



## Letter to the Editor

**Digital ankle brachial index— a valuable tool for Office evaluation of PAD?**


It is with pleasure that I reviewed the manuscript “Validation of digital ankle brachial index as a screening tool in symptomatic patients with peripheral artery disease” [1]. PAD is a common disease of the cardiovascular system that affects approximately 8.5 million Americans over 40 years old. This disease is associated with significant morbidity, mortality, and quality of life (QoL) impairment [2]. Therefore, early and accurate detection of significant disease in symptomatic patients is crucial.

In order to appreciate the utility of the technology discussed in the manuscript, it is useful to review the current algorithm for the diagnosis of PAD. History and focused physical examination remain the first steps in screening all patients for PAD and is a Class I recommendation by the current American Heart Association (AHA) guidelines [3]. Studies have demonstrated patients with confirmed PAD often do not present with typical claudication but demonstrate other atypical leg symptoms, functional impairments or are asymptomatic [4–6].

If the focused clinical examination raises suspicion for PAD, a traditional resting ankle brachial index (ABI) is the next test of choice, and is also an AHA Class I recommendation [3]. Guo X et al reported that ABI was associated with 91% sensitivity and 86% specificity, ( $p < 0.001$ ), for detecting hemodynamically significant stenosis (lesions  $>$  or  $=$  50%). Despite this, ABIs are often limited in their practical utility. In addition to being moderately time consuming and requiring trained staff, it is difficult to fit into the majority of busy PAD/CLI clinics, complicating the flow of patient care. These practical limitations shed light on an area with potential need for improvement. In fact, currently industry is heavily focused on device development for the detection and quantification of PAD severity. New technology may create the next reliable and effective screening tool.

The FloChec™ digital ABI is the measurement of the blood volume through plethysmography, the device uses blood flow sensors with infrared light emitting diode (LED) and analyzes this information using a digital algorithm generating a ratio. Digital ABI presents as an alternate tool to substitute resting ABI. The device is less time consuming, easier to perform, and requires little staff training. If appropriately validated, the digital ABI could potentially be included in patient intake as a new vital sign.

The effectiveness of digital ABI has been tested in both primary care and specialized vascular centers with limited results and evidence [7,8]. Diage RT, et al, compared the findings of Digital ABI ratio in a primary care setting in both symptomatic and asymptomatic patients but presented a low correlation of claudication with flow obstruction. Digital

ABI technology, FDA approved since 2010 has been used in primary care as screening tool for PAD, being a simple to operate alternative to resting ABI [7]. Pereira, K et al. presented in 2018 Society of Interventional Radiology Meeting the results of their prospective clinical trial using a digital ABI device from a different manufacturer with correlation to angiographic and doppler ultrasound findings. The use by vascular specialists is rising and more data is being published.

Digital ABI is a novel tool for screening and improve clinical decision making in patients with PAD. This is the first study with significant positive findings through correlation with angiographic findings making this article very relevant for clinical practice. This manuscript brings a new perspective of digital ABI being a potential new evolution in the triage of patients with PAD. Easy to implement in most practices and able to be used both as a follow up parameter and for selection for invasive angiography, FloChec™ digital ABI has been shown to be a valid screening tool with high sensitivity (84% -  $p = 0.007$ ) and an independent predictor of PAD on this multivariate analysis. 1 The small sample size can be considered a limitation of this study, but the content of the paper can serve as a signal for developing a larger scale multicentric prospective study.

This manuscript will most certainly affect my clinical planning through digital ABI.

## References

- [1] Gajanana D, Raikar MG, Ram P, et al. Validation of digital ankle-brachial index as a screening tool in symptomatic patients with peripheral arterial disease. *Cardiovasc Revasc Med* 2019;211–3.
- [2] Writing Group Members, Mozaffarian D, Benjamin EJ, et al. Heart Disease and Stroke Statistics–2016 Update: A Report From the American Heart Association. *Circulation* 2016;133(4):e38–360. <https://doi.org/10.1161/CIR.0000000000000350>.
- [3] Gerhard-Herman MD, Gornik HL, Barrett C, et al. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol* 2017;69(11):1465–508. <https://doi.org/10.1016/j.jacc.2016.11.008>.
- [4] McDermott MM, Mehta S, Greenland P. Exertional leg symptoms other than intermittent claudication are common in peripheral arterial disease. *Arch Intern Med* 1999;159(4):387–92.
- [5] Hirsch AT, Criqui MH, Treat-Jacobson D, et al. Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA* 2001;286(11):1317–24.
- [6] McDermott MM, Greenland P, Liu K, et al. Leg symptoms in peripheral arterial disease: associated clinical characteristics and functional impairment. *JAMA* 2001;286(13):1599–606.
- [7] Diage TR, Johnson G, Ravipati G. Digital ankle-brachial index technology used in primary care settings to detect flow obstruction: a population based registry study. *BMC Res Notes* 2013;6:404. <https://doi.org/10.1186/1756-0500-6-404>.
- [8] Wilson-Flewelling S, Salamo R. Value of a novel Automated (Digital) Ankle brachial Index device as a screening tool for PAD in an outpatient clinic setting: A preliminary prospective study. Presented at the:

Robert E. Beasley  
2 January 2019