The ankle–brachial index independently predicted all-cause mortality in high-risk patients with peripheral arterial disease

Thatipelli MR, Pellikka PA, McBane RD, et al. **Prognostic value of ankle-brachial index and dobutamine stress echocardiography for cardiovascular morbidity and all-cause mortality in patients with peripheral arterial disease.** J Vasc Surg. 2007;46:62-70.

Clinical impact ratings: Cardiology ★★★☆☆☆

Question

In high-risk patients referred to a vascular center for evaluation of peripheral arterial disease (PAD), how does the ankle–brachial index (ABI) compare with dobutamine stress echocardiography (DSE) for predicting cardiovascular (CV) morbidity and all-cause mortality?

Methods

Design: Cohort study comparing 2 previously established independent predictors of CV risk (ABI and DSE).

Setting: Gonda Vascular Center, Mayo Clinic, Rochester, Minnesota, USA.

Patients: 395 of 437 patients (mean age 70 y, 60% men) who were referred to the vascular center for PAD and underwent ABI and DSE testing were included in the analysis. Exclusion criteria were noncompressible arteries, incomplete vascular laboratory evaluation, and poor-quality baseline echocardiographic images.

Description of prediction guide: The ABI was the ratio of the greater of ankle systolic to the greater of brachial systolic blood pressures (measured in the supine position). The lower ratio was used if patients had bilateral disease. The ABI categorized patients into abnormal (score < 0.9) and normal (score ≥ 0.9) groups. DSE testing comprised evaluation of the left ventricular ejection fraction and wall motion at rest or with stress. DSE categorized patients into positive (inducible myocardial ischemia defined as new or worsening wall motion abnormalities with stress) and negative groups, or abnormal (ischemia or fixed wall motion abnormalities present at rest and unchanged with stress) and normal groups. Multivariate associations between clinical and echocardiographic variables and CV events or all-cause mortality were assessed using Cox proportional-hazard models.

Outcomes: CV events (stroke, transient ischemic attack, unstable angina, and myocardial infarction) and all-cause mortality.

Main results

At a mean 4.7 years, 27% of patients had a CV event and 39% died. Multivariate analysis including several clinical factors showed that abnormal ABI was the best predictor of all-cause mortality. ABI was not an independent predictor for CV events; carotid disease, diabetes mellitus, and β-blocker therapy were independent predictors. Neither positive nor abnormal DSE predicted CV events or all-cause mortality (Table).

Conclusions

The ankle–brachial index independently predicted all-cause mortality, but not cardiovascular events, in high-risk patients referred to a vascular center for evaluation of peripheral arterial disease. Dobutamine stress echocardiography did not predict cardiovascular events or mortality.

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Ankle-brachial index (ABI) vs dobutamine stress echocardiography (DSE) for predicting death and cardiovascular (CV) events in patients with peripheral arterial disease*

Outcomes	Hazard ratio (95% CI)		
	Abnormal ABI	Positive DSE	Abnormal DSE
All-cause mortality	2.34 (1.36 to 4.05)	1.16 (0.86 to 1.57)†	1.11 (0.79 to 1.57)†
CV events	1.69 (0.81 to 3.55)†	1.13 (0.76 to 1.68)†	1.33 (0.86 to 2.08)†

*CI defined in Glossary. Results based on multivariate analysis of demographic, clinical, and echocardiographic variables.
†Not statistically significant.

Commentary

Thatipelli and colleagues performed a retrospective chart review of patients referred to a tertiary care center for assessment of PAD by ABI measurement. Because all patients underwent DSE on the basis of clinical indications, most patients had known or suspected coronary artery disease in addition to PAD. The selection of a cohort with a high pretest probability of coronary disease may have hampered the prognostic value of DSE. Conversely, this study confirms the utility of the ABI for risk stratification in PAD. The study also reemphasizes the high vascular risk for patients with objective evidence of PAD.

What should clinicians do with these results? Given the global atherothrombotic risk conferred by PAD—nearly 67% of patients in the study had a CV event or died in < 5 years—the immediate imperative should be risk-factor modification for all patients with confirmed PAD. Additionally, because patients with moderate PAD (ABI score 0.5 to 0.8) or severe PAD (ABI score < 0.5) had even worse vascular morbidity and mortality, the data suggest that close follow-up and more intensive management of risk factors (with high-dose statins and optimized antihypertensive therapy) should be applied to such patients (1-3).

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