



CHRONIC LIMB ISCHEMIA; ROLE OF ANKLE-BRACHIAL INDEX (ABI) IN EVALUATION OF PERIPHERAL VASCULAR INTERVENTION IN PATIENTS

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ABSTRACT... Background: The Ankle brachial index (ABI) measurements are commonly used inscreening and management of Peripheral Vascular Disease. In recent studies, Ankle brachial index (ABI) is utilized as a predictor of future atherosclerotic vascular disease and all-cause mortality. **Purpose:** The purpose of this study was to investigate utility of pre and post peripheral vascular intervention ankle-brachial index (ABI) assessment in patients with the chronic limb ischemia. **Study Design:** Quasi experimental study. **Setting:** National Institute of Cardio-Vascular Disease (NICVD), Karachi, Pakistan. **Period:** January 2013 to June 2014. **Methodology:** The study included 23 patients hospitalized. According to study inclusion/exclusion criteria, patients of chronic limb ischemia on clinical ground and the vascular lesions of lower limb according to Trans-Atlantic Inter-Society Consensus (TASC score classification II) were evaluated and recruited. The lesions were further classified into three types, Aortoiliac, Femoropopliteal and Tibioperoneal. Ankle brachial index (ABI) was classified according to American Diabetic Association. The study was approved by the ethical committee of NICVD. Data was analyzed using SPSS 20. Inc. **Results:** The mean age of the enrolled patients was 57.86 ± 6.56 years. Majority of the patients were male 18 (78.3%). The commonly found peripheral lesion was femoropopliteal in 9 (39%), TASC grade A was common with 8 (62%) of cases. ABI score done pre and post procedure showed a significant difference with a (p -value < 0.05) and there was an improvement of ABI scores in all the lesions after peripheral vascular intervention. **Conclusion:** The study results concluded that there was an improvement in ABI score after intervention of peripheral vascular surgery for lower limb segment and recommended its utility for the assessment in Peripheral Vascular Disease intervention.

Key words: Ankle-Brachial Index (ABI), Chronic Limb ischemia, Vascular Lesion, Peripheral Surgery.

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INTRODUCTION

Despite the introduction of new sophisticated tools for assessment of vascular lesions, in last thirty years, the ankle to brachial pressure index (ABPI) remains the cornerstone of non-invasive, simple and cheap screening of peripheral vascular disease (PVD).¹ Recent literature suggests that presence of PVD is a marker of increased cardiovascular risk even in asymptomatic subjects², as most of the time PVD is without symptoms or with complains mimicking other conditions leading to difficulty in early diagnosis.³ Recent guidelines recommends same intense control of risk factors and aggressive

measures for a patient with PVD considering them to be coronary risk equivalent.^{3,4} Hence, it's important to diagnose them early to pick high risk patients. Considering this evidence in relation to management strategies for a patient with PVD it looks measurement of ankle brachial index can be a great tool to pick this condition early. Initially, ABI was proposed to be an indicator of lower extremity disease^{5,6} but subsequent evidence has shown it to be a tool and marker of atherosclerosis at other sites with increase cardiovascular mortality in both symptomatic and asymptomatic patients.⁷⁻⁹

MATERIAL AND METHOD

The designed Quasi experimental study was done at National Institute of Cardiovascular Diseases and National Medical Centre from January 2013 to June 2014. Both, male and female patients with chronic limb ischemia on clinical ground further confirmed by CT Angiography were included. Lower limb vascular disease was classified according to TASC II classification for the management of peripheral vascular disease¹⁰. ABI was measured pre and post intervention by paired t-test (type of student t test) and disease severity was labeled according to American Diabetic Association (ABI 0.9-1.3 Normal, 0.7-0.9 Mild, 0.4-0.69 Moderate and < 0.4 as severe). For Statistical analysis SPSS version 21 was applied. Data description was in mean standard deviation and paired t test was used. P-value < 0.05 was taken as statistically significant for difference in pre and post intervention results.

RESULTS

Total 23 patients with lower limb arterial disease were subjected to the vascular intervention. The mean age of the patients was 57.68±6.56 years. Male and females were 18(78.3%) and 5(21.7%) respectively. 11(48%) were found to have diabetes, 21(91%) were hypertensive, 17(74%) were smoker and 20(87%) had hyperlipidemia. Three types of peripheral vascular lesion were present, Aortoiliac in 7(30%), Femoropopliteal in 9(40%) and Tibioperoneal in 7(30%) cases. TASC score (Trans-Atlantic Inter-Society Consensus) was evaluated for 13 cases which was grade A in 8(62%) cases, Grade B in 4(31%) and Grade C in 1(8%) of cases.

Baseline mean ABI score was 0.46±0.05 which got improved after intervention with peripheral vascular surgery to 0.87±0.15 (mean difference =0.41±0.1, p-value=0.001). The mean ABI score was stratified for type of lesion and mentioned in the Table-I.

| Lesions | N | Group | n=23 | |
|-----------------|---|----------|------------|---------|
| | | | Mean ±SD | P-value |
| Aortoiliac | 7 | Pre ABI | 0.44 ±0.05 | 0.001 |
| | | Post ABI | 1.00 ±0.00 | |
| Femoropopliteal | 9 | Pre ABI | 0.47 ±0.04 | 0.001 |
| | | Post ABI | 0.94 ±0.05 | |
| Tibioperoneal | 7 | Pre ABI | 0.45 ±0.05 | 0.003 |
| | | Post ABI | 0.71 ±0.17 | |

Paired t-test was applied, p-value ≤0.05 was taken as significant

Table-I. Stratification of the ABI score for type of lesion

DISCUSSION

As mentioned earlier, Peripheral vascular disease (PVD) is an indicator of systemic atherosclerosis with an association of increase risk of cardiovascular death.¹⁰ Unfortunately, it is asymptomatic in a number of cases so remained under-diagnosed.⁵ Although in some cases, critical leg ischemia can be easily recognized by its clinical presentation but the early identification of this condition continues to be a diagnostic challenge at primary care level.³ In screening for nonspecific lower limb pains especially on exertion, pulse and lower limb pressure measurements should be considered as basic screening along with keeping them on analgesics or vitamins. The measurements of ankle brachial index (ABI), a

simple non-invasive and inexpensive tool can be applied in general practice for objective screening of PVD, there are multiple guidelines available for its measurement and calculation.^{4,7,12,13,14,15} For its role in the evaluation and assessment of vascular intervention, it is successfully practice in aortoiliac and infra-inguinal arterial reconstruction with significant improvement in ABI after the procedure.¹⁶ However, the improvement in ABI values depends on disease extent, underlying condition and modality of intervention applied. As in the Inference of European Multi-center randomized control trial (Vein Graft Surveillance Trial, VGST), showed that routine duplex graft surveillance may add on more cost when compared to standard clinical follow-up and

ABPI measurement followed by selective duplex scanning. The importance of ensuring standardization and applying local quality control to ABPI measurement cannot be overemphasized in this respect.¹⁷ The sensitivity and specificity of ABI with the Doppler technique varies in chronic disease like Diabetes.^{18,19} Although, ABI has shown variability in sensitivity but found to be quite reliable in specificity.^{20,21}

For that reason we thought to utilize this tool to assess the success of revascularization and results showed post procedure improvement of ABI in all of our patients which we feel quite reassuring before discharge of the patient. If we look onto intervention of specific segments in our study, post procedure ABI after Aorto-iliac and Femoropopliteal interventions were almost within normal limits but in Tibioperoneal interventions post procedure ABI improved but haven't reached to a normal values. ABI may further be improve weeks or months after revascularization and for that reasons one can perform it on follow up visits after procedure to measure further improvement in blood flow to the effected segments.^{22,23,24,25}

CONCLUSION

We conclude that ABI measurement after intervention in chronic limb ischemia can be utilized to assess procedural success and recommend it as part of management of patients who are undergoing lower extremity revascularization procedures. A baseline ABI values may be of help in long term follow up of patient's limbs perfusion status and a guide before embarking on expensive investigations especially in our country with scarcity of health resources. Its simplicity, reproducibility and cost effectiveness can make it an obligatory assessment step in screening and peri-procedural assessment of PVD patients.

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



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AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author-s Full Name | Contribution to the paper | Author=s Signature |
|-------|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 | Fawad Farooq | Concept, design, Data analysis, Manuscript writing. |  |
| 2 | Shams Uddin Shaikh | Data collection, reviewing manuscript. |  |
| 3 | Shahbaz Shaikh | Data collection & analysis |  |
| 4 | Tariq Ashraf | Data collection |  |