

# **Peripheral Arterial Disease in People With Diabetes**

By Dr. Anita Kharbteng,  
Sales & Clinical Support Manager, Cardinal Health (Asia Pacific)

## **Introduction**

Peripheral arterial disease (PAD) is a condition characterized by atherosclerotic occlusive disease of the lower extremities. While PAD is a major risk factor for lower-extremity amputation, it is also accompanied by a high likelihood for symptomatic cardiovascular and cerebrovascular disease. Although much is known regarding PAD, the assessment and management of PAD in those with diabetes is less clear and poses some special issues. At present, there are no established guidelines regarding the care of patients with both diabetes and PAD.

## **The Epidemiology and Impact of PAD in People With Diabetes**

PAD affects ~12 million people in the U.S. 20% of symptomatic patients with PAD had diabetes, but this probably greatly underestimates the prevalence, given that many more people with PAD are asymptomatic rather than symptomatic.

The most common symptom of PAD is intermittent claudication. More extreme presentations of PAD include rest pain, tissue loss, or gangrene; these limb-threatening manifestations of PAD are collectively termed critical limb ischemia (CLI).

PAD sufferers have a five-fold risk of death from heart attack or stroke. Diabetic patients are at an even higher risk. PAD is also a major risk factor for lower-extremity amputation. Diabetes and smoking are the strongest risk factors for PAD. Other factors are advanced age, hypertension and hyperlipidemia.

## **Diagnosis: ABI**

Diagnosing PAD is of clinical importance for two reasons. The first is to identify a patient who has a high risk of subsequent MI or stroke. The second is to elicit and treat symptoms of PAD, which may be associated with functional disability and limb loss.

Two commonly used tests are the absence of peripheral pulses and the presence of claudication. Both, however, suffer from insensitivity. A more accurate estimation is the ankle-brachial index (ABI), which involves measuring the systolic blood pressures in the ankles (dorsalis pedis and posterior tibial arteries) and arms (brachial artery) using a hand-held 5-10 MHz Doppler and a blood pressure cuff and then calculating a ratio. Simple to perform, it is a non-invasive, quantitative measurement of the patency of the lower extremity arterial system. The ABI has been validated against angiogram and found to be 95% sensitive and almost 100% specific.

The ABI is measured by placing the patient in a supine position for 5 min. Systolic blood pressure is measured in both arms, and the higher value is used as the denominator of the ABI. Systolic blood pressure is then measured in the dorsalis pedis and posterior tibial arteries by placing the cuff just above the ankle. The higher value is the numerator of the ABI in each limb.

$$\text{ABI} = \frac{\text{HIGHEST ANKLE SYSTOLIC PRESSURE}}{\text{HIGHEST BRACHIAL (ARM) SYSTOLIC PRESSURE}}$$

The diagnostic criteria for PAD based on the ABI are interpreted as follows:

- Normal if 0.91 – 1.30
- Mild obstruction if 0.70 – 0.90
- Moderate obstruction if 0.40 – 0.69
- Severe obstruction if <0.40
- Poorly compressible if >1.30

An ABI value >1.3 suggests poorly compressible arteries at the ankle level due to the presence of medial arterial calcification. This renders the diagnosis of PAD by ABI alone less reliable.

Due to the high estimated prevalence of PAD in patients with diabetes, the American Diabetes Association (ADA) December 2003 Consensus Statement recommends that a screening ABI should be performed in patients >50 years of age who have diabetes. If normal, the test should be repeated every 5 years. A screening ABI should be considered in diabetic patients <50 years of age who have other PAD risk factors (e.g., smoking, hypertension, hyperlipidemia, or duration of diabetes >10 years). A diagnostic ABI should be performed in any patient with symptoms of PAD.

In the patient with a confirmed diagnosis of PAD in whom an assessment of the location and severity is desired, the next step would be a vascular laboratory evaluation for segmental pressures, toe brachial index (TBI) and pulse volume recordings (PVRs).

### **Conclusions:**

In summary, PAD is a common cardiovascular complication in patients with diabetes. In contrast to PAD in nondiabetic individuals, it is more prevalent and, because of the distal territory of vessel involvement and its association with peripheral neuropathy, it is more commonly asymptomatic.

Patients with PAD and diabetes thus may present later with more severe disease and have a greater risk of amputation. Moreover, the presence of PAD is a marker of excess cardiovascular risk.

It is important to diagnose PAD in patients with diabetes to elicit symptoms, prevent disability and limb loss, and identify a patient at high risk of MI, stroke, and death. The diagnosis is made with a determination of the ABI. It is recommended that patients with diabetes who are >50 years of age have an ABI performed. An ABI is also useful in patients with other PAD risk factors and in those with symptoms.

The ADA strongly encourages clinicians to function cooperatively and effectively as teams of specialists in the management of this complex patient population, with the common goal of reducing vascular events – MI, Stroke, and amputation – that too often result in disability, social decline, and death.

*(Excerpts taken from Diabetes Care 2003, American Diabetes Association.  
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