

Does the Clinical Examination Predict Lower Extremity Peripheral Arterial Disease?

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RATIONAL CLINICAL EXAMINATION REVIEW SOURCE

This is a rational clinical examination abstract, a regular feature of the *Annals'* Evidence-Based Emergency Medicine (EBEM) series. Each features an abstract of a rational clinical examination review from the *Journal of the American Medical Association* and a commentary by an emergency physician knowledgeable in the subject area.

The source for this rational clinical examination review abstract is: Khan NA, Rahim SA, Anand SS, et al. The rational clinical examination: does the clinical examination predict lower extremity peripheral arterial disease? *JAMA*. 2006;295:536-46.¹ The *Annals'* Evidence-Based Emergency Medicine editors assisted in the preparation of the abstract of this rational clinical examination review, as well as selection of the Evidence-Based Medicine Teaching Points.

OBJECTIVE

To systematically review the diagnostic performance of the clinical examination for peripheral arterial disease.

DATA SOURCES

The Cochrane databases and MEDLINE from 1966 to 2006 were searched for English-language studies evaluating the clinical examination for the diagnosis of peripheral arterial disease. Medical Subject Headings (MeSH) keywords included "peripheral vascular disease," "arterial occlusive disease," "arteriole sclerosis obliterans," "intermittent claudication," and "thromboangiitis obliterans." Four physical examination textbook bibliographies were also searched for relevant articles.

STUDY SELECTION

Studies were selected by consensus of 2 reviewers and met the criterion of diagnostic reference standard for peripheral arterial disease with the Arterial Brachial Index, duplex sonography, or angiogram. Quality checklists previously developed and reported in other rational clinical examination series were used to help make selections and to evaluate the

quality of the studies.² The authors sought to include only studies in which the clinical examination and the reference test were independent of each other, thereby excluding studies with incorporation bias and providing a more precise summary estimate. The process identified 51 articles for review, with 17 articles meeting inclusion criteria.

DATA EXTRACTION AND ANALYSIS

The authors abstracted measures of diagnostic efficacy, including sensitivities, specificities, predictive values, and likelihood ratios (LRs) and present these with corresponding confidence intervals (CIs).

MAIN RESULTS

The presence of a femoral bruit is the most useful positive clinical finding to diagnose peripheral arterial disease in asymptomatic patients (positive LR [+LR] 4.8; 95% CI 2.4 to 9.5). Other valuable clinical findings include claudication (+LR 3.3; 95% CI 2.3 to 4.8) and any pulse abnormality defined as absent or reduced pulse (+LR 3.1; 95% CI 1.4 to 6.6) (Table).

The absence of either claudication or pulse abnormality decreased the likelihood of moderate to severe peripheral arterial disease, with a negative LR (–LR) of 0.57 (95% CI 0.43 to 0.76) and 0.44 (95% CI 0.30 to 0.66), respectively.

In patients who are symptomatic with leg complaints (reproducible leg pain that occurs with exercise, does not occur at rest, and is relieved within 10 minutes of rest³), the presence of cool skin is the most diagnostic positive finding (+LR 5.9; 95% CI 4.1 to 8.6). Other valuable findings are the presence of at least 1 bruit (+LR 5.6; 95% CI 4.7 to 6.7) and any palpable pulse abnormality (+LR 4.7; 95% CI 2.2 to 9.9). In this group of patients, the likelihood of peripheral arterial disease is decreased in the absence of any leg bruits (–LR 0.39; 95% CI 0.34 to 0.45) or pulse abnormality (–LR 0.38; 95% CI 0.23 to 0.64). Subgroup analysis of a diabetic cohort (n=31) and hyperlipidemic cohort (n=39) showed that combinations of clinical findings did not improve diagnostic accuracy. If there

Table. Significantly predictive likelihood ratios for the diagnosis of peripheral arterial disease.

Clinical finding	Positive LR (95% CI)	Negative LR (95% CI)
Asymptomatic		
Femoral bruit	4.8 (2.4–9.5)	
Presence of claudication	3.3 (2.3–4.8)	
Pulse abnormality	3.1 (1.4–6.6)	
Symptomatic		
Presence of cool skin	5.9 (4.1–8.6)	
At least 1 bruit	5.6 (4.7–6.7)	0.39 (0.34–0.45)
Pulse abnormality	4.7 (2.2–9.9)	0.38 (0.23–0.64)

was claudication and abnormal pulses, +LRs were 6.5 (95% CI 3.8 to 11) and 8.1 (95% CI 2.7 to 24), respectively. The –LR for these findings suggested significant negative predictive value as well, at 0.24 (95% CI 0.13 to 0.46) and 0.21 (95% CI 0.12 to 0.38).

The Arterial Brachial Index has been considered the standard reference for diagnosing peripheral arterial disease.⁴ In fact, the rational clinical examination authors report that an Arterial Brachial Index score of 0.9 or less has a sensitivity of 95% and a specificity approaching 100% for diagnosing peripheral arterial disease compared with angiography.^{5,6} Time constraints are often cited as a significant barrier to performing a complete Arterial Brachial Index measurement. Arterial auscultation by handheld Doppler is becoming more available and simple to use. One study of 218 outpatients older than 55 years demonstrated that a handheld Doppler could be used as part of a scoring system to provide greater accuracy than other components of the clinical examination for identifying patients who require bedside Arterial Brachial Index assessment.⁷

CONCLUSIONS

Clinical examination findings are not independently sufficient to conclusively diagnose peripheral arterial disease. The greatest diagnostic accuracy is achieved with the handheld Doppler as part of the peripheral arterial disease screening score.

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COMMENTARY: CLINICAL IMPLICATION

In this rational clinical examination series, the authors provide an empirical evaluation of the utility of clinical examination findings in the diagnosis of peripheral arterial disease. Peripheral arterial disease can be the cause of a patient's presentation to the emergency department or, if incidental to the presenting complaint, an indicator of generalized

atherosclerotic disease, increased risk of myocardial infarction and stroke, and increased risk of premature death.⁸ In either case, an accurate diagnosis of peripheral arterial disease without the time and expense of advanced imaging can aid the emergency physician in determining the most appropriate care for the patient.

The diagnostic value of different aspects of the clinical assessment for peripheral arterial disease varies. The Arterial Brachial Index, a ratio of the ankle-to-brachial artery systolic pressures, is considered a diagnostic reference standard for peripheral arterial disease because the ratio generally decreases with increasing peripheral artery stenosis.

Intermittent claudication is leg pain associated only with exercise and relieved with rest. Intermittent claudication is the classic symptom of peripheral arterial disease, a fact reflected in the potentially useful +LR of this finding (+LR 3.3; 95% CI: 2.3 to 4.80), although patients with peripheral arterial disease most often report atypical leg pain or no claudication at all. The most valuable diagnostic signs of intermittent claudication in patients presenting with leg pain are cool skin in the symptomatic limb, the presence of a bruit, and any palpable pulse abnormality (reduced or absent). Individual signs appear to be as positively diagnostic as combinations, although combinations of normal findings are helpful in predicting the absence of peripheral arterial disease.

Accuracy of pulse assessment appeared to increase with a handheld Doppler as part of a clinical prediction rule used by Farkouh et al.⁷ In this study, the right and left posterior tibial arteries were assessed for auscultation and palpation with an unvalidated scoring system. A score of less than 6 resulted in an increased likelihood of peripheral arterial disease (LR 7.80; 95% CI 4.8 to 12.7). In contrast, a score of greater than or equal to 6 significantly decreased the likelihood of peripheral arterial disease (LR 0.20; 95% CI 0.10 to 0.40). Given the unvalidated nature of these findings, it is difficult to draw concrete conclusions; however, future investigations may confirm the utility of handheld Doppler and peripheral arterial disease scoring systems at the bedside.

TAKE-HOME MESSAGE

Femoral bruits, claudication, and pulse abnormalities make peripheral arterial disease more likely, whereas the absence of bruits or pulse abnormalities make the diagnosis less likely. The reliability of pulse assessment may be improved with handheld Doppler; however, the Arterial Brachial Index is an easily measured and accurate reference standard for diagnosing peripheral arterial disease at the bedside.

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