

## Diabetic hand syndrome: case reports

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### ABSTRACT

Diabetic hand syndrome is a rare and underdiagnosed complication of diabetes mellitus. This term is used to describe a potentially dangerous infection of the hand, characterized by debilitating musculoskeletal disorders. Although the diagnosis is commonly made in tropical regions, cases have also been reported in non-tropical and in marginalized urban areas. The pathophysiology of this syndrome remains unclear because, unlike diabetic foot, peripheral neuropathy and vascular disease do not seem to play a major role. Evidence suggests that it may be associated with the duration of diabetes, poor metabolic control and microvascular complications. In this article, we present the cases of two patients with diabetic hand syndrome. The first case involves a 52-year-old female patient from a rural area, diagnosed with type 2 diabetes mellitus six years ago, currently in poor metabolic control. She underwent amputation of the fourth finger with a favorable postoperative course. The second case involves a 60-year-old male patient from a marginalized urban area in Lima, also diagnosed with type 2 diabetes mellitus. He underwent amputation of his left second finger with a surgical diagnosis of necrosis and tenosynovitis. Diabetic hand syndrome can have a significant clinical impact and may lead to permanent disability. Early diagnosis improves prognosis, thus the importance of performing thorough physical examinations of the hands among patients with diabetes mellitus.

**Keywords:** Hand; Diabetes Mellitus; Hand-Foot Syndrome (Source: MeSH NLM).

### INTRODUCTION

Strictly speaking, the term “diabetic hand” encompasses three conditions traditionally associated with diabetes: limited joint mobility (LJM), Dupuytren’s contracture and trigger finger. More broadly, diabetes mellitus is linked to a constellation of debilitating musculoskeletal disorders affecting the hand, collectively referred to as diabetic hand syndrome. This includes LJM (also known as diabetic cheiroarthropathy), Dupuytren’s contracture, stenosing tenosynovitis (trigger finger), carpal tunnel syndrome (CTS), Charcot neuroarthropathy, reflex sympathetic dystrophy (RSD) and a range of hand infections to which individuals with diabetes are particularly susceptible. Evidence suggests that these conditions may be associated with the duration of diabetes, poor metabolic control and microvascular complications <sup>(1)</sup>.

Diabetic hand syndrome has been used to describe a serious hand infection commonly diagnosed in marginalized urban areas (non-tropical diabetic hand syndrome [NTDHS]). This syndrome primarily affects people between the ages of 50 and 60, from low socioeconomic status and poor glycemic control <sup>(1-3)</sup>.

### CASE 1

We present the case of a 52-year-old patient with poorly controlled diabetes mellitus (HbA1c: 12.5 %) from a rural area of Cajabamba, department of Cajamarca, who had regular contact with domestic animals. Fourteen days prior to emergency admission, she visited the hospital showing edema and vesicular lesions on the outer edge of her fifth finger, which later enlarged and became inflamed, causing mild pain.

Two days before her admission, she noticed changes in the color and temperature (coldness) of the finger. A primary care physician evaluated her and prescribed unspecified analgesics and antibiotics. However, as her symptoms persisted, she sought treatment in the emergency room.

On the initial examination, she had fever and tachycardia. A foul-smelling, necrotic lesion was visible on her left fifth finger. As a result, she was diagnosed with mild diabetic ketoacidosis and sepsis. Intravenous insulin and antibiotic therapy were initiated. After further evaluation, amputation of her left fifth finger, which displayed

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characteristics of wet gangrene, was performed (Figure 1).



**Figure 1.** Case 1. Postoperative amputation of the fifth finger, showing necrotic edges and purulent drainage at the surgical site

On the seventh postoperative day, a second surgery was required, as well as antibiotic therapy. Arterial Doppler ultrasound revealed distal arterial insufficiency due to monophasic flow in the left ulnar artery. Despite these interventions, the patient's condition worsened, leading to a further debridement, though no clinical improvement was observed. Angiography confirmed peripheral artery disease in the left ulnar artery. Finally, amputation of the fourth finger was performed, with favorable postoperative course (Figure 2).



**Figure 2.** Case 1. Image taken on the fifth postoperative day after debridement, showing necrotic edges

## CASE 2

We present the case of a 60-year-old cab driver from a marginalized urban area of Lima, who was diagnosed with type 2 diabetes mellitus 15 years ago, with poor adherence to medical treatment and poor metabolic control. Fourteen days prior to hospital admission, he developed a lesion on the middle of his left second finger, which progressively increased in size, showing a purplish discoloration at the base of the finger, along with pain and purulent drainage

(Figure 3). Oral antibiotic therapy provided no clinical improvement.



**Figure 3.** Case 2. Image after amputation

Following an initial physical examination, during which the patient presented stable vital signs, he was admitted for surgical cleaning of the radial region of his left second finger. However, due to poor recovery, amputation of his left second finger was required, with a surgical diagnosis of necrosis and tenosynovitis. Daily ulcer care was performed in the hospital, but a second surgical cleaning became necessary. The patient then showed good progress, and a skin graft was later performed (Figure 4).



**Figure 4.** Case 2. Image after skin graft surgery

## DISCUSSION

Hand disorders are generally not considered common complications among patients with diabetes, despite a mortality rate of 13 % when they occur <sup>(1-3)</sup>. Recently, reduced hand strength has started to be recognized as an additional complication of diabetes <sup>(1,8)</sup>.

The highest number of cases has been reported in tropical regions such as Africa and countries like India, leading to

the term “tropical diabetic hand syndrome” (TDHS) <sup>(3)</sup>. However, this complication can also occur in non-tropical regions (NTDHS), although with a lower prevalence (0.37 %, compared to 1.4 %-3.2 % for TDHS) <sup>(4-8)</sup>. There is limited scientific evidence of hand infections among patients with diabetes in non-tropical regions, which has limited early diagnosis and management of this complication.

Similar risk factors have been described in both TDHS and NTDHS <sup>(8,9)</sup>. Hyperglycemia, associated with poor glycemic control, plays a crucial role in impairing the patient’s immune response <sup>(11,12)</sup>. Occupational activities that predispose individuals to hand injuries, such as domestic or field work, are also contributing factors <sup>(12-15)</sup>. In tropical regions, these tasks are predominantly performed by women, while in non tropical regions, they are performed by men. The difference in occupational roles may explain the variation in prevalence by sex across different regions <sup>(12,13,16)</sup>. Additionally, the limited awareness of this complication, combined with low socioeconomic status that restricts access to healthcare, further contributes to the risk among these patients <sup>(15,17)</sup>.

The pathophysiology of the disease remains unclear. Unlike diabetic foot, peripheral neuropathy and vascular disease do not seem to play a major role in the development of NTDHS, although neuropathy is sometimes mentioned as an associated factor <sup>(9,10,16)</sup>.

Peripheral artery disease and peripheral neuropathy are well-established risk factors for diabetic foot ulcers and infections. A retrospective study conducted in China involving 17 cases found that diabetic neuropathy was present in 88 % of the cases, while ischemia, as opposed to diabetic foot ulcers, was present in only 11 %. These results align with a study conducted in Africa, where peripheral neuropathy or infection play a larger role than peripheral artery disease <sup>(13,16)</sup>. This suggests a possible pathogenesis where reduced sensation in the hands predisposes patients with diabetes to unnoticed injuries, which would otherwise be easily detected in healthy patients <sup>(17)</sup>.

In conclusion, diabetic hand syndrome is a rare and underdiagnosed complication of diabetes mellitus, yet it can have a significant clinical impact, potentially leading to permanent disability. Early diagnosis is crucial to improving prognosis, making it essential to perform thorough physical examinations of the hands among patients with diabetes <sup>(16,17)</sup>. Although diabetic hand syndrome is common, it remains relatively underdiscussed. The conditions described under the umbrella of diabetic hand syndrome also occur in the general population; however, they are more prevalent among patients with diabetes. These may differ in their presentation, natural course and response to treatment compared to those in the healthy population. While much focus is placed on chronic microvascular complications

of diabetes, musculoskeletal complications are often overlooked in clinical practice. It is important to diagnose them, despite evidence that their presence correlates with microvascular complications, especially retinopathy <sup>(18)</sup>.

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## BIBLIOGRAPHIC REFERENCES

- Papanas N, Maltezos E. The diabetic hand: a forgotten complication? *J Diabetes Complications* [Internet]. 2010;24(3):154-62.
- Abbas ZG, Archibald LK. Tropical diabetic hand syndrome. Epidemiology, pathogenesis, and management. *Am J Clin Dermatol* [Internet]. 2005;6(1):21-8.
- Gill GV, Famuyiwa OO, Rolfe M, Archibald LK. Tropical diabetic hand syndrome. *Lancet* [Internet]. 1998;351(9096):113-4.
- Yeh C, Kapila R, Schwartz RA. Nontropical diabetic hand syndrome: A troubling new entity. *Dermatol Ther* [Internet]. 2019;32(6):e13125.
- Al-Ani AH, Hadad A, Al Kela T. Tropical diabetic hand syndrome: A prospective study in Jordan. *J Bahrain Med Soc* [Internet]. 2013;24(2):66-70.
- Cánaves Y, Parón L. Síndrome de mano diabética. *Rev Med Rosario* [Internet]. 2013;79(3):118-25.
- Wang C, Lv L, Wen X, Chen D, Cen S, Huang H, et al. A clinical analysis of diabetic patients with hand ulcer in a diabetic foot centre. *Diabet Med* [Internet]. 2010;27(7):848-51.
- Abbas ZG, Gill GV, Archibald LK. The epidemiology of diabetic limb sepsis: an African perspective. *Diabet Med* [Internet]. 2002;19(11):895-9.
- Abbas ZG, Lutale J, Gill GV, Archibald LK. Tropical diabetic hand syndrome: risk factors in an adult diabetes population. *Int J Infect Dis* [Internet]. 2001;5(1):19-23.
- Mbaye M-N, Tiéba G, Ba Diagne M, Sarr A, Mané Diallo I, Diedhiou D, et al. Clinical, bacteriological, and evolutive characteristics of hand infections in diabetic patients. Prospective study of 71 cases in Senegal. *Med des Mal Metab* [Internet]. 2016;10(7):679-82.
- Abbas ZG. Reducing diabetic limb amputations in developing countries. *Expert Rev Endocrinol Metab* [Internet]. 2015;10(4):425-34.
- Lawal Y, Ogirima M, Salisu M, Dahiru I, Girei B. Tropical diabetic hand syndrome: Surgical management and proposed classification. *Arch Int Surg* [Internet]. 2013;3(2):124-7.
- Obbiba A, Chadli A, Elaziz S, El Ghomari H, Farouqi A. Infections of the upper limb in diabetic patients. *Med des Mal Metab* [Internet]. 2014;8(1):95-9.
- Gill GV, Famuyiwa OO, Rolfe M, Archibald LK. Serious hand sepsis and diabetes mellitus: specific tropical syndrome with western counterparts. *Diabet Med* [Internet]. 1998;15(10):858-62.
- Bahar Moni AS, Hoque M, Mollah RA, Ivy RS, Mujib I. Diabetic Hand Infection: An Emerging Challenge. *J Hand Surg Asian Pac Vol* [Internet]. 2019;24(3):317-22.
- Rydberg M, Zimmerman M, Gottsäter A, Svensson AM, Eeg-Olofsson K,

Dahlin LB. Diabetic hand: prevalence and incidence of diabetic hand problems using data from 1.1 million inhabitants in southern Sweden. *BMJ Open Diabetes Res Care* [Internet]. 2022;10(1):e002614.

17. Yeh C, Kapila R, Schwartz RA. Nontropical diabetic hand syndrome: A troubling new entity. *Dermatol Ther* [Internet]. 2019;32(6):e13125.
18. Goyal A, Tiwari V, Gupta Y. Diabetic Hand: A Neglected Complication of Diabetes Mellitus. *Cureus* [Internet]. 2018;10(6):e2772.

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