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CAN CORONARY ARTERY DISEASE RISK FACTORS BE USED AS A PREDICTOR FOR PERIPHERAL ARTERY DISEASE? A CROSS SECTION STUDY

Physiotherapy

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ABSTRACT

AIM: To assess ankle brachial index in people with high risk factors for coronary artery disease.

OBJECTIVES:

- To screen people, using Framingham Risk Score (FRS), for high risk for coronary artery disease.
- To assess ankle brachial index (ABI) in people with high risk for coronary artery disease (CAD).
- To find out any change in ankle brachial index in people with high risk for coronary artery disease.

METHODOLOGY: 110 subjects were assessed with the help of Framingham Risk Score for evaluation of their risk for coronary artery disease on the basis of age, total cholesterol, HDL levels, diabetes, smoking, and their systolic blood pressure. Subjects diagnosed with PAD or with symptoms of PAD were excluded. Out of 110 subjects, 78 subjects were included as they had FRS ≥20%. The subjects were then assessed for their ankle-brachial index using vascular Doppler.

RESULT: In the present study, non-parametric correlation – Spearman's rho was calculated between ABI and Risk. It was negative and value was 0.176. The p-value is 0.001 which is significant. This indicates that as CAD risk increases, the value of ABI reduces.

CONCLUSION: It is concludes that people with high risk for coronary artery disease have reduced ankle-brachial index and hence, are prone to peripheral arterial disease.

KEYWORDS

coronary artery disease, Framingham Risk Score, peripheral artery disease, Ankle brachial index

INTRODUCTION

Peripheral Vascular Disease of the lower extremity is the most common cause of morbidity and affects millions of people in India. It is a common condition with variable morbidity affecting men and women over the age of 45 years. It is going to be a major health problem in our country as the Indian population is aging. [1]

Atherosclerosis is narrowing of arteries involving medium and large sized arteries. It is estimated that 74% patients of atherosclerotic coronary artery disease have involvement of some other arteries also. 40% patients of coronary artery disease have associated peripheral arterial disease (PAD), 14% have carotid artery stenosis and 17% have associated renal artery stenosis. [2]

The clinical manifestation of PVD occurs almost a decade later than CAD. A majority of patients with PAD have associated coronary arterial disease (CAD). [2]

Previous studies have consistently documented that PAD is a significant predictor of future cardiovascular events, such as myocardial infarction or stroke. [3,4,5,6]

Although PAD is a strong prognostic marker for future cardiovascular events, only a small fraction of patients with PAD are properly diagnosed. In most cases, PAD is asymptomatic and therefore under diagnosed.[5]

Therefore, identifying patients with PAD especially those with asymptomatic disease in atherosclerotic disease is of high prognostic importance.

The ankle brachial index (ABI) is a sensitive and cost-effective and efficient screening tool for PAD. It is highly sensitive (90%) and specific (98%). [6] Ankle blood pressure is obtained by inflating a blood pressure cuff above the ankle and detecting the return of the dorsalis pedis or posterior tibial artery pulse by Doppler ultrasonography as the cuff is slowly deflated. [6,7]

The patient is diagnosed with PAD when the ABI is ≤ 0.9. PAD is graded as mild to moderate if the ABI is between 0.4 and 0.9, and an ABI less than 0.40 is suggestive of severe PAD. An ABI value greater than 1.3 is also considered abnormal, suggestive of non-compressible vessels. [6,8,9]

The primary aim of the present study was to investigate the use of low ABI (≤ 0.90) as an indicator of PAD in a target population who have Framingham score of ≥20

The **Framingham Risk Score** (FRS) is a gender-specific algorithm used to estimate the 10-years cardiovascular risk of an individual. The Framingham Risk Score was first developed based on data obtained from the Framingham heart study, to estimate the 10-year risk of developing coronary heart disease. FRS is validated means of predicting cardiovascular disease (CVD) risk in asymptomatic patients. Long-standing risk factors for the development of CAD are age, family history, blood levels of total cholesterol, high-density lipoprotein (HDL) cholesterol and low density lipoprotein(LDL) cholesterol, blood pressure, cigarette use, diabetes mellitus. [10]

Risk is considered low if the FRS is less than 10%, moderate if it is 10% to 19%, and high if it is 20% or higher. Any patient who has a >20% risk for a CAD event based on the Framingham risk score is considered to be at equivalent risk to a patient with established CAD. [10,11]

Despite the recognition that PAD is associated with a marked increase in the risk of ischemic events, this particular manifestation of systemic atherosclerosis is largely under diagnosed and under treated. So the purpose of this study was to evaluate the ankle brachial index in people with high risk for coronary artery disease using FRS and to know if there is any change in ankle brachial index in people with high risk for coronary artery disease.

In this way, this can help us in early detection of peripheral arterial disease in high risk coronary artery disease people and preventing further complications related to PAD.

METHODOLOGY

Approval for the study was obtained from the ethical committee of the institute. Subjects who fitted in the selection criteria were explained the purpose and general procedure of the study in the language they understood better and written consent was taken. 110 subjects were assessed with the help of Framingham Risk Score for evaluation of their risk for coronary artery disease. Out 110 subjects assessed for FRS, 78 subjects were included as they had FRS ≥ 20%. The subjects were then assessed for their ankle-brachial index using Edan Sonotrax Vascular Doppler 8MHz.

RESULT

Out of the 110 subjects assessed for the study, 78 were included in the study as they had FRS ≥20%. Mean age was 56.96± 8.65 years

Out of 78, 42 (53.85%) had ABI ≤ 0.9 with mean age of 58.12 ± 8 years.

There were 54 males and 24 females.

In the present study, non-parametric correlation – Spearman's rho was calculated between ABI and Risk. It was negative and value was 0.176. The p-value is 0.001 which is significant. (Fig 1)

Subjects who were at risk of PVD (ABI ≤ 0.9 with FRS >20%) in them 92.86%were diabetic, 50% smokers

DISCUSSION

CAD and PAD are two major problems of modern medicine, due to the mortality, reduced life expectancy, and social and economic impacts associated with these conditions. The diagnosis of PAD is largely viewed as a measure of the individual's global systemic atherosclerotic burden. Thus, even the asymptomatic form of PAD is of great significance to both the patient and clinician. The major impediments to improving the care of patients with PAD are related to the lack of disease recognition, poor understanding of its impact on the patient,
The study by Sue Duval, joseph Massaro et al [12] Where 18,049 US REACH (REduction of Atherothrombosis for Continued Health) outpatients with a complete baseline risk factor profile were assessed for PAD using ABI.(ABI of <0.9) or any symptoms. They developed a nomogram from regression procedure.

In the present study subjects who were at high risk of CAD, 53.85% had ABI ≤ 0.9. In Non-parametric Spearman's correlation between ABI and Risk shows negative correlation and value was 0.176. The p-value was 0.001 which is significant. This indicates that as CAD risk increases, the value of ABI reduces. The present study demonstrated the usefulness of this index in predicting significant coronary lesions.
FRS can be used to predict PAD prevalence. Thus it can be used as a pre screening tool before ABI can be done. A person with low risk need not be tested and health care resource might be better focused on high risk individuals.

Bendermacher, Willigendael etal. Recognized the potential benefit of PAD risk score derived from general practice population without claudication symptoms. In general, risk factor modification and antiplatelet therapy is essential in all patients with PAD to prevent systemic atherosclerotic complications. [13]

The diagnosis and early treatment are critical in order to minimize PAD events. For people with established CVD or other measures of atherosclerosis, the prevalence of low ABI was reported as 15% to 40% [14,15]

In this study Subjects who were at risk of PVD (ABI ≤ 0.9 with FRS ≥20%) in them 92.86% were diabetic and 50% were smokers. Smoking and or DM increases the risk of PAD independently by approximately threefold. The presence of DM increases the risk of PAD more than four-fold, and the American Diabetes Association recommends PAD screening by ABI every five years for individuals with DM, even before the age of 50 years or in the presence multiple risk factors. [16]

A previous longitudinal study, which showed that symptomatic and asymptomatic subjects with PAD had higher cardiovascular mortality than subjects without PAD, indicates the prognostic importance of asymptomatic PAD. [17]

CONCLUSION

FRS can be used to recognize probability of PAD in vulnerable at risk population

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- PAD is a common but under recognized particularly in those with diabetes, and smokers.
- The risk factors for PAD are similar to the risk factors of atherosclerosis elsewhere; risk factor modification is key to successful management and achieving favorable outcomes.
- Although intermittent claudication is the classic symptom of PAD, the vast majorities of those affected are asymptomatic and can be diagnosed by an abnormal ABI value.

CLINICAL IMPLICATION

Despite the fact that PAD can be noninvasively and accurately diagnosed with the ABI, it often remains under diagnosed and undertreated. Health care providers must make every effort to detect the disease at an early stage, assess associated risk factors, and provide proper long-term care. Aggressive management of atherosclerotic risk factors, a structured exercise program

Irrespective of the presence or absence of PVD, every high risk subjects should be encouraged to quit smoking and to exercise regularly."Stop smoking and start walking", should be the carry home message for all.

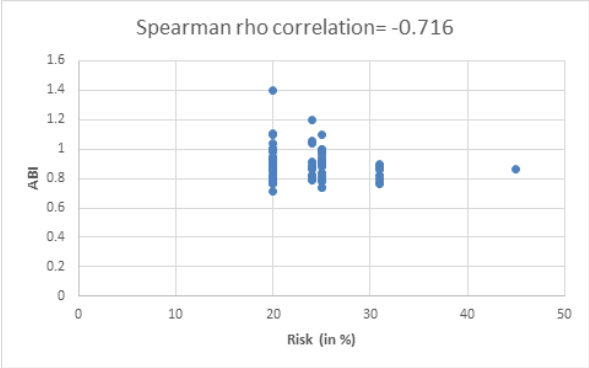

Fig 1

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