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Research Article

A Cross Sectional Study on Assessment of Coronary Artery Disease in Patients with Peripheral Arterial Disease

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Abstract
Introduction: *Peripheral artery disease (PAD) is an atherosclerotic disease associated with cardiovascular risk factors, and with high cardiovascular morbidity and mortality. This study was done to assess the prevalence of CAD, and to evaluate the risk factors for the presence of CAD in patients with PAD.*
Materials and Methods: *A total of 300 patients with peripheral artery disease underwent coronary angiogram; age and CV risk factors including diabetes, hypertension, smoking, dyslipidemia were recorded.*
Results: *The coronary angiograms of 132 (44%) patients were within normal limits, and 168 (56%) patients manifested CAD with 44% being critical. Smoking, diabetes and hypetemsion were significantly associated with CAD, with the later two being independent predictors.*
Conclusion: *There is high incidence of CAD in patients with peripheral artery disease with heterogenous spectrum. Aggressive treatment of cardiovascular risk factors in PAD is critically important in reducing mortality and morbidity.*
Keywords: *Coronary artery disease, peripheral artery disease.*

Introduction

Atherosclerosis is the common cause for Coronary is a chronic Lipid –driven inflammatory disease of arterial wall leading to multifocal plaque development, predominantly at pre dilection site characterized by low and oscillatory endothelial shear stress and pre-existing intimal thickening [1].

Peripheral artery disease (PAD) is an atherosclerotic disease whose prevalence increases with advancing age. The presence of major cardiovascular risk factors leads to an increased prevalence of coronary artery disease in PAD patients, as well as an increase in the incidence of new coronary events [2]. In PAD patients, all-cause

mortality was determined to be 3.1 times higher than in non-PAD patients, and death because of coronary artery disease was 6.6 times higher[3]. The study was conducted to assess the prevalence of angiographic coronary artery disease (CAD), and to correlate the traditional cardiovascular risk factors with CAD in patients with PAD of the lower extremities.

Materials and Methods

This study was carried out in a total of 300 patients with peripheral arterial disease whose peripheral angiograms revealed a >70% stenosis in at least one artery of the lower extremities over a period of 24 months. All patients underwent coronary angiography.

A diagnosis of hypertension was based on at least two blood-pressure values >140/90 mm Hg, measured during hospitalization. A diagnosis of diabetes mellitus was based on at least two fasting blood glucose values >125 mg/dL, Blood lipid values were recorded from the biochemistry data obtained in hospital records of patients. History of smoking was recorded.

The following criteria were used during coronary artery angiographic evaluation: Normal coronary arteries: No lesion or wall irregularity in coronary arteries; Mild and moderate (noncritical) CAD: <70% stenosis in coronary arteries; Obstructive CAD: >70% stenosis in at least one coronary artery; and Multiple artery disease: >70% stenosis in more than one coronary artery.

All data was analysed with SPSS software version 17. Continuous data was presented as mean ± standard deviation and categorical data was presented as frequencies and percentages.

Differences in baseline characteristics between patients were evaluated using the unpaired Student's t-test and chi-square test. Regression analysis was carried out to find a relation between the risk factors with the outcomes, considering the alpha level of error as 5%

Results

The mean age of subjects was 56.58±0.71 years (range, 16 to 87 years), including 270 (90%) males. Smoking, diabetes and hypertension were present in 18.3%, 27.7% and 30.3% patients respectively. The average total lipid profiles of subjects comprised total cholesterol levels of 212 ± 44 mg/dL, triglyceride levels of 182 ± 79 mg/dL, and high-density lipoprotein (HDL) levels of 42 ± 6 mg/dL. Coronary artery angiography was normal in 132 (44%) patients where as 168 patients (56%) showed evidence of CAD including 132 patients having significant stenosis. 48.5% and 51.5% patients had single and multi vessel disease respectively. A comparison of subject groups with and without CAD revealed significant differences in the association of risk factors including male gender, smoking, diabetes and hypertension (table 1). On regression analysis diabetes was found to be independent predictor of CAD in patients with PAD where as smoking and hypertension were not (table 2). The OR in the CAD group was found to be higher with an increase in the number of risk factors when all the subjects were evaluated according to the presence of 0 to 1, 2 to 3, and 4 to 5 risk factors, with hypertension, diabetes mellitus, cigarette smoking, total cholesterol, triglyceride, and HDL levels examined as risk factors.

Table 1: Showing association of CV risk factors with presence of CAD

Risk Factors			CAD Absent (n)	CAD Present (n)	P value
Smoking		Absent	137	114	0.042
		Present	37	18	
Diabetes		Absent	133	84	0.004
		Present	35	48	
Hypertension		Absent	127	82	0.016
		Present	41	50	
Gender		Male	151	119	0.549
		Female	17	13	

Table 2: Showing regression analysis

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Smoking	.588	.321	3.346	1	.067	1.800	.959	3.380
Diabetes	-.619	.276	5.033	1	.025	.538	.313	.925
Hypertension	-.482	.269	3.206	1	.073	.618	.364	1.047
Constant	.053	.369	.020	1	.886	1.054		

Discussion

In the present study atherosclerotic CAD was present in 56% of subjects, and 44% had significant CAD. In the literature, the prevalence of CAD in PAD patients varies according to clinical status and the risk factors of selected subjects. Sukhija et al [4] evaluated angiographic CAD in groups with and without PAD, and determined that 98% of the PAD group and 81% of the non-PAD group had obstructive CAD. The rate of obstructive CAD was higher than in our study. The difference may involve the high-risk patient population that presented at their hospital for stable angina pectoris or acute coronary syndrome.

When cardiovascular risk factors were assessed, values for hypertension, diabetes, dyslipidemia, and smoking were significantly higher in the PAD group. Bhardwaj et al[5] reported on the prevalence of CAD as 15% in relatively young patients with no complaint of the CAD and with relatively lower rates of hypertension (17%) and diabetes mellitus (3.8%). The prevalence of obstructive CAD was determined to be 57% in another study with patient profiles similar to those in our study (mean age, 61.8 years; diabetes mellitus, 25%; hypertension, 50%) [6]. In 2005, the American College of Cardiology/American Heart Association guidelines for patients with peripheral artery disease stated that significant CAD of at least 1 coronary artery was reported in up to 60% to 80% of those with lower-extremity PAD[7]. The prognosis of patients with lower-extremity PAD is characterized by an increased risk for cardiovascular ischemic events because of concomitant CAD and cerebrovascular disease. Coronary artery disease is among the most prominent causes of mortality in PAD. Mortality was found to be increased 2-to-6-fold in patients with accompanying coronary heart disease [3]. Hence, determining the presence and severity of CAD in patients with PAD, and identifying independent risk factors, are important in the management of patients with PAD.

To evaluate the predictive significance of cardiovascular risk factors, the group of subjects with normal coronaries was compared with the group with CAD. Hypertension, diabetes, total cholesterol, triglyceride, and HDL values were found to be significant in the group with CAD. However, only diabetes was determined to be independent predictor for CAD in the logistic regression analysis. When the group with normal coronary arties was compared with the group with only multivessel CAD, age, hypertension, diabetes, and total triglyceride levels were found to be significant. The cardiovascular risk factors of both hypertension and diabetes affect atherogenesis through various mechanisms, resulting in widespread endorgan disease. In a recent study, advanced age, metabolic syndrome, and diabetes were shown to be predictors of severe CAD in PAD patients[9]. Hertzer et al found a significant relationship between inoperable CAD and the presence of diabetes and advanced age in peripheral-artery patients[6]. However, hypertension was not significant. In previous studies also, the severity of CAD and mortality due to CAD were significantly higher in patients with symptomatic PAD than in those with asymptomatic PAD [3, 10].

This study had couple of limitations in the form of limited sample size and being a retrospective study.

Conclusion

There is high incidence of CAD in patients with peripheral artery disease with heterogenous spectrum. Traditional risk factors like smoking, diabetes and hypertension are significantly associated with co-occurrence of CAD in patients with PAD. Aggressive treatment of cardiovascular risk factors in PAD is critically important in reducing mortality and morbidity.

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