

Case series on tropical diabetic hand syndrome

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Abstract

Tropical diabetic hand syndrome is a term used to describe diabetes complication of the hand affecting people in the tropics. It consists of localized cellulitis with variable swelling and ulceration of the hands, progressive, fulminant hand sepsis and gangrene in extreme cases. This syndrome is not well-recognized and is therefore less frequently reported. The authors describe three different female patients who were known diabetics of varying duration presenting with this syndrome at our tertiary health center and who were successfully managed by both the surgical and medical units. The need for early diagnosis and aggressive management is emphasized.

Key words: Antibiotics, infection, insulin, tropical diabetic hand syndrome

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Introduction

Tropical diabetic hand syndrome (TDHS) is a term used to describe diabetes complication of the hand affecting people in the tropics.^[1] It describes a specific acute symptom complex found in patients with diabetes in the tropics, which may follow minor trauma to the hand and is associated with a progressive synergistic form of gangrene.^[2] It encompasses localized cellulitis with variable swelling and ulceration of the hands, to progressive, fulminant hand sepsis and gangrene affecting the entire limb.^[1] It is not as well-recognized as foot infections and it is not typically classified as a specific diabetes complication. Another complication of diabetes affecting the hand and which may be confused with TDHS is the Diabetic Hand Syndrome, which presents with trigger finger (sometimes called flexor tenosynovitis), Dupuytren's contracture, carpal tunnel syndrome, limited joint mobility (sometimes called cheiroarthropathy), muscle wasting and sensory changes.^[3] Prevention involves patient's education about hand care, good nutrition and early presentation. These cases emphasize the importance of early recognition and treatment of TDHS by clinicians in developing countries to prevent complications, which have potential for socio-economic burden.

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Case Reports

Case 1

This was a case report of a 47-year-old female patient who presented with swelling of the right index finger and fever both 2 weeks duration. Swelling was insidious in onset, progressively worsened and subsequently discharging purulent material. There was no history of trauma, but there was a history of reduced sensation on both hands and numbness before the onset of symptoms. She had been diagnosed with diabetes about 8 years previously at a peripheral hospital and was placed on oral hypoglycemics however she has not been adherent with her medications and was not on clinic follow-up at the time of presentation. On examination, she looked acutely ill-looking, febrile with a temperature of 38.4°C, pale and dehydrated. Examination of the hand revealed swelling of the index finger extending up to the radial side of the palm over the metatarsal with differential warmth and tenderness over the index finger and palm, sensation was reduced in both extremities in a glove and stocking distribution. The blood pressure was 110/80 mmHg. A diagnosis of diabetic hand syndrome was

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made. Wound swab yielded growth of *Staphylococcus aureus* sensitive to ofloxacin and ceftriaxone, while an X-ray of the affected hand showed soft-tissue swelling. Random blood glucose at presentation was 292 mg/dl while the hemoglobin A1c (HbA1c) was 12%. She was commenced on intravenous 0.9% normal saline, subcutaneous insulin, antibiotics (ceftriaxone), analgesics, wound dressing and she also had surgical wound debridement. Wound healed and she was subsequently discharged with fasting blood glucose of 96 mg/dl and she was to continue physiotherapy as an out-patient for stiff joints of the hand [Figure 1].

Case 2

This was a report of a 30-year-old female tailor who presented with a right hand swelling, which started as a painful swelling on the right hand of 1 week duration following a needle prick injury she sustained at work. No previous history of trauma to the hand, numbness or paraesthesia. She was diagnosed with type 2 diabetes mellitus about a month ago and was commenced on metformin and glibenclamide, which she has been taking as prescribed. Examination revealed an acutely ill looking young woman in painful distress, febrile with a temperature of 39.8°C, pale, tender swelling of the thenar aspect of the right hand with associated swelling of the distal third of right forearm with differential warmth and pus collection in the thenar eminence. Random blood glucose at presentation was 312 mg/dl while the HbA1c was 14%. Wound swab yielded growth of *Klebsiella* species sensitive to imipenem and ceftazidime. She was subsequently commenced on subcutaneous insulin, antibiotics (ceftazidime), analgesics, hematinics. She had surgical wound debridement, drainage of pus and dressing. Wound healed and she was discharged with fasting blood glucose of 110 mg/dl was to continue physiotherapy as out-patient for stiff joints of the hand [Figure 2].

Case 3

Here we present a case of a 53-year-old female patient diabetic of 2 years who presented with 4 weeks history

of insidious ulcer in the middle finger of the right hand. Examination revealed an ulcer in middle phalanx of the mid-finger with gangrenous distal phalanx and necrotic tissue slough. X-ray of the affected hand showed soft-tissue swelling with evidence of subcutaneous emphysema involving the right middle finger. Random blood glucose at presentation was 262 mg/dl while his HbA1c was 8.6%. Wound swab yielded growth of *Klebsiella* species sensitive to Ofloxacin and Ceftriazone: She was commenced on intravenous ceftriaxone, metronidazole, subcutaneous insulin and analgesics. She had disarticulation of the right middle finger and was subsequently discharged on pre-mixed insulin 6 weeks after admission with fasting blood glucose of 120 mg/dl and she was to continue physiotherapy as out-patient for stiff joints of the hand.

Discussion

Hand ulceration and infection was first described in Africa by Akintewe *et al.*^[4] in 1984 although 7 years earlier, a report^[5] from the United States had described this entity. Even though most of the reported cases emanate from different parts of the African continent,^[6-8] it has been reported more recently in India.^[9] Infection and ulceration of the hand is a major cause of morbidity and mortality in certain populations in Africa;^[2,6] The term "TDHS" has been used to describe diabetes complication among patients who have progressive, fulminant hand sepsis.^[1,2,10] Mild preceding trauma is common, as is poor glycemic control, delayed presentation and low socioeconomic status. It occurs more commonly in women.^[4] Once infection is established, a vicious cycle is established and areas immediately surrounding the infection become edematous. The small vessels within the infected area are prone to thrombosis and occlusion. This is as a result of sluggish flow, due to platelet and leukocyte adhesion to the vessel walls. These two factors may combine to produce localized tissue ischemia and even gangrene.^[11] The outcome may be poor, with amputation, disability and even death occurring in some cases.



Figure 1: Palmer view of right hand of Case 2 as described in the text



Figure 2: Dorsal view of right hand of Case 3 as described in the text

One of the first analytic studies on TDHS was done in Dar es Salaam, Tanzania, to characterize its epidemiology, clinical characteristics and risk factors.^[6] The findings in this report illustrate important characteristics that distinguish TDHS from diabetic foot ulcer syndrome. Neither peripheral vascular disease nor peripheral neuropathy appears to play a substantial role in the pathogenesis of TDHS. In contrast, peripheral vascular disease and peripheral neuropathy are well-known risk factors for diabetic foot ulcers and foot infections.^[6] The prevalence of TDHS in Nigeria is 1.6-3.2%.^[4]

All the three patients highlighted in this report were women and this is similar to three other reports conducted in Africa, which reported a predominance of women with diabetes who develop hand sepsis: This is assumed to be as a result of women generally being responsible for household chores, farming and planting of crops, all which involve use of the hand thereby exposing themselves to hand trauma.^[4,6,7]

TDHS may present with cellulitis, fulminant sepsis, osteomyelitis, swelling and gangrene.^[4] It can develop into a rapidly progressive, synergistic gangrene (Meleney's gangrene) that can result in death within days of onset of symptoms.^[2,6] Although most of the patients survive, some of the may end up with permanent disability such as loss of the hand following amputation.^[12]

The likelihood of permanent disability or death may be increased because of delays in medical treatment. Such delays might occur because of limited access to medical care or because the patient is unaware of the risk for life-threatening infection.^[6] *S. aureus* is the most common organism that is isolated in diabetic hand ulcers, probably because staph aureus is a common skin flora and therefore could contaminate skin ulcers.^[13] Though in the patients we reported, only one out of the three wound swab cultured yielded growth of staph aureus, while the other two patients culture yielded growth of *Klebsiella* species. Culture of tissue biopsy specimens typically yields a single bacterial species in >75% of cases, whereas swab cultures usually yield polymicrobial flora, probably because of contamination.^[11] Archibald *et al.* reported that superficial swab cultures of hand lesions for the majority of patients they saw yielded polymicrobial growth that included *Streptococcus* species, *S. aureus*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Escherichia coli*, or *Proteus mirabilis*.^[6] In view of this, broad-spectrum antimicrobial therapy is necessary because of the development of polymicrobial gangrene. Glycaemic control and management of other co-morbidities if present should be done aggressively. The suitable treatment for most of these patients includes incision and wound drainage, debridement or amputation (13% of TDHS patients require major upper limb amputation) and high-dose, intravenous, broad-spectrum antibacterial therapy that includes anti-anaerobic activity. The

importance of aggressive glycemic control cannot be overemphasized. Education, still the most important preventive tool in developing countries, should remain an integral part of prevention and it should be simple, repetitive and target both health-care providers and patients. Diabetic patients should be educated on how to care for their hands properly and the importance of consulting a doctor or presenting to a clinic immediately at the onset of hand symptoms. Simple care, motivation, education and action by diabetic patients and health workers is essential in protecting their hands from infection, as diabetes is becoming more prevalent world-wide and especially so in resource-poor tropical countries.

Conclusion

These case report attempts to address the need for physicians to recognize and aggressively treat TDHS has been highlighted by the above case reports. Prevention strategies include patient and staff education that focuses on proper hand care, nutrition and the importance of seeking medical attention immediately following hand trauma regardless of the severity of the injury, or at the earliest onset of hand-related symptoms.

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