

## Peripheral Arterial Disease in Proven Coronary Artery Disease

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### Original Research Article

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**Abstract:** Peripheral arterial disease (PAD) is a predictor of cardiovascular morbidity and mortality leading to adverse outcome. It is a marker of increased risk of cardiovascular events in patients with coronary arterial disease (CAD). The prevalence of unknown PAD among CAD patients varies worldwide according to the methods of diagnosis. PAD and CAD share same risk factor profile and etiopathogenesis. Present study was aimed to determine the prevalence of PAD among patients with CAD and study risk factor profile. Patients presented with the symptoms suggestive of ischemic heart disease were assessed for the presence of PAD with CAD. In detail medical, personal and past history was recorded for demographic and risk factors analysis. All vital parameters, with special reference to peripheral pulsations, upper and lower limb blood pressure, pre-gangrene and gangrenous changes in extremities including non-healing ulcer were recorded. Total 500 patients with history suggestive of CAD were assessed for the presence of PAD and risk factors. Mean age of the patients was 49.68 +/-7.63 years. Prevalence of CAD was found to be highest in age group of 41 to 60 years with male reponderance. Risk factor profile shows smoking (39%) as the most prevalent risk factor followed by hypertension (37%) and T2DM (21%). Total 85 patients (17%) had PAD with male: female ration 11:1. Most common symptom of PAD was claudication (15.2%) and sign was absent or weak peripheral pulsation (6.4%). Incidence of iliofemoral disease was 35% in patients with left main disease, 28% in triple vessel while 11.1% in persons with normal coronaries. We observed 17% prevalence of PAD among cases of CAD, which are more vulnerable for worse outcome. Screening of PAD in CAD will help to improve their outcome.

**Keywords:** Peripheral arterial disease, coronary artery disease, risk factors.

### INTRODUCTION

Peripheral arterial disease (PAD) is a distinct atherosclerotic disease characterized by occlusion or stenosis of arteries distal to the aortic bifurcation [1]. Mostly major blood vessels supplying lower limbs get affected with PAD. Worldwide reported prevalence of PAD in general population varies from 10 to 22% and it increases with age[2]. Patients may remain asymptomatic or present in the form of intermittent claudication, or critical limb ischemia. Lower limb arterial disease progresses over a period of time leading to loss of mobility, gangrene and amputation[3]. Risk factors for PAD are same as those of coronary artery disease (CAD) like age, smoking, hypertension, diabetes mellitus, and hypercholesterolemia.

PAD is a predictor of cardiovascular morbidity and mortality leading to adverse outcome. Commonly it is present along with CAD with reported prevalence of 22-42% [4]. Presence of PAD in patients with CAD makes the patients more vulnerable for cardiovascular

events. Timely identification of PAD among high individual is a key step to avoid worse outcome. Aggressive medical therapy or revascularization can help the patients from subsequent complications. Various clinical and diagnostic methods are there to detect PAD in clinical practice. Grenon SM and colleagues observed association of symptomatic PAD with 70% increased risk of subsequent CV events and 80% increased risk of death in their prospective Heart and Soul study cohort of 1018 patients with CAD[5]. Considering increased level of risk in patients with CAD, we evaluated angiographically proved cases of CAD for the presence of unknown PAD.

### MATERIAL AND METHODS

Present hospital based study was carried out to find out the incidence of PAD and risk factors in patients undergoing coronary angiography. Patients presented with the symptoms suggestive of ischemic heart disease were assessed for the presence of PAD with CAD. Patients' age, gender, history of IHD,

claudication, non-healing ulcers and gangrene was recorded. To assess risk factor profile, history of smoking, tobacco chewing, T2DM, hypertension, hyperlipidemia, and family history of IHD was obtained. In detail general physical and systemic examination was carried out and all vital parameters with special reference to peripheral pulsations, upper and lower limb blood pressure, pre-gangrene and gangrenous changes in extremities including non-healing ulcer were recorded. Electrocardiogram, 2-D Echo and color Doppler examination was done in all patients to look for regional wall motion abnormality,

global left ventricular systolic function and presence of left ventricular clot. After obtaining informed consent, coronary angiography was done to confirm the presence of CAD.

**RESULTS**

Total 500 patients with history suggestive of CAD were assessed for the presence of PAD and risk factors. Mean age of the patients was 49.68 +/-7.63 years. Mean age of female was 53.83+/-7.13 and of male were 50.32+/-8.89 years.

**Table-1: Shows age and sex-wise distribution of the patients**

Age in years	Male	Female	Total
<= 40	31 (7%)	03 (4.6%)	34 (6.8%)
41-50	167 (38%)	27 (41.1%)	194 (38%)
51-60	157 (36%)	24 (37.1%)	181 (36%)
61-70	75 (17.1%)	09 (14.1%)	84 (16%)
>71	05 (1.14%)	02 (3.3%)	07 (1.4%)
Total	435 (87%)	65 (13%)	500

**Table-2: Represents the cardiovascular risk factor profile of 500 patients undergoing coronary angiography**

Risk factor	Male	Female	Total
Systemic hypertension	155 (35.6%)	32 (49%)	187 (37%)
T2DM	88 (20%)	17 (26%)	105 (21%)
Hyperlipidemia	36 (8.2%)	4 (6%)	40 (8%)
Smoking	194 (44.6%)	1 (1.5%)	195 (39%)
Family history IHD	70 (16.1%)	11 (17%)	81 (16.2%)

Clinical profile of patients showed 231 (46.2%) had Myocardial infarction followed by chronic stable angina among 204 (40.8%) and then unstable angina among 65 (13%) cases. On analysis of CAD on coronary angiography, single vessel disease was observed to be the most prevalent (27.2%) followed by triple vessel (24%), double vessel (20.6%), and left main disease (3.4%). 6% of the cases had non-significant (stenosis <50%) disease, while 18.8% of the

subjects had normal coronaries. All the patients were evaluated for the presence of PAD. Symptoms and signs of PAD among 500 patients who underwent coronary angiography are presented.

Most common symptom was claudication (15.2%) and sign was absent or weak peripheral pulsation (6.4%) (Table-3).

**Table-3: Symptoms and signs of PAD Patients**

Symptoms and signs of PAD	Male n=435	Female n=65	Total n=500
Claudication	70 (16.1%)	6 (9.23%)	76 (15.2%)
Absent /weak peripheral pulsation	28 (6.43%)	4 (6.15%)	32 (6.4%)
Pregangrenous changes	13 (2.98%)	3 (4.6%)	16 (3.2%)
Gangrene	8 (1.84%)	2 (3%)	10 (2%)
Non-healing ulcer	5 (1.14%)	1 (1.5%)	6 (1.2%)

**Table-4: Distribution of PAD in different blood vessels has been represented**

Blood vessels	Male	Female	Total
Right common iliac	28 (6.43%)	2 (3.7%)	30 (6%)
Left common iliac	22 (5%)	00	22 (4.4%)
Right external iliac	13 (3%)	00	13 (2.6%)
Left external iliac	5 (1.14%)	00	5 (1%)
Right internal iliac	5 (1.14%)	00	5 (1%)
Left internal iliac	8 (1.8%)	00	8 (1.6%)
Right femoral	10 (2.3%)	1 (1.5%)	11 (2.2%)
Left femoral	7 (1.6%)	1 (1.5%)	8 (1.6%)
Other	6 (1.4%)	2 (3.7%)	8 (1.6%)
Non-significant	53 (12%)	10 (15.3%)	63 (12.6%)
Popliteal and posterior tibial	7 (1.6%)	1 (1.5%)	8 (1.6%)

Right common iliac was the most common vessel affected in 30 patients. Other vessels included

right subclavian in 1 patient, right brachial in 1 and left brachial in 1 patient.

**Table-5: Shows the distribution of iliofemoral disease according to type of CAD**

CAD	Male	Female	Total
Single vessel disease	20 (16.3%)	1 (7.1%)	21 (15%)
Double vessel disease	10 (11.11%)	1 (7.1%)	11 (10.6%)
Triple vessel disease	34 (30.8%)	00	34 (28%)
Left main disease	6 (37.5%)	00	6 (35%)
Non-significant	2 (7.6%)	1 (7.1%)	3 (10%)
Normal coronaries	6 (8.6%)	4 (16%)	10 (11%)

Incidence of iliofemoral disease was 35% in patients with left main disease, 28% in triple vessel while 11.1% in persons with normal coronaries.

## DISCUSSION

PAD is an occlusive atherosclerotic disorder of arteries distal to aortic bifurcation. In broad sense, the term is used to refer chronic disease of legs due to atherosclerosis. Presence of PAD has been found to be associated with higher risk of total and cardiovascular mortality [6].

In the present study done on defined population comprised of 500 patients admitted in ICU with symptoms suggestive of IHD, evaluation for the presence of PAD and its risk factors was done. Prevalence of CAD was found to be highest in age group of 41 to 60 years with male preponderance. Risk factor profile shows smoking (39%) as the most prevalent risk factor followed by hypertension (37%) and T2DM (21%).

Out of 500 patients who underwent coronary angiography, PAD was prevalent among 85 (17%) individuals. 78 males (17.9%) and 7 females (10.76%) had angiographic evidence of iliofemoral disease. Maximum prevalence of iliofemoral disease was observed in patients with more than 70 years of age (42.8%) followed by patients in age group of 61-70 years (39.3%). Most common symptom was claudication (15.2%) and sign was absent or weak peripheral pulsation (6.4%). Sharma and associates

from India assessed 94 males and 60 females with established cardiovascular disease for the presence of PAD. In their study population, they found 24.03% prevalence of PAD which was positively correlated with traditional risk factors like advanced age, smoking, hypertension, T2DM, hyperlipidemia. But there was no statistical difference between men and women in terms of PAD. (7)

Poredos P *et al.* assessed the prevalence of PAD by means of ankle-brachial index assessment among 952 patients at high cardiovascular risk with or without evidence of CVD or CAD observed PAD among 32% of patients with CAD and 36% of patients with CVD. There was high prevalence of both symptomatic and asymptomatic PAD in high-risk individuals [4]. Sarangi *et al.* studied correlation between PAD and CAD using ABI in Indian population. They reported 18% prevalence of PAD with strong correlation between PAD and CAD [8] Saran R *et al.* reported lower prevalence that is 7.7% in diagnosed cases of CAD of Indian origin with significant association with conventional cardiovascular risk factors [9]. Swiss Atherothrombosis Survey evaluated prevalence of PAD among high-risk population more than 55 years of age with stroke, CAD. Study reported 6.4% of prevalence using ABI as the diagnostic parameter [10]. Study from Bangladeshi population documented 44.2% prevalence of PAD among patients of CAD. Our study findings are in accordance with this with respect to age, sex distribution and risk factor profile [11]. Several

researchers assessed the prevalence and association of PAD in angiographically proven cases of CAD [12-15].

Overall prevalence of PAD in general population above the age of 55 years is 12-20% [16]. Identification of presence of PAD provides valuable prognostic information. To evaluate lower limb PAD several clinical methods are practiced like palpation of peripheral pulses, ABI that is a ratio of systolic blood pressure measurement of the ankle to that of the brachial artery and toe pressure measurements. Some diagnostic tests are also useful to detect PAD such as X ray, pulse volume recording, Doppler velocimetry, duplex imaging, and digital contrast angiography intravascular ultrasound and MR angiography [17].

CAD and PAD have similar risk factors and underlying pathophysiology. Hence in patients of CAD, clinicians should consider possibility of PAD, which may remain, asymptomatic or undiagnosed in many cases. But it is an important predictor of total and cardiovascular mortality leading to poor outcome. Hence timely diagnosis and treatment of the patients with PAD is very important to prevent local progression and complications of the disease. Also it helps in secondary prevention of subsequent cardiovascular events.

#### CONCLUSION

The overall prevalence of PAD was 17% among studied cohort with CAD. Prevalence was highest with advanced age with male preponderance. CAD and PAD have similar risk factors and underlying pathophysiology. Hence in patients of CAD, clinicians should consider possibility of PAD, which may remain, asymptomatic or undiagnosed in many cases.

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