

# An Unusual Cause of Multiple Foot Ulcers in a Patient with Type 2 Diabetes

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## Abstract

Diabetes is the most common cause of nontraumatic lower limb amputation. The majority of those amputations are preceded by an ulcer, usually as a result of peripheral neuropathy, peripheral vascular disease, or a combination of both. Regular foot examination and multi-disciplinary team approach are supported by evidence as tools to reduce foot ulceration. A cause for foot ulceration is not always evident, but presumed trauma or burn are usually thought. We are presenting a rather unusual case of a 70-year-old patient with long-standing diabetes and peripheral sensory neuropathy who first presented with bilateral superficial foot ulcers. On follow-up visits, further new superficial multiple ulcers were discovered and a possibility of rat bite was raised which he and his family denied. His daughter later confirmed the sighting of rodent biting his flesh. Rodent bites causing foot ulcers are rare; however, the clinician's vigilance is key for the early detection and treatment.

**Keywords:** Diabetes, foot ulcer, peripheral neuropathy, rat bite

## INTRODUCTION

Foot ulcers in patients with diabetes are a major concern, peripheral neuropathy with loss of protective sensation and peripheral vascular disease are the main two factors leading to the development of foot ulcers.<sup>[1-3]</sup> Since the majority of the lower limb amputations start with an ulcer, it is crucial that those ulcers are promptly diagnosed and treated, preferably in multidisciplinary foot specialist settings to avoid amputations and achieve the best possible outcome.<sup>[1]</sup> Patients with diabetic foot ulcers have about 2.5 times higher risk of death at 5 years compared to those with diabetes without foot ulcers.<sup>[2]</sup> It is, therefore,

essential to screen patients with diabetes regularly for loss of protective sensation and to be categorized according to their risk for future foot ulceration.<sup>[3]</sup> This may include careful search for rare causes. We describe an example of an unusual cause.

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## CASE REPORT

A 72-year-old male with type 2 diabetes, baseline characteristics, and comorbidities as shown in Table 1. He presented to the diabetes foot clinic with 2 days history of bilateral foot ulcers. The patient had type 2 diabetes for over 40 years complicated by severe bilateral sensory neuropathy. Although he is known to our clinic with previous foot ulcers, which had healed, he presented in June 2018, with multiple small new ulcers on the right heel and the tip of the right second toe as shown in Figure 1. There was no history of injury or any apparent cause for the ulcers. On examination, he has bilateral multiple small superficial painless foot ulcers, there were no signs of infection and ulcers were randomly distributed over both feet. The ulcers were linear and have well-defined sharp margins, the vascular assessment was normal. The ulcers were cleaned, dressed, and a further review was arranged. He was lost to follow-up for some time, 20 days later he attended with new multiple ulcers over both shins [Figure 2] in addition to his previous foot ulcers, which remain unchanged. In view of his new anterior lower leg ulcers, he was referred to dermatology opinion to exclude bullous skin disease, which has been ruled out. On subsequent follow-up, new foot ulcers appear on both feet with evidence of what looks like bite marks resulting in fragmentation of the feet dressing [Figure 3]. Due to the unusual presentation, in particular, the short

onset of multiple ulcers, dressing misplacement, and fragmentation, the patient's relatives were advised to look carefully around his room for the possible presence of a rat which may explain this unusual presentation.

A few days later, the family confirmed that they have captured and removed a rat from the patient's home and 3 weeks later all ulcers have completely healed [Figure 4].

## DISCUSSION

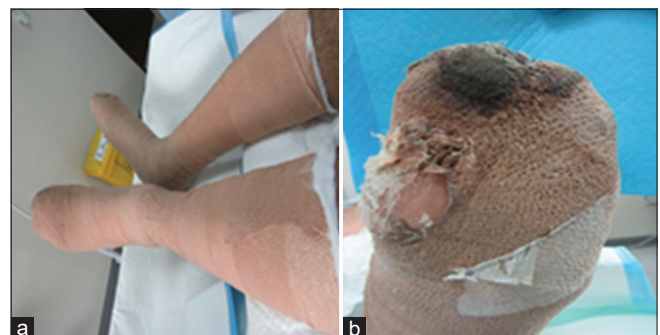
While rat bites as a cause of foot ulcers in patients with diabetes are rare, especially in the Western world, it is not uncommon in parts of Africa and Asia. The diagnosis may go unrecognized and can be mistaken with other common causes of diabetic foot ulcers such as trauma. Some clinical features



**Figure 1:** Multiple, bilateral, superficial, and sharp foot ulcers



**Figure 2:** Bilateral superficial lower leg ulcers



**Figure 3:** (a) Full dressing at the foot clinic. (b) Dressing fragmentation

**Table 1: Patient's baseline characteristics and comorbidities**

Characteristics	Details/Results
HbA1c	75 mmol/mol (9.0%)
Creatinine	70 $\mu$ mol/L
Estimated glomerular filtration rate	48 ml/min/1.73 m <sup>2</sup>
LDL	2.34 mmol/L
Urine albumin/creatinine ratio	275 mg/gm
Other comorbidities	Hypertension, dyslipidemia, peripheral neuropathy, microalbuminuria
Surgical history	Prostatectomy, cataract surgery, right knee replacement
Medications	Insulin aspart biphasic 30/70 twice daily, dapagliflozin 10 mg, vildagliptin 50 mg BD, metformin 1000 mg BD, atorvastatin 20 mg

LDL: Low-density lipoprotein, HbA1c: Glycosylated hemoglobin



**Figure 4:** Complete ulcer healing

such as the short onset of bilateral multiple foot ulcers with sharp or serrated edges can provide clinicians with clues to the diagnosis, especially in elderly patients with impaired or lost peripheral sensation due to diabetic polyneuropathy, living alone, and mostly in rural areas. There have been many case reports in the literature of foot ulcers caused by rat bites, the majority of these case reports are in Asia and Africa.<sup>[4,5]</sup> Most of these cases share a common presentation with the short onset of fresh ulceration, often bilateral with sharp edges. Sometimes, rat-bite ulcers are complicated with severe sepsis resulting in amputation; therefore, early identification and treatment are important to prevent limb-threatening complications.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the

patient has given his consent for his images and other clinical information to be reported in the journal. The patient understand that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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#### Authors' contributions

All authors contributed to the care of the patient, drafting of the case report, revision, and approval of its final version.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

#### Compliance with ethical principles

No prior ethical approval is required for single-case reports at our institution.

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