

A Study of Peripheral Vascular Disease in Elderly and its Association with Coronary Artery Disease

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Abstract

Background: Atherosclerotic cardiovascular disease is a leading cause of mortality and peripheral vascular disease is an important cause of morbidity in the elderly. Peripheral vascular disease is an independent risk factor for increased rate of cardiovascular events and mortality. This study was carried out to find the prevalence of peripheral vascular disease in elderly with coronary artery disease and to find out the risk factors for peripheral vascular disease in the study group.

Material and Methods: A cross sectional study was carried out from October 2003 to September 2004 in the geriatric ward among 80 people aged 60 and above with coronary artery disease. A detailed history regarding age, sex, occupation, presence of claudication, claudication distance, smoking, diabetes and hypertension was obtained. All these patients underwent a thorough physical examination. Ankle Brachial Pressure Index was measured in all the patients.

Results: The overall prevalence of peripheral vascular disease in patients with coronary artery disease in this study was 23.75%. The prevalence of peripheral vascular disease increases with the duration of coronary artery disease. Nearly half of the patients with peripheral vascular disease were asymptomatic. There was a significant association between peripheral vascular disease and various risk factors such as age, male gender, smoking, diabetes and hypertension.

Conclusion: Peripheral vascular disease is common in elderly people with coronary artery disease. Asymptomatic peripheral vascular disease is common among the elderly. Proper screening, prevention and treating atherosclerotic peripheral vascular disease will reduce the morbidity and mortality and maintain the functional independence in the elderly.

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Introduction

Peripheral vascular disease (PVD) refers to the atherosclerotic disease of the lower extremities. PVD in the elderly is important for the following reasons. First, it is an independent risk factor for vascular disease in other regions, resulting in increased rate of cardiovascular events and mortality. Second, PVD itself is symptomatic and can produce claudication and limb ischemia. Lastly, it adversely affects the functional status of the elderly. PVD in the elderly assumes importance for all these reasons, especially because its prevalence increases with age.

Atherosclerotic cardiovascular disease is a leading cause of mortality and PVD is an important cause of morbidity in elderly. The diagnosis of atherosclerosis is often made at the late stages of the disease. However, it can be made earlier using a variety of diagnostic procedures when there is a high index of suspicion or when significant cardiovascular risk factors are present. The best validated diagnostic method, angiography, is invasive with a slightly higher risk in the elderly. Noninvasive techniques that are commonly used in the evaluation of PVD include Doppler ultrasound studies and Ankle Brachial Pressure Index (ABPI). As morbidity associated with coronary artery heart disease increases in people with PVD, detection of PVD with a rapid non-invasive technique provides easy assessment of the level of atherosclerosis and identifies those at higher risk.^{1,2,3} The various risk factors implicated in the development of PVD are advanced age, cigarette smoking, diabetes, hypertension and increased lipid

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levels.

Therefore, an observational and cross sectional study was carried out in the Department of Geriatric Medicine, Government General Hospital, Madras Medical College and Research Institute, Chennai to find out the prevalence of PVD in elderly patients with coronary artery heart disease and also to correlate the presence of risk factors to PVD.

Material and Methods

80 subjects aged 60 years and above with coronary artery disease admitted in the Geriatric ward were randomly selected for this cross sectional study. The diagnosis of coronary artery disease was made in those patients satisfying at least two of the following criteria 1. Typical history of angina pectoris, 2. History of myocardial infarction / thrombolytic therapy, 3. ECG showing evidence of pathologic 'q' waves and ST-T changes suggestive of ischemic heart disease.

A detailed history including age, sex, occupation, presence of claudication, claudication distance, smoking, diabetes and hypertension was elicited. WHO/Rose Questionnaire was used to elicit the claudication history.

All these patients underwent a detailed physical examination including Body Mass Index (BMI), Waist-Hip Ratio (WHR), evidence of hypovascularity in the lower limb (colour change, presence of gangrene and ulcers, hair loss and brittle nails), pulsations in femoral, popliteal, posterior tibial and dorsalis pedis of both lower limbs, blood pressure in sitting and standing position. Ankle Brachial Pressure Index (ABPI) was then measured on both sides. A sphygmomanometer cuff applied above the ankle with a Doppler probe placed over the posterior tibial or dorsalis pedis arteries to detect the return of flow after cuff deflation gives systolic pressure at the ankle. The highest value was taken as the ankle systolic pressure. Then dividing this value by the brachial systolic pressure gives the ABPI. The normal ABPI value is 0.95 and above. The severity of the peripheral vascular disease was classified as mild, moderate and severe according to the ABPI values.

Hemoglobin, blood sugar, chest x-ray, electrocardiogram, echocardiogram were done in all patients. Coronary angiogram was done in 39 patients.

Results

In this study, 80 elderly people aged 60 years and

Table 1. Agewise prevalence of PVD in CAD patients.

| Age (yrs.) | No. of patients | No. of patients with PVD |
|------------|-----------------|--------------------------|
| 60-64 | 59 | 14 (23.7%) |
| 65-70 | 9 | 1 (11.1%) |
| Above 70 | 12 | 4 (33.3%) |
| Total | 80 | 19 (23.7%) |

Table 2. Relationship between claudication and PVD

| Claudication symptoms | No of PVD patients | % |
|-----------------------|--------------------|------|
| Present | 10 | 52.7 |
| Absent | 9 | 47.3 |

Table 3. Distribution of severity of PVD by ABPI

| ABPI | No. of patients | % |
|------------------------|-----------------|------|
| Mild (0.8-0.94) | 9 | 47.3 |
| Moderate (0.5-0.79) | 9 | 47.3 |
| Severe (less than 0.5) | 1 | 5.3 |

above with coronary artery disease were included. The mean age was 63.7 years and the median age was 62 years. Of the 80 patients evaluated, 64 were males and 16 patients were females.

Among the 80 people with coronary artery disease 59 were in the 60-64 age group, 9 were in the 65-69 age group and 12 were in the 70 and above age group. In this study 39 patients had undergone coronary angiogram. Of them 11 patients had single vessel disease, 11 had double vessel disease and 17 had triple vessel disease.

In this study, 19 patients (23.7%) with coronary artery disease were found to have PVD (Table 1).

Out of the 19 patients with PVD, 9 patients (47.3%) had no claudication (Table 2).

Of the 19 patients with PVD, 9 patients had mild disease, 9 patients had moderate disease and 1 patient had severe disease as assessed by ABPI (Table 3).

The prevalence of PVD increases with the duration of coronary artery disease (Table 4).

In this study there is a good correlation between

Table 4. Relationship between duration of CAD with PVD.

| Duration of CAD(yrs.) | No. of Patients | Patients with PVD n | % |
|-----------------------|-----------------|------------------------|------|
| <5 | 58 | 11 | 18.9 |
| 6-10 | 18 | 5 | 27.7 |
| >10 | 4 | 3 | 75.0 |
| TOTAL | 80 | 19 | 23.7 |

Table 5. Relationship between risk factors and PVD.

| Risk factors | Prevalence of PVD in % | Odds ratio |
|--------------|------------------------|------------|
| Smoking | 33.3 | 2.64 |
| Diabetes | 30.3 | 1.83 |
| Hypertension | 29.3 | 1.89 |

PVD and risk factors such as smoking, diabetes and hypertension (Table 5).

Discussion

In this study, the prevalence of PVD in patients with coronary artery disease was 23.7% and the prevalence of PVD increases with the duration of coronary artery disease. These findings were consistent with other studies.^{4,5,6,7}

One third of patients aged above 70 years, had PVD, while the prevalence of PVD in the age group 60-64 years was 23.7%. The prevalence was lowest in the 65-69 age group (11.1%). This could be explained by the low sample size in the above said category. It is revealed from this study that the prevalence of PVD rises with age, which is almost on par with study done by Voget et al.⁸

In this study, males (n=64) outnumbered females (n=16) with male: female ratio being 4:1. Among the male patients, 25% had PVD while only 18.7% of the female patients had PVD. This is in correlation with the Framingham study, where the prevalence of peripheral vascular disease was more in males.⁵

In this study, nearly half (47.3%) of the patients with PVD were asymptomatic and the positive predictive value of claudication in detecting PVD was only 38.46%. This data correlates with the study done by McDermott et al, where they found that most elderly men and women with peripheral vascular disease did not have intermittent claudication symptoms. Hence, it is inferred from this study that elderly individuals should be routinely screened for the presence of

peripheral vascular disease using noninvasive techniques.⁹

The positive predictive value of palpatory method in diagnosing PVD in this study was low (42%). This observation stresses the fact that ABPI must be included in the evaluation of peripheral vascular disease in the elderly. This is well in accordance with other studies. According to Edinburg Arterial Study and Scottish Heart Study, when ABPI was used to detect peripheral vascular disease the prevalence was found to be three fold higher than when the method of history and physical examination was used.^{10,11}

In this study of patients with PVD, it was found that most of them had either mild or moderate disease as assessed by ABPI. The proportion of very severe disease was small in this study which may be due to the fact that the study group was small. Patients with mild and moderate peripheral vascular disease should be followed subsequently as the pathology of atherosclerosis is a progressive phenomenon.

In this study, there was a good correlation between peripheral vascular disease and various risk factors such as increased age, male gender, smoking, diabetes mellitus and hypertension. So we should have a greater index of suspicion for the presence of peripheral vascular disease when any one of the above said risk factors is present in the elderly. Among the risk factors, smoking was a major risk factor for peripheral vascular disease with odds ratio being 2.64. This was followed by hypertension (odds ratio=1.89) and diabetes mellitus (odds ratio=1.83).

Conclusion

Peripheral vascular disease is common in elderly people with coronary artery disease. Asymptomatic peripheral vascular disease is common in the elderly. Proper screening, prevention and treating atherosclerotic disease affecting peripheral vessels will reduce the morbidity and mortality and maintain the functional independence in the elderly.

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