Review: Physical examination predicts the presence and distribution of peripheral vascular disease


Question
How accurate is physical examination for diagnosing the presence and distribution of peripheral vascular disease?

Data sources
English language studies were identified by searching MEDLINE (January 1966 to January 1997) using the terms arterial occlusive diseases, physical examination, peripheral vascular disease, intermittent claudication, and pulse; bibliographies of relevant papers; and textbooks on physical diagnosis, surgery, and vascular surgery.

Study selection
Studies on the bedside diagnosis of peripheral vascular disease that determined interobserver variability and compared physical signs with an objective criterion standard were selected.

Data extraction
Methodologic quality of studies, physical examination procedure, criterion standard, patients, study quality, test characteristics, interobserver variability, and distribution of vascular disease. Only studies with at least a well-defined study population and physical examination procedure and an acceptable criterion standard were used in the main analyses.

Main results
17 studies were selected for review. Compared with the criterion standard of the ankle-to-arm systolic pressure index, abnormal pedal pulses, femoral arterial bruit, prolonged venous filling time, and unilateral cool limb were useful predictors of vascular disease (Table). However, color abnormalities, prolonged capillary refill time, and trophic changes were not useful predictors (Table). Aortoiliac disease was predicted by abnormal femoral pulse with 38% sensitivity and 100% specificity and by iliac bruits with 28% sensitivity and 87% specificity; arterial stenosis was predicted by limb bruit with 80% sensitivity and 75% specificity; disease distal to the adductor canal on angiography was predicted by the Buerger test with 100% sensitivity and 54% specificity; and femoral artery occlusions ending at the adductor hiatus were predicted by warm knees with 73% sensitivity and 75% specificity.

Conclusions
Abnormal pedal pulses, femoral arterial bruit, prolonged venous filling time, and a unilateral cool limb predict vascular disease. Abnormal femoral pulse, iliac bruits, limb bruit, the Buerger test, and warm knees predict distribution of vascular disease.

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Operating characteristics of physical examination procedures for diagnosing the presence of peripheral vascular disease

<table>
<thead>
<tr>
<th>Physical examination item</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>+LR*</th>
<th>-LR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal pedal pulses</td>
<td>63% to 95%</td>
<td>73% to 99%</td>
<td>3.0 to 44.6</td>
<td>0.1 to 0.4</td>
</tr>
<tr>
<td>Femoral arterial bruit</td>
<td>20% to 29%</td>
<td>95% to 96%</td>
<td>4.7 to 5.7</td>
<td>0.7 to 0.03</td>
</tr>
<tr>
<td>Prolonged venous filling</td>
<td>22% to 25%</td>
<td>94% to 95%</td>
<td>3.6 to 4.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Unilateral cool limb</td>
<td>10%</td>
<td>98%</td>
<td>5.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Color abnormality</td>
<td>24% to 35%</td>
<td>84% to 87%</td>
<td>1.6 to 2.8</td>
<td>0.7 to 0.03</td>
</tr>
<tr>
<td>Prolonged capillary refill</td>
<td>25% to 28%</td>
<td>84% to 85%</td>
<td>1.6 to 1.9</td>
<td>0.8 to 0.03</td>
</tr>
<tr>
<td>Trophic changes</td>
<td>43% to 50%</td>
<td>70% to 71%</td>
<td>1.4 to 1.6</td>
<td>0.7 to 0.03</td>
</tr>
</tbody>
</table>

*+LR = likelihood ratio for presence of disease if the test is positive; -LR = likelihood ratio if the test is negative.

Commentary
In this technologic era, the criterion standard for evaluation of peripheral arterial disease is the ankle-to-arm systolic pressure index, determined with the assistance of a hand-held Doppler flowmeter. However, a careful history and physical examination, even without Doppler availability, can often reveal a surprising amount of information. The growing awareness that peripheral vascular disease is almost always associated with cardiac, cerebral, or renal arterial insufficiency makes the physical findings described in this study important to the clinician. In particular, abnormal pedal pulses, femoral arterial bruit, prolonged venous filling time, and unilateral limb coolness were independent predictors. These findings were also independent of medical history findings that included age, atherosclerosis risk factors, sex, and claudication. Trophic changes of the nails and skin, long considered important, were shown to be less so.

It is important to note and avoid pitfalls when diagnosing peripheral vascular disease. Occasionally, people with healthy arteries do not have palpable pulses. Sometimes, pulses are palpable when disease is present and an exercise test is needed to clarify the diagnosis. Patients with diabetes commonly have arteries that are stiff and hard to compress, leading to abnormally elevated systolic blood pressures and distorted ankle-to-arm indices.

The authors described in detail a maneuver to estimate the ankle systolic pressure, the absence of Doppler equipment. The maneuver, the visual flush method, approaches 85% accuracy compared with conventional techniques for measuring an ankle-to-arm index.

The message is clear. For a complete and thorough evaluation of peripheral arterial circulation, a clinician should use a careful history and physical examination combined with the available technology.

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