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ORIGINAL ARTICLE

Evaluation of Ankle-brachial index in peripheral vascular disease in type II diabetes mellitus patients

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ABSTRACT:

Background: One common sign of atherosclerosis is peripheral arterial disease. The present study evaluated ankle brachial index (ABI) in peripheral vascular disease (PVD) in type 2 diabetes mellitus patients. **Materials & Methods:**80 type II diabetes patients with peripheral vascular disease of both genders were enrolled. Height (cm), weight (kg) and BMI were recorded. Ankle brachial index (ABI) for each legwas calculated. **Results:** Out of 80 patients, males were 48 and females were 32. The mean ABI <0.5 was seen in 16 patients, 0.5- 0.9 in 24 patients and 0.9- 1.3 in 40 patients. The difference was significant (P< 0.05). **Conclusion:** When it came to type II diabetes patients with peripheral vascular disease, the majority of the patients had an ankle-brachial index of 0.9–1.3. Therefore, it can be hypothesized that in patients with type 2 diabetes mellitus, a higher ankle brachial index (ABI) may be a sign of peripheral vascular disease (PVD).

Key words: Ankle brachial index, Peripheral vascular disease, Diabetes

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INTRODUCTION

One common sign of atherosclerosis is peripheral arterial disease (PAD). Age and the existence of cardiovascular (CV) risk factors both raise its prevalence. Intermittent claudication or distal trophic lesions are examples of circumstances of discovery; however, some subjects have no symptoms at all, and the condition is discovered during a routine physical examination.[1] Since atherosclerotic cardiovascular diseases are the main cause of death for individuals with diabetes mellitus (DM), they account for the majority of the disease's costs to the public health system. Another major risk factor for lower limb complications is peripheral arterial disease (PAD), which is associated with other vascular events such as stroke and myocardial infarction and increases the chance of cardiovascular diseases by up to one-third in patients with diabetes at a later stage.[2]

Diabetes and its aftereffects are becoming more common and are now recognized as a major and challenging health concern. By 2025, 57 million of the 300 million diabetics worldwide will reside in India. Uncontrolled diabetes mellitus can have several negative effects, one of which is peripheral vascular disease (PVE).[3] It is also a major contributing factor to lower limb amputations, which occur 12 times more frequently in diabetics than in non-diabetics. PVD is one risk factor for foot infections. Leg amputations are primarily caused by infections and PVD in the presence of a diabetic foot ulcer. While the exact risk factors for PAD in people with diabetes mellitus remain unclear, it is widely recognized that the ankle-brachial index (ABI) is the most effective way to diagnose the condition.[4]

When a diabetic patient is asymptomatic and either older than 50 or younger than 50 and has additional cardiovascular disease risk factors, the American College of Cardiology/American Heart Association (AHA) recommends screening for peripheral artery disease (PAD). It's interesting to note that in 2018, the American Diabetes Association (ADA) recommended against administering the ABI test to T2DM patients who did not exhibit symptoms or indications of PAD.ABI is a generally accurate, repeatable, and non-invasive measurement.[5,6] The present study evaluated ankle brachial index (ABI) in peripheral vascular disease (PVD) in type 2 diabetes mellituspatients.

MATERIALS & METHODS

The present study consisted of 80 type II diabetes patients with peripheral vascular disease of both genders. All patients gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Height (cm), weight (kg) and BMI were recorded. Recording ofcomplete blood count, fasting and post-prandial blood glucose, glycosylated haemoglobin, lipid profile, blood urea,urine examination, and serum creatinine level was performed. Colour doppler ultrasound, ECG, CT scan for cerebrovascular profile and coronary angiography, sphygmomanometer measurement of ankle and brachial artery pressure, doppler examination to auscultate and record blood flow from dorsalis pedis and posterior tibial and brachial arteries and treadmill testing to assess functional limitations objectively. Ankle brachial index (ABI) for each legwas calculated. Results thus

obtained were subjected to statistical analysis P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 80		
Gender	**Males**	**Females**
Number	48	32

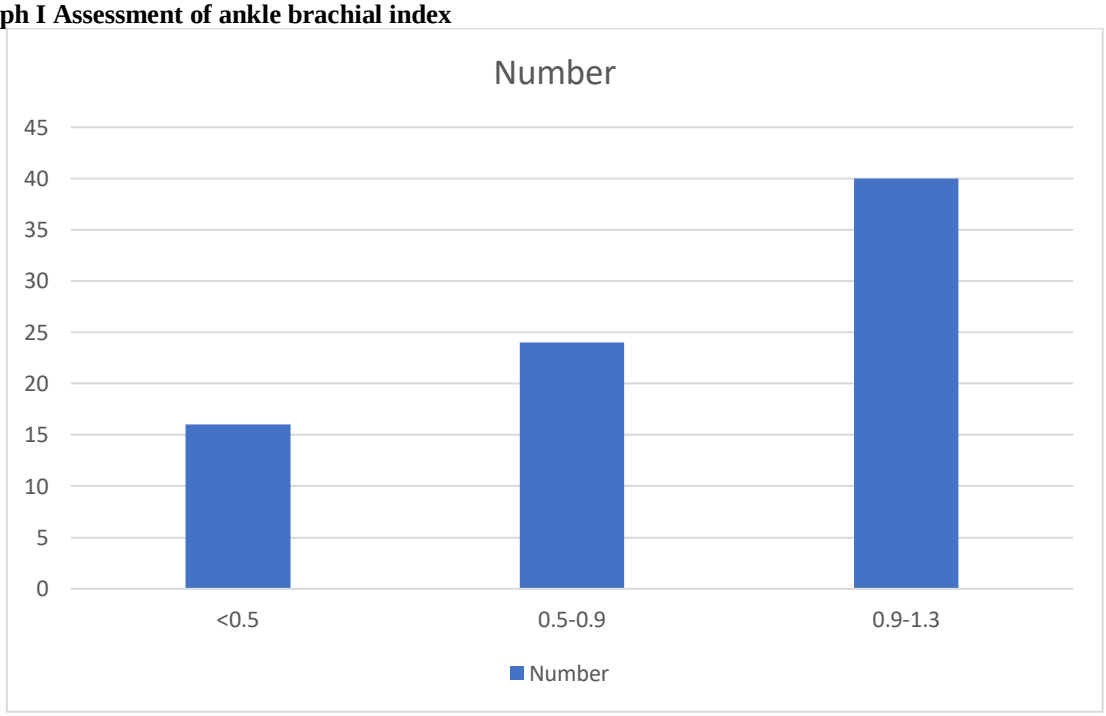
Table I shows that out of 80 patients, males were 48 and females were 32.

Table II Assessment of ankle brachial index

Ankle brachial index (ABI)	Number	P value
<0.5	16	0.01
0.5-0.9	24	
0.9-1.3	40	

Table II, graph I shows that mean ABI <0.5 was seen in 16 patients, 0.5- 0.9 in 24 patients and 0.9- 1.3 in 40 patients. The difference was significant (P< 0.05).

Graph I Assessment of ankle brachial index



DISCUSSION

The traditional definition of peripheral artery disease (PAD) is the blockage of the arteries leading to the lower extremities by atherosclerotic plaques. Arterial calcification (AC) can also affect peripheral arteries, despite the general consensus on this point.[7] For the purposes of this inquiry, both PAD and AC will be referred to as lower extremity artery disease (LEAD). Cardiovascular events in patients with type 2 diabetes mellitus (DM) have been linked to LEAD.[8] Heart attacks, strokes, and other atherosclerotic-related fatalities have been among these incidents. Risk factors for PAD include smoking, high cholesterol, diabetes mellitus, hypertension, and a prior history of cardiovascular disease.[9]The present study assessed ankle brachial index (ABI) in peripheral vascular disease (PVD) in patients with type 2 diabetes mellitus.

We found that out of 80 patients, males were 48 and females were 32.Ostchega et al[10]examined the prevalence of PAD and associated risk factors.PAD prevalence was 12.2%. PAD prevalence increased with age. PAD prevalence was 7.0% (95% CI = 5.6-8.4%) for those aged 60 to 69, 12.5% (95% CI = 10.4-14.6%), and 23.2% (95% CI = 19.8-26.7%) for those aged 70 to 79 and 80 and older. Age-adjusted estimates show that non-Hispanic black men and women and Mexican-American women had a higher prevalence of PAD than non-Hispanic white men and women (19.2%, 95% CI = 13.7-24.6%; 19.3%, 95% CI = 13.3-25.2%; and 15.6%, 95% CI = 12.7-18.6%, respectively). The results of the fully adjusted model show that current smoking (OR = 5.48, 95% CI = 3.60-8.35), previous smoking (OR = 1.94, 95% CI = 1.39-2.69), diabetes mellitus (OR = 1.81, 95% CI = 1.12-2.91), low kidney function (OR = 2.69, 95% CI

= 1.58-4.56), mildly decreased kidney function (OR = 1.71, 95% CI = 1.22-2.38), high-sensitivity C-reactive protein greater than 3.0 mg/L (OR = 2.69, 95% CI = 1.24-5.85), treated but not controlled hypertension (OR = 1.95, 95% CI = 1.40-2.72), and untreated hypertension (OR = 1.68, 95% CI = 1.13-2.50) were all significantly associated with prevalent PAD.

We found that mean ABI <0.5 was seen in 16 patients, 0.5- 0.9 in 24 patients and 0.9- 1.3 in 40 patients. Joosten et al[11] evaluated the association between smoking, hypertension, hypercholesterolaemia and T2DM as PAD predictors in men. They concluded that patients who did not present one or more of these risk factors had 77% lower risk of developing this disease.

Ahn et al[12]surveyed the prevalence of peripheral arterial disease (PAD) in Korean patients with coronary arterial disease (CAD) or cerebrovascular disorder (CVD). A total of 424 hospitalized patients was enrolled as the control group. The prevalence of PAD was significantly higher in the study group than the control group (7.6% vs 1.7%; P < 0.001). To analyze the relationship of other vascular diseases and PAD, the patients were regrouped; group A (no CAD or CVD), group B (CAD only), group C (CVD only), and group D (CAD and CVD). Compared with group A, those with other vascular diseases (group B, C, D) had significantly higher prevalence of PAD, diabetes, dyslipidemia, renal insufficiency and claudication. The trend that patients with CAD or CVD are at risk of PAD is observed in this cross-sectional study in Koreans. Routine ABI measurement is recommended in these high-risk groups for early detection and proper management of PAD. Santo et al[13]in the 3412 subjects, ankle brachial index (ABI) measurements were performed. An ABI < or =0.9 was considered as valid in diagnosing PAD. ABI value < or =0.9 was found in 2.3%, and a significant rate of carotid stenosis was also found Echocardiographic markers left ventricular diameter (LVD) >55 mm, interventricular septum (IVS) >11 mm, left ventricular diastolic volume (LVDV) was found > 100 ml), and ejection fraction (EF) was <50% were found with high frequency in those with ABI < or =0.9. Unrecognized PAD is lower compared with other findings but our prevalence resulted higher than other prevalence previously found by other study performed in Italy. Unrecognized PAD shows significant arterial co-morbidities and the ABI is a useful method to screen asymptomatic PAD.

The shortcoming of the study is the small sample size.

CONCLUSION

When it came to type II diabetes patients with peripheral vascular disease, the majority of the patients had an ankle-brachial index of 0.9–1.3. Therefore, it can be hypothesized that in patients with type 2 diabetes mellitus, a higher ankle brachial index (ABI) may be a sign of peripheral vascular disease (PVD).

REFERENCES

1. Pistrosch F, Natali A and Hanefeld M. Is hyperglycemia a cardiovascular risk factor? Diabetes Care 2011; 34: S128–S131.
2. Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). J VascSurg 2007; 45: S5–S67.
3. Aderval Aragão J, Prado Reis F, Ribeiro Borges Neto R, et al. Prevalence of peripheral occlusive arterial disease in patients with chronic renal failure. J Vasc Bras 2009; 8: 301–306.
4. Haskell WL, Lee IM, Pate RR, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Med Sci Sports Exerc 2007; 39: 8: 1423–1434.
5. Imai E, Horio M, Nitta K, et al. Modification of the Modification of Diet in Renal Disease (MDRD) study equation for Japan. Am J Kidney Dis 2007; 50: 927–937.
6. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACCF/AHA focused update of the guideline for the management of patients with peripheral artery disease (Updating the 2005 Guideline). Vasc Med 2011; 16: 452–476.
7. Premalatha G, Shanthirani S, Deepa R et al. Prevalence and risk factors of peripheral vascular disease in a selected South Indian population: the Chennai Urban Population Study. Diabetes Care 2000; 23 (9): 1295-300.
8. Pecoraro RE, Reiber GE, Burgess EM. Pathways to diabetic limb amputation: basis for prevention. Diabetes Care 1990; 13 (5): 513-21.
9. Lange S, Diehm C, Darius H, Haberl R, Allenberg JR, Pittrow D, Schuster A, von Stritzky B, Tepohl G, Trampisch HJ. High prevalence of peripheral arterial disease and low treatment rates in elderly primary care patients with diabetes. Exp Clin Endocrinol Diabetes 2004;112:566-573.
10. Ostchega Y, Paulose-Ram R, Dillon CF, Gu Q, Hughes JP. Prevalence of peripheral arterial disease and risk factors in persons aged 60 and older: data from the National Health and Nutrition Examination Survey 1999-2004. J Am Geriatr Soc 2007;55:583-589.
11. Joosten MM, Pai JK, Bertoia ML, et al. Associations between conventional cardiovascular risk factors and risk of peripheral artery disease in men. JAMA 2012; 308(16): 1660.
12. Ahn S, Park YJ, Min SI, Kim SY, Ha J, Kim SJ, Kim HS, Yoon BW, Min SK. High prevalence of peripheral arterial disease in Korean patients with coronary or cerebrovascular disease. J Korean Med Sci 2012;27:625-629.
13. Santo Signorelli S, Anzaldi M, Fiore V, Catanzaro S, Simili M, Torrisi B, Neri S. Study on unrecognized peripheral arterial disease (PAD) by ankle/brachial index and arterial comorbidity in Catania, Sicily, Italy. Angiology 2010; 61: 524-9.