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ANKLE BRACHIAL PRESSURE INDEX IN ASSESSMENT OF CARDIOVASCULAR RISK IN HYPERTENSIVE PATIENTS AND ITS COMPARISION WITH NON-HYPERTENSIVE PATIENTS

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ABSTRACT

Background: Atherosclerosis is the most common cause of mortality and morbidity worldwide, is considered a generalized process which affects coronary cerebral, and peripheral arteries of the lower extremities. Ankle-brachial pressure index is a used as an indirect marker for increased cardiovascular risk. Aim -To assess the atherosclerotic risk using Ankle brachial pressure index in hypertensive patients. **Methods:** The cross sectional study included data from hypertensive and non-hypertensive patients (n=100). The Ankle brachial pressure were measured in the posterior tibial arteries using a Doppler ultrasound probe. The detailed demographic and anthropometric data was entered in proforma and data statistically analyzed. **Results:** There is significant correlation of hypertension with ABPI. Mean ABPI ($p<0.001$)was low in hypertensive patients than normotensive subjects. **Conclusions:** The present study data was showing a link between low ABPI with Hypertension, IHD, Stroke, and Smoking. So there is significant association of low Ankle Brachial Pressure Index (ABPI) in patients with Hypertension, IHD Stroke and smoking. And the study also signified the importance of ABPI a simple noninvasive tool for assessing the atherosclerotic risk in an individual.

KEYWORDS: ABPI Atherosclerosis, hypertension, Doppler.

BACKGROUND

PAD is the origin of the lower limb of atherosclerosis. It can affect walking, and can lead to tissue loss, infection, and amputation in severe cases. PAD affects 12% to 14 % of total population, hitting 10% in population over 60 years and 20% aged over 75 years1-22. Over and above mor MAB specifically induced by PAD, patients with PAD are also increased risk of CVD events as atherosclerosis is a coronary and cerebrovascular condition triggered by a systemic diseases.

The most severe cause of lower extremity ischemic syndrome in Western cultures is PAD caused by atherosclerosis. About half of PAD had athletes are coronary or vascular cerebral 3-4. Even if they are asymptomatic, the risk of future cardio- cerebrovascular events is higher than that of healthy people, and six times higher than those of healthy individuals5. This association between peripheral artery disease and increasing mortality is due to the fact that systemic atherosclerosis is the underlying pathological procedure. Atherosclerosis is likely to occur in other parts of the arterial tree if the periphery is present.

Risk factors associated with PAD pathogenesis are like those involved in atherosclerotic coronary processes. The typical risk factors associated with PAD include smoking, diabetes, blood pressure, dyslipidemia, obesity, physical inactivity and increased ageing. In the emergency department, hypertension patients with cerebrovascular or cardiovascular complications can be found directly .The Fontaine classification sets the basis for peripheral vascular disease clinical (I-IV) studies8. While the main and most frequently only sign of a peripheral vascular condition is intermittent claudication, sadly the majority of patients are asymptomatic and undiagnosed9. As a result, the diagnosis of the peripheral arterial disease is dependent on clinical history and has extremely low sensitivity.

Consequently, the Ankle Brachial Pressure Indice (ABPI), a Doppler Simple noninvasive Limb vessel Calculation (ABPI), has been commonly adopted to support the clinical diagnosis of and quantification of the peripheral arterial disease.11 Ankle Brachial Pressure Index (ABPI) is the tibia artery connection. The standard range of ABPI is 0.91–1.3, ABPI > 1.3 or < 0.9 are considered to be a higher, and low, and mild diseases range to 0.7–0.9, moderate disease levels of 0.41–0.69 and ratios of less than or equal to 0.4 are cited as in severe disease13. 13 Brachial pressure indices are the tibia-sysolic and brachial-artery systemic blood pressure

ratios. A number of organizations advocate the diagnosis of ABPI, not only as a diagnostic instrument, but also as a risk management method for the setting of peripheral vascular disease14. ABPI is also an indication of generalized atherosclerosis, in addition to the identification of peripheral Vascular Disease.

In addition, in patients with peripheral vascular disease the lower ABPI, the greater the risk of all cause and cerebrovascular death 16. Similarly high ABPI over 1.30 is also a predictor of both increase in all-causal and cardiovascular mortality (even when the observed was not -diagnostic due to a secondary arterial compression to calcification).17 The present study can be used to evaluate and predict cardiovascular disease in non-invasive ABPI asymptomatic hypertensive subjects.

METHODS

A cross-sectional analysis involving 100 patients identified or newly diagnosed with HTN was conducted. They have visited and enrolled in the study, following written notifications from the Out Patient Department of Karnataka Institute for Medical Science, Hubballi, Karnatoka, India. The research was performed between June 2018 and 18 December. Exclusion criteria for peripheral vascular disease, diabetes mellitus, those with severe edema feet and women with induced pregnancy were previously diagnosed.

Both participants were mindful of the investigative essence of the study and received prior to the research procedure a written informed consent. Clearance has been taken from the Ethical Committee.

The research included 100 patients. 100. The sample size was taken according to the study's convenience. For both, 50 were normotensive subjects (JNC8) in 50 patients and 50 were hypertensive (systolic BP 140-159 and/or diastolic BP 90-99 mm hg). Detailed history of high blood pressure, personal behavior, profession and other systemic diseases was asked for individual patients. Specific physical examinations were carried out, including general and systematic checks. Blood pressure measurements with a random zero sphygmomanometer were performed in the right arm of the systolic (phase V) blood pressure after 10 minutes of rest in supine position. The cardiovascular, digestive, gastrointestinal and central nervous system included were studied anthropometrically and systemically.

Ankles systolic pressure was determined by right and left arteries in the rear tibial arteries and by the Doppler ultrasound probe brachial systolic pressure was determined in left and right arteries. The standard procedure was inserted into the proforma, including a full blood count, a renal function procedure, an electric cardiology, echocardiography and a lipid profile.

Statistical Analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data was represented as mean and standard deviation. Independent t test or was used as test of significance to identify the mean difference between two quantitative variables. p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical Software

MS Excel**,** SPSS version 22(IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

RESULTS

Table 1: General Profile Distribution of Subjects in the Study.

General Profile		Count	%
Age	<30 years	5	5.0%
	31 to 40 years	10	10.0%
	41 to 50 years	14	14.0%
	51 to 60 years	28	28.0%
	61 to 70 years	30	30.0%
	>70 years	13	13.0%
Sex	Female	34	34.0%
	Male	66	66.0%

Mean age of subjects was 57.12±13.755 years. Majority of subjects were in the age group 61 to 70 years (30%). 66% were males and 34% were females.

Table 2: Morbidity Profile among Subjects.

Morbidity Profile	Absent		Present	
	Count	%	Count	%
Smoking	68	68.0%	32	32.0%
Hypertension	50	50.0%	50	50.0%
IHD	68	68.0%	32	32.0%
Stroke	86	86.0%	14	14.0%

In the study 32% were smokers, 50% had HTN, 32% had IHD and 14% has stroke.

Table 3: Mean ABPI Comparison with Respect to Morbidities.

Morbidities		ABPI			p value
		Mean	SD	Median	
Hypertension	Absent	1.11	0.14	1.1000	<0.001*
	Present	0.88	0.14	0.8650	
IHD	Absent	1.06	0.16	1.0750	<0.001*
	Present	0.85	0.13	0.8150	
Stroke	Absent	1.03	0.17	1.0450	<0.001*
	Present	0.81	0.12	0.7850	
Smoking	Absent	1.08	0.15	1.080	<0.001*
	Present	0.82	0.09	0.825	

In the study Mean ABPI among Hypertensive subjects was 0.88±0.14 and among non-Hypertensive subjects

was 1.11±0.14. There was significant difference in Mean ABPI with respect to HTN.

Similarly Mean ABPI among subjects with IHD was 0.85±0.13 and among subjects without IHD was 1.06±0.16. There was significant difference in Mean ABPI with respect to IHD.

Similarly mean ABPI among subjects with Stroke was 0.81±0.12 and among subjects without Stroke was 1.03±0.17. There was significant difference in Mean ABPI with respect to Stroke.

Similarly mean ABPI among subjects who were smoking was 0.82±0.09 and among subjects who were not smokers was 1.08±0.15. There was significant difference in Mean ABPI with respect to Smoking.

DISCUSSION

An ABPI ratio of less than 0.9 was associated with a relatively triple increase for both men and women in cardiovascular mortality, such as ischemic stroke. In this study we tested ABPI for hypertensive and non-hypertensive patients, and found substantial inverse association between the ABPIs and the systolic and diastolic blood pressures. Similarly, the ABPI is an increased overall mortality and cardiovascular mortality like stroke and IHD.

In the present study the mean ABPI in patients with IHD was low (0.85), whereas the difference with ABPI was highly statistically significant compared to those without IHD, the mean ABPI in hypertensive patients was 0.88. 25 (78.12 per cent) were patients with low ABPI similar to the previous study of 32 patients with ischemic heart disease. Ogren Met al found that in Sweden the rate of heart events was 25% in the low ABPI group (17/67) and the other 10% (18 M). Ogren Met al. ABPI is a ten year independent forecast of the death rate of asymptomatic medium agedmales from the coronary heart disease, as described by Kornitzer et al.

A mean ABPI in patients with CVA was small at present (0.81) and the variations in ABPI were statistically high. Similar findings were obtained in several previous studies out of 14 patients with stroke12 who had a small ABPI (85.1%). Low ABI is associated with risk of an ischemic stroke or transient attack in older people in the Framingham study of Murabito JM et al. 20 Albert W Tsai et al studied ABPI relationship and a 7-year ischemic stroke impact are found in the ARIC. F Purroy et al concluded from their survey that abnormal ABI was associated with classical risk factors , in particular hypertension, which increases the risk of stroke.21 They concluded that low ABI was closely associated with an increased incidence of ischemic stroke.

Smoking is a strong independent, low ABPI risk factor, in this analysis we have found that smokers have less ABPI mean (0,82) than non-smokers (1,03). Smoking has been a clear independent risk factor for low ABPI in elderly people. Newman and Al indicate that smoking and low ABPI in elderly have a substantial association. Kamath Ganesh et al found the high level of cigarette smoking and PAD development in the Indian population in their study .22

CONCLUSIONS

The present study data was showing a link between low ABPI with Hypertension, IHD, Stroke, and Smoking. So there is significant association of low Ankle Brachial Pressure Index (ABPI) in patients with Hypertension IHD, Stroke and smoking. And the study also signified the importance of ABPI a simple noninvasive tool for assessing the atherosclerotic risk in an individual.