

What are the factors that lead to diabetic foot amputation?

by **PHILIP COLERIDGE SMITH DM MA BCh FRCS**

Consultant Vascular Surgeon, Medical Director of the British Vein Institute and Emeritus Reader in Surgery at UCL Medical School

➔ **ABOUT 3.5 MILLION PEOPLE** in the UK have diabetes, amounting to about 6% of the population. That figure has grown from 1.4 million in the past 30 years. Two types of diabetes are present in the UK population: type 1 diabetes develops in young people and is attributable to a failure to produce insulin in the pancreas, while type 2 diabetes normally develops in older people and is strongly associated with obesity. In that condition the body becomes resistant to the effects of insulin. A considerable increase in type 2 diabetes largely accounts for the growth in the numbers of diabetics, which parallels the rise in prevalence of obesity.

The management of diabetes involves careful regulation of the balance between intake of carbohydrate foods, exercise and the dose of blood glucose lowering drugs. It is important for the avoidance of complications that the blood glucose levels are maintained within the normal range or close to it. The patient must test their blood glucose levels regularly and adhere to a diet with an appropriate amount of carbohydrate in order to regulate blood glucose levels.

Complications of diabetes most commonly occur in those patients who fail to control their diabetes adequately. The quality of diabetic control is measured for clinical use by assessing the levels of glycated haemoglobin, which gives an indication of the blood glucose levels over the preceding 2-3 months. That is done by measuring the haemoglobin A1c (HbA1c) in the blood – in most patients 2-3 times per year.

Complications of diabetes and the vascular surgeon

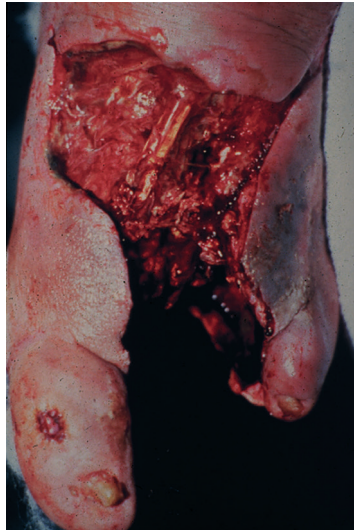
Persistently high blood glucose levels lead to damage to several organs, including the eye – where diabetic retinopathy may lead to blindness – and the kidney, where diabetic nephropathy may lead to renal failure. Diabetic patients are much more likely to develop atherosclerosis, leading to coronary heart disease, strokes and lower-limb arterial disease.

In the leg, the distribution of arterial narrowings is often in the calf, which may lead to ischaemia of the foot. A further problem which commonly affects the lower limb is diabetic neuropathy, which reduces the ability of the patient to detect minor injury to the foot due to loss of sensation there.

Damage to motor nerves which control muscle contraction may cause incoordination of the muscles, which is essential for the maintenance of normal foot shape and function. Deformity of the foot may arise, increasing the risk of damage to the skin leading to a foot ulcer.

The nerve problems often affect those nerves which regulate the distribution of blood flow to the tissues. Diabetic patients usually have warm peripheries due to that issue, and that can cause oedema (waterlogging) of the tissues. The immune system is often less efficient in diabetic patients, leading to increased risk of infection.

The combination of all those factors may lead to minor damage to the skin, in which a blister develops. Ill-fitting shoes can rapidly cause a blister in diabetic patients, which can lead to loss of the skin and an ulcer through which infection may enter. Reduced immunity to infection



can allow severe infection to run rapidly through the foot, spreading swiftly from the foot to the leg. The only solution to an extensive major infection is a below-knee amputation.

Controlling diabetic foot problems

NICE has published advice on the prevention and management of diabetic foot problems in great detail in its document NICE NG19. The aim is to ensure that medical practitioners and healthcare workers provide rapid treatment for patients with diabetic foot ulceration. NICE advises that a diabetic patient presenting with a new episode of foot ulceration should be referred to the local multidisciplinary foot care service – which includes specialists in diabetology, podiatry, diabetes specialist nursing care, vascular surgery, microbiology and others. The referral should be made within 24 hours and the patient should be seen by the diabetic foot care service within a further 24 hours.

As I have noted above, delays in providing such an assessment may permit uncontrolled infection to invade the foot, necessitating an amputation below the knee. Where a physician or nurse has failed to make such a referral, substandard care may have been provided.

Strategy regarding diabetic foot ulceration

The management of a diabetic foot ulcer includes a number of components: 'offloading', control of foot infection, control of ischaemia, wound debridement, wound dressings. Offloading of the ulcerated area of the foot using a plaster cast prevents further damage to the foot. Antibiotics are useful in order to treat the infection, if present.

The vascular surgeon can investigate and treat limb ischaemia due to atherosclerosis, although that may be technically difficult or infeasible, since the affected arteries in the leg and foot are not easily reopened or bypassed due to their small size.

Wound debridement is effective in removing dead tissue in order to gain control of infection. The debridement may have to involve removal of the toes or the forefoot (pictured) and is usually done by a vascular surgeon.

The aim is to avoid a major amputation: if most of the foot is retained that is a far better outcome than a below-knee amputation. Diabetic patients are often treated by a series of 'debridement' procedures in which small sections of dead tissue are excised in an attempt to avoid a more major amputation.

Litigation concerning diabetic foot

With the increasing population of diabetic patients the number of cases where I have advised concerning diabetic foot problems has increased. In the light of the advice from NICE on swift referral of patients to the multidisciplinary diabetic foot care service, delays in referral may be considered to be substandard management.

However, such cases are usually defended on causation. It may be difficult to show that loss of one or two toes could have been avoided where minor delays in referral have been made. On the other hand, if a significant delay in referral has occurred, and the immediate treatment

required as a result is a below or above-knee amputation, the claimant may argue that it was avoidable with more expedient care.

In patients with limb ischaemia due to arterial disease, the efficacy of vascular surgery to improve blood flow may be limited by the distribution of the narrowed arteries in distal parts of the limb, where modern vascular surgery is less effective. Claimants may consider that, where vascular surgery has been done, it should have avoided a limb amputation. However, the defendant would probably argue that the surgeon's ability to improve the blood flow was prevented by the severity of the arterial disease. The limb may have been lost because of the severity of the arterial disease in combination with diabetes.

In a number of cases of limb amputation in diabetic patients, the clinical notes show that the claimant was morbidly obese and there was failure to control the blood glucose levels over many years. The claimant has frequently disregarded medical advice concerning weight-loss and adherence to the correct dietary regime in order to control the diabetes. In such cases, much of the responsibility for an amputation may lie with the claimant and the defendant may argue that in such circumstances loss of the limb was inevitable.

Even in cases where the claimant does succeed, the defendant is likely to assert that several factors may lead to loss of life expectancy. Diabetes and morbid obesity each lead to a loss of life expectancy of about a decade. The occurrence of severe limb ischaemia (from diabetes or other cause) leads to an observed life expectancy of about four years. The value of such cases may be greatly eroded by considerations of life expectancy.

In conclusion, there has been a large increase in the number of patients with diabetes in the UK and worldwide in recent years. That has led to many cases of diabetic foot disease – often leading to the need for an amputation. Loss of the limb can be avoided by expediently delivered good quality care from a multidisciplinary team. However, although failure to provide such treatment may comprise substandard care, there are several factors which may limit the likelihood of success of clinical negligence litigation. □

Mr Philip Coleridge Smith DM MA BCh FRCS
Consultant Vascular Surgeon
Medical Director, British Vein Institute



19 years

Defendant instructions

Claimant instructions

Single joint expert

Court experience

Areas of experience:

- Surgery of veins and arteries
- Sclerotherapy & laser ablation of varicose veins
- Varicose veins
- Deep vein thrombosis
- Pulmonary embolism
- Leg ulcer
- Lymphoedema
- Peripheral ischaemia
- Injury to blood vessels
- Medical negligence and personal injury

Office address:

British Vein Institute, 24-28 The Broadway, Amersham HP7 0HP

Tel: 0870 609 2389 Fax: 0872 111 7042

Email: p.coleridgesmith@bvi.uk.com

Web: www.medical-expert-witness.co.uk www.bvi.uk.com