

## Case 24 Black toes



Figure 24.1

A 40-year-old, unemployed labourer presented to the accident and emergency department with these black, but not especially painful, toes on his left foot (Fig. 24.1). He was known to have diabetes and was on insulin, but confessed to being very bad about taking it and was rather confused about his correct dosage. He admitted that he often neglected the advice given to him in the diabetic clinic concerning his diet and care of his feet and, all too frequently, indulged in drinking bouts with his mates. He smoked 'as many cigarettes as he could get' – probably about 20 a day.

On examination, the left hallux and the second and third toes were obviously gangrenous and infected. There was some pitting oedema over the dorsum of the foot. All the pulses in the right lower limb were present. On the left side, the femoral and popliteal pulses were easily felt but not the ankle pulses. However, these could be picked up using the Doppler probe. There was diminution of sensation to both vibration and fine touch (10 g nylon monofilament) over both feet. Clinical examination was otherwise normal and this included fundoscopy, with no evidence of diabetic retinopathy. His capillary blood glucose was 20mmol/L in the

Emergency Department.

### What is the, pretty obvious, diagnosis?

Diabetic gangrene of the left foot with clinical evidence of diabetic neuropathy.

### What factors in his diabetes contributed towards development of the gangrene?

- *Diabetic microangiopathy*: This affects the blood vessels at arteriolar level with subintimal hyperplasia. The same pathology leads to the characteristic changes of diabetic retinopathy.
- The poorly controlled diabetes also predisposes to infection of the poorly vascularized tissues.
- *Diabetic neuropathy* (typically glove and stocking distribution of diminished sensation): This increases the risk of minor, unnoticed trauma to the skin of the foot, allowing ingress of bacteria into the ischaemic soft tissues.

### What factors in smoking contribute to this condition?

- Nicotine produces vasospasm at an arteriolar level.
- Inhaled carbon monoxide in the smoke is taken up by haemoglobin to form carboxyhaemoglobin, which reduces the oxygen-carrying capacity of the blood. It is slowly dissociated, so this phenomenon persists long after the cigarette is stubbed out.
- Smoking increases platelet adhesiveness and so encourages thrombosis.

### How should the patient be treated initially?

He requires emergency hospital admission. The diabetes is brought under control with insulin and diet adjustment. Broad spectrum antibiotic treatment is commenced after a bacteriological swab has been taken, the organisms identified and their sensitivities determined.

Smoking is vetoed.

### Is major amputation likely to be necessary in this patient?

This is unlikely in the first instance. The peripheral pulses are present, so this is a local phenomenon due to the factors already described. Under a general anaesthetic, all the necrotic tissues are excised as a forefoot amputation, resulting in a deformed but useful foot. Such local amputation is demonstrated in these 'before and after' photographs of a similar patient with diabetic gangrene (Fig. 24.2). If the patient persists in smoking and continues ignoring his diabetes he will inevitably develop further diabetic complications necessitating a more proximal amputation.



(a)



(b)

**Figure 24.2** (a) Before and (b) after surgery in a diabetic patient with diabetic gangrene.