IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 7 Ser. 1 (July. 2019), PP 68-71
www.iosrjournals.org

Study of Ankle Brachial Index in Systemichypertension

Sundaramoorthy Ushalakshmi[1], Deepa Avadhani[2]
[1]*Professor and Head, Department of Medicine, Kilpauk Medical College, Chennai*
[2]*Department of Medicine, Kilpauk Medical College, Chennai/ The TamilnaduDr.M.G.R Medical University , India*
Corresponding Author: Sundaramoorthy Ushalakshmi

Abstract: *Hypertension is considered to be one of the leading causes of morbidity globally. Hypertension increases the risk of cardiovascular disease, renal failure, and peripheral arterial disease(PAD). Ankle brachial index (ABI) is a simple and non-invasive tool to assess the peripheral artery disease. It indicates the presence of atherosclerosis in the peripheral blood vessel. There were a total of 198 patients enrolled in this study. Prevalence of asymptomatic PAD was found to be 47%. There was an inverse correlation between ABI and age, BMI, duration of hypertension, Systolic Blood Pressure(SBP),Diastolic Blood Pressure(DBP) and Pulse Pressure(PP). It would be beneficial to include Ankle Brachial index as a routine in primary care set up as it is safe, easy and patient friendly. Measuring ABI may significantly reduce the future cardiovascular events in hypertensive patients*

Keywords: *Atherosclerosis, Cardiovascular, Hypertension, Morbidity, Non-invasive*

Date of Submission: 24-06-2019 Date of acceptance: 06-07-2019

I. Introduction

Hypertension is considered to be one of the leading causes of morbidity globally. Approximately 7.6 million deaths (13–15% of the total) and 92 million disability-adjusted life years globally are due to hypertension. Hypertension increases the risk of cardiovascular disease, renal failure, and peripheral arterial disease. It adds to the total burden of cardio vascular risk factors if other risk factors are also present. Ankle brachial index (ABI) is a simple and non-invasive tool to assess the peripheral artery disease. It indicates the presence of atherosclerosis in the peripheral blood vessel. Measurement of ABI is simple and requires a blood pressure apparatus and a hand held Doppler probe. An ABI of less <=0.9 is considered as low ABI .It indicates presence of peripheral artery disease. Hypertension is a known risk factor for peripheral arterial disease.(PAD) along with diabetes and smoking. The present study aims at prevalence of this condition in hypertensive patients without comorbidities. The measurement of ABI is easy to take. It is non-invasive and safe, thus patient friendly. Hence it can be used to screen for lower limb ischemia in hypertensive patients.

II. Methodology

This was a cross sectional study during a period of 6 months of 198 hypertensive patients according to JNC7 who visit the Department of Medicine. They were enrolled for the study after excluding those with diabetes mellitus, chronic kidney disease, dyslipidemia, coronary artery disease, smokers and those with symptoms of peripheral vascular disease. The data of each patient was collected on a proforma specially designed for this study. This includes name, age, height, weight, systolic blood pressure, diastolic blood pressure, duration of hypertension and ankle brachial index.Blood pressure was measured in both ankles and arms with thepatient in supine position. Systolic blood Pressure was measured in both arms with the help of Blood pressure cuff and Doppler instrument (Ultra Tec PD1 v with a vascular probe of 5 MHz) in the ante cubital fossa. Systolic pressure was measured at the left and right dorsalis pedis arteries. If it was not found in dorsalis pedis arteries, systolic blood pressure was recorded at the left and right posterior tibial arteries. The blood pressure cuff was applied to the ankle just proximal to the medial malleoli. This entire data was analysed for statistical significance and correlation.

III. Statistical Analysis

Data obtained were maintained in the master chart in Microsoft Excel format and analysis was done using SPSS 11.5 version. Data was arranged in proportions. The variables were compared using Pearson correlation coefficient. A p value of <0.05 was considered to be statistically significant.

IV. Results

A total of 198 patients were included in this study. The age distribution of the population was according to Table 1. 31% were males and 69% were females. there were 53% patients with normal BMI. There were 45% of patients were overweight and 2% were obese. Duration of hypertension among the subjects is depicted in Table 2. Patients were also sorted according to their age as shown in Table1. Percentage of patients with ABI <= 0.9 and those with >0.9 are determined in each group and plotted in the form of bar diagram as shown in Fig.1, which indicates that the percentage of patients with ABI <=0.9 increases as age increases. Fig 2 shows that percentage of patients with ABI ≤ 0.9 increases as BMI increases. Percentage of patients with ABI ≤ 0.9 were calculated for various duration of hypertension as shown in the Table3. This is depicted as a bar diagram in Fig.3 , which shows that percentage of patients with ABI≤ 0.9 increases as duration of hypertension increases. Fig 4 shows that our patients fall between SBP of 146 to 190 mm Hg. It also depicts that as SBP increases ABI decreases which is statistically significant with p value of 0.0001. Fig 5 shows as DBP increases ABI decreases and this was found to be statistically significant with the p value of 0.039. Fig 7 is a scattered diagram that shows correlation between pulse pressure and ABI. The correlation trendline indicates that as pulse pressure increases ABI decreases. This was found to be statistically significant with the p value of 0.0001.

V. Figures and tables

Table 1 – Age distribution and ABI

AGE	<=0.9	>0.9
21-30	0	100
31-40	27.6	72.4
41-50	50	50
51-60	50.7	49.3
61-70	60.9	39.1
71-80	100	0
81-90	100	0

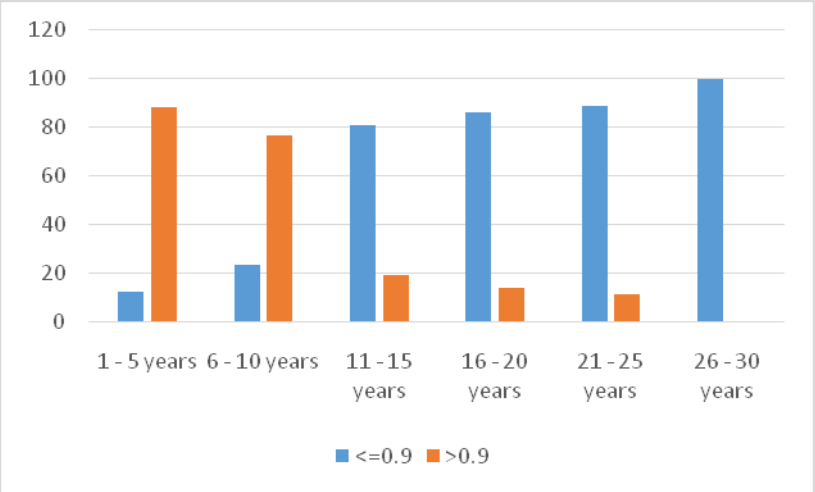

Figure 1- Age distribution and ABI

Table 2 – duration of hypertension and ABI

Duration in years	<=0.9	>0.9
1 - 5 years	11.9	88.1
6 - 10 years	23.2	76.8
11 - 15 years	80.8	19.2
16 - 20 years	86.4	13.6
21 - 25 years	88.9	11.1
26 - 30 years	100	0

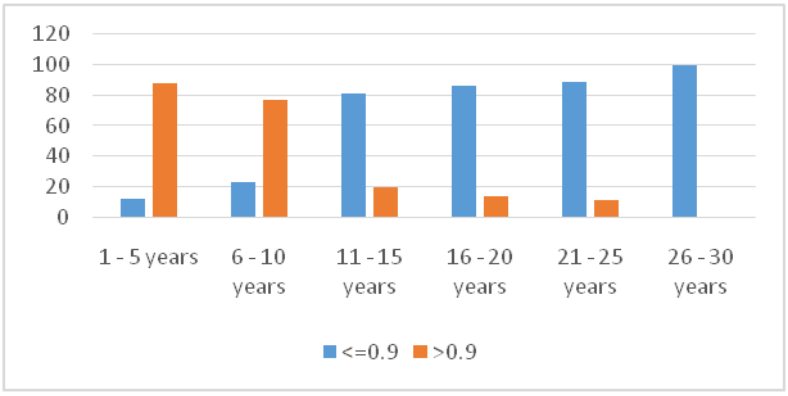

Figure 2- comparison between BMI and ABI

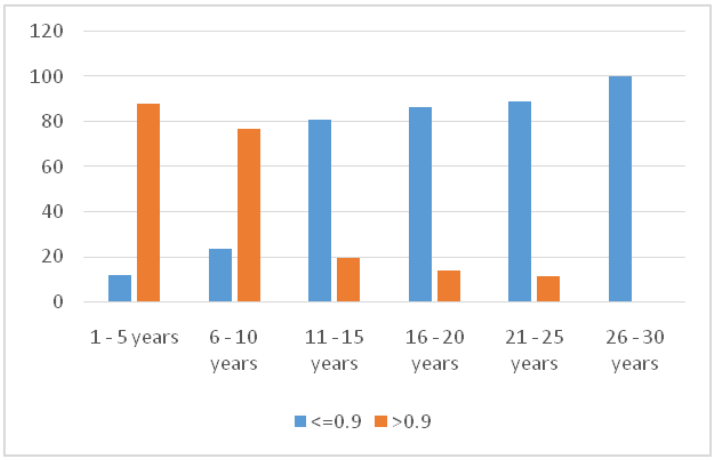

Figure 3 - Duration of hypertension and ABI

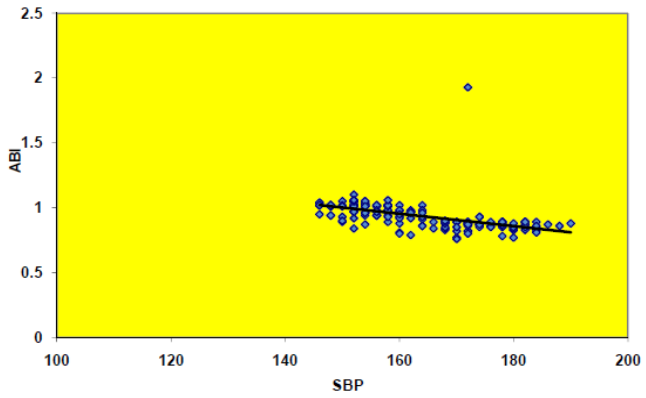

Figure 4 – Correlation between SBP and ABI

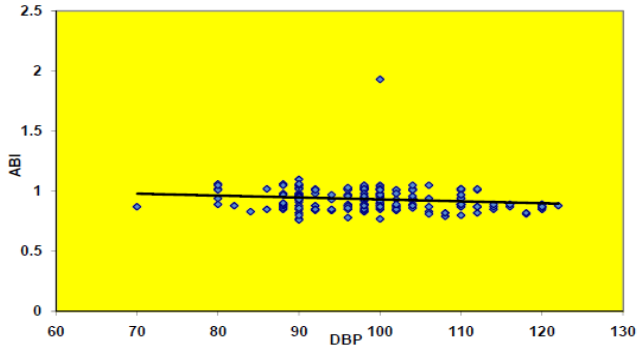

Figure 5 – correlation between DBP and ABI

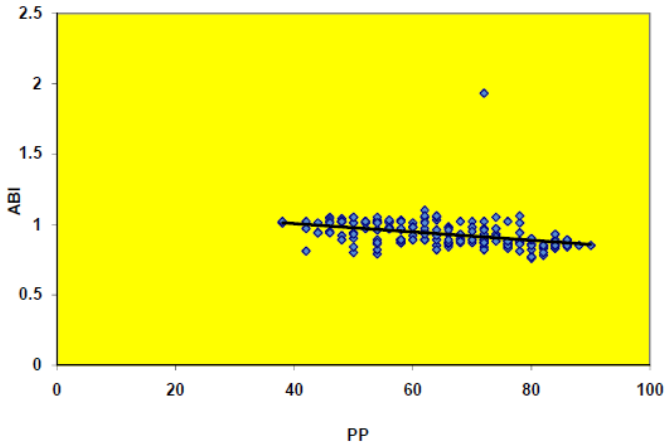

Figure 6 – Correlation between PP and ABI

VI. Discussion

There were a total of 198 patients enrolled in this study. Prevalence of asymptomatic PAD was found to be 47%. ABI was ≤ 0.9 in 46.8% males ABI was ≤ 0.9 in 47.8% females. There was inverse correlation between age and ABI. There was inverse correlation between ABI and BMI. There was inverse Correlation between ABI and systolic pressure. There was inverse correlation between ABI and diastolic pressure. There was inverse correlation between ABI and pulse pressure. There was inverse correlation between ABI and duration of hypertension.

VII. Conclusion

Subclinical peripheral artery disease is common in hypertensive patients even though they do not have other comorbidities. Measuring the Ankle Brachial Index is an efficient method to detect patients who are at increased cardiovascular risk. It would help treating physician to advocate preventive measures to reduce the risk. It would be beneficial to include Ankle Brachial index as a routine in primary care set up as it is safe, easy and patient friendly. Measuring ABI may significantly reduce the future cardiovascular events in hypertensive patients .

References

[1]. The Seventh Report of the Joint National Committee on Prevention,Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7report.JAMA 2003; 289:2560.
[2]. Burt VL, Whelton P, Roccella EJ, et al: Prevalence of hypertension in the U.S. adult population: Results from the Third National Health and Nutrition Examination Survey, 1988–1991. Hypertension 1995; 25:305.
[3]. Samson RH, Showalter DP, Liss E: Incidence of hypertension in patients referred for vascular laboratory testing. In press.
[4]. Lewington S, Clarke R, Qizilbash N, et al: Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. Lancet 2002; 360:1903.
[5]. MacMahon S, Peto R, Cutler J, et al: Blood pressure, stroke, and coronary heart disease: I. Prolonged differences in blood pressure: Prospective observational studies corrected for the regression dilution bias. Lancet 1990; 335:765.
[6]. Vasan RS, Lerson MG, Leip EP, et al: Impact of high-normal blood pressure on the risk of cardiovascular disease. N Engl J Med 2001; 345:1291. 104
[7]. Borghi C, Dormi A, Ambrosioni E, Gaddi A: Relative role of systolic, diastolic, and pulse pressure as risk factors for cardiovascular events in the Brisighella Heart Study. J Hypertens2002; 20:1737.
[8]. Buhler FR, Bolli P, Kiowski W, et al: Renin profiling to select antihypertensive baseline drugs. Am J Med 1984; 77:36.
[9]. Trenkwalder P, James GD, Laragh JH, Sealey JE: Plasma renin activity and plasma prorenin are not suppressed in hypertensives surviving to old age. Am J Hypertens1996; 9:621.
[10]. Alderman MH, Madhavan S, Ooi WL, et al: Association of the renin sodium profile with the risk of myocardial infarction in patients with hypertension. N Engl J Med 1991; 324:1098.
[11]. Cavallini MC, Roman MJ, Pickering TG, et al: Is white coat hypertension associated with arterial disease or left ventricular hypertrophy?.Hypertension 1995; 26:413.

Sundaramoorthy Ushalakshmi. "Study of Ankle Brachial Index in Systemichypertension." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 7, 2019, pp 68-71.