Foot assessment in GP practices for people with diabetes

Diabetes increases the chance of lower-limb amputation: directly, as a result of ulcers caused by trauma and complicated by lack of sensation; and indirectly, by peripheral vascular disease. In any one patient both causes can occur.

As well as the costs to the individual of foot ulceration or amputation, there are also large costs to the NHS as a result of high bed occupancy and the cost of vascular surgery and artificial limbs (King’s Fund, 1996).

The nurse can help to reduce the rates of amputation through primary, secondary and tertiary preventative advice and by identification of the ‘at-risk’ foot.

Risk factors for foot complications Diabetes can cause increased stiffness of many foot joints, resulting in less flexible foot arches; the foot shape may alter to produce clawing of the toes and prominent metatarsal heads, and there can be loss of subcutaneous fat (Robertson et al, 2002; Collier et al, 1989).

Peripheral neuropathy in feet leads to:
- Loss of sensation, which can result in tissue damage.
  For example, a person with diabetes could walk a long distance with foreign objects in his or her shoes and not be aware of it;
- Altered sensations, which result in the feeling of pins and needles or burning pains from neuropathy. Normal stimuli may frequently be interpreted as painful – touch can feel like a wasp sting, warmth can feel very hot. As a result, patients may not realise that their pain may actually be caused by, for example, a tight-fitting shoe;
- Motor neuropathy, leading to small muscle dysfunction which produces clawing of the toes;
- Autonomic neuropathy, which causes unusual blood flow responses to temperature changes or trauma – a feature that probably contributes to neuropathic joint disease (Charcot’s joint).

Charcot’s joint is a chronic, progressive, degenerative disease of one or more joints characterised by swelling, instability of the joint, haemorrhage, heat, and atrophic and hypertrophic changes in the bone.

Series of small fractures can occur in the small bones of the foot, and as patients cannot feel the pain they continue to walk and cause further damage.

The likelihood of peripheral neuropathy developing depends on the mean HbA1c (glycated haemoglobin) and the length of time the patient is hyperglycaemic (Diabetes Control and Complications Trial, 2002; Stratton et al, 2000).

Peripheral vascular disease (PVD) causes loss of circulation and ischaemia which is often bilateral, multisegmental and distal (starting at the toes). Absent foot pulses are the critical marker. The development of PVD is dependent on the classical risk factors of smoking, high blood pressure and high levels of low density lipoprotein (LDL) cholesterol. HbA1c probably contributes but its role is relatively small. Women usually have less vascular disease than men but this advantage is lost with the presence of diabetes.

Types of foot problem found in people with diabetes

The two main clinical types are:

Neuropathic feet Clinical signs include:
- Foot pulses remain palpable;
- Good circulation;
- Foot is warm to the touch;
- Patient describes the foot as feeling numb;
- Foot does not respond appropriately to painful stimuli.

The two main complications of neuropathic feet are:
- Neuropathic ulcers, found mainly on the soles of feet; and
- The development of neuropathic joints.

Neuropathic ulcers are pressure ulcers and usually form under areas of marked callusity as sterile necrotic areas. However, they are susceptible to infections including polymicrobial infection which may spread rapidly, causing overwhelming tissue destruction. This process is the main reason that amputation may be necessary for some people with neuropathic feet.

Ischaemic feet Clinical signs include:
- The foot is cool to the touch;
- Foot pulses are absent;
- Pain may be present at rest;
- Ulceration occurs at the edges of the foot from localised pressure damage (Figs 1 and 2). Gangrene may occur.

Infection is a complication of neuropathy and ischaemia and is responsible for considerable tissue damage in the feet of people with diabetes.

Reducing the risk of complications The risk of foot problems can be reduced by emphasising the need to keep HbA1c, LDL cholesterol and blood pressure within normal limits, and by advising people to stop smoking.

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The nurse should encourage healthy living and adherence to therapy, and should help the patient to ask for appropriate treatment from the GP and podiatrist. Strategies to minimise the consequences of foot complications include: teaching the patient and carer about foot care, including regular inspection, identification of poor-fitting shoes or slippers and early recognition of the ‘at-risk’ foot; prompt use of preventative measures; and rapid and intensive treatment of foot complications in multidisciplinary foot clinics, which can include vascular surgery.

Assessing the foot Many patients with diabetes are unable to see their feet because of poor eyesight or reduced mobility so assessment by the primary care nurse is vital.

Regular foot inspection by a healthcare professional should include: watching how the patient walks, followed by a visual inspection of the legs, dorsal, plantar and posterior surfaces of the foot and between the toes; looking for any new or old trauma shown by blisters, corns or callosities; and looking for any interdigital fungal infection.

If the feet are unclean, encourage cleanliness. Shoes and socks should also be examined to ensure that they have adequate width, depth and length, and that the shoes have a functional insole and sole. New shoes should initially be worn for short periods of time.

Vascular examination This involves feeling the pulses in the feet.

Neurological examinations An important aspect of grading diabetic neuropathy is to assess the degree of loss of sensation in the foot. This can be assessed by finding out if the patient can feel the vibration of a tuning fork. More evidence-based methods include:

- The biothesiometer – a probe is applied to part of the foot, usually on the big toe. The probe can be made to vibrate at increasing intensity by turning a dial. The person being tested indicates as soon as he or she can feel the vibration. The reading on the dial at that point is recorded and interpreted.
- The monofilament – touch pressure sensation is tested by a standardised 10g monofilament pressed against part of the foot. When the filament bends, its tip exerts a pressure. If the patient cannot feel the monofilament at certain specified sites on the foot, he or she has lost some sensation and is considered to be at risk of developing a neuropathic ulcer. The monofilament has the advantage of being cheaper than a biothesiometer.

Management of feet of people with diabetes

Low-risk foot This has no abnormalities of vascularity or sensation and the patient is sufficiently mobile to cut his or her own nails. The nurse should arrange annual review of the feet and offer lifestyle advice and health education.

‘At-risk’ foot This has signs of neuropathy, absent foot pulses or other risk factors, but no previous ulcer; the patient is able to see and reach the foot and nails. The nurse should arrange to see the patient more frequently, ideally every three months, and should inspect the feet at each visit. These visits also provide opportunities for patient education.

Treatment goals for blood pressure, HbA1c and lipids may need to be reset, with advice given on possible need for angiotensin converting enzyme (ACE) inhibitors, statins and aspirin, and on improving glycaemic control.

The nurse should also alert colleagues in secondary care if an admission is planned for elective surgery because a patient with an ‘at-risk’ foot is at high risk of developing heel pressure ulcers from lying on a theatre couch, bed or sitting in a chair. This risk is likely to be missed when risk assessment is based on many of the pressure ulcer risk assessment tools currently in use (Schoonhoven et al, 2002).

High-risk foot Evidence of risk factor, foot deformity, skin changes and a history of a previous ulcer. The nurse should ensure referral to a specialised podiatry service; if the findings are confirmed then the patient will be seen frequently by that team every one to three months. The nurse needs to ensure that clinic attendance is possible for people with disabilities or immobility, and that patients can be seen urgently if new problems occur. Foot care education should occur at regular diabetes review appointments.

The newly ulcerated foot (including cellulitis) When new ulceration occurs, refer the patient to a specialised podiatry or foot care team within 24 hours.

Ulcerated feet The patient should remain under specialist care until the ulcer has healed. The nurse needs to ensure attendance is possible for people with disabilities or immobility, and that the patient can be seen urgently if new problems occur.

Documentation This must record the presence or absence of palpable foot pulses and sensation, and the overall appearance of the foot. Any specific action taken must also be noted.