Screening for 'at risk' feet in diabetes over the last 10 years

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There has been an increased awareness of diabetic foot complications and their management over the last decade, mainly due to several key guidelines and recommendations from NICE (2004), the DoH (2001, 2003) and SIGN (2001). Another major contributing factor has been the requirement for general practices to provide QOF data, which has resulted in more screening taking place. The rationale for foot examinations in people with diabetes is to identify those at increased risk of foot ulceration and the initiation of preventative strategies including education, regular podiatry, foot orthoses and inspections.

So have there been any significant developments in screening strategies over the last 10 years?

General screening concepts

There are several screening principles that remain unchanged irrespective of any new technological or system developments.

- It is important to keep sight of the overall screening rationale: why and what are we screening for?
- When using screening tools or scoring systems never lose sight of basic clinical assessment skills, use common sense and assess the whole patient without relying on a piece of equipment alone.
- Having decided on a local screening programme, ensure all involved in screening are doing the same thing.
- Having obtained screening data it is important to analyse it and decide what actions need to be taken.
- It is imperative that data obtained is recorded in a clear and unambiguous way in order for all team members to understand it and enable it to be accessed and used to compare any changes at future reviews.
- Update and audit competencies, knowledge and outcomes.

Screening for neuropathy

The 10 g monofilament has now become perhaps the most used tool for detecting ulcer risk due to sensory neuropathy and should, arguably, remain so. Despite this, there is still confusion regarding the most reliable testing sites, how many incorrect responses equate to ulcer risk and how to act on results obtained. Similarly, the use of a 128 Hz tuning fork is still widely used. A recent study suggests that this method of testing is equally useful compared with the 10 g monofilament and Neuropathy Disability Score (Meijer et al, 2004).

A new device has been developed that tests small fibre nerve function. The device puffs variable degrees of cold air onto the skin surface and the individual asked to indicate when they feel the cold stimulus. According to Zeigler et al (2005), this device is reliable, reproducible, semi-quantitative, relatively cheap and easy to use. However, as it is reported to detect small nerve dysfunction, it is unlikely that it may be of use for determining neuropathic ulcer risk, but by enabling early detection of small fibre neuropathy it would facilitate early targeted interventions.

Another recently developed tool is the 'Neuropad'. This can best be described as self adhesive litmus paper. It is a square piece of activated blue paper that changes to pink when it comes into contact with sweat. Therefore, when stuck to the skin surface it is reportedly able to determine sympathetic nerve function and thus detect the presence of autonomic neuropathy (Papanas et al, 2007).

While both of the above devices above are relatively cheap and as simple to use as a 10 g monofilament, further studies are required before they can be adopted into routine clinical practice.

Peripheral arterial disease

The screening methods used for detecting peripheral arterial disease have remained unchanged over the last decade, although the use of a hand-held Doppler has now become more commonplace.

One recent development has been the introduction of a compact and portable mini vascular-assessment laboratory the 'Vascular Assist' by Huntleigh Diagnostics. This portable device combines the use of ultrasound Doppler and photophlegsmography (PPG) that allows clinicians to obtain Doppler signals and Doppler

waveform analysis (DWA) together with ABPIs and toe brachial pressure indices (TBIs) using PPG. Having said this, the equipment used – although very compact, portable and relatively easy-to-use – is expensive and thus is unlikely to be used in most routine clinical practices. It also requires some understanding of peripheral haemodynamics to interpret the waveforms.

A recent study by Williams (2005), which examined pulse palpation, ABPIs, TBIs and DWA as peripheral arterial screening tests against Colour Duplex Imaging suggested that the combination of TBI and DWA may be more reliable than either palpation of foot pulses or ABPIs in people with diabetes. The author, however, has concerns regarding the validity of TBIs as the propensity and pathological process for medial wall calcification is not large-vessel specific and thus may equally affect the smaller arteries that also have higher relative smooth muscle content.

There is, perhaps, a need for further work to develop a reliable, reproducible and objective method for determining significant peripheral obstructive arterial disease in people with diabetes. Using good clinical observations, history taking and pulse palpation are still arguably sufficient to identify the majority of people with peripheral arterial disease.

Increased plantar pressures

It has been clearly shown that high plantar foot pressures associated with peripheral neuropathy are closely associated with foot ulceration (Reiber, 1999). However, the technology to identify this has been mainly confined to research establishments due to cost and time constraints.

The introduction of a simple, cheap and quick method of identifying high foot pressures has become readily available (Garrow, 2005). This system is based on the Harris footprint mat (Silvino, 1980) and comprises carbonated paper sandwiched between a top film and lower paper grid layer which, when walked over, leaves a footprint on the lower layer. The foot imprint shows areas of low to high pressure captured as either light or darker grey. The intensity of greyness is referenced against a graduated scale with light grey representing low and black representing high pressures. This tool is simple, relatively cheap and easy to use giving semi-quantitative data that can be stored in an individual's records and either used to identifying at risk areas as a patient education tool or to fabricate foot orthoses.

Skin temperature

Use of an infra-red skin thermometer has been recently reported as a self-screening tool to identify areas of high ulcer-risk on the plantar surface of the feet (Lavery, 2007). Individuals who were given an infra-red thermometer were asked to measure the skin temperature at six sites on each foot daily and to reduce their activity if any site had an increase in temperature of >2.2°C compared with the corresponding site on the other foot. The results suggest a reduction in the incidence of foot ulcers compared with two control groups. This study advocates self temperature monitoring for the reduction of ulcer occurrence by identifying inflamed areas of skin, indicating rest and thus reducing in detrimental trauma.

Summary

In conclusion, over the last 10 years there have been very few significant new developments that aid day-to-day clinical detection of the at risk foot in diabetes. The existing screening tools still stand true as reliable, reproducible and easy-to-use in everyday clinical practice. However, it is disappointing to see that the foot-care protection pathway model recommended by NICE has still not been has not been implemented very widely through out the UK (NICE, 2004). The reasons for this I am sure are many and varied, but it is essential to rectify this if a national reduction in lower extremity amputation, ulceration and patient suffering is ever to be achieved. ■

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