



"My foot isn't getting better!"

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Alastair's presentation

- Alastair, 67, presents to the emergency department for the third time in three weeks with a swollen and painful right foot.
- He received two different courses of antibiotics and, although he initially responded to each, the swelling and pain returned quickly.
- He has been referred back for initiation of intravenous therapy.
- He is a non-insulin-dependent diabetic and an ex-smoker with well-controlled hypertension, a remote history of myocardial infarction and gout.
- He has no history of trauma and no prior history of cellulitis.
- On examination the foot is swollen, red and tender, with evidence of a dry scab over the middle toe (Figure 1).



Figure 1. Swollen, red and tender foot on examination.

For more on Alastair, turn to page 4.

Questions & Answers

1. *What is most likely going on?*

Apparent cellulitis that does not respond to adequate therapy should trigger suspicion for alternative diagnoses. Foot pain in patients with risk factors for occlusive vascular disease is strongly suggestive of ischemic foot, which is probably the principal culprit in Alastair's case. The condition predisposes to, and is frequently complicated by, other conditions like infection of the soft tissue and/or bone, and co-existing diabetic neuropathy may hide the symptoms of trauma or foreign bodies.

Differential diagnoses include:

- gout,
- stasis dermatitis,
- osteitis and
- a predisposition to recurrent cellulitis (e.g., by untreated interdigital tinea infection, or exposure to organisms not covered by the standard antibiotic regimens).

2. *What are the typical features of this diagnosis?*

In sub-acute or chronic cases, the ischemic foot classically presents in a patient with a history of previous intermittent claudication, who complains of tight or burning pain, usually across the dorsum of the foot, but sometimes affecting the whole foot. Although the affected foot is usually pale, collateral circulation may allow reasonable skin colour and venous return (a cool, red foot). Pulses may even be present in the setting of severe ischemia, especially in diabetics with microvascular disease.

The pain is usually relieved by keeping the foot dependent, and patients who wake up with foot pain may learn that they can get back to sleep if they leave the foot hanging over the edge of the bed. Prolonged dependency can cause the foot and ankle to be swollen and red, increasing the risk of misdiagnosis as cellulitis or gout. In chronic cases, the skin may be dry and scaly with poor nail and hair growth and the foot may be numb. As ischemia worsens, ulceration may appear (typically on the toes or heel and occasionally on the leg), especially after local trauma.

Acute limb ischemia, usually results from acute thrombotic occlusion of an artery following rupture of an atherosclerotic plaque, or embolic occlusion by thromboembolism of cardiac origin. Occasionally, occlusion occurs as a result of acute arteritis. In acute cases, the patient will present with a cold, pulseless, pale or blotchy foot (cold, white foot). In these cases, a history of claudication may be absent, and the pain will be acute

and more severe because of the lack of collateral circulation.


A useful (although not completely reliable) bedside test is to raise the foot and observe the colour. In cellulitis or gout, the foot will remain red when it is raised while, if ischemic, the foot will become pale (Buerger's sign).

3. *What ED interventions are indicated?*

Acute limb ischemia has a significant risk of mortality or amputation and requires immediate referral to a vascular surgeon. Permanent tissue loss can occur in less than four to six hours. Pain at rest or with minimal effort in a patient with chronic vascular disease is also an indication for urgent referral. In the acute emergency department (ED) phase, oxygenation and hydration should be maximized, and heparin therapy (at a deep vein thrombosis dosage) should be initiated.

A clear diagnosis of peripheral ischemia does not rule out concomitant local pathology and, although no ancillary investigations should be allowed to delay referral or therapy, patients awaiting definitive treatment may have certain tests carried out in the ED.

X-rays may demonstrate occult fracture, foreign body or osteitis. Electrocardiography may help determine a source of thromboembolism (e.g., atrial fibrillation). Any associated infection, should be managed at once.

Vascular disease in the peripheries usually indicates generalized occlusive vascular disease, so it should be recognized that these patients are at a very high risk of other vascular catastrophes, like stroke or myocardial infarction. Risk factors must be strenuously addressed with regimens that may include smoking cessation, antiplatelet and lipid-lowering medication, tight glucose and blood pressure control, as well as dietary and exercise interventions. Patients with thromboembolism of a cardiac origin will benefit from anticoagulation. Prophylactic foot care (in both feet) must be meticulous, especially in patients with diabetes. 

Back to our patient

Alastair insists that he has kept his foot elevated as instructed by his physician, however, his daughter says that he prefers to sit with it hanging down. Although not dramatically cold to the touch, *dorsalis pedis* and *tibialis posterior* pulses are absent, and his femoral and popliteal pulses are very weak on the right.

When his foot is elevated, it quickly becomes very pale. His ankle-brachial index (ankle systolic pressure is divided by the brachial pressure, both measured in the supine position and measured by Doppler) at the bedside is 0.25 (normal is > 0.9).

Intravenous antibiotics are started to address any possible concomitant infections and he is prescribed antifungal cream for his athlete's foot.

Emergency angiography demonstrates stenosis of the distal abdominal aorta and both common iliac arteries, which is most severe on the right. He is admitted to the vascular surgery service for aorto-bifemoral bypass.

The six "P"s of acute limb ischemia

- Pain
- Pallor
- Polar (cold)
- Pulselessness
- Paresthesia
- Paralysis

Any of these symptoms should remind the clinician to consider the diagnosis.

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