a risk factor for the pathogenesis of PAD. This is in accordance with the Strong heart study, which found that alcohol consumption is negatively associated with PAD ^[10]. 91.9% of the population had a history of hypertension and 92% of the patients had a history of diabetes. There are number of studies which support our findings

The American Diabetes Association reported that diabetes mellitus is the strongest risk factor of PAD ^[11]. National Health and Nutrition Examination Survey found Odds ratio of

2.08 for presence of Diabetes^[12]. In the San Diego population study the OR of diabetes mellitus for PAD was reported as 6.9 ($p < 0.001$)^[13]. Dyslipidemia also has been identified as a significant risk factor for PAD in many studies. Ridker et al. reported dyslipidemia as an independent risk factor (RR 3.0, 95% CI 1.5–6.1)^[14]. National Health and Nutrition Examination Survey also found the OR for dyslipidemia as high as 1.7 (95% CI 1.01–2.74)^[12]. A cross sectional study conducted in Finland by Korhonen et al. (OR 2.3, 95% CI 1.56–6.58), Rotterdam follow up study (OR 1.32, 95% CI 1.07–1.64) and San Diego Population

Study (RR 1.85, $p = 0.01$) have reported hypertension as a significant risk factor of PAD.^[15,16] 83.9% of the study population were obese, they had BMI > 30. 85.7% of patients aged older than 60 years had an ABI < 0.9, which is as expected. Patients with ABI < 0.9 were found to have a significantly higher mean weight, height, WHR, LDL and RBS than people with normal ABI and the relation was significant.

The main limitation of our study was the relatively small sample size. In addition, a study of inflammatory markers could have thrown more light on the pathogenesis of the disease.

Conclusion:

The impact of PVD on life style is very great. Therefore, early diagnosis and implementation of various preventive measures to delay the disease progression is extremely important. In our, study majority of the subjects belonged to the older age group (57-66yrs). Most of them had history of smoking, diabetes and hypertension. A large proportion of patients were obese. 85.5% of the patients had ABI < 0.9 and these patients had a significantly higher mean weight, height, WHR, LDL and RBS than people with normal ABI.

The findings of our study highlight the importance of prevention of atherosclerosis in patients of PVD by increasing awareness regarding the complications of the disease. Lifestyle modifications like cessation of smoking, exercise and regular use of medications for existing medical problems should be emphasized upon. Identification of risk factors and their management is very crucial to avoid long term complications of PVD.

Conflict of Interest: NIL

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