

# High Ankle-Brachial Index Spells Trouble, Too

BY BRUCE JANCIN  
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MUNICH — Just when a low ankle-brachial index is gaining traction in clinical practice as a useful predictor of cardiovascular events, new evidence indicates a high ankle-brachial index also confers significant risk.

Historically, high ankle-brachial index (ABI) values were dismissed as erroneous and were tossed out. Not anymore. They have clinical value, Dr. Denis L. Clement said at the annual congress of the European Society of Cardiology.

"Many, many studies show that the lower your ABI, the higher your risk. The second part of the ABI story is that a high ABI is also a problem. It's a brand-new picture," said Dr. Clement, emeritus professor of cardiology and angiology at the University of Ghent (Belgium).

He cited a recent report from the National Institute on Aging-sponsored Health ABC (Aging and Body Composition) study. The investigators—led by Kim Sutton-Tyrrell, Dr.P.H., professor and vice-chair of the department of epidemiology at the University of Pittsburgh—concluded that among older adults, both low and high ABIs (that is, values less than 0.91 or greater than 1.30) confer similarly elevated risks for subsequent development of coronary heart disease.

The prospective study involved 2,886 adults aged 70-79 years in the Pittsburgh and Memphis areas who were followed for a mean of 6.7 years. At baseline, a normal ABI (range, 0.91-1.30) was present in 80% of subjects; low values were present in 13%, high values in 5%, and noncompressible leg arteries in 2%.

After adjustment for age, sex, diabetes, and conventional cardiovascular risk factors, the risk for coronary disease events associated with a low ABI was 41% greater than in subjects with a normal ABI. A high ABI conferred a 50% increased risk, whereas noncompressible arteries carried a 65% increased risk (Stroke 2008;39:863-9).

Noncompressible arteries independently conferred particularly high risks of heart failure and stroke (2.4- and 2.1-fold increases, respectively) as well as a 78% increase in all-cause mortality. High ABIs, in contrast, weren't associated with increased risks of stroke, heart failure, or total mortality, but only with coronary events.

Dr. Sutton-Tyrrell and coworkers made a case for the ABI as a particularly good test because it provides separate but complementary vascular information. A low ABI indicates peripheral artery disease (PAD), a marker of atheromatous plaque lesions in the coronary and intracranial arteries. High ABIs indicate arteriosclerotic vessel wall stiffness, which has the hemodynamic consequences of reduced coronary

filling, increased cardiac afterload, and possible microvascular damage to the brain induced by high pressures.

That's a lot of information to be gained from such a fast and simple test, Dr. Clement observed.

The clinical import of high ABIs was previously reported in a Native American



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DR. CLEMENT

population in the Strong Heart Study (Circulation 2004;109:733-9), and in a broader population in the Cardiovascular Health Study (Circulation 2006;113:388-93). But the Health ABC study is the first to define the prognostic import of high ABIs and noncompressible arteries on specific types of cardiovascular events.

Dr. Clement noted that within a month of the Health ABC study report, investigators in the department of family and preventive medicine at the University of California, San Diego, showed that a high ABI, defined in this case as 1.40 or above, was associated with increased prevalence

of foot ulcers, neuropathy, stroke, and heart failure, as well as worse physical-functioning quality of life scores (J. Am. Coll. Cardiol. 2008;51:1292-8).

He cited yet another major ABI study published in recent months: a University of Edinburgh report involving nearly 29,000 supposedly normal Scottish men and women older than age 50 who were free of clinical cardiovascular disease. The prevalence of an ABI of 0.90 or less was 7.3% in men and 13.6% in women (Eur. J. Cardiovasc. Prev. Rehabil. 2008;15:370-5).

"Most of us thought PAD was primarily a man's disease. Please correct your thinking," Dr. Clement urged. "In this study there were more women than men with abnormal ABIs. It's a disease of both sexes."

He hailed as practice-changing a recent meta-analysis of nearly 50,000 men and women featuring more than 480,000 person-years of follow-up that highlighted the value in combining ABI measurement with the standard Framingham risk score.

The combined assessment markedly improved cardiovascular risk stratification, compared with the Framingham score alone. In fact, in each 10-year Framingham risk category, a low ABI was associated with roughly a doubling of total and cardiovascular mortality and major coronary events, compared to what was predicted from the Framingham score alone (JAMA 2008;300:197-208). ■

## Doppler Still Best Method for Obtaining Ankle-Brachial Index

BY BRUCE JANCIN  
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MUNICH — Neither pulse palpation nor an automatic oscillometric blood pressure device is a reliable substitute for Doppler determination of ankle-brachial index, according to a comparative study.

Experts agree that the ankle-brachial index (ABI) is an extremely useful screening test for peripheral artery disease and cardiovascular risk—and that it is underutilized in clinical practice. There has been considerable interest in pulse palpation and automatic oscillometric methods as alternatives to determining ABI using a Doppler device. The hope has been that these lower-cost, low-tech alternatives might boost the popularity of routine ABI screening in primary care. But they simply don't make the grade, Dr. Denis L. Clement indicated at the annual congress of the European Society of Cardiology. He cited a recent French study that compared the three methods of measuring ABI in 54 subjects.

The mean ABI by Doppler—the only validated method—was 1.03, well within what is gener-

ally considered normal. In contrast, the mean ABI in the same subjects as determined by pulse palpation by the same physicians was 0.85, which is supposed to indicate occlusive peripheral artery disease.

The automatic blood pressure device yielded a mean ABI of 1.09; however, both intra- and interobserver variability were unacceptably high for this method. The same was true for pulse palpation, according to the investigators (Int. J. Clin. Pract. 2008; 62:1001-7).

Another recent technical development in ABI measurement involves using the lower rather than the higher of the two ankle pressure readings, continued Dr. Clement, emeritus professor of cardiology and angiology at the University of Ghent (Belgium).

The American Heart Association currently recommends measuring the systolic blood pressure of both the anterior and posterior tibial arteries of each leg, then using the higher of the two ankle pressures in calculating the ABI for each leg. But Dr. Christine Espinola-Klein and coworkers at Johannes Gutenberg University Mainz (Germany) have

shown this method excludes a sizeable group of individuals at high risk for cardiovascular events. Better to use the lower ankle pressure reading, according to the investigators.

They followed 812 patients for a median of 6.6 years after undergoing ABI determination during hospitalization for chest pain. By the standard definition of ABI using the higher ankle pressure, 25% of patients had peripheral artery disease as defined by a baseline ABI below 0.9. Another 11% of patients had an ABI of less than 0.9 when the lower ankle pressure reading was utilized, but not by the standard definition; Dr. Espinola-Klein and coworkers called this the "suspected PAD" group.

During follow-up, 19% of patients experienced an MI, stroke, or cardiovascular death. The event rate was 28.4% in patients with baseline PAD as defined by ABI in the standard manner and was similar at 25% in those with suspected PAD based on the lower ankle pressure. Those without PAD according to the modified definition had a significantly lower 14.8% event rate (Circulation 2008;118:961-7). ■

## Prognosis for PAD Linked to Stenotic-Lesion Location

BY MITCHEL L. ZOLER  
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MUNICH — For peripheral artery disease, like real estate, it's all about location.

In a review of 400 patients, those with proximally located peripheral artery disease (PAD) within aortoiliac vessels were more than twice as likely to die or have a cardiovascular disease event during follow-up as patients with peripheral artery disease lesions located exclusively in distal, infrailiac arteries, Dr. Victor Aboyans reported in a poster at the annual meeting of the European Society of Cardiology.

"This is the first study showing general prognosis differences in PAD patients according to disease location, independent of associated risk factors," said Dr. Aboyans, a senior physician at Dupuytren University Hospital in Limoges, France.

The study reviewed all 400 patients who underwent an initial, lower-limb angiography examination at the hospital during 2000-2005. Their average age was 68 years, and 78% were men. Arterial stenoses of 50% or more were located by two ex-

perienced vascular physicians.

Aortoiliac lesions were found in 211 patients. Many of these patients had lesions in distal arteries, too, although 56 of these patients only had aortoiliac stenoses. The other 189 patients in the study had stenotic lesions confined to distal parts of the lower vasculature, including femoro-popliteal disease and infragenicular disease.

During follow-up through April 2007, the rate of total death in the patients with aortoiliac stenoses was about 2.5-fold higher than those PAD patients who only had distal lesions in an analysis that adjusted for differences in patient age, gender, smoking status, diabetes, heart failure, prescribed drug use, and several other comorbidities and variables, Dr. Aboyans said. A second 2.5-fold increased risk was calculated for the incidence of cardiovascular disease events in the patients with proximal disease, compared with those who only had infra-iliac stenoses.

The finding needs confirmation by examination of larger numbers of patients, and by study of patients at other institutions, Dr. Aboyans said. ■