

Vascular Diseases and Hypertension



Wanpen Vongpatanasin and Ronald G. Victor

INTRODUCTION

Diseases of the systemic and pulmonary vasculature are among the most common clinical problems encountered in internal medicine. Yet these important diseases are not often given the emphasis they deserve; they fall between the cracks of traditional medical subspecialties. Early clinical recognition is important because effective therapy often can prevent or at least delay needless suffering and death. This chapter reviews the causes, clinical manifestations, diagnostic evaluations, and therapeutic approaches to the major forms of systemic and pulmonary vascular diseases as well as arterial hypertension.

SYSTEMIC VASCULAR DISEASE

Peripheral Arterial Disease

The term *peripheral arterial disease* (PAD) refers to atherosclerotic vascular disease of mainly the lower extremities. Similar to other atherosclerotic vascular diseases, PAD is more prevalent in men than it is in women, particularly before the age of menopause. The prevalence increases with age, ranging from 2% to 6% for adults younger than 60 years to 20% to 30% for those older than 70 years. As with coronary atherosclerosis, the major reversible risk factors are cigarette smoking, diabetes mellitus, hyperlipidemia, and hypertension. Only 30% to 50% of patients with PAD become symptomatic. The classic syndrome of intermittent claudication refers to ischemic muscle pain or weakness brought on by exertion and promptly relieved by rest. Claudication is associated with a significant 10-year risk of morbidity and mortality. Approximately 25% of patients will develop worsening claudication, 5% will require amputation, 10% to 20% will require revascularization, and 30% will die of a cardiovascular event (e.g., heart attack, stroke) as a result of concomitant coronary artery and/or cerebrovascular atherosclerosis. To minimize progression of PAD and avoid complications, risk factor modification is absolutely essential. This includes tight control of blood pressure (BP), plasma lipids, and blood glucose. Complete cessation of tobacco use is a must.

The diagnosis of PAD begins with a careful history and physical examination and is confirmed by noninvasive laboratory testing. Ischemic pain occurs in the leg muscles supplied by arterial segments that are distal to the site of stenosis. Calf claudication is the hallmark of femoral-popliteal disease, whereas discomfort in the thigh, hip, or buttock associated with impotence indicates aortoiliac disease (Leriche's syndrome).

Depending on the severity of the stenosis, the pain is experienced at a predictable walking distance and is promptly relieved by rest. Claudication must be differentiated from the pseudoclaudication of lumbar degenerative spinal canal stenosis. In the latter condition, walking can also aggravate leg pain, but it is not relieved simply by the cessation of exercise. Rather, assuming positions that minimize lumbar extension, such as stooping forward or sitting, alleviates the pain. The characteristic physical findings of PAD are absent or diminished pulses distal to the stenosis, bruits over the diseased artery, hair loss, thin shiny skin, and muscle atrophy. Severe ischemia causes pallor, cyanosis, decreased skin temperature, ulceration, and gangrene.

Noninvasive techniques are quite good. The *ankle-brachial index* (ABI) is the ratio of the highest systolic BP measured from either the dorsalis pedis or the posterior tibialis artery to the highest systolic BP obtained from the brachial artery using a Doppler stethoscope. The normal ABI range is 1.0 to 1.4. An ABI of 0.9 or less indicates PAD. This simple noninvasive test has a sensitivity and specificity of 95% and 99%, respectively. In some patients with diabetes mellitus or renal failure, the media of the affected leg vessels become so heavily calcified that they resist compression except during very high levels of cuff inflation. The result is a falsely elevated ankle BP and an artificially normal or supernormal ABI (Table 12-1).

Duplex ultrasonography is an important adjunct to the ABI and has a similar sensitivity and specificity. This test is particularly useful to diagnose PAD in patients with noncompressible vessels due to medial wall calcification. The Doppler velocity waveform remains abnormal despite a spuriously normal or elevated ABI. Magnetic resonance (MR) angiography and computed tomographic (CT) angiography permit excellent visualization of vascular stenosis and identification of runoff vessels. With these noninvasive imaging modalities, spatial resolution is comparable to that of traditional invasive

TABLE 12-1 INTERPRETATION OF ANKLE-BRACHIAL INDEX

ANKLE-BRACHIAL INDEX	INTERPRETATION
1.00-1.40	Normal
0.90-0.99	Borderline
0.70-0.89	Mild PAD
0.40-0.69	Moderate PAD
<0.40	Severe PAD
>1.40	Noncompressible vessels

PAD, Peripheral arterial disease.