



EFIM
European Federation of Internal Medicine



Peripheral Arterial Disease Management

A Practical Guide for Internists

EFIM Vascular Working Group

- Peripheral arterial disease (PAD) is a growing concern among our aging population. More than 27 million people are affected by PAD across Europe and North America.
- The effects of PAD are not limited to intermittent claudication and restricted physical activity. Individuals suffer serious cardiovascular events and are at as high a risk of premature death as patients with a history of myocardial infarction or stroke.
- Many patients with other cardiovascular conditions, including myocardial infarction and stroke, and those with diabetes, also have PAD. Polyvascular disease (disease in more than one vascular bed) doubles a patient's chances of further ischaemic vascular events or death.
- Individuals with PAD are often asymptomatic, sometimes because of limited physical activity. Ankle–brachial index (ABI) testing is a key tool to identify these patients.
- Internists, whether in hospital- or office-based practices, are ideally placed to identify patients suffering from, or at risk of, PAD because of their role in the continuing care of elderly patients and patients with diabetes, hypertension, dyslipidaemia and chronic renal disease.

★ Internists are ideally placed to identify patients suffering from, or at risk of, PAD ★

- This Practical Guide has been written specifically for Internists by the EFIM Vascular Working Group to provide clear and relevant advice on best practice in the diagnosis and management of PAD, based mainly on the recently published Trans-Atlantic Inter-Society Consensus for the Management of PAD (TASC II) guidelines.
- The Guide is intended to support Internists in their day-to-day practice, to increase awareness of the value of ABI testing and strengthen the clinical care of this insidious disease.

EFIM Vascular Working Group

Coen Stehouwer (the Netherlands)

Denis Clement (Belgium)

Chris Davidson (UK)

Curt Diehm (Germany)

Jan Willem Elte (the Netherlands)

Marc Lambert (France)

Daniel Sereni (France)

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What is PAD?

- PAD arises from a build-up of atherothrombotic plaques in peripheral blood vessels causing narrowing or partial blockage of the vessels, reduction of blood flow, and consequent ischaemia and tissue damage.

Who is likely to have PAD?

- Symptoms include pain or cramps in the calf muscles or elsewhere in the leg either when at rest, or when walking that disappear at rest (intermittent claudication).
- Many individuals are asymptomatic.
- The main risk factors for PAD are shown in the table below.

Risk factors for PAD (those in red have the strongest association)			
Male gender	Age >65 years	Smoking (past and present)	Diabetes
Hypertension	Dyslipidaemia	Pre-existing cardiovascular disease, including myocardial infarction and stroke	Chronic renal insufficiency

★ **Most individuals with PAD do not have the classic symptoms of pain when walking. Many individuals are asymptomatic** ★

The consequences of PAD

- 40–60% of patients with PAD will also have coronary artery or cerebrovascular disease.
- The co-presence of PAD with coronary artery and/or cerebrovascular disease (polyvascular disease) almost doubles the possibility of having a major cardiovascular event (myocardial infarction, stroke or vascular-related death) within 1 year.
- Patients with PAD often have other mobility problems and can develop critical limb ischaemia without preceding claudication, which may result in amputation of the foot or leg. Patients with diabetes are especially at risk.
- Approximately 75% of patients with PAD will die of cardiovascular causes.

★ **Whether symptoms are present can depend on a patient's level of activity** ★

★ **Be PAD proactive. Most patients have a low awareness of PAD and its consequences, and may not tell you about their symptoms** ★

When to assess

- Patients can be assessed at any time if they are suspected of being at risk of PAD (see page 3, *Who is likely to have PAD?*).

How to assess

- Assessment should include a history, clinical examination (pulse palpation) and objective testing (ABI).
- Objective testing using ABI measurements is a quick, simple and accurate non-invasive test for PAD that can be performed, like blood pressure measurements, in an office environment.

★ **Leg pain related to PAD can be easily confused with muscular pains or arthrosis, particularly in the elderly** ★

★ **ABI measurements give a clear objective measurement of PAD and can be performed in the physician's office** ★

Three steps to assessing PAD

Step 1

Patient history

- Check: Is the patient physically active?

Look out for:

- Typical signs and symptoms of PAD
 - Intermittent claudication (pain in the leg, commonly localised to the calf muscles, which appears when walking and disappears when at rest)
- Atypical signs and symptoms
 - Numbness, weakness or heaviness of the leg
 - Aching or pain in the feet and toes when at rest
 - Cold legs or feet (especially if there is a marked difference between the legs)
 - Hair loss or change of skin colour on the legs
 - Toe and foot sores that do not heal

Three steps to assessing PAD

Step 2

Clinical examination
(pulse palpation)

- Palpable pedal pulses: These generally rule out PAD (except in some patients with diabetes or chronic renal failure – see page 9, *Guide to performing an ABI test*)



Clinical photography courtesy of C. Diehm, University of Heidelberg, Germany.

Step 3

Objective testing (ABI)

- An ABI measurement of ≤ 0.9 at rest indicates clinically significant PAD

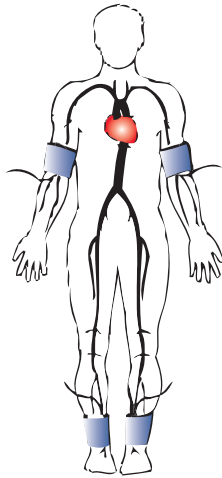
ABI testing

- An ABI test can be used to:
 - Confirm a diagnosis of PAD in patients with symptoms
 - Identify PAD in patients who are asymptomatic
 - Provide information on long-term prognosis (risk of coronary artery disease, cerebrovascular disease and cardiovascular mortality) – that is, risk stratification.
- TASC II* recommends that an ABI should be measured in patients who:
 - Have leg symptoms on exertion
 - Are aged 50–69 years and have a cardiovascular risk factor (particularly diabetes or smoking)
 - Are aged 70 years or older, irrespective of risk factor status.
- In countries where risk tables (e.g. Framingham or SCORE) are used, an ABI measurement can provide valuable information for further risk stratification of patients on the borderline of qualifying for pharmaceutical management.
 - TASC II recommends ABI testing for patients who have a Framingham risk score of 10–20%.

★ **Identifying PAD can occur at any point in a patient's clinical pathway** ★

*Trans-Atlantic Inter-Society Consensus for the Management of PAD

Guide to performing an ABI test (based on current TASC II recommendations)



- Equipment required:
 - 10–12 cm blood pressure cuffs
 - Hand-held 5-mHz or 10-mHz Doppler instrument
- Measure systolic blood pressure from both brachial arteries, and from the anterior or posterior tibial arteries after the patient has been lying down for 10 minutes
- Both arm pressures should be recorded; if not equal, then the higher value should be used
- Record the ABI to two decimal places

PAD may be present in either or both legs

Guide to performing an ABI test (based on current TASC II recommendations)

Example

- Brachial blood pressure:
Right arm: 156/88 mmHg
Left arm: **160**/92 mmHg
 - Take the highest of the two arm pressures
 - Measure anterior and posterior tibial artery pressure
 - ABI:
Right leg: 160/**160** = 1.00
Left leg: 100/**160** = 0.63
- Diagnosis: PAD in the left leg

For **each** leg, the ABI = ratio of:

the **higher** of the ankle systolic pressures
(anterior or posterior tibia) in that leg (mmHg)

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the **higher** of the arm systolic pressures
(from either left or right arm) (mmHg)

Guide to performing an ABI test (based on current TASC II recommendations)



Clinical photograph courtesy of Huntleigh Healthcare

- A reduced ABI of ≤ 0.9 indicates PAD
- In patients with intermittent PAD, a normal ABI cannot exclude the condition
- In patients with diabetes or chronic renal failure, normal or high ABI values (>1.40) can be misleading because excessive vascular calcification can make the tibial vessels at the ankle non-compressible
- The presence of clear pedal pulses should help to identify whether the ABI results are accurate.
If not clear, additional tests include:
 - Toe systolic pressures, pulse volume recordings or duplex ultrasound imaging

Why is there a need to manage PAD?

- Patients with PAD are at markedly increased risk for cardiovascular events and require intensive risk factor modification and, if symptomatic, antiplatelet therapy.

Risk factor modification

- Risk factors can be modified independently or as part of an overall total risk reduction strategy, according to locally approved guidelines.
- Risk factor modification can include:
 - Lifestyle management
 - Pharmacological management
 - A combination of the above – according to the severity of the condition.

The goals of management

- The management recommendations and goals of TASC II* are summarised in the table below. Locally approved guidelines should be referred to if these differ.

TASC II grading is based on:

- Evidence level A One or more published randomised, controlled clinical trials of overall good quality and consistency
- Evidence level B Well-conducted clinical studies but lack of good quality randomised clinical trial data
- Evidence level C No applicable studies of good quality available. Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities

Guide to the management of PAD (adapted from TASC II guidelines)		
Smoking	Management recommendations Advice [evidence level B], counselling and nicotine replacement therapy (repeated if necessary) [evidence level A]	Target goals Aim for complete cessation

*Trans-Atlantic Inter-Society Consensus for the Management of PAD

Guide to the management of PAD (adapted from TASC II guidelines)

	Management recommendations	Target goals
Weight reduction	Counselling to address caloric balance, a healthy and varied diet, and physical activity	Body mass index (BMI) reduction for patients who are overweight (BMI: 25–30 kg/m ²) or obese (BMI: >30 kg/m ²)
Dyslipidaemia	Dietary modification [evidence level B] Statins should be prescribed for symptomatic patients [evidence level A]	Symptomatic and asymptomatic: Low-density lipoprotein reduction to <2.59 mmol/L (<100 mg/dL) [evidence level A – symptomatic and C – asymptomatic] History of other vascular disease: Low-density lipoprotein reduction to <1.8 mmol/L (<70 mg/dL) [evidence level B]
Diabetes	Aggressive glycaemic control necessary [evidence level C]	HbA _{1c} <7.0% (as close to 6.0% as possible)
Homocysteine	Patients with PAD should not be given folate supplements to reduce their risk of cardiovascular events [evidence level B]	

>> continued

Guide to the management of PAD (adapted from TASC II guidelines)

	Management recommendations	Target goals
Hypertension	<p>Follow local guidelines for hypertension management</p> <p>Thiazides and angiotensin-converting enzyme inhibitors should be considered as initial therapy [evidence level B]</p> <p>Beta-blockers are not contraindicated in PAD [evidence level A]. (Previous concerns regarding possible worsening of claudication symptoms have not been borne out in randomised trials)</p>	<p>Patients <i>without</i> diabetes or renal insufficiency:</p> <p><140/90 mmHg [evidence level A]</p> <p>Patients <i>with</i> diabetes or renal insufficiency:</p> <p><130/80 mmHg [evidence level A]</p>
Antiplatelet therapy	<p>All symptomatic patients, with or without a history of other cardiovascular disease, should be prescribed an antiplatelet agent (aspirin or clopidogrel) long term to reduce the risk of cardiovascular morbidity and mortality [evidence level A]</p> <p>In asymptomatic patients, treatment should be guided by their overall cardiovascular risk</p>	

★ **The aim should be to reduce as many risk factors as possible** ★

Please use these two pages as a reminder of your locally approved management guidelines.

Guide to the management of PAD	
Smoking	Local guidelines (complete as required)
Weight reduction	
Dyslipidaemia	

Guide to the management of PAD	
Diabetes	Local guidelines (complete as required)
Homocysteine	
Hypertension	
Antiplatelet therapy	

Management of patients with polyvascular disease

- Patients with polyvascular disease face a high risk (>10%) of a major cardiovascular event within 1 year of diagnosis. Long-term aggressive management with more frequent follow-up should be considered for such patients.

Treatment of the symptoms of claudication

- Exercise therapy is the primary mode of treatment for the relief of the symptoms of claudication.
- Cardiovascular risk factor management alone will not typically provide symptomatic relief.
- Suitable pharmacotherapy for patients with such symptoms could include cilostazol or naftidrofuryl [evidence level A].

When to refer patients

- Patients should be referred to a physician competent in the care of vascular diseases for further assessment where appropriate; for example, patients with late-stage PAD showing critical limb ischaemia (patients with chronic ischaemic disease who have had symptoms for more than 2 weeks).
- Risk factor modification should be initiated even if a patient is to be referred.

 **Referral should not delay initiation of risk factor modification** 

Discharge guidance for in-hospital patients

- Following discharge from hospital, primary care physicians should be notified with full details of the patient's diagnosis, including the diagnostic tests that have been conducted, degree of risk, and treatment recommendations.
- Reasons for the choice and duration of treatment should be provided where these could be helpful to the patient's physician; for example, to emphasise the need for more aggressive management in a patient with polyvascular disease.

★ **Continuity of care is vital** ★

★ **Patients with polyvascular disease require more aggressive long-term management to avoid a major cardiovascular event** ★

Further reading

Belch JJ, Topol EJ, Agnelli G, et al. Critical issues in peripheral arterial disease detection and management: a call to action. *Arch Intern Med* 2003;163:884–892.

Hackam DG, Tan MK, Lin PJ, et al. Supporting a call to action for peripheral artery disease: insights from two prospective clinical registries. *J Vasc Surg* 2006;44:776–781.

Norgren L, Hiatt WR, Dormandy JA, et al. Inter-Society Consensus for the Management of PAD (TASC II). *J Vasc Surg* 2007;45(Suppl S):S5–S67; *Eur J Vasc Endovasc Surg* 2007;33(Suppl 1):S1–S75.

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