Assessing the foot in patients with diabetes

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Careful foot care for patients with diabetes can help to avoid foot ulcers and amputation. Practice nurses should know how to carry out a foot assessment.

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Practice nurses are increasingly at the forefront of caring for patients with diabetes. Part of that care involves regular foot checks to determine the risk of ulceration. Ulceration may lead to amputation and a higher risk of premature death. Up to 80% of diabetes-related amputations are avoidable. During a foot check, nurses should take a history, examine the patient, assess for loss of protective sensation, and classify risk. They should seek to obtain further treatment for patients at increased risk.

Up to 80% of the 100 diabetes-related amputations performed each week in England are potentially preventable. If current rates continue, the number of amputations will rise from over 6,000 in 2009-10 to more than 7,000 in 2014-15. People with diabetes who have an amputation or foot ulcer have a relative increased likelihood of death within five years of up to 80% (Diabetes UK, 2012a). These figures are a shocking indictment of the care of people with diabetes in the UK, and every effort must be made to reverse this situation.

As part of its Putting Feet First campaign, Diabetes UK has produced useful literature for patients and health professionals (Diabetes UK, 2012b). This provides background information and an effective foot care pathway. There is a clear flow chart in which risk is identified as low, moderate, high or active, and each risk level is defined and accompanied by an action plan.

Diabetes UK has used the phrase "Fast track for a foot attack" to emphasise the potential seriousness of increasing symptoms, and to promote the concept of rapid access for treatment by a specialist multidisciplinary team, which has been shown to promote faster healing and therefore result in fewer amputations (Diabetes UK, 2013).

Causes of foot problems in diabetes

There are two main causes of foot ulcers in patients with diabetes – peripheral neuropathy and peripheral vascular disease.

Peripheral neuropathy

About half of patients with diabetes are thought to have some degree of diabetic peripheral neuropathy (Boulton et al, 2005). Peripheral neuropathy is the term used to describe damage to the nerves that occurs as a result of high levels of circulating blood glucose. This injures the walls of the blood vessels that supply the peripheral nerves, and prevents essential nutrients reaching the nerves, which are then damaged.

If the sensory nerves are damaged, patients may experience a number of symptoms in the feet and lower legs, including numbness; tingling; burning or stabbing pain; extreme sensitivity to touch; skin, hair or nail changes; and a lack of coordination.

Loss of protective sensation (LOPS) is the single most important risk factor in the development of a foot ulcer. The associated vulnerability to physical and thermal trauma increases the risk of ulceration sevenfold (Singh et al, 2005).

A rare deformity known as Charcot foot can also occur as a result of severe
neuropathy (Fig 1). This is a neuropathic process with osteoporosis, fracture, acute inflammation and disorganisation of the foot architecture providing extra pressure points where ulcers may occur (Tidy, 2011). If Charcot foot is suspected, the patient should be referred urgently to the multidisciplinary foot team (Scottish Intercollegiate Guidelines Network, 2010).

**Peripheral vascular disease**
As well as damage to the nerves, patients with diabetes have a higher risk of developing atherosclerosis (narrowing of the arteries) due to atheroma. This can reduce the blood flow to the feet, resulting in delayed healing of any injury. Associated risk factors include hypertension, smoking and hypercholesterolaemia.

**Essential components of the diabetic foot check**
All nurses involved in the management of patients with diabetes should be able to perform a diabetic foot check and should receive training for this from a recognised organisation or from their local podiatrist.

*The foot check should include:*

**History:** ask if the patient has had any foot problems since their last assessment. Check for any pain or numbness or altered sensation in the feet. Ask if they are having any problems looking after their feet. Report any apparent intermittent claudication when the patient complains of pain in the calf or foot on activity which is relieved with rest, indicating arterial insufficiency.

**Inspection:** visually inspect the skin on all areas of the lower legs and feet. Check behind the heels and over the balls of the feet for dry, cracking skin and fissures. Check between the toes and examine each toenail for length, colour, thickness, debris, odour, separation from the nail bed and pain. Note the character of the skin changes on the leg and foot. Record any changes in colour and texture of the skin. Note any calluses and record their location, size and colour, as these could indicate areas of mechanical stress or pre-ulcer formation.

Look for any deformity, such as the Charcot foot, which may predispose the foot to ulceration.

Check the skin temperature using the back of the hand. Normally the leg is warmer at the tibia and cooler at the toes. Patients with neuropathy have no change in temperature due to dilatation of the capillaries in the toes.

Check also for the presence of varicose veins, haemosiderosis (brown staining of the ankle area), oedema and scarring from previous ulceration.

**Vascular examination:** palpate for the dorsalis pedis and posterior tibial pulses on both feet. If you are unable to palpate the pulses, use a Doppler scanner if available to ascertain the presence or absence of the pulse.

**Check for capillary filling time:** press the distal pulp of a toe until it blanches and then release. Normal reperfusion takes 0-5 seconds and delayed refill is an indicator of arterial ischaemia.

**Assessment of protective sensation:** LOPS can be tested for using a 10g single-use monofilament, 128Hz tuning fork or biothesiometer (National Institute for Health and Care Excellence, 2004). If single-use monofilaments are not available, the filament should be cleaned according to local policy between patients and not used on more than 10 patients in one session.

The monofilament should be applied on at least three locations for each foot,
pressing the monofilament until it bends halfway and then releasing (Fig 2). Calluses or hard skin should be avoided. If the patient is unable to feel the filament at one or more sites, LOPS is diagnosed. If using a tuning fork, vibration sense can be tested at the tip of the big toe and should last for more than five seconds.

All the results should be documented (Box 1). All patients should have their risk for developing ulceration identified and documented and they must be advised of their risk.

Classifying ulceration risk

Low risk: there is no evidence of LOPS or peripheral vascular disease and there are no other risk factors. These patients should be reviewed annually.

Moderate risk: there is one risk factor present such as LOPS or signs of peripheral vascular disease without callus or deformity. These patients should be referred to the podiatrist for assessment and for specialist intervention if required.

High risk: the patient has a history of ulceration or amputation or more than one risk factor is present. These patients should be seen by the podiatrist within one to three months according to need and be referred for specialist intervention when required.

Active: the patient must be referred rapidly and seen within 24 hours (NICE, 2004) if there is:

- Active ulceration;
- Spreading infection;
- Critical ischaemia;
- Gangrene;
- An unexplained hot, red, swollen foot with or without pain;
- Painful peripheral neuropathy;
- An acute Charcot foot.

All patients, regardless of risk, should have a tailored management plan and be given verbal and written information with advice on how to care for their feet.

Useful leaflets

The Ten Tips for Healthy Feet and Touch the Toes Test documents can be downloaded or ordered free from the Diabetes UK website (tinyurl.com/DUK-10-tips-feet and tinyurl.com/DUK-toes). These give patients clear instructions on how to keep their feet healthy, and how to self-manage between foot examinations by testing the sensitivity of their feet.

Diabetes UK has also produced a booklet called How to Spot a Foot Attack. If a foot check has shown a patient has a high risk of developing serious foot problems, this booklet is an excellent resource and can be ordered from the charity’s online shop (www.diabetes.org.uk). It advises patients on how to spot a foot attack and to contact their GP or foot protection team immediately. If these clinicians are unavailable, patients are advised to attend the nearest out-of-hours healthcare service or accident and emergency department.

The booklet has space for emergency numbers including the GP, podiatrist/foot protection team and multidisciplinary foot team. It is important that these numbers are filled in correctly. If the patient is unsure of the contact numbers, the practice nurse should complete this section of the booklet.

Conclusion

The importance of good foot care management and prevention of foot problems in patients with diabetes cannot be overemphasised. All nurses involved in this care should be trained and should refer patients to the multidisciplinary foot care team according to the classified risk.

The recognition and classification of risk by both health professionals and patients with relevant, prompt action could prevent many hundreds of amputations every year. NT

References

Diabetes UK (2012b) Putting feet first. Diabetes Update; spring 2012. tinyurl.com/DUK-footcare