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ANKLE BRACHIAL INDEX (ABI) IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Abstract:

Objective: *To estimate the ankle brachial index in patients with type 2 diabetes mellitus at tertiary care hospital*

Patients and Methods: *All the diabetic population (≥ 3 years duration) between 40 - 80 years of age, either gender without previous diagnosis of peripheral arterial disease or clinical suggestive of intermittent claudication intermittent visited at tertiary care hospital from January 2016 to June 2016 & gave voluntary consent to participate in the study were recruited. The highest systolic blood pressure of lower limbs was divided by highest systolic blood pressure of lower limb was considered as ABI and the normal range is 0.9 and 1.2 while the ABI <0.9 was considered as low ABI (existence of arterial disease). The quantitative variables are presented as mean (deviation standard) and qualitative as frequencies and percentages by using statistical analyze program SPSS version 16.*

Results: *During six months study period total fifty patients with type 2 diabetes mellitus were evaluate for ankle-brachial index. The mean ± for age (years) & duration of diabetes mellitus (years) for whole population was 60.52±8.92 & 9.95±3.85 respectively. The ABI was detected in 34 (68%) of the patients with male gender predominance 22 (64.7%) while the mean ± SD for ABI in male and female population was 0.51±2.31 and 0.63±1.94 respectively.*

Conclusion: *Low ABI was detected in diabetic population and is strong risk factor for cardiovascular and cerebrovascular diseases.*

Keywords: *Ankle brachial index, Diabetes mellitus and Peripheral vascular disease.*

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INTRODUCTION:

Diabetes is associated with an increased risk of disease coronary and cerebrovascular disorders with higher risk mortalities. In addition to prevalence of arteriosclerosis high cardiovascular mortality of this population is due to its worse prognosis after a coronary complication [1-3]. All this highlights the importance of establishing preventable strategies in this high risk group. Early diagnosis of the existence of vascular disease in asymptomatic diabetic subjects could increase the degree of attention to the existence of cardiovascular risk factors, favor adoption of energetic preventive strategies aimed at control and establish measures to diagnose the presence of arteriosclerosis in vascular territories and reducing the risk of vascular complications. [4, 5] The ankle-brachial index (ABI) is a simple technique and accessible to detect the presence of obstructive artery of lower limbs [6, 7], Various studies have shown that a reduced value, usually lower than 0.9, is associated with a higher risk of vascular complications (peripheral vascular diseases) and death [8, 9]. The systematic approach detect very high risk subjects who could get benefit from a strict glycemic control, the various risk factors and extensive studies for asymptomatic vascular disease in other vascular territories [10]. Thus the present study evaluates the prevalence of low or pathological ankle brachial pressure index in diabetic population at tertiary care hospital as early detections can save the patients from various complications associated with peripheral vascular diseases.

PATIENTS AND METHODS:

All the diabetic population (≥ 3 years duration) between 40 - 80 years of age, either gender without previous diagnosis of peripheral arterial disease or clinical suggestive of intermittent claudicating intermittent visited at tertiary care hospital from January 2016 to June 2016 & gave voluntary consent to participate in the study were recruited and enrolled in this six months cross sectional descriptive study. The detail history, physical examination and relevant investigations were advised and the blood sample drawn for blood glucose, HBA1C, lipids and lipoproteins while the subjects with a diagnosis of type I diabetes mellitus were excluded from the analysis. A portable eco-doppler was used to determine the ankle ankle-brachial index (ABI), bidirectional 8 MHz and sphygmomanometer Calibrated mercury. The systolic blood pressure was measured (PAS) in the posterior tibial artery and dorsalis pedis arteries of both lower limbs and in the brachial artery of both upper limbs. The higher systolic reading of the left and right arm brachial artery is generally used for the assessment while the pressures in each foot's posterior tibial artery and dorsalis pedis artery are measured with the higher of the two values used as the ABI for that leg. The highest systolic blood pressure of lower limbs was divided by highest systolic blood pressure of lower limb. The normal range is 0.9 and 1.2 while the ABI <0.9 was considered as positive test (existence of arterial disease). All participants gave their informed consent and the quantitative variables are presented as mean (deviation standard) and qualitative as frequencies and percentages by using statistical analyze program SPSS version 16.

RESULTS:

During six months study period total fifty patients with type 2 diabetes mellitus were evaluate for ankle-brachial index. The mean ± for age (years) & duration of diabetes mellitus (years) for whole population was 60.52±8.92 & 9.95±3.85 respectively. The demographical and clinical profile presented in Table 1 while the frequency of low ABI is presented in Table 2.

TABLE 01: THE DEMOGRAPHICAL AND CLINICAL PROFILE OF THE PATIENTS

AGE (years)	**FREQUENCY (N=50)**	**PERCENTAGE (%)**
40-49	11	22
50-59	14	28
60-69	13	26
70-80	12	24
GENDER		
Male	32	64
Female	18	36
RESIDENCE		
Urban	23	46
Rural	27	54
Duration of diabetes mellitus (yrs)		
3-5	06	12
5-10	18	36
>10	26	52
		.
HBA1C		
Normal	12	24
Raised	38	76
Treatment Status		
Irregular	32	64
Regular	18	36
Type of Treatment		
Oral hypoglycemic drugs	08	16
Insulin	05	10
Both	05	10

TABLE 02: THE FREQUENCY OF LOW ABI IN DIABETIC POPULATION

PARAMETER	**Frequency**	**Percentage (%)**
Ankle-brachial index (<0.9)		
Yes	34	68
No	16	32
Gender (n=34)		
Male	22	64.7
Female	12	35.2
Mean ±SD for ABI		
Male	0.51±2.31	
Female	0.63±1.94	

DISCUSSION:

Our data show that diabetic patients have a high prevalence of a low ABI (68%) and this prevalence, however, does not can be considered as a whole population as the study was single institutional study. In fact, the prevalence of a low ABI in previous studies in diabetics is reported to be higher, between 16% and 29%, according to age, gender and time of evolution of diabetes [11, 12]. In our study this prevalence was higher in males, at more advanced ages, in subjects who continued treatment with oral anti diabetics or insulin, which translated a more evolved disease, and in those who presented cardiovascular disease. The risk factors identified were smoking, hypertension, the raised level for serum cholesterol and triglycerides (TG), LDL-C and reduce level of HDL-C and is consistent with the study by Kennedy M, et al [13]. Diabetics with pathological ABI had a raised concentration of LDL-C however the LDL-C is a risk factor for the development of peripheral arterial disease in several studies [14, 15]. The presence of metabolic syndrome is also association with a higher prevalence of abnormal ABI in our population. Similar finding was also observed that the presence of the metabolic syndrome in diabetics is associated with a higher mortality rate [16]. In the DIAD study, 22% of diabetics without known coronary disease or clinical suspect had myocardial perfusion defects and this frequency is much higher in the diabetics with peripheral arterial disease [17, 18]. The American Diabetes Association (ADA) advises that an active search for coronary disease should be performed in diabetic population with peripheral arteriopathy and also recommended the screening for ABI to improve risk stratification in such population [19]. Thus, the prevalence of a low ABI is exist in diabetic population, relating to age, gender, time of evolution of diabetes and the presence of arteriosclerosis in other vascular territories. The determination in this population would allow to those high risk individuals who are candidates for more energetic control of their glycemic status, risk factors and screening for vascular disease at the coronary and carotid level.

CONCLUSION:

Low ABI was detected in diabetic population and is strong risk factor for cardiovascular and cerebrovascular diseases. Thus the ABI measurement is a simple, inexpensive, noninvasive and time non-consuming method for atherosclerosis and subclinical atherosclerosis detection and can supply best standard approach for the cardiovascular risk prediction.

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