

Type 2 diabetes presenting as neuropathic foot ulceration: A case report

Sola Odunsi, Layla Thurston,
Andrew Boulton, Frank Bowling,
David Murray

Classically, people with diabetes present with polydipsia, polyuria and weight loss. However, diabetes may also present with diabetic complications. Here, the authors describe a case of neuropathic foot ulceration in a man with undiagnosed diabetes. Healthcare professionals should be aware of possible undiagnosed diabetes in people who present with foot ulceration in all populations.

It was the Greek physician Aretaeus (30–90 AD) who first described a disease presenting with polydipsia, polyuria and weight loss that we now recognise as diabetes (Henschen, 1969). Centuries later, type 2 diabetes is a major cause of morbidity and mortality, particularly in older people and people of south Asian or African-Caribbean origin. Type 2 diabetes can progress insidiously and so present as an incidental diagnosis or a hyperosmolar non-ketotic coma (Campbell, 2000).

Research suggests that up to 50% of people with type 2 diabetes are asymptomatic at the time of diagnosis (International Diabetes Federation, 2006). One study estimated that diabetes is typically diagnosed 9–12 years after onset (Harris et al, 1992). Given this extended period of untreated and increasing

hyperglycaemia, it is possible that diabetes-related complications will be present at the time of diagnosis. In a retrospective survey of non-traumatic and non-neoplastic lower-limb amputations, it was reported that 15% of those with diabetes-related amputations received their diabetes diagnosis at the time of being admitted for amputation (New et al, 1998). Likewise, the UK Prospective Diabetes Study (1998) revealed that 13% of people with type 2 diabetes had neuropathy of sufficient severity as to put them at risk of foot ulceration at the time of diagnosis.

In the following report, the authors describe a rare case of type 2 diabetes with diabetic foot complications on presentation in a young, white British male, and the subsequent clinical management that culminated in a positive outcome. It is an extremely rare case with regard to the patient's age and ethnicity.

Article points

1. People may have asymptomatic diabetes and present only with diabetic complications, including foot ulceration.
2. Mr C, a 39-year-old man, presented with a neuropathic diabetic foot ulcer complicated by osteomyelitis, but no prior diagnosis of diabetes.
3. Healthcare professionals should be mindful of checking for diabetes in any patient who presents with ulceration of the foot.

Keywords

- Neuropathic ulceration
- Undiagnosed diabetes

Author details can be found on the last page of this article.

Page points

1. Mr C, a clinically obese 39-year-old white British man, presented to the authors' walk-in centre with a 3-week history of pain and intermittent swelling of his left foot ... Mr C reported no past medical history of note.
2. On examination, the foot was swollen and warm with four malodorous lesions. The lesions probed the bone and there was extensive tracking. Osteomyelitis was suspected.
3. Mr C was found to have a random capillary blood glucose level of 18 mmol/L. A fasting blood glucose test was undertaken and type 2 diabetes diagnosed.
4. Mr C was admitted to hospital under the joint care of the diabetes and vascular teams. Informed written consent was obtained for left first ray amputation and surgical wound debridement.

Case report

Mr C, a clinically obese (BMI 32 kg/m²) 39-year-old white British man, presented to the authors' walk-in centre with a 3-week history of pain and intermittent swelling of his left foot. He reported having stepped on a piece of glass, which had entered close to the great toe. Mr C treated the injury with antiseptic at home. Despite the discomfort, he was able to walk.

Mr C reported no past medical history of note, with no prior admissions; he was on no regular medications. On the contrary, the patient reported having an active lifestyle and a healthy diet, being a non-smoker with a minimal alcohol intake, working at a local law firm. He reported a family history of type 2 diabetes (his father).

On examination, the foot was swollen and warm with four malodorous lesions. The lesions probed the bone and there was extensive tracking. Osteomyelitis was suspected. Mr C's peripheral circulation was intact (triphasic waveforms), but marked bilateral neuropathy was noted (loss of vibration sensation >35 m/s²).

Fluid from under the left first metatarsal head region was drained and sent for microscopy, culture and sensitivity. While awaiting the result, Mr C was started on a broad-spectrum antibiotic regimen (amoxicillin 500 mg four times a day) to address the soft tissue infection. Allevyn (Smith & Nephew, Hull) and Inadine (Systagenix, Gatwick) dressings were applied and changed daily. Mr C's foot was offloaded with a Scotchcast (3M Healthcare, Loughborough) boot.

Mr C was found to have a random capillary blood glucose level of 18 mmol/L. A fasting blood glucose test was undertaken and type 2 diabetes diagnosed. Metformin (500 mg twice daily) was prescribed.

Imaging via X-ray revealed gross bone destruction of the first metatarsal head and base of the proximal phalanx, indicating osteomyelitis across the joint space (Figure 1), and marked soft tissue swelling. The amoxicillin was stopped once Mr C had

been reviewed on the ward and clindamycin 500 mg twice-daily and ciprofloxacin 300 mg three times per day prescribed to address the osseous and soft tissue infection based on the culture and sensitivity report.

Mr C was admitted to hospital under the joint care of the diabetes and vascular teams. Informed written consent was obtained for left first ray amputation and surgical wound debridement. The procedure was carried out under general anaesthetic. The first metatarsophalangeal joint was exposed, the soft tissue at this level appeared healthy and there was profuse bleeding. The metatarsal was excised mid-shaft. The tendons were retracted to promote healing and haemostasis was ensured with Vicryl (Ethicon, Livingston) transfixion stitches to the arteries. The wound was left open for secondary intention healing. The excised bone crumbled to the touch due to the osteomyelitis and culture confirmed a *Staphylococcus aureus* infection.

Postoperative assessment the wound site showed clean, healthy granulating tissue and no signs of infection. Mr C was encouraged to heel weight bear with a Scotchcast boot and intermittent negative pressure wound therapy was started (125 mg/mmHg).

Mr C was discharged 3 days postoperatively. At the time of writing he was being followed-up as an outpatient in the author's high-risk foot clinic. On examination of the fundi as an outpatient, Mr C was also found to have background retinopathy with ischaemic changes.

Discussion

In this case, the presence of a grade 3B ulcer (University of Texas wound classification system; Lavery et al, 1996). Deep penetration of the wound with an osseous infection made ray amputation the only management option. Foot ulcers precede more than 80% of non-traumatic lower-limb amputations (Pecoraro et al, 1990).

Healthcare professionals should be alert to the possibility of undiagnosed diabetes in people presenting with foot ulceration in

all populations. While a foot examination is a key component of the diabetes annual review (NICE, 2004), Mr C – presenting with a complication of diabetes, but with undiagnosed diabetes – had missed out on neurological and vascular assessment, footwear evaluation and enhanced foot care education from which may have prevented the episode described here.

Mr C's retinopathy was a late finding associated with his presentation with foot ulceration. However, such a presentation is not unheard of. A study carried out in Birmingham by Walsh and colleagues in 1975 identified 47 people with characteristic features that they described as the "eye-foot syndrome"; all presented with long-standing foot lesions and were subsequently found to have diabetes and diabetic retinopathy. In addition, they all denied the classical symptoms of diabetes. Of the 47 patients identified with "eye-foot syndrome" the majority were white males, despite a high proportion of west Indian and south Asian people in the local population.

As the long-term complications of diabetes usually present several years after initial diagnosis, people with the condition will generally have more time to adjust psychologically to the condition. Mr C was not afforded this adjustment period, giving him little time to come to terms with the diagnosis, let alone the other possible complications that accompany it.

Studies suggest that people with diabetic foot complications experience poor psychosocial adjustments to their condition, relative to those without diabetic foot complications (Vileikyte et al, 2004). Furthermore, these people were more likely to present with depressive symptoms subsequently (Vileikyte et al, 2005). However, the response to a diagnosis of diabetes is generally considered a unique and personal one that takes into consideration various aspects of illness cognition as described by the common-sense model (Vileikyte et al, 2004). It can be hoped that the less extensive nature of Mr C's amputation, together with the

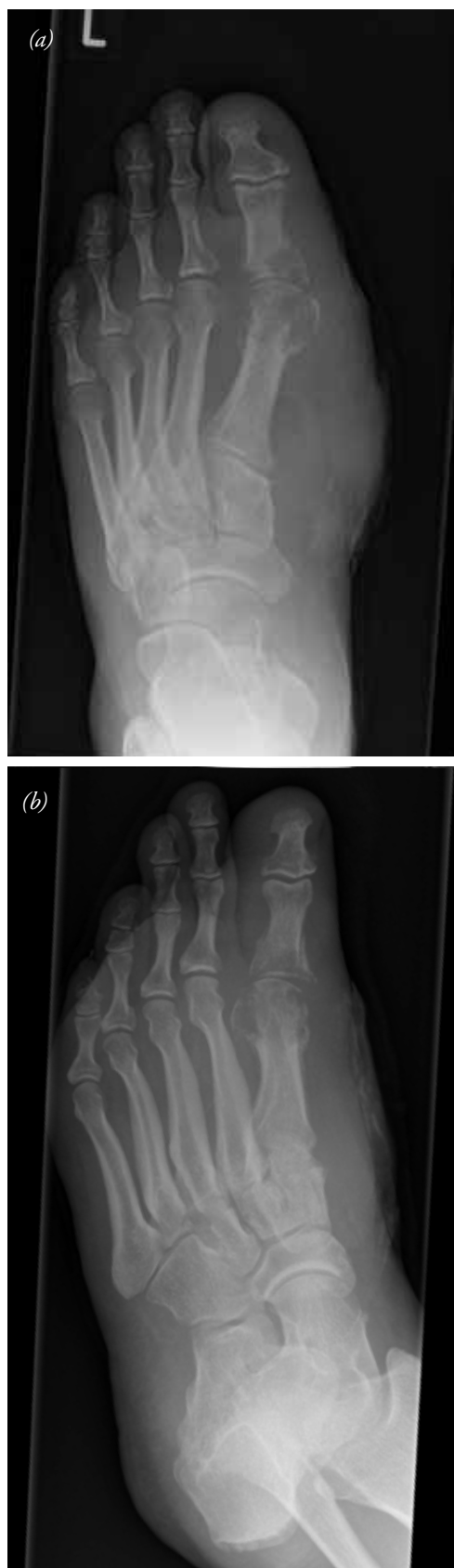


Figure 1a–b. X-rays of Mr C's left foot. Note the gross bone destruction of the first metatarsal head and at the base of the proximal phalanx.

“This type of presentation – neuropathic ulceration as a complication of undiagnosed diabetes – is, unfortunately, becoming less of a rare finding.”

support (family and medical) he received, will act as a buffer against negative psychosocial outcomes. However, it is important to bear in mind these possibilities and to follow up this aspect of recovery in the longer term. Positively, since the amputation and initiation of metformin, Mr C has achieved optimal glycaemic control, something he has unknowingly been without for many years.

Conclusion

Considering the degree of the neuropathy and retinopathy present, it is reasonable to suspect that Mr C may have had type 2 diabetes for up to 10 years prior to the episode reported here during which he was diagnosed with the condition. This type of presentation – neuropathic ulceration as a complication of undiagnosed diabetes – is, unfortunately, becoming less of a rare finding.

The case presented here highlights the need for healthcare professionals to screen for diabetes in all patients presenting with foot ulceration. This is particularly significant where there is a loss of sensation and ischaemia. This case also demonstrates how effective multidisciplinary team management combined with prompt intervention can result in good clinical outcomes. ■

Authors

Sola Odunsi and Layla Thurston are fourth year medical students, University of Manchester, Manchester. Andrew Boulton and David Murray are Consultant Physicians; Frank Bowling is a Research Fellow and Podiatrist; all are based at Manchester Royal Infirmary, Manchester.

Campbell IW (2000) Epidemiology and clinical presentation of type 2 diabetes. *Value Health* 3(Suppl 1): 3–6

Harris MI, Klein R, Welborn TA, Knuiman MW (1992) Onset of NIDDM occurs at least 4–7 yr before clinical diagnosis. *Diabetes Care* 15: 815–9

Henschen F (1969) On the term diabetes in the works of Aretaeus and Galen. *Med Hist* 13: 190–2

International Diabetes Federation (2006) *Diabetes Atlas. 3rd edn.* International Diabetes Federation, Brussels

Lavery LA, Armstrong DG, Harkless LB (1996) Classification of diabetic foot wounds. *J Foot Ankle Surg* 35: 528–31

New JP, McDowell D, Burns E, Young RJ (1998) Problem of amputations in patients with newly diagnosed diabetes mellitus. *Diabet Med* 15: 760–4

NICE (2004) *Type 2 Diabetes: Prevention and Management of Foot Problems.* NICE, London. Available at: guidance.nice.org.uk/CG10 (accessed 14.03.2012)

Pecoraro RE, Reiber GE, Burgess EM (1990) Pathways to diabetic limb amputation. Basis for prevention. *Diabetes Care* 13: 513–21

UK Prospective Diabetes Study Group (1998) Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group. *Lancet* 352(9131): 837–53

Vileikyte L, Rubin RR, Leventhal H (2004) Psychological aspects of diabetic neuropathic foot complications: an overview. *Diabetes Metab Res Rev* 20(Suppl 1): S13–8

Vileikyte L (2005) The psycho-social impact of diabetes foot damage. *Diabetes Voice* 50: 11–3

Walsh CH, Soler NG, Fitzgerald MG, Malins JM (1975) Association of foot lesions with retinopathy in patients with newly diagnosed diabetes. *Lancet* 1(7912): 878–80

ERRATUM TO

Aerden D et al (2011) Ankle–brachial pressure index: A mixed blessing. *The Diabetic Foot Journal* 14: 154–8

The caption to *Figure 1* suggests it shows the taking of an ankle–brachial pressure index. The image in fact illustrates an upper-calf pressure measurement. The publisher apologises for any confusion that may have been caused by this error.