

Intermittent claudication an opportunity for secondary prevention

Intermittent claudication is an important marker of increased cardiovascular risk. For most patients presenting with this symptom, management will be conservative but an aggressive approach to cardiovascular risk factors is essential.

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Intermittent claudication refers to leg muscle pain brought on by walking and relieved almost immediately by stopping and resting. It is a characteristic symptom of arterial insufficiency.

Aetiology

In the vast majority of cases, intermittent claudication is caused by atherosclerosis affecting one or more segments of blood supply to the lower extremities: the aortoiliac, femoropopliteal and tibial vessels. Bifurcations and tunnels are commonly affected, with early lesions occurring at the aortic bifurcation and in the distal superficial femoral artery where it courses through the adductor canal in the lower thigh to become the popliteal artery (Figure 1). Diabetic patients have a characteristic pattern of disease involving tibial vessels below the knee, often with sparing of proximal arteries.

A less common cause in patients in the typical age group (above 50 years) and with similar risk

factors to those with atherosclerosis is a thrombosed popliteal aneurysm. However, this entity is often associated with acute ischaemia rather than a chronic presentation.

Other much rarer pathologies are occasionally encountered. Arterial trauma not recognised at the time of injury may present later with intermittent claudication. Popliteal artery entrapment, adventitial cystic disease, Buerger's disease and various other types of arteritides such as Takayasu's disease, giant cell arteritis, scleroderma and systemic lupus erythematosus occur rarely, often without the typical risk factors for atherosclerosis (an exception is Buerger's disease, in which smoking is a universal association).

Features

The onset of intermittent claudication is usually gradual, although it may be acute if thrombotic occlusion occurs on underlying stenotic disease. In the majority of cases, the lower leg is affected;

IN SUMMARY

- Intermittent claudication is a characteristic symptom of arterial insufficiency that is generally caused by atherosclerosis.
- The degree of disability and progression or otherwise of symptoms determines how extensively the peripheral circulation should be investigated.
- Abdominal aortic aneurysms occur with increased frequency in patients with peripheral arterial disease.
- The ankle brachial index (ABI) is a useful objective indicator of peripheral arterial disease and an important marker of cardiovascular disease overall.
- If cardiovascular risk factors are not managed aggressively, the life expectancy of patients with intermittent claudication is reduced by 10 years, with 75% of deaths being due to a cardiovascular event.
- Secondary cardiovascular disease prevention measures will reduce deaths and disability from myocardial infarction and stroke and lessen the potential for limb threatening ischaemia.

Intermittent claudication: help with history taking*

Suggested questions when enquiring about leg pain that could be intermittent claudication are listed below. Responses that indicate a diagnosis of peripheral arterial disease are shown in brackets.

- Does this pain ever begin when you are standing still or sitting? (No)
- Do you get the pain if you walk uphill or if you hurry? (Yes)
- Do you get the pain if you walk at an ordinary pace on the level? (No = mild, Yes = moderate/severe)
- What happens to the pain when you stand still? (It goes away)
- Does the pain disappear within 10 minutes or less when you stand still (Yes)
- Where do you get the pain or discomfort? (Usually in the calf; less frequently in the buttock, thigh, shin, foot)

* Adapted from the Edinburgh claudication questionnaire (see references 1 and 2).

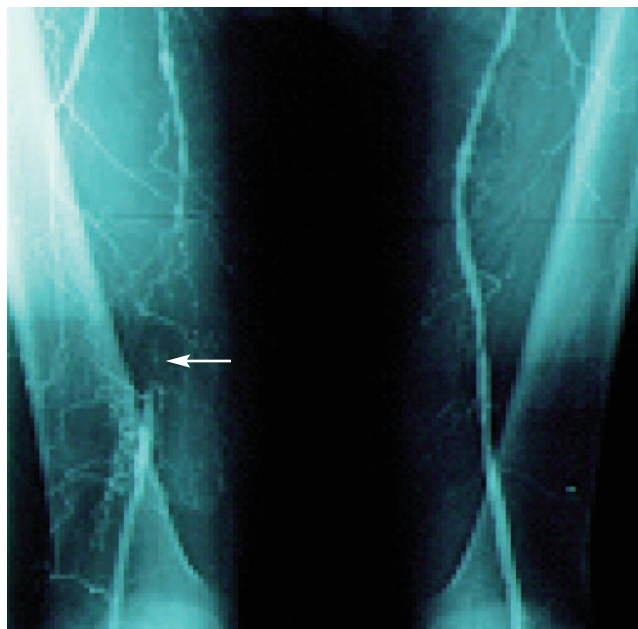


Figure 1. Angiogram showing occlusion of the distal superficial femoral artery (arrowed), a typical site of atherosclerotic involvement.

however, buttock and thigh symptoms may be present if there is proximal aortoiliac occlusive disease (Leriche's syndrome consists of buttock claudication and impotence associated with aortoiliac occlusion). The distance covered by walking on flat ground before symptom onset is relatively constant although shortened by walking up an incline or hurrying. Symptoms may be exacerbated by the presence of anaemia and improved by wearing shoes with a supportive heel that takes some pressure off the calf muscles.

Rest pain (like intermittent claudication) is a characteristic symptom of peripheral arterial disease but indicates more advanced arterial insufficiency with limb threatening ischaemia. Patients usually have a preceding history of intermittent claudication, although this may be absent if activity has been restricted for another reason, such as severe arthritis, dyspnoea or angina. The pain occurs in the foot at night on lying down (due to a decrease in hydrostatic pressure) and is relieved by getting up and walking around. Often patients will try to sleep sitting in a chair, with the limb dependency leading to leg swelling.

Evaluation History

In a patient presenting with leg muscle pain on exercise it is important to enquire about the

nature of the pain. Suggestions for history taking are given in the box on this page.

It is important to assess the degree of disability caused by the symptoms, which is highly dependent on the individual. For example, claudication after walking 100 metres may be acceptable in an elderly patient who is still able to manage activities of daily living but unacceptable in a younger patient if it restricts ability to work. The effects of intermittent claudication on quality of life that were reported in a patient survey in 2001 are listed in Table 1.¹

If symptoms or signs of peripheral arterial disease are present, a careful general history and examination are important. In particular, the physician should enquire about angina, transient ischaemic attack and stroke. Cigarette smoking, hypertension, diabetes mellitus and dyslipidaemia are risk factors that need to be identified with a view to their correction. Respiratory and renal status are especially important if intervention is likely to be indicated.

Examination

A careful physical examination should confirm or rule out the presence of peripheral arterial disease. If all peripheral pulses are present and normal, clinically significant arterial insufficiency can generally be excluded. A reduced pulse indicates

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stenosis proximal to that site and an absent pulse indicates occlusion. The presence of a bruit indicates turbulence associated with stenosis.

In nondiabetic patients, the most common site for the onset of peripheral arterial disease is the superficial femoral

artery in the lower thigh, which is associated with reduced or absent popliteal and pedal pulses. The second most commonly affected site is the aortic bifurcation, which is associated with reduced or absent femoral pulses. In diabetic patients, the pattern of disease predominantly involves tibial vessels below the knee, which is associated with normal popliteal pulses but reduced or absent dorsalis pedis and posterior tibial pulses. However, it should be noted that the dorsalis pedis pulse may be absent in 10 to 15% of normal subjects.

An easily palpable pulse in the abdominal aorta, femoral or popliteal artery, especially in an obese patient, should raise suspicion of an aneurysm. Colour changes of pallor and rubor with 'trophic' changes of digital hair loss, brittle nails, dry skin and ischaemic ulceration occur with critical limb ischaemia.

Differential diagnosis

Intermittent claudication is a symptom that, when typical, indicates the presence

of underlying peripheral arterial disease. The only other likely diagnosis is neurogenic claudication associated with spinal canal stenosis, which is usually due to lumbar spondylosis. Leg pain with neurogenic claudication is often more severe when walking down stairs rather than up; it is frequently accompanied by limb paraesthesiae and numbness, and may occur without walking (e.g. on lying, sitting or first arising).

Investigations

The degree of disability and the progression (or otherwise) of symptoms will determine how extensively the peripheral circulation should be investigated. If symptoms are stable or improving with no significant impact on activities of daily living, specific investigation of the peripheral arterial system may not be indicated.

Baseline blood tests

Before any specific investigation for peripheral arterial disease is performed, cardiovascular risk factors should be assessed by measuring fasting blood glucose, cholesterol and triglyceride concentrations. Other important baseline investigations are haemoglobin (to check for anaemia and polycythaemia) and serum creatinine levels.

Specific investigations

The opportunity should be taken to look for an abdominal aortic aneurysm – the silent killer that occurs with increased frequency in patients with peripheral arterial disease. Surgical intervention is indicated in asymptomatic patients if the aneurysm is more than 5 cm in diameter and the operative risk is acceptable. Carotid disease, which also may be asymptomatic, should be looked for so that stroke prevention strategies can be put in place. Both of these entities can readily be diagnosed noninvasively by duplex ultrasonography.

Detailed anatomical assessment of

Table 1. Reported effects of intermittent claudication on quality of life¹

- Pain and discomfort
- Inability to go for walks
- Difficulty with shopping
- Increased time requirements for ordinary tasks
- Need for a family member to take over household chores
- Inability to participate in sporting activities (e.g. golf, bowls)
- Loss of social contacts
- Feelings of frustration
- Social embarrassment

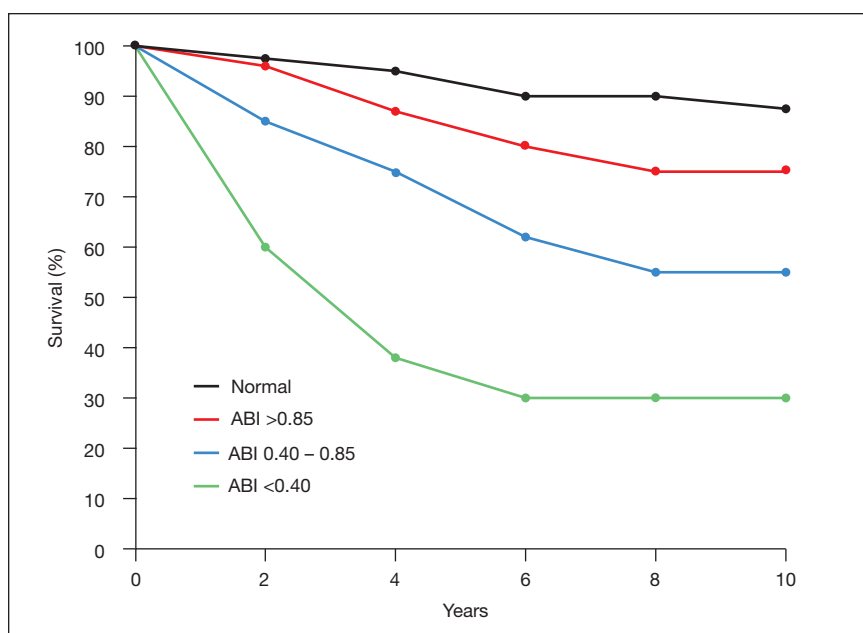
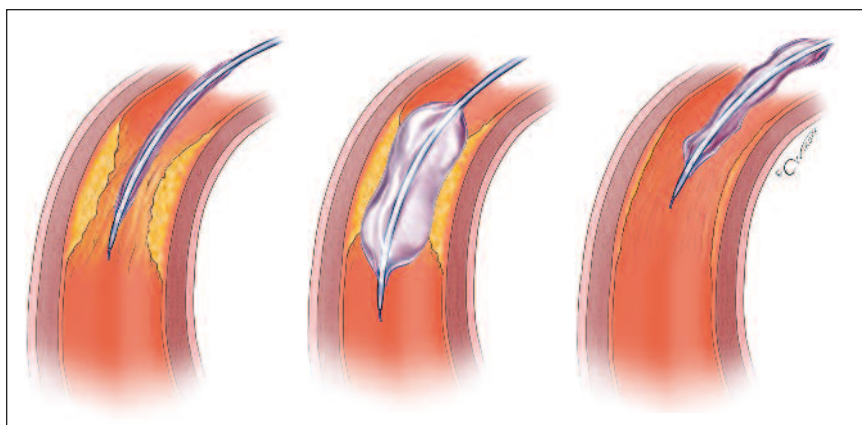


Figure 2. The ankle brachial index (ABI) is the ratio of ankle to brachial systolic blood pressure. It is a prognostic marker for survival, with decreasing values correlated with decreasing survival.



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Figure 3. Balloon angioplasty. The balloon is inserted into the narrowed or blocked segment of the artery (left), inflated to reduce obstruction (centre), deflated and then removed (right).

peripheral arterial disease can be obtained noninvasively with duplex ultrasound scanning. However, the required ultrasound equipment is not inexpensive, and a good quality study requires a skilled vascular technologist working in an environment where patterns of disease are well understood. If the initial management plan is for a noninterventional approach (which will apply to the majority of patients who have intermittent claudication), there is not a strong indication to obtain detailed anatomical information. This applies also to angiography, which is invasive and carries a small risk of local complications at the puncture site and general complications of anaphylaxis and renal failure. Although CT angiography can be performed without arterial puncture, it carries the risk associated with contrast administration and is costly. Angiography should be reserved for patients requiring intervention.

The ankle brachial index (ABI), which is the ratio of ankle to brachial systolic blood pressure, is obtained using a Doppler probe. It is a very useful objective indicator of peripheral arterial disease and an important marker of cardiovascular disease overall (Figure 2). The index may be falsely elevated in patients with sclerotic and calcified vessels, especially with diabetes mellitus – estimation

of toe pressure is a useful adjunct in these patients.

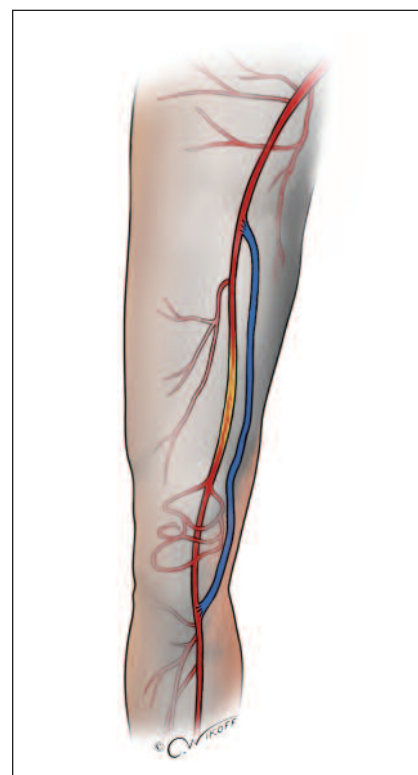
Management

Peripheral arterial disease is one manifestation of cardiovascular disease, with intermittent claudication being a marker for an increase in cardiovascular risk. If cardiovascular risk factors are not managed aggressively then within 10 years of onset about 43% of these patients will develop coronary heart disease, 24% will progress to cardiac failure, and 21% will suffer a stroke.³ Average life expectancy will be reduced by 10 years, with mortality of 30% at five years and 60 to 70% at 10 years; 75% of deaths will be due to a cardiovascular event.^{1,4,5}

The more generalised cardiovascular effects are of overall greater importance than intermittent claudication itself, which tends to run a benign course in most patients. A long term follow up study of patients with claudication found the following outcomes:⁶

- 73% of patients remained stable
- 16% worsened without intervention
- 7% proceeded to angioplasty and/or surgery
- 4% proceeded to amputation.

Often patients presenting with intermittent claudication are satisfied with reassurance that the risk of amputation



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Figure 4. A femoropopliteal bypass with saphenous vein graft.

Table 2. Secondary prevention measures to prolong survival

- Smoking cessation
- Regular exercise
- Antiplatelet therapy (aspirin, 100 mg daily)
- Statin therapy – aim for LDL cholesterol <3 mmol/L
- Blood pressure control – aim for <140/85 mmHg
- ACE inhibitor
- Glycaemic control – aim for Hb_{A1c} <7%

is relatively low, especially if relevant risk factors are corrected. They should be told that regular exercise to the point of pain will not harm the limb and will in fact stimulate the development of

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Consultant's comment

Intermittent claudication is the most common presentation of patients with arteriosclerotic disease of the legs. In the past, this was considered in isolation; now it should be considered as a marker of generalised vascular disease – including coronary artery disease. Similarly, a carotid bruit in a patient is of more importance as an indicator of generalised vascular disease than as a portent for future cerebrovascular disease.

It has been well demonstrated that the progress of cardiac disease is significantly affected by careful attention to risk factors. A patient who presents with mild intermittent claudication may indeed be fortunate if that leads the GP to actively address risk factors.

Patients very rarely die of peripheral vascular disease, although it may cause serious symptoms. In general, these patients die of coronary artery disease, the first indication of which may be vascular claudication in the legs.

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collateral arterial circulation, resulting in an increase in walkable distance. For selected patients, quality of life can be improved and amputations may be prevented by intervention with angioplasty and surgery (see Figures 3 and 4), but these procedures will not improve life expectancy or prevent myocardial infarction or stroke.

Secondary cardiovascular prevention measures, which are listed in Table 2, are important. These will reduce death and disability resulting from myocardial infarction and stroke and reduce the potential for progression to limb threatening ischaemia. In addition, secondary prevention will significantly limit the impact on healthcare resources by reducing the requirement for invasive procedures.

Summary

Diagnosing a patient with intermittent claudication provides a unique opportunity to apply secondary cardiovascular prevention measures that can have a significant impact on survival and quality of life. In the majority of patients, management of the symptom is 'conservative'; however, this should be seen as aggressive management of cardiovascular risk factors rather than a passive approach.⁷ **MT**

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