Research Article

A Study of Risk Factor Stratification in Patients of Coronary Artery Disease with Concomitant Peripheral Arterial Disease

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Abstract: Coronary artery disease occurs due to atherosclerosis which by similar mechanisms causes peripheral artery disease. The present study shows that the risk factors associated with coronary artery disease can similarly be used for risk stratification of the peripheral artery disease.

Keywords: Peripheral artery disease, Coronary artery disease, Risk factors, Statistical significance.

INTRODUCTION

Peripheral artery disease (PAD) generally refers to a disorder that obstructs the blood supply to the lower or upper extremities. It may result from thrombosis, embolism, vasculitis, fibromuscular dysplasia, or entrapment but atherosclerosis is found to be the most common cause. Analysis of data from CAPRIE study demonstrated that there is considerable overlap between cerebral, coronary, and peripheral atherosclerotic disease [1]. The interrelation between PAD and CAD is striking. Many of the risk factors found to predispose to the development of coronary artery disease have been noted in clinical studies to occur in excess in person with occlusive peripheral arterial disease. The most important are cigarette smoking, diabetes mellitus, hyperlipidemia, hypertension, advanced age, post-menopausal state, male sex and obesity especially metabolic syndrome [2]. While there are considerable interactions between established and novel risk factors, it is thought that the novel risk factors have independent associations with the development of PAD [3]. The most common symptom of peripheral arterial disease is intermittent claudication that is relieved by rest. Most extreme presentation of peripheral arterial disease include rest pain, tissue loss, gangrene and are collectively termed critical limb ischemia [4]. The study was conducted in Government medical college Jammu at department of internal medicine for risk factor stratification in coronary artery disease patients with peripheral artery disease using the, The Rose/World health organisation (WHO) questionnaire, to detect symptomatic PAD [5].

MATERIAL AND METHODS

This prospective, cross-sectional study was conducted over a period of one year from November 2012 to October 2013 in the Department of Cardiology and Postgraduate Department of Internal Medicine, Government Medical College, Jammu and 73 patients were included in the study. All were subjected to Radiological Investigations (Colour Doppler examination) and CT angiography or Interventional Procedure (Peripheral Angiography). Out of the 73 Patients with CAD, 24 patients had PAD (Peripheral arterial disease) while the remaining 49 patients did not have PAD. Patients were divided into 2 groups PAD (PAD+CAD) and Non PAD (CAD only). A detailed history, physical examinations and relevant investigations were done. In addition, abdominal aortography, renal angiography, CT angiography of bilateral carotids and other tests were done in selected cases wherever necessary. Risk factors were studied in mutually exclusive groups (PAD and Non PAD groups). The results were analysed and inferences were drawn using IBM SPSS software.

RESULTS AND DISCUSSION

A total of 73 patients were taken and were subjected to Peripheral Angiography/colour Doppler of peripheral arterial system to find the presence or absence of the PAD.

Table 1: Clinical profile of patients with CAD

PAD: Non-PAD	24(32.88%): 49(67.12%)
Male: Female	49(67.12%): 24(32.88%)
Mean Age PAD: Total patients	62.6±5.34: 61.21±6.9

The mean age was greater in PAD group and was statistically significant, which indicates that the patients in PAD group were older than those in Non-PAD group.

Table 2: Prevalence of risk factors in PAD and non PAD groups

Risk Factors	PAD group (n=24)	Non-PAD group (n=49)	Statistical significance
Smoking	20(83.33)	22(44.90)	p<0.001
Hypertension	16(66.67)	17(34.69)	p<0.01
Diabetes	13(54.16)	8(16.32)	p<0.001
Hyperhomocysteinemia	4(20.83)	3(4.08)	p=0.31
Dyslipidemia	14(58.33)	16(32.65)	p<0.05
CKD	5(20.83)	1(2.04)	p=0.02
Family H/o CAD	1(4.16)	2(4.08)	
Alcoholism	1(4.16)	3(6.12)	p>0.05
L.V. Function			p=0.006 ,
E.F < 40%	18	20	Odds ratio
E.F≥ 40%	6	29	(R.R)=4.35

The association of smoking, diabetes mellitus, hypertension, hyperhomcysteinemia, CKD with PAD was found to be statistically significant. Alcoholism was not found to be statistically significant. Relation between PAD and Left Ventricular dysfunction (defined echocardiographically by an ejection fraction <40% or a shortening fraction < 25% [6].

Table 3: Relation between severity of coronary artery disease and PAD

	Significant CAD C2,C3, C4,C5 (n=55)	Mild CAD C1 (n=18)	p Value
	No. (%)	No. (%)	
PAD (P2,P3,P4)	21(38.18%)	3(16.67%)	p=0.02
Non PAD (P0, P1)	34(61.82%)	15(83.33%)	

C0: Normal coronary artery, (Excluded from the study), C1: Non-critical plaque, C2: Single-vessel disease >70% disease, C3: Double-vessel disease, C4: Multi-vessel disease, C5: Left main coronary disease. P0: Normal peripheral arteries, P1: Non-critical plaques, P2: Proximal critical single stenosis, P3: Distal stenosis, P4: Stenoses or complete occlusion in all segments [7].

Thus, the presence of PAD is positively associated with significant CAD. It, hereby, implies that the presence of PAD is associated with more compromised cardiac function, higher systemic inflammatory state with more severe CAD. This can contribute to the higher mortality and morbidity.

Table 4: Systemic Inflammation : Mean Erythrocyte sedimentation rate (ESR) in the PAD and Non PAD Group

	PAD Group	NON PAD Group	
Mean ESR±SD (mm/sec in 1st hour	43 ±5.3	27± 4.2	p< 0.05

The PAD group had significantly higher ESR levels.

DISCUSSION

Atherosclerosis is a progressive disease of blood vessels which begins early in life and is usually asymptomatic for many years. It is a complex, chronic inflammatory process that affects elastic and muscular arteries. There is also considerable overlap between Peripheral arterial disease, cerebrovascular disease and coronary artery disease [1, 8]. The presence of PAD among patients with CAD is associated with more progressive atherosclerosis and adverse cardiovascular outcomes [9, 10]. Risk factors for PAD are similar to other atherosclerotic diseases. In the present study, the patients with CAD underwent Peripheral angiography/ colour Doppler of peripheral arterial system. It was

found that 32.8% patients had PAD. Such a large proportion is also supported by number of others studies. It is estimated that 40% of patients with CAD have symptomatic PAD [11, 12]. Several population-based studies based on predominantly white European populations have found the prevalence of PAD to be between 6% and 18% over the age of 55 years [13-15]. Many of the risk factors found to predispose to the development of coronary artery disease have been noted in clinical studies to occur in excess in person with occlusive peripheral arterial disease. The most important are cigarette smoking, diabetes mellitus, hyperlipidemia, hypertension, advanced age, male sex, post-menopausal state and obesity especially metabolic syndrome [2]. Age as a consistent risk factor for PAD was supported by a study where they reported that atherosclerotic PAD affects nearly 10% of men 65 years of age, increasing to 20% of men and women ≥75 years. These observations are consistent with the findings of Dormandy *et al.* [17] and Smith SC *et al.* [18]. In recent years, several new plausible risk factors for atherosclerosis have been discovered, which include homocysteine, C-reactive protein (CRP), Fibrinogen, lipoprotein (a) [3,18-21] Diabetes with a prevalence of 54.16% in the PAD group was statistically significant (p=0.005). A population-based study in South India reported a prevalence of PAD of 6.3% amongst diabetics compared to 3.2% in the whole population [2]. Higher prevalence of Diabetes in PAD group in our study could be explained by the fact that PAD group is actually concomitant CAD with PAD group with denser cluster of risk factors. 45.20% of the CAD patients were hypertensive with prevalence of 66.67% in the PAD group (p=0.009). Premalatha *et al.* similarly found that PAD patients had a significantly higher mean SBP than those without PAD [22].

CONCLUSION

The adverse cardiovascular outcomes observed among patients with peripheral arterial disease (PAD) highlight the need for intensive risk factor modification. However, only a fraction of PAD patients receive guideline-recommended therapies.

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