

Diabetes and the feet in old age

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ARTICLE POINTS

1 A foot lesion can be a presenting sign of diabetes.

2 Removing the patient's shoes and socks and looking at the feet takes only a few minutes.

3 People with diabetes should never use corn cures.

4 The use of prescribed footwear with cushioned insoles is a very effective means of protecting the at-risk foot from injury.

5 We cannot expect our patients to look at their feet on a regular basis if we do not examine them ourselves in the clinic.

KEY WORDS

- Diabetes
- Elderly people
- Neuropathy
- Foot ulceration
- Neuropathy Disability Score

Introduction

Prevalence studies suggest that many elderly people will have undiagnosed diabetes and associated complications, including neuropathic foot lesions. Early identification and treatment are essential to prevent foot lesions progressing to more severe complications, including lower limb amputation. The at-risk foot may be identified through a simple screening test, such as the Neuropathy Disability Score, and by routinely checking the feet of all patients at each clinic visit. Good foot care is very important for all people with diabetes, particularly the elderly.

Prevalence rates for diabetes have been increasing since the early 1900s (Finucane and Popplewell, 2001) and an epidemic in the first quarter of the 21st century is predicted (King et al, 1998). A survey of American citizens found that the rates of diabetes increased with age, and that the prevalence of undiagnosed diabetes was equal to that of diagnosed diabetes (Harris et al, 1998). Many elderly people will therefore have undiagnosed diabetes with its associated complications.

A foot lesion can be a presenting sign of diabetes, and it is estimated that as many as 10% of people with diabetes will have had a foot ulcer at some time in their life (Boulton, 1997). If not treated correctly and promptly, a trivial lesion can lead to more severe complications with an increase in morbidity and mortality, including lower limb amputation. Good footcare is very important for all people with diabetes, particularly the elderly.

Effect of diabetes on the feet

The Diabetic Foot and Amputation Group describe the diabetic foot as:

'A group of syndromes in which neuropathy, ischaemia, and infection lead to tissue breakdown, resulting in morbidity and possible amputation' (Edmonds et al, 1996).

Peripheral neuropathy leads to sensory motor and autonomic dysfunction, with loss of the protective pain sensation, alteration in foot shape, dry skin and callus formation.

Peripheral vascular disease affects the

circulation to the feet and legs, and is manifest in the neuro-ischaemic foot, in which there is neuropathy and ischaemia (Edmonds et al, 1996). Patients with peripheral vascular disease may initially complain of intermittent claudication and, as the ischaemia worsens, pain in the legs in bed at night; these pains may be masked by sensory neuropathy and should be distinguished from the chronic pain of sensory neuropathy.

Peripheral vascular disease in people with diabetes is a sign of wider involvement of the whole arterial system. A study of 33 patients with a black toe who presented at a diabetic foot clinic between 1988 and 1994 found that isolated foot digital gangrene was a powerful indicator of impending acute myocardial infarction (Shawnis et al, 1998). Two-thirds of participants were smokers, and by the end of the study 20 patients had died from myocardial infarction and one had suffered a stroke.

Limited joint mobility can be a major factor in the development of high plantar foot pressures, which alone do not contribute to foot ulceration but can make the foot more susceptible to ulceration (Fernando et al, 1991). It is a combination of factors that leads to the breakdown of the foot in diabetes (Table 1). The alteration in foot shape results in high pressure under the ball of the foot, clawed toes and a high arch. Extra-depth/bespoke footwear with cushioned insoles from a hospital-based orthotist are needed to prevent foot damage.

Assessment of the diabetic foot

Modern, expensive equipment is not



Figure 1. Shoe-induced ulcer on the great toe.

necessary for diabetic foot screening (Edwards and Foster, 1999). The Neuropathy Disability Score (Young et al, 1993) (Table 2) uses a tuning fork, Neurotip pen, and hot and cold rods for assessing vibration, pain and temperature sensation respectively, and a tendon hammer for the ankle reflex.

The Neuropathy Disability Score is part of our routine foot examination for neuropathy for all new patients with foot ulcers (Figure 1). The North West Diabetes Study Group also recommend the Semes Weinstein monofilaments and palpation of the foot pulses (dorsalis pedis and posterior tibial) as a good screening tool. The sounds of the Doppler waveforms (monophasic, biphasic, or triphasic) can help to identify a diminished blood supply, but vascular calcification can give a falsely elevated ankle-brachial index reading.

Nurses should look at the shape of the feet, noting any bony lumps that could rub on the shoe. The skin should be inspected for any cracks (particularly on the heel), hard skin, corns or calluses. The temperature of the feet should be assessed by feeling them with the hand. A cool foot may be indicative of ischaemia, while a hot foot may signify an infection or Charcot foot. The colour of the feet is affected if the foot is infected, when there may be swelling, redness or cellulitis. The ischaemic foot is cool, hairless and pale, with reduced or absent foot pulses. The toes in the ischaemic foot may be red or bluish. If the skin is dry, an emollient cream should be applied daily to keep the skin supple and prevent cracking.

A dedicated multidisciplinary footcare team can reduce the incidence of morbidity and mortality in diabetic foot ulceration (Edmonds et al, 1986). The team should include podiatrists, nurses, doctors and an

orthotist. The ultimate goal of the team is the prevention of foot problems.

Infection

Infection often complicates diabetic foot ulceration, as the break in the skin provides a portal of entry for bacteria. Infections are often polymicrobial and can spread rapidly through the foot, causing gross tissue destruction (Edmonds and Watkins, 2001). It is important that people with diabetes and foot ulcers are referred promptly to a specialist unit or podiatrist whose contact details are known by the specialist nurses.

Podiatry

Podiatry is very important for elderly people with diabetes, who – as a result of old age and the complications of diabetes – may not be able to reach or see their feet. Care should be taken always to refer to a state-registered podiatrist.

A build-up of callus under the forefoot can act as a foreign body and elevate plantar pressures, leading to ulceration (Young et al, 1992). A history of a previous foot ulcer and the presence of plantar callus are highly predictive of future ulceration (Murray et al, 1996); regular debridement is essential. Corn cures should never be used as they can damage the surrounding skin and lead to foot ulceration and sepsis. Foster et al (1989) reviewed seven patients who rapidly

Table 1. Risk factors for foot ulceration

- Neuropathy
- Vascular disease
- Nephropathy
- Blind/partially sighted
- Elderly or live alone
- Ill-fitting shoes
- Limited joint mobility
- High foot pressures
- Previous foot ulcer
- Foot deformity
- Oedema
- Trauma
- Callus

Table 2. The Neuropathy Disability Score

Test	Right foot	Left foot
Vibration (128 Hz tuning fork) (Tip of great toe) Present = 0, Reduced/Absent = 1		
Pinprick sensation (Dorsum of great toe) Present = 0, Reduced/Absent = 1		
Temperature sensation (Dorsum of great toe) Present = 0, Reduced/Absent = 1		
Ankle jerk Present = 0 Present on reinforcement = 1 Absent = 2		
Total score*		

*This is the sum of the scores derived from both feet
A score of 1–3 indicates mild neuropathy, 4–6 moderate neuropathy, and 7–10 severe neuropathy

PAGE POINTS

- 1 Immobile elderly people with diabetes are at risk of developing pressure sores on the heel, particularly if they also have neuropathy.
- 2 For people with pressure sores, regular pressure relief in a bed or chair is essential.
- 3 Prevention is better than cure.
- 4 Heel ulcers are the most serious ulcers in the diabetic foot and can lead to amputation.
- 5 The level of diabetic foot screening in nursing homes by podiatrists may not be adequate and there may be no protocol for this.

developed severe foot ulceration after using a corn cure. Four of these patients needed forefoot surgery.

Footwear

The use of prescribed footwear with cushioned insoles is very effective in protecting the feet from injury (Chanteleau et al, 1989). However, it is known that not everyone supplied with special shoes wear them at all times when walking (Chanteleau and Haage, 1994; Knowles and Boulton, 1996), and this can lead to ulcer recurrence or the formation of new ulcers. People with diabetes who are prescribed special footwear and insoles should be advised to check them for fit and wear, and to ensure that they do not contain any stones or other foreign bodies before wearing them.

Elderly people often wear slippers in the house; however, these do not support or protect the feet, as they are usually thin-soled with no protective cushioning. Falls in the elderly are more likely if slippers are worn. In a study of people in residential care, Kerse et al (2004) found that although falls were frequent in this population, the risk factors related to footwear were potentially reversible if shoes rather than slippers were worn. Sherrington and Menz (2003) confirmed these findings. They found that older people who sustained a fall-related hip fracture were often wearing potentially hazardous footwear, such as slippers, when they fell.

Another cause of falls in the elderly is loss of balance, which may be due to old age or medical conditions other than diabetes. Cavanagh et al (1992) found that patients with peripheral neuropathy secondary to diabetes were 15 times more likely to report an injury during walking or standing than the control group, with women feeling less safe than men. The authors concluded that peripheral neuropathy has a clinically significant effect on gait and posture. When superimposed on old age and other medical conditions, it puts elderly people with diabetes at higher risk of injury than their counterparts without diabetes.

Pressure relief

Immobile elderly people with diabetes are at risk of developing pressure sores on the heel

(Figure 2), particularly if they also have neuropathy. These people may be in a nursing home or hospital ward, and regular pressure relief in a bed or chair is essential. Prevention really is better than cure. Heel ulcers are the most serious ulcers in the diabetic foot and can lead to amputation (Younes et al, 2004). Simply removing shoes and socks and looking at the feet will help to identify problem areas so that pressure relief can be instigated.

Elderly people with diabetes who are residents in nursing and care homes often have other health problems, such as dementia, frailty, depression and coexisting medical conditions that increase their risk of foot complications. As a result, they may be unable to look after themselves and thus neglect their feet. The level of diabetic foot screening in nursing homes by podiatrists may not be adequate and there may be no protocol for this (Ashton and Dean, 2002).

Education

Education leaflets and verbal advice on diabetic foot care should be provided to both people with diabetes and their relatives or carers. The advice given should be relevant to each person. People with diabetes should be given clear explanations at each stage of their diagnosis, to avoid dissatisfaction, complaint or litigation (Bending, 2004). We cannot expect our patients to look at their feet regularly if we do not examine them in the clinic.

People with diabetes should be reminded not to walk barefoot, not to wear ill-fitting shoes, and not to use hot-water bottles or corn cures. They should not perform any bathroom surgery and should seek the advice of a podiatrist for nail cutting and corn and callus debridement. Their feet should be examined daily, and they should be given an



Figure 2. Pressure sore on the heel of the foot.

emergency contact number in case any foot problems are discovered that should be dealt with quickly. Specialist nurses should include preventive foot care and a brief foot examination in their consultations.

Foot ulcers can have a significant impact on quality of life, which can affect the person's ability to perform simple everyday tasks or leisure activities and lead to depression (Vilekyte, 2001).

Conclusion

In the UK, we have an ageing population, with more and more people who have diabetes and are at high risk of developing foot complications. The International Consensus Guidelines (Bakker, 2000) advise regular inspection of the at-risk foot and use of appropriate footwear. It is important to educate the patient, family and other healthcare providers so that potential problems are identified early. The elderly person with diabetes has an increased risk of developing foot and gait problems.

Paul Brand, CBE (1914–2003), a missionary and surgeon in India, and later at the National Hansen's Disease Centre in Carville, Louisiana, USA, had a major impact on footcare in leprosy and diabetes. He wrote:

'The diabetic patient who claims their shoes are killing them may well be correct.' (Brand, 1983)

This statement is very true, as ill-fitting shoes are a common cause of foot ulceration. He suggested that the best way to prevent serious foot lesions was for every healthcare professional to ask their patients to remove their shoes and socks at each clinic visit. His words must not be forgotten. ■

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PAGE POINTS

1 The feet of people with diabetes should be examined daily, and patients should be given an emergency contact number in case any foot problems are discovered.

2 Specialist nurses should include preventive foot care and a brief foot examination in their consultations.

3 The International Consensus and Practical Guidelines on the diabetic foot (Bakker, 2000) advise regular inspection of the at-risk foot and use of appropriate footwear.

4 Ill-fitting shoes are a common cause of foot ulceration.

5 Paul Brand, CBE (1914–2003), who had a major influence on footcare in leprosy and diabetes, suggested that the best way to prevent serious foot lesions was for every healthcare professional to ask their patients to remove their shoes and socks at each clinic visit.