

Peripheral Artery Disease Screening and Cardiovascular Disease Risk Assessment with the Ankle-Brachial Index in Adults: Recommendation Statement

► See related Putting Prevention into Practice on page 859.

This summary is one in a series excerpted from the Recommendation Statements released by the USPSTF. These statements address preventive health services for use in primary care clinical settings, including screening tests, counseling, and preventive medications.

The complete version of this statement, including supporting scientific evidence, evidence tables, grading system, members of the USPSTF at the time this recommendation was finalized, and references, is available on the USPSTF website at <http://www.uspreventiveservicestaskforce.org>.

This series is coordinated by Sumi Sexton, MD, Associate Medical Editor.

A collection of USPSTF recommendation statements published in *AFP* is available at <http://www.aafp.org/afp/uspstf>.

Summary of Recommendation and Evidence

The U.S. Preventive Services Task Force (USPSTF) concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for peripheral artery disease (PAD) and cardiovascular disease (CVD) risk assessment with the ankle-brachial index (ABI) in adults (*Table 1*).

I statement.

See the Clinical Considerations section for suggestions for practice regarding the I statement.

Rationale

IMPORTANCE

In addition to morbidity directly caused by PAD, patients with PAD have an increased risk of CVD events because of concomitant coronary and cerebrovascular disease. Recent data from the National Health and Nutrition Examination Survey show that 5.9% of the U.S. population 40 years or older (7.1 million persons) has a low ABI (0.9 or less).¹ More than one-half of these persons do not have typical symptoms of PAD.

Early detection of PAD in asymptomatic patients is primarily considered because subsequent treatment may reduce CVD in a potentially large group of persons who are otherwise not known to be at increased risk. Patients with known CVD or diabetes mellitus are already at high risk of CVD events, and risk reduction interventions (such as antiplatelet or lipid-lowering therapies) are recommended for these patients. Screening for PAD with the ABI in persons with diabetes or known CVD is unlikely to alter effective management decisions and is therefore outside the scope of this recommendation.

DETECTION

Although the USPSTF found few data on the reliability of the ABI as a screening test in asymptomatic persons, it was able to extrapolate from evidence in symptomatic adults and conclude that there is adequate evidence that the ABI is a reliable screening test for PAD.

BENEFITS OF DETECTION AND EARLY TREATMENT

The USPSTF found no evidence that screening for and treatment of PAD in asymptomatic patients leads to clinically important benefits. It also reviewed the potential benefits of adding the ABI to the Framingham Risk Score and found evidence that this results in some patient risk reclassification; however, how often the reclassification is appropriate or whether it results in improved clinical outcomes is not known.

Determining the overall benefit of ABI testing requires not only evidence on appropriate risk reclassification but also evidence that this reclassification leads to treatments shown to improve clinical outcomes. One randomized trial found that aspirin did not reduce CVD events in patients with a low ABI.² No studies assessed the effect of lipid-lowering therapy or other cardiovascular risk reduction interventions in patients with asymptomatic PAD and no known diagnosis of CVD or diabetes. The USPSTF found inadequate evidence that early treatment of screen-detected PAD leads to improvement in clinical outcomes.

HARMS OF DETECTION AND EARLY TREATMENT

The USPSTF found no studies addressing the magnitude of harms of screening for PAD with the ABI; however, the direct harms to the patient of screening itself, beyond the

Table 1. Peripheral Artery Disease Screening and Cardiovascular Disease Risk Assessment with the Ankle-Brachial Index in Adults: Clinical Summary of the USPSTF Recommendation

Population	Asymptomatic adults without a known diagnosis of PAD, cardiovascular disease, severe chronic kidney disease, or diabetes mellitus
Recommendation	No recommendation Grade: I statement
Risk assessment	Important risk factors for PAD include older age, diabetes, smoking, hypertension, high cholesterol level, obesity, and physical inactivity. Peripheral artery disease is more common in men than women and occurs at an earlier age in men.
Screening tests	Resting ABI is the most commonly used test in screening for and detection of PAD in clinical settings. It is calculated as the systolic blood pressure obtained at the ankle divided by the systolic blood pressure obtained at the brachial artery while the patient is lying down. Physical examination has low sensitivity for detecting mild PAD in asymptomatic persons.
Balance of benefits and harms	Evidence on screening for PAD with the ABI in asymptomatic adults with no known diagnosis of cardiovascular disease or diabetes is insufficient; therefore, the balance of benefits and harms cannot be determined.
Other relevant USPSTF recommendations	The USPSTF has made recommendations on using nontraditional risk factors, including the ABI, in screening for coronary heart disease. These recommendations are available at http://www.uspreventiveservicestaskforce.org .

NOTE: For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, go to <http://www.uspreventiveservicestaskforce.org>.
ABI = ankle-brachial index; PAD = peripheral artery disease; USPSTF = U.S. Preventive Services Task Force.

time needed for the test, are probably minimal. Other harms resulting from testing may include false-positive results, exposure to gadolinium or contrast dye if magnetic resonance angiography or computed tomography angiography is used to confirm diagnosis, anxiety, labeling, and opportunity costs.

The USPSTF found inadequate evidence on the harms of early treatment of screen-detected PAD. One study showed that low-dose aspirin treatment in asymptomatic patients with a low ABI may increase bleeding.² Additional harms associated with treatment include use of unnecessary medications (or higher doses) and their resulting adverse effects and discontinuation of medications known to be effective in patients with established coronary artery disease if the patient is reclassified to a lower risk category on the basis of a normal ABI.

USPSTF ASSESSMENT

The USPSTF concludes that the evidence on screening for PAD with the ABI in

asymptomatic adults with no known diagnosis of CVD or diabetes is insufficient and that the balance of benefits and harms therefore cannot be determined.

Clinical Considerations

PATIENT POPULATION

This recommendation applies to asymptomatic adults who do not have a known diagnosis of PAD, CVD, severe chronic kidney disease, or diabetes.

ASSESSMENT OF RISK

In addition to older age, major risk factors for PAD include diabetes, smoking, hypertension, high cholesterol level, obesity, and physical inactivity, with smoking and diabetes showing the strongest association.³ PAD is more common in men than in women and occurs at an earlier age in men, possibly in part because of the higher prevalence of smoking in men. Among healthy U.S. men 40 to 75 years of age without a history of CVD, the risk of PAD over 25 years in the

absence of four conventional cardiovascular risk factors (smoking, hypertension, hypercholesterolemia, or type 2 diabetes) is rare (nine cases per 100,000 person-years).⁴ These four risk factors account for 75% of all cases of PAD, and at least one of these risk factors is present at the time of PAD diagnosis in 96% of men. Therefore, if screening is determined to be beneficial, it would probably be most beneficial to persons who are at increased risk of PAD and are not already receiving cardiovascular risk reduction interventions.

PAD is a manifestation of systemic atherosclerosis and is typically considered a predictor for other types of CVD (coronary artery disease or cerebrovascular disease) and CVD events, such as myocardial infarction, cerebrovascular accident, and death. Patients with PAD are at increased risk of CVD events because of concomitant coronary and cerebrovascular disease.⁵

SCREENING TESTS

Resting ABI is the most commonly used test in screening for and detection of PAD in clinical settings, although variation in measurement protocols may lead to differences in the ABI values obtained. The ABI is calculated as the systolic blood pressure obtained at the ankle divided by the systolic blood pressure obtained at the brachial artery while the patient is lying down. A ratio of less than 1 (typically defined as less than 0.9) is considered abnormal and is commonly used to define PAD. Physical examination has low sensitivity for detecting mild PAD in asymptomatic persons. Although femoral bruit, pulse abnormalities, or ischemic skin changes significantly increase the likelihood ratio for low ABI (≤ 0.9), these signs indicate moderate to severe obstruction or clinical signs of disease. Although often done, the clinical benefits and harms of screening for PAD with a physical examination have not been well evaluated and are beyond the scope of this review.⁵

In addition to its ability to detect PAD, an abnormal ABI may be a useful predictor of CVD morbidity and mortality. ABI measurement may increase the discrimination or calibration of existing CVD risk assessments apart from whether it accurately detects PAD. However, the number of patients with an abnormal ABI who also

have other diseases or findings that would indicate a need for treatment and whether there is value to these patients knowing they have an abnormal ABI is not clear.

SCREENING INTERVALS

No studies provided evidence about the intervals for screening for PAD with the ABI.

TREATMENT

Evidence shows that low-dose aspirin treatment in asymptomatic patients with a low ABI does not improve health outcomes and may increase bleeding.² No trials provided evidence on other interventions to reduce CVD events or interventions that might delay the onset of lower-extremity symptoms.

SUGGESTIONS FOR PRACTICE REGARDING THE I STATEMENT

In deciding whether to screen for PAD with the ABI in asymptomatic adults, clinicians should consider the following factors.

Potential Preventable Burden. The true prevalence of PAD in the general population is not known. Recent data from the National Health and Nutrition Examination Survey show that 5.9% of the U.S. population 40 years or older (7.1 million persons) has a low ABI (0.9 or less).¹ More than one-half of these persons do not have typical symptoms of PAD. The proportion of these patients who will develop symptoms is not known; however, PAD is an indicator of CVD. Studies estimate that in persons with stable claudication but not critical ischemia, approximately 70% to 80% will remain stable over five years, whereas 10% to 20% will have worsening claudication and 1% to 2% will develop critical ischemia.⁶ Similar data are not available for asymptomatic patients with a low ABI.

Potential Harms. Although minimal harms are associated with the ABI test itself, downstream harms are possible. False-positive results, anxiety, labeling, and exposure to gadolinium or contrast dye if magnetic resonance angiography or computed tomography angiography is used to confirm diagnosis may occur. Using the ABI in conjunction with Framingham Risk Score results may reclassify a patient's risk. Given the uncertainty of the appropriateness of such reclassifications, patients could

be reclassified to a higher risk category and receive additional treatments with resulting adverse effects, or be reclassified to a lower risk category and discontinue treatments that may be beneficial.⁵

Cost. The cost of the ABI test is primarily in time and staff resources; performing the test in the office setting takes approximately 15 minutes.⁶ In addition, new equipment that performs pulse volume recordings or Doppler wave form tracings may need to be purchased.⁶ Providing this test to asymptomatic patients may divert time from other prevention activities that may be more beneficial to the patient.

Current Practice. In a survey of primary care practices across the United States, nearly 70% of clinicians reported never using the ABI in their practice settings, 6% to 8% reported using the ABI once per year, and only 12% to 13% reported using the ABI once per week or month.⁷

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The "Other Considerations," "Discussion," "Update of Previous USPSTF Recommendation," and "Recommendations of Others" sections of this recommendation statement are available at <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/peripheral-arterial-disease-pad-and-cvd-in-adults-risk-assessment-with-ankle-brachial-index>.

The U.S. Preventive Services Task Force recommendations are independent of the U.S. government. They do not represent the views of the Agency for Healthcare Research and Quality, the U.S. Department of Health and Human Services, or the U.S. Public Health Service.

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