CASE REPORT

Buruli Ulcer of the Foot in an Urban Dweller: A Case Report and Review of the Literature

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ABSTRACT

Buruli ulcer (BU) is a chronic cutaneous ulcer caused by *Mycobacterium ulcerans*. It is the third most common mycobacteria infection of immunocompetent host, after tuberculosis and leprosy. The index case is a 24year-old male with a left foot ulcer of 3weeks duration. It initially started as a single painless papule, then subsequent suppuration and necrotic ulceration followed. Complete wound healing was achieved following long course of treatment with rifampicin and clarithromycin; and wound care with debridement, dressing and split-thickness skin grafting. A high index of suspicion for the diagnosis of BU is necessary for a foot ulcer in the tropics, especially when there is no response to initial conventional wound care. A work-up for BU should be instituted and it responds to rifampicin and wound care.

Keywords*: Chronic cutaneous ulcer, Foot ulcer, Granulomatous inflammation, Mycobacterium ulcerans.*

INTRODUCTION

Buruli ulcer (Bairnsdale or Daintre or Mossman or searl ulcer) is a chronic debilitating, necrotizing disease of the skin and soft tissues caused by *Mycobacterium ulcerans*. Globally, it is the third most common mycobacteriosis and patients who are not treated early can suffer permanent disfigurement and functional disability.[1] Most cases occur in tropical and subtropical

regions, except for Australia, China and Japan.[2]

The exact mode of transmission of *M. ulcerans* is unknown; however, epidemiological studies have shown that it is commonly found in populations living near wetlands.[3] Several studies however have also documented lower odds of acquiring the disease when using cloth barriers (long pants and long-sleeved shirts), using rubbing alcohol or washing minor wounds immediately after they occur, and using insect repellents.[2,3] There has however, been no documentation of human-to-human transmission, thus it is not considered a contagious disease.[3]

M. ulcerans infection may affect the face, chest wall, abdomen, extremities especially the lower ones. The pre-ulcerative stage manifests initially as firm, non-tender, subcutaneous nodule 1-2 cm in diameter, dermal papule or indurated plaque.[4]

The ulcerative stage (active clinical form) occurs days to weeks later. The skin covering the plaque or nodule slowly sloughs, leaving an extensive necrotic ulcer with undermined edges. Subcutaneous necrosis may extend several centimeters beyond the edge of the ulcer; therefore, the lesion appears smaller than its actual size.[5]

BU may destroy nerves, appendages, and blood vessels and may invade bone. Approximately 33% of patients present with underlying osteitis, osteomyelitis, or joint involvement.[3] Interestingly, one fourth of the patients with *M ulcerans* osteomyelitis have no apparent history of cutaneous BU.[6]

Patients who are untreated or received late treatment often suffer long-term restrictions of joint movement, limiting their functionality and cosmetic problems. Early suspicion, diagnosis, and treatment of the disease are of vital importance in preventing such disabilities.

The aim of this case report is to present an indigenous case of Buruli ulcer reported from an urban city, the initial dilemma in management, the management, outcome and the need to maintain a high index of suspicion for this rare case.

CASE SUMMARY

A 24yr old male presented with a non-healing left foot wound of 3weeks duration. It initially started as a small skin nodule located over the posterolateral surface of his left foot. The nodule was itchy, painless, progressively increased in size and ruptured after a week with the resultant ulceration.

He reported no fever, chills, rigors, generalized weakness, fatigue, weight loss, change in appetite, chronic cough, drenching night sweat nor contact with chronically coughing persons. There was no history of trauma prior to the development of the wound. There was no bite by any animal or insect. He is not a known hypertensive, diabetic or Sickle Cell Disease patient.

Physical examination revealed a 3cm x 3cm ulcer on the lateral aspect of the dorsum of the left foot, irregular margin, and undermined edge with floor covered with slough. The surrounding skin was hyper-pigmented. It was non-tender, no differential

warmth but peripheral pulses and pressure sensations were present (Figure 1).

Investigation results showed hemoglobin level of 14.9g/l and elevated erythrocyte sedimentation rate of 16mm/1st hour. The sputum acid fast bacilli, retroviral screening (RVS), Veneral Disease Research Laboratory(VDRL) were all negative. His fasting blood sugar was normal at 84mg/dl. The liver enzymes (alanine transaminase, aspartate transaminase, alkaline phosphatase) were within normal range and the liver function was normal.

An initial diagnosis of chronic left foot ulcer of an unknown cause was made.

The wound was debrided in the theatre and a rhomboid flap cover was done (see Figure 2). Intravenous ceftriaxone 1g daily, oral tinidazole 1g daily, multivitamins and some microelements were commenced. Patient was asked to elevate left lower limb often.

Specimen from the ulcer was taken during the debridement and sent for histopathology assessment. The report was chronic granulomatous inflammation showing focal ulcerations, suppurations and multiple foci of granulomatous inflammation in deep dermis. The granuloma is predominantly composed of epithelioid cells admixed with multinucleated giant cells. There was also evidence of nuclear dusting.

The skin flap broke down with skin necrosis after a week (see Figure 3).

On the basis of the history, and a chronic granulomatous inflammation from histopathological result, a diagnosis of BU was made. Rifampicin 600mg daily, and clarithromycin 500mg bid were added to his medications.

A second debridement was done and negative pressure wound treatment (NPWT) was applied. After the 6th week on rifampicin and clarithromycin, split thickness skin graft (STSG) was used to cover the wound and NPWT was continued on the recipient site.

There was a 50% take at 5th day post STSG with significant superficial epidemolysis. The patient was however discharged home on request at the 10th day post STSG, to continue alternate daily wound dressing on outpatient basis. This was done for the following 8weeks. There was a significant improvement as the ulcer healed completely (see Figure 4).

Figure 1. Left leg ulcer on presentation

Figure 2. Left leg ulcer rhomboid flap initial breakdown

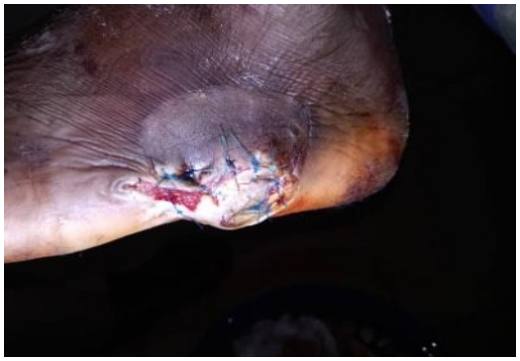
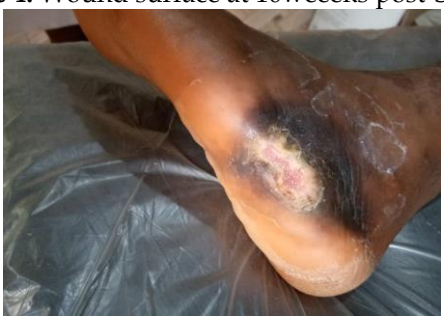


Figure 3. Flap necrosis with complete skin loss

Figure 4. Wound surface at 10weeeks post-SSTG



DISCUSSION

BU often starts as a painless swelling (nodule), a large painless area of induration (plaque) or a diffuse painless swelling of the legs, arms or face (oedema). Without treatment or sometimes during antibiotics treatment, the nodule, plaque or oedema will ulcerate within 4 weeks. Bone is occasionally affected, causing deformities. BU primarily affects children aged 5-15 years.[7] There is equal distribution between males and females.[8]

Our index patient is a 24-year male thus even though BU is common among children under 15 years of age, it can also be found in individuals above 15 years. His wound also started as a painless subcutaneous nodule which opened up to form an ulcer within weeks as no form of care was administered.

Lesions frequently occur in the limbs compared to other body parts. Health workers should be careful in the diagnosis of BU in patients with lower leg lesions to avoid confusion with other causes of ulceration such as diabetes, arterial and venous insufficiency lesion. The index patient is neither a known diabetic nor hypertensive.

BU can be seen to cluster in families.[8] However no documentation of human-to-human transmission, thus BU is not considered a contagious disease.[3] There is no history of similar case among close family members in the index patient.

The WHO has classified BU lesions into three categories.[1] The first includes lesions that measure less than 5 cm in diameter, while the second is comprised of non-ulcerative lesions and ulcers that measure between 5 and 15 cm. The third category are lesions larger than 15 cm or those that involve critical sites, including eyes, genitals, breasts, bone (osteitis or osteomyelitis), and joints, or are disseminated. The third category is further subdivided into three groups (3a, single lesion with osteomyelitis; 3b, lesions at critical sites; and 3c, multiple small lesions). In Africa, around 30% of patients present in each category. The index case belongs to category 1.

Confirmation of BU is done with any of the following four main methods: microscopic detection of acid-fast bacilli (AFB), cultures, PCR targeting specific *M. ulcerans* genes, and histopathology.[9] Histopathology report supported the diagnosis of BU in this index patient.

Medical treatment has the most effect among patients with WHO category 1 BU lesions.[8,10,11,12,13] Nienhuis *et al*. compared the efficacy of two antibiotic regimens for *Mycobacterium ulcerans* infection.[12] In Ghana, patients aged 5 years or older were randomly assigned to receive streptomycin (15 mg/kg IM daily) plus rifampicin (10 mg/kg PO daily) for 8 weeks (n=76) or streptomycin and rifampin for 4 weeks followed by rifampin and clarithromycin (7.5 mg/kg PO daily) for 4 weeks (n=75). No significant difference was observed for each treatment regimen; however, the number of streptomycin injections was reduced by switching to oral clarithromycin after 4 weeks.[12]

Friedman *et al*. also demonstrated a successful treatment in 42 of 43 patients using rifampin (10 mg/kg PO daily) combined with either ciprofloxacin (500 mg twice daily) or clarithromycin (500 mg twice daily).[13]

Negative-pressure wound therapy (NPWT) has also been shown to be effective.[14] In conjunction with antibiotics, surgery is used to remove devitalized tissue, cover open wounds with skin grafts, and correct or minimize deformities.[15] Both medical (rifampicin 600mg daily, and clarithromycin 500mg bid for 8weeks, in addition to vitamin supplements and micro nutrient supplements like zinc and selenium), surgical (debridement and skin grafting) and NPWT were included in the treatment of this index patient.

The median healing times for category I, II, and III were 8, 10, and 20 weeks, respectively.[11] Wound healing was achieved within 10weeks in the index case.

Scarring, contractures, lymphedema, osteomyelitis, metastatic lesions, and secondary infections may result after healing of BU. Squamous cell carcinomas have been reported in BU.[16] Apart from scarring, no other complication was seen in the index patient. This may be due to earlier presentation and prompt intervention.

CONCLUSION

The World Health Organization (WHO) considers BU as one of the 20 neglected diseases and has called for increased surveillance, control, and research.[1,17] This index case re-enforces the need for this increased surveillance and control of BU. This was a case of BU in a 24year old immune-competent male with an acceptable outcome. Prompt diagnosis and intervention is necessary to prevent morbidity.

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