Toe Brachial Indices Are an Accurate Peripheral Artery Disease Screening Tool In Vascular Deserts

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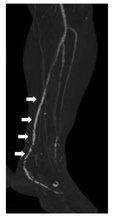
Introduction

Undiagnosed peripheral arterial disease (PAD) can progress to chronic limb-threatening ischemia (CLTI), causing pain, infection, and tissue loss. Within five years, 5-10% of PAD patients develop CLTI. Socioeconomic disadvantage is linked to higher PAD prevalence, and patients in the lowest income quartile face 38.5% higher odds of major amputation.

Despite an overall adequate number of U.S. vascular surgeons, maldistribution leaves rural areas with limited access, worsening outcomes. Targeted cardiovascular screening in vascular deserts is essential to improve health literacy and care access. Toe-brachial index (TBI) testing offers a practical alternative for PAD screening in patients with diabetes and vascular calcification, where ankle-brachial index (ABI) is unreliable.



Objective

This study aims to evaluate toe brachial indices as an accurate way to effectively screen this patient population. We hypothesize that TBI measurements will be equivalent to ABI in patients screened in vascular deserts.

Methods

99 patients screened with both ABI and TBI

- 49 patients were screened in vascular deserts (VD) at targeted events
- 50 retrospective patients were screened as new PAD patient in vascular clinic (VC)
- PAD defined as ABI <0.9 or TBI <0.7
- Non-compressibility (NC) defined as ABI ≥1.4

ANOVA and correlation analyses used to assess:

- ABI and TBI overall
- Sub-analysis: NC ABI, DM, claudication symptoms

Patient Demographics

❖ 99 patients (49 VD + 50 VC)

- 56% male, 54% Hispanic
- Average age 60 ±19 years
- 38% smokers, 36% DM
- 58% had seen a PCP in last year

❖ 50% reported claudication

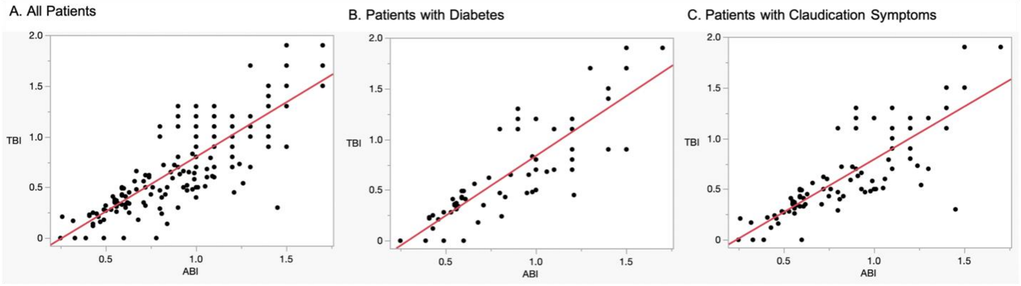
❖ 36% met criteria for PAD based on ABI/TBI

❖ 8% had NC ABI's

❖ No patients screened had undiagnosed CLTI

Results

- There was a strong correlation between ABI and TBI (Pearson's correlation coefficient 0.82, P<0.001) overall and among patients with measurable ABIs (PCC 0.83, P<0.001), but not among patients with non-compressible ABIs (PCC 0.38, P<0.001)
- Results were similar in subgroups stratified by diabetes status and claudication symptoms (both, P<0.001)



Results

There were significant and graded associations of TBI with ABI. (P<0.001)

- Mean TBI was 0.38 (95% CI 0.31, 0.45) among patients with ABI<0.9
- Mean TBI was 0.90 (95% CI 0.84, 0.96) among patients with ABI between 0.9 and 1.4
- Mean TBI was 1.33 (95% CI 1.18, 1.48) among patients with ABI>1.4

Conclusion

Toe-brachial index (TBI) is an efficient and accurate tool for PAD screening, especially in patients with diabetes and non-compressible vessels. It requires fewer resources, minimal training, and is well-suited for use in vascular deserts, making it a practical solution for improving access to care in at-risk communities.