Case Report

Tropical diabetic hand syndrome with septicaemia in a 63-year-old male: a case report and review of the literature

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Abstract

Background: Tropical diabetic hand syndrome (TDHS) is a rare complication of diabetes mellitus prevalent in tropical regions. It is characterized by localized swelling, cellulitis, and ulceration of the hand. A high index of suspicion, prompt and aggressive surgical intervention, tight glycaemic control as well as parenteral antibiotic therapy are the hallmarks of effective management of this potentially fatal complication of diabetes mellitus. The aim of this paper is to report a case of tropical diabetic hand syndrome with septicaemia.

Case Report: A 63-year-old male carpenter who was not previously known to be diabetic presented with a history of a trivial nail puncture to his left middle finger 5 weeks before arrival in hospital. Examination revealed features of septic shock, dehydration and hyperglycaemia. Prompt resuscitation was followed by commencement of parenteral antibiotics, insulin therapy and drainage with serial debridement. A split skin graft was used to cover the residual defect on the dorsum of the left hand after satisfactory control of sepsis. He was discharged home after 73 days in hospital with impaired function of the left hand.

Conclusion: This case underscores the importance of heightened clinical suspicion, early recognition, and prompt therapeutic intervention in mitigating the deleterious sequelae of TDHS. It also highlights the importance of patient education initiatives in improving healthcare seeking behaviour and curtailing reliance on alternative healthcare modalities.

Keywords: Diabetes mellitus, hand infection, tropical, septicaemia

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INTRODUCTION

Tropical diabetic hand syndrome (TDHS) is a rare complication of diabetes mellitus prevalent in tropical regions. Early descriptions of diabetic hand complications with sepsis came from the United States in 1977 in a study by Mann.[1, 2] It was further characterised in 1984 by Akintewe *et al*[3] in Nigeria but the actual name was coined by Gill *et al* in 1998.[1]

It is marked by localized swelling, progressing to cellulitis and ulceration of the hand following minor trauma of which there may be no recollection.[3,4] Infection usually follows trivial or unremembered trauma and may progress to oedema which is due to thrombosis and small vessel occlusion caused by sluggish flow following platelet and leucocyte adhesion to the vessel walls. Localised tissue oedema is followed by spreading cellulitis which may rapidly become a synergistic gangrene.[5,6]

TDHS is commoner in women and the prevalence in Nigeria ranges from 1.6-3.2%.[3-5] A high index of suspicion, prompt and aggressive surgical intervention, tight glycaemic control as well as parenteral antibiotic therapy are the hallmarks of effective management of this potentially fatal complication of diabetes mellitus.[7-17] The aim of this paper is to report a case of tropical diabetic hand syndrome with septicaemia.

CASE REPORT

A 63-year-old male carpenter presented in the emergency department of our hospital with a 3-week history of gradually increasing pain, swelling, and redness of his left hand. He admitted that he had a nail puncture injury to his left middle finger about 5 weeks before presentation, with gradual development of pain, hand swelling, fever and chills over approximately 3 weeks. The patient had not been diagnosed with diabetes before presentation. He was receiving treatment in a chemist shop before being brought to the hospital due to deterioration in his condition. On examination he was weak, ill looking, dehydrated and febrile (39.1ºC). Pulse rate was 112/min, regular and poor volume. Blood pressure was 94/62 mm Hg. There was gross swelling of the left hand extending into the forearm with exquisite tenderness and limited range of motion. Other systems were not contributory. Laboratory investigations revealed haemoglobin concentration was 9.7g/dl; white cell count / differential count was 22 x 10^9/l, N-88%, L-10%, E-02%; fasting blood sugar was 29.8mmol/l; serum electrolyte urea and creatinine levels were Na^+-138mmol/l, K^+-3.8mmol/l, Cl-99mmol/l, Urea-5.6mmol/l, and Creatinine-300mmol/l. Radiographic imaging ruled out fractures or foreign bodies.

A diagnosis of tropical diabetic hand syndrome with sepsis was made based on the clinical presentation, elevated blood sugar levels and elevated white cell count. The patient was admitted, rehydrated with intravenous fluids and commenced on intravenous Ceftriaxone, Metronidazole and Gentamicin. He was also commenced on intravenous human insulin.

After 24 hours of antibiotic and insulin therapy, drainage and debridement of the hand was done under local anaesthesia recovering approximately 200ml of brownish, offensive pus and necrotic tissue. There was no bacterial growth after 48 hours of pus culture. Twice daily honey dressing was commenced with the wound gradually improving over several days. A large residual skin defect over the dorsum of the left hand was covered with a split skin graft from the left thigh. The graft had an approximately 60% survival on the 7th post-operative day (Figure 1) and dressing was continued until eventual healing. Other clinical photographs are not available due to a cyberattack on the cloud account. The donor site healed uneventfully. He was discharged on Glibenclamide and Metformin after 73 days in hospital. There was marked impairment of hand function 6 months after discharge despite intensive physiotherapy and he has been unable to resume his carpentry job. Proper education on diabetes mellitus was instituted along with regular follow-up in the outpatient department.

DISCUSSION

Tropical diabetic hand syndrome has been described in diabetic patients who have progressive, fulminant hand infection. Mild preceding trauma (nail puncture in the index patient) is common in the presence of elevated and poorly controlled blood sugar. [4]

Risk factors for this condition include poor glycaemic control, low BMI, family history of diabetes and Type 1 diabetes. While peripheral vascular disease and peripheral neuropathy are

well documented risk factors in diabetic foot, they are not implicated in TDHS.[4]

Four clinical patterns are recognized: (i) progressive bacterial synergistic gangrene (Meleney's) which is characterized by spreading infection in the subcutaneous tissues and skin; (ii)Necrotizing fasciitis which results in soap formation in the fatty tissues of the hand; (iii) Streptococcal fasciitis which develops rapidly with massive oedema and erythema, progressing to skin vesicle formation and gangrene; and (iv) infection with *Clostridium* spp. which will cause cellulitis with crepitus or myositis with massive oedema, skin vesicle formation, severe pain and marked systemic signs.[2]

The index patient presented with oedema and erythema which had progressed to fasciitis and pus formation but further deterioration was stopped by vigorous intervention.

Lawal *et al*[7] proposed a classification for TDHS based on severity and prognosis: (i) Group I: Hand infections limited to skin, subcutaneous tissues, muscles and the web space in between metacarpals including the space of Parona; (ii) Group II: Infections involving deep tendons, bones, and joints including osteomyelitis but no gangrene; and (iii) Group III: Digital and hand gangrene. The patient reported here was categorized in Lawal *et al* Group 1.

Culture of tissue biopsy specimens usually yields a single bacterial species in 75% of cases while swab cultures are usually polymicrobial probably due to contamination.[4] Such growths include *Staphylococcus aureus, Staphylococcus epidermidis, Klebsiella pneumoniae, Pseudomonas aeruginosa, Escherichia coli and Proteus mirabilis.*[2] Due to the polymicrobial presentation it is prudent to use high dose parenteral broad-spectrum antibiotics which also provide anaerobic cover. Cultures taken from the index patient did not reveal any growth after 48 hours incubation and is probably due to the fact that he had already commenced antibiotics before presenting in the hospital.

Glycaemic control is crucial in adequate treatment of tropical diabetic hand syndrome and typically is done using insulin. Patients previously on oral hypoglycaemic drugs will have these discontinued. Surgical management may include drainage of abscesses, debridement, amputation of gangrenous digits, hand amputation and in extreme cases limb amputation. Further surgical management after control of sepsis may include skin grafting (as in the index patient) and skin flap reconstruction.

A very common problem in most patients recovering from TDHS is stiffness and reduced hand function with most unable to resume their previous occupations. This was the case with our patient and intensive and focused physiotherapy has a major role in management of this complication.

The index patient presented while unaware he had diabetes just as reported by Onyegbutulem *et al* in Abuja.[8] Screening of patients presenting with hand infections for diabetes mellitus should thus be a sine qua non. It is important to distinguish TDHS from the Diabetic Hand Syndrome which may present with trigger finger, carpal tunnel syndrome, Dupuytren's contracture, limited joint mobility, muscle wasting and sensory changes.[5]

Figure 1: Dorsum of left hand showing split skin graft with approximately 60% take.

Note scar of decompressing incision extending into forearm.

CONCLUSION

Tropical Diabetic Hand Syndrome is a comparatively rare manifestation of diabetes mellitus, particularly prevalent in tropical climates. This case illustrates the importance of a high index of suspicion, early recognition, prompt surgical intervention, and collaborative care in management to improve outcomes in

affected individuals. Proper education and enlightenment campaigns are critical to help patients recognize the symptoms and complications of diabetes. This will encourage early recourse to conventional healthcare and reduce patronage of alternative healthcare providers.[9]

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Conflicts of interest
There are no conflicts of interest

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