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### Should the ankle-brachial index be included in the routine cardiovascular assessment?

Peripheral artery disease (PAD) is a common manifestation of systemic atherosclerosis, with a prevalence ranging from 4% in the Western healthy adult population over the age of 40 years, to 29% in patients screened in primary care offices, with diabetes, cigarette smoking, and age as risk factors. Peripheral artery disease is highly associated with the risk of cardiovascular ischemic events and excess total mortality.

Identification and quantification of this systemic risk have been established from numerous population-based and observational case-control studies. The PAD risk of systemic cardiovascular events is driven primarily by concomitant coronary and cerebrovascular disease. In patients with PAD who have no other clinical evidence of coronary or cerebral disease, the annual risk of myocardial infarction, stroke, and vascular death is approximately 3%/year. However, adding clinical coronary disease increases the event rate to approximately 6%/year, and in patients with all three territories affected, the event rate is as high as 9%/year.<sup>1</sup> Moreover, patients with claudication (symptoms during walking exercise) have far lower mortality event rates (1% to 2%/year) than do patients with critical limb ischemia (defined as ischemic symptoms at rest, ulceration, or gangrene), with an annual mortality risk of up to 12%/year.<sup>2</sup>

As analyzed in a recent editorial,<sup>3</sup> identification of PAD is often based on a simple, risk-free, and cost-effective hemodynamic test, the ankle-brachial index (ABI). Typically, a Doppler ultrasonography instrument is used to identify the arterial pulse, and systolic pressures are measured in both arms and at the dorsalis pedis and posterior tibial arteries at the ankles. These measurements are made with the patient supine and usually can be obtained in 15 minutes. Each of the ankle pressures is normalized to the single highest arm pressure, and values <0.90 are considered diagnostic of the disease. In addition to using a single cutoff point for the diagnosis of PAD, the hemodynamic disease severity across the range of ABI values <1.00 is also highly associated with risk. More recently, the independent contribution of the ABI to assessment of cardiovascular risk has been defined by an international ABI meta-analysis that included more than 480 000 person-years of follow-up in 24 955 men and 23 339 women. After adjustment for the Framingham risk score, the ABI provided significant improvement in predicting cardiovascular risk, independently of established risk

factors in a broad population. In fact, the ABI resulted in reclassification of the Framingham risk estimate in approximately 20% of men and one-third of women.

Recently a long-term study has been published, aiming at examining the association of progressive versus stable peripheral arterial disease (PAD) with the risk of future cardiovascular (CV) events.<sup>4</sup> In 508 subjects (59 women, 449 men) ABI and CVD risk factors were measured twice (1990 to 1994). Mortality and morbidity were tracked for 6 years after Visit 2 using vital statistics and hospitalization data. Decreases in ABI of more than 0.15 between Visit 1 and Visit 2 approximately doubled all-cause and CV mortality at 3 years, and CV morbidity/mortality (RR: 1.9) at 6 years, independent of Visit 2 ABI and other risk factors. So, in addition to the known prognostic significance of a low ABI, and more recently, a high ABI, this study shows a deteriorating ABI also carries a poor prognosis independently of severity and traditional cardiovascular risk factors.

Given the wealth of information obtained from this simple hemodynamic test, current ACC/AHA guidelines have provided a Class 1A recommendation for measuring the ABI in "at-risk" populations.<sup>5</sup> In contrast, the US Preventive Services Task Force recommended against routine screening for PAD.<sup>6</sup> The rationale was that screening with the ABI would not provide information "beyond treatment based on standard cardiovascular risk assessment" and that screening asymptomatic adults could lead to increased harm due to "false positive results and unnecessary workups."

Clinical trials are needed that include measurement of the ABI as an entry criterion, to determine if long-term treatment strategies targeting PAD improve outcomes.

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