

Analysis of Utility of Palpatory Ankle Brachial Pressure Index for Peripheral Vascular Occlusive Disease in Type II Diabetics as a Screening Tool: Study Conducted at a Tertiary Care Hospital

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ABSTRACT

Background: Present study was conducted for analysing the utility of palpatory ankle brachial pressure index (ABI) for peripheral vascular occlusive disease (PVOD) in type II diabetics as a screening tool.

Materials & Methods: A total of 100 patients were enrolled in the present study. All the patients were affected by type 2 diabetes mellitus. We measured peripheral pulses in the brachial artery and dorsalis pedis. In order to evaluate the clinical value of palpatory ABPI in the diagnosis of asymptomatic PVOD, palpable peripheral pulses were checked thoroughly. With cut-off values, an ABPI of less than or equal to 0.9 was deemed suggestive of PVOD, 0.9-0.99 to be borderline, and higher than or equal to 1.00 to be normal.

Results: Duration of diabetes was more than 5 years in 75 percent of the patients. According to ABPI classification, ABPI was ≥ 1 in 60 percent of the patients. ABPI was abnormal suggestive of PVOD in 21 percent of the patients. The sensitivity and specificity of ABPI in the diagnosis of PVOD did not reach the level of statistical significance. The area under the curve was 0.513, thus showing poor discriminatory value in the diagnosis of PVOD concerning the duration of type II

diabetes mellitus.

Conclusion: Further confirmation may be necessary since palpatory ABPI alone may not be an adequate screening technique for PVOD in high-risk patients in these locations.

Key words: Diabetes, Ankle Brachial Pressure Index, Occlusive.


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INTRODUCTION

In 2002, diabetes was the sixth leading cause of death, with 73,249 death certificates listing diabetes as the underlying cause of death and an additional 224,092 death certificates listing diabetes as a contributing cause of death. Diabetes is likely to be underreported as a cause of death due to the many complications associated with diabetes that ultimately cause death. Overall, the risk of death among people with diabetes is almost twice that of people of similar age who do not have diabetes. Duration of diabetes also is an important determinant of mortality; younger age-of-onset groups (<45 years of age) have an increased risk of premature death. From death certificate data, it appears that age-adjusted death rates for African Americans and Hispanic Americans are similar to the rates of whites. An increased mortality rate in North American Native Americans with type 2 diabetes also is apparent.¹⁻³

Most individuals with type 2 diabetes exhibit intra-abdominal (visceral) obesity, which is part of the "ectopic fat" deposition pattern closely related to the presence of insulin resistance. In addition, hypertension, dyslipidemia (high triglyceride and low HDL-cholesterol levels; postprandial hyperlipemia), vascular endothelial dysfunction and elevated PAI-1 levels often are present in these individuals. This clustering of abnormalities is referred to as the "insulin resistance syndrome" or the "metabolic syndrome". Because of these abnormalities, patients with type 2 diabetes are at increased risk of developing atherosclerotic cardiovascular disease (ASCVD) with macrovascular complications (myocardial infarction and stroke). Type 2 diabetes has a strong genetic predisposition and is more common in minority ethnic groups, e.g. Mexican-Americans, Latinos, African Americans, American Indians, Pacific Islanders, than in individuals

of European ancestry.⁴⁻⁶ Hence; the present study was conducted for analysing the utility of palpatory ankle brachial pressure index (ABI) for peripheral vascular occlusive disease (PVOD) in type II diabetics as a screening tool.

MATERIALS & METHODS

The present study was conducted for analysing the utility of palpatory ankle brachial pressure index (ABI) for peripheral vascular occlusive disease (PVOD) in type II diabetics as a screening tool.

A total of 100 patients were enrolled in the present study. All the patients were affected by type 2 diabetes mellitus. We measured

peripheral pulses in the brachial artery and dorsalis pedis. In order to evaluate the clinical value of palpatory ABPI in the diagnosis of asymptomatic PVOD, palpable peripheral pulses were checked thoroughly. Using a regular sphygmomanometer, the palpatory technique was used to assess the brachial and ankle pressures. Five minutes were allotted for measuring the brachial and ankle blood pressures; the average of the two readings was used. With cut-off values, an ABPI of less than or equal to 0.9 was deemed suggestive of PVOD, 0.9-0.99 to be borderline, and higher than or equal to 1.00 to be normal. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software.

Table 1: Demographic data

Variable		Number	Percentage
Age group (years)	Less than 40	23	23
	More than 40	77	77
Gender	Males	61	61
	Females	39	39
Duration of diabetes	Less than 5 years	25	25
	More than 5 years	75	75

Table 2: ABPI classification

ABPI	Number	Percentage
≤0.9	21	21
0.91 to 0.99	19	19
≥1	60	60
Total	100	100

RESULTS

The mean age of the patients was 48.3 years. 61 percent of the patients were males while the remaining were females. Duration of diabetes was more than 5 years in 75 percent of the patients. According to ABPI classification, ABPI was ≥1 in 60 percent of the patients. ABPI was abnormal suggestive of PVOD in 21 percent of the patients. The sensitivity and specificity of ABPI in the diagnosis of PVOD did not reach the level of statistical significance. The area under the curve was 0.513, thus showing poor discriminatory value in the diagnosis of PVOD concerning the duration of type II diabetes mellitus.

DISCUSSION

American Diabetes Association has defined self-dietary management as the key step in providing the diabetics, the knowledge and skill in relation with treatment, nutritional aspects, medications and complications. A study showed that the dietary knowledge of the targeted group who were at high risk of developing T2DM was poor. Red meat and fried food were consumed more by males as compared to females. The percent of males to females in daily rice consumption was significantly high. DM can be controlled through improvement in patient's dietary knowledge, attitudes, and practices. These factors are considered

as an integral part of comprehensive diabetes care. Although the prevalence of DM is high in gulf countries, patients are still deficient in understanding the importance of diet in diabetes management. Studies have shown that assessing patients' dietary attitude may have a considerable benefit toward treatment compliance and decrease the occurrence rate of complications as well. DM is the fourth among the leading causes of global deaths due to complications. Annually, more than three million people die because of diabetes or its complications. Worldwide, this disease weighs down on health systems and also on patients and their families who have to face too much financial, social and emotional strains. Diabetic patients have an increased risk of developing complications such as stroke, myocardial infarction, and coronary artery disease. However, complications such as retinopathy, nephropathy, and neuropathy can have a distressing impact on patient's quality of life and a significant increase in financial burden.^{10- 12} Hence; the present study was conducted for assessing the Utility of Palpatory Ankle Brachial Pressure Index as a Screening Tool for Asymptomatic Peripheral Vascular Occlusive Disease in Type II Diabetic patients.

Mean age of the patients was 48.3 years. 61 percent of the patients were males while the remaining were females. Duration

of diabetes was more than 5 years in 75 percent of the patients. According to ABPI classification, ABPI was ≥ 1 in 60 percent of the patients. ABPI was abnormal suggestive of PVOD in 21 percent of the patients. The sensitivity and specificity of ABPI in the diagnosis of PVOD did not reach the level of statistical significance. The area under the curve was 0.513, thus showing poor discriminatory value in the diagnosis of PVOD concerning the duration of type II diabetes mellitus. Ankle brachial index (ABI) is a simple method to screen peripheral arterial disease (PAD) and to evaluate cardiovascular (CV) prognosis in the general population. Measuring it requires a hand-held Doppler probe but it can be done also with an automatic device. ABI is an effective tool for clinical practice or clinical studies. However, in diabetic patients, it has some specific caveats. Sensitivity of the standard threshold of 0.9 appears to be lower in diabetic patients with complications. Moreover, highly frequent arterial medial calcifications in diabetes increase ABI. It has been demonstrated that measurements >1.3 are well correlated with both an increased prevalence of PAD and CV risk. Therefore, ABI thresholds of less than 0.9 and more than 1.3 are highly suspicious for PAD and high CV risk in diabetic patients. However, when there is concomitant clinical peripheral neuropathy or high risk of arterial calcification, the efficiency of ABI seems to be limited. In this case, other methods should be applied, toe pressure, in particular. Thus, the ABI could be used in patients with diabetes, but values should be interpreted with precision, according to the clinical situation (Potier L et al).¹³ Lee MY et al investigated whether PAD, as indicated by an abnormally low or high ankle-brachial index (ABI), is associated with the development of DR in patients with type 2 diabetes mellitus (DM) without DR. We enrolled 414 (221 men and 193 women) patients with type 2 DM who underwent ABI measurements at our outpatient clinic. PAD was defined as an abnormally low (<0.9) or high (≥ 1.3) ABI in either leg, and DR was defined as being non-proliferative or proliferative. Of the enrolled patients, 69 (16.7%) had an ABI <0.9 or ≥ 1.3 . The median follow-up period was 23 (15–40) months, during which 74 (17.9%) patients developed DR. In multivariate analysis, an ABI <0.9 or ≥ 1.3 was independently associated with the development of DR (vs. ABI ≥ 0.9 to <1.3 ; hazard ratio, 2.186; 95% confidence interval, 1.261 to 3.789; $p = 0.005$). An abnormal ABI was associated with the development of DR in our patients with type 2 DM without DR.¹⁴

CONCLUSION

Further confirmation may be necessary since palpatory ABPI alone may not be an adequate screening technique for PVOD in high-risk patients in these locations.

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