

Screening for Peripheral Vascular Diseases Based on the Ankle Brachial Index in Patients Attending the OPD at a District Level Medical College Hospital

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Abstract

Peripheral vascular disease (PVD) is a silent killer and in view of the rising trend in the atherosclerotic heart disease and syndrome X in the Indian population the prevalence of the peripheral arterial disease (PAD) is likely to register similar increase [1,2]. The mortality and morbidity of the peripheral arterial disease is comparable to that caused by the coronary artery disease, especially so, when the patient presents with critical limb ischemia [3]. Since the peripheral arteries, unlike the coronary and cerebral arteries are not end arteries, adequate time is likely to result in development of collaterals [4].

Early detection of the peripheral arterial disease, especially in the asymptomatic stage is likely to prevent and delay the consequences of the disease, through simple measures like life style modification, simple clinical tests, pharmacological interventions etc.

Thus early detection of the peripheral vascular disease will reduce the public health expenditure involved in treating the disease and prevents the complications, saves limbs and life [6]. Though, Doppler evaluation of the peripheral arterial system is eminently suitable non-invasive technique for early detection and screening for peripheral vascular diseases [7] but has the drawback of being costly and hence unaffordable by the middle income group and poor patient population. Not freely available at the PHC and RHC level and requires technical expertise.

Ankle brachial index (ABI) is a reliable method for early detection and screening of the peripheral vascular diseases, on account of it being non-invasive, can be undertaken in the OPD itself. Equipment to measure ankle brachial index is cheap and can be done with the minimal technical skill even by a para medical worker with adequate training. The present study is to evaluate the role of ABI in screening for the prevalence of peripheral arterial diseases in asymptomatic patients at risk attending the general OPD at Narayana Medical College hospital in Nellore, to estimate the severity of the same in the asymptomatic and symptomatic patients. And to provide the suitable preventive health education to the individuals found to have risk factors for peripheral arterial diseases.

Keywords: Peripheral Vascular Disease; Ankle Brachial Index.

Review of Literature

Peripheral vascular disease was paid little attention in the Indian medical literature. India is the diabetic capital of the world and the peripheral vascular disease is a known macrovascular complication of diabetes mellitus. There is significant difference in the prevalence of the peripheral vascular disease reported in India when compared to the rest of the world [9].

The prevalence rates of PVD were 2.7, 2.9, and 6.3% in individuals with NGT (normal glucose tolerance), IGT (impaired glucose tolerance, and diabetes [10].

The unique features of peripheral vascular disease include:
a. Presentation at younger age of 45 years
b. increased association with the diabetes mellitus,
c. Strongest association with the coronary vascular disease and cerebral vascular disease,
d. Poor understanding of the

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disease among the physicians, patients. Poor resources for diagnosis and management [11]. The ankle-brachial index (ABI) is the ratio of the systolic blood pressure (SBP) measured at the ankle to that measured at the brachial artery. Originally described by Winsor 1 in 1950, this index was initially proposed for the non-invasive diagnosis of lower-extremity peripheral artery disease (PAD). Later, it was shown that the ABI is an indicator of atherosclerosis at other vascular sites and can serve as a prognostic marker for cardiovascular events and functional impairment, even in the absence of symptoms of PAD [12].

There is a large body of evidence (18 population-based cohorts) suggesting that a low ABI is independently associated with increased CAD and CVD risk, after adjusting for FRS factors [13].

Ankle Brachial Pressure Index (ABI) is a simple, cheap, reliable and reproducible method with high specificity of 97% and positive predictive value of 94.1%. Routine screening of patients of diabetes with ABI may be recommended for early diagnosis and treatment of PVD [14].

Ankle brachial index is more closely associated with the functional impairment in the lower limbs than the symptoms like intermittent claudication etc. [15].

ABI can be considered a generalized atherosclerotic predictor, identifying patients at high risk for developing cardio- or cerebrovascular events and should be incorporated into routine clinical practice [16].

Aims and Objectives

1. To study the role of the Ankle brachial index

- a. In screening for the prevalence of peripheral arterial diseases in asymptomatic patients at risk attending the general OPD at Narayana Medical College hospital in Nellore
- b. And to estimate the severity of the same in the asymptomatic and symptomatic patients.
- c. To provide the suitable preventive health education to the individuals found to have risk factors for peripheral arterial diseases

Materials and Methods

This is a prospective observational study.

Permission for the study is cleared by the institutional ethics committee.

All patients aged 45 years and older, attending the general OPD of Narayana General hospital, are recruited for the study.

Patients who have features of Critical limb ischemia in whom the ankle brachial index is contraindicated are excluded from the study

Study sample size is calculated for confidence level of 95% and the confidence interval of 5, and estimated population of 5000 and the sample size obtained was 357.

The following data is collected from all the recruited patients:

- a. The purpose of the visit to the hospital, Whether any time patient suffered the pain suggestive of claudication by administering Edinburgh Claudication Questionnaire. Whether the patient has any of the following risk factors for atherosclerosis:
 - i. Family history of atherosclerotic cerebral, coronary, or peripheral vascular diseases.
 - ii. Hypertension
 - iii. Diabetes mellitus
 - iv. Smoking
 - v. Hyperlipidaemia
- b. Ankle brachial index is recorded as per the standardized technique [17] using an automatic digital blood pressure recording apparatus to control the measurement error
- c. Those patients who have abnormal ankle brachial index are segregated and their data tabulated
- d. The usual descriptive statistical techniques like the distribution of data etc are tabulated and charted.
- e. The findings are subjected to statistical analysis

Results

Out of total number of 400 study subjects More than 70% were males. There were 11% of the study subjects who had abnormal ABI Out of whom the ABI showed mild PVD in 9% of the subjects, 1% were symptomatic. Further 2% of the study subjects had moderate PVD and none of them were symptomatic. One of the study subjects had severe PVD but did not report symptoms. This substantiates our study objective that PVD may remain asymptomatic.

Out of 400 subjects studied 7% of the male subjects had PVD on screening with ABI and 4% were females. In the subjects with abnormal ABI the associated risk factors were, Diabetes mellitus in 39% , Hypertension in 34% and smoking in 24%, and Coronary artery disease was 11%. The predominant risk factor for PVD was Diabetes mellitus in males (34%) and Hypertension in females (11%). There was family history of risk factors for atherosclerosis in 9% of the patients.

Discussion

The prevalence of atherosclerosis is increasing in our country. While most of the screening and preventive measures are directed at coronary and cerebrovascular

disease, the peripheral vascular disease is neglected. The morbidity and mortality related to the peripheral vascular disease is comparable to the coronary and cerebrovascular disease. The peripheral vascular disease is usually silent and patients with peripheral vascular disease often seek treatment for other ailments in the general OPD. A screening in the form of measurement of ABI for these asymptomatic patients would detect majority of these asymptomatic patients. ABI can be measured with any digital blood pressure monitor and is a cheaper option than the Doppler evaluation of lower limb arteries. Suitable life style modifications and other preventive measures will go a long way in limiting the morbidity and mortality associated with the PVDs.

Conclusions

Our study proves that the PVD of mild, moderate and severe nature can exist in asymptomatic patients. It is advisable to measure ABI in all patients attending the general OPD. A digital blood pressure monitor can be effectively used for measuring ABI. Even a Para medical worker or a nurse can undertake the measurement of ABI.

Summary

1. Peripheral vascular disease can be asymptomatic.
2. In patients attending the General OPD the prevalence could be about 10%
3. Irrespective of presenting complaint measurement of ABI is a reliable means of detecting the silent peripheral vascular disease.
4. ABI can be measured easily, reliably, and cheaply using a digital blood pressure monitor.

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