Clinical Case Reports

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CASE REPORT

Primary cutaneous tuberculosis in a 27-year-old medical intern from needle-stick injury: a case report

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Funding Information
No funding information provided.

Received: 26 December 2013; Revised: 24 April 2014; Accepted: 1 June 2014

Clinical Case Reports **2015; 3(1): 39–42**

doi: 10.1002/ccr3.143

Key Clinical Message

The authors report a case of cutaneous tuberculosis in a 27-year-old African male medical intern who contracted primary cutaneous from a needle-stick injury. Cultures of pus aspirated from the finger initially grew *Staphylococcus aureus* that led to a delay in the diagnosis.

Keywords

Cutaneous, primary, tuberculosis.

Introduction

Primary cutaneous tuberculosis results from the direct inoculation of *Mycobacterium tuberculosis* into the skin of a person with no previous history of tuberculosis infection [1]. Cutaneous tuberculosis is considered predominantly an occupational disease and is a challenging diagnosis to make, especially in low-income countries due to a wide array of differential diagnoses, for example, fungal infections, leishmaniasis [2, 3].

Case Presentation

A 27-year-old previously healthy African male medical intern sustained a needle-stick injury from a wide bore needle (gauge 18) to his little finger while performing a lumbar puncture on a HIV-infected patient. He sustained a small lesion that bled a little and he immediately washed it with water and soap. He was immediately started on postexposure prophylaxis Anti-Retroviral drugs (ARVs): Zidovudine, Lamivudine and Kaletra for 28 days as per the Kenya National AIDS Control Program protocol. His initial rapid HIV test (Determine) test was negative and so was a PCR done on completion of the ARVs. He had no significant past medical history.

The patient source, an African Female, was WHO clinical stage 4, not on ARVs and was being investigated for meningitis died soon the lumbar puncture and her results were not followed up until several months later.

Two weeks after the injury, the intern had swelling of the little finger associated with a persistent dull ache for which he sought surgical intervention. Pus was aspirated from the finger and incision and drainage were done under local anesthesia. Culture of the pus grew *Staphylococcus aureus* sensitive to flucloxacillin on which he was started.

His little finger now had an open wound that persisted for several months despite debridement and different antibiotic regimens: levofloxacin, clindamycin, ceftriaxone, and vancomycin. The intern continued to clean and dress his wound daily.

He developed painless axillary lymphadenopathy 6 weeks after the injury. For the next 6 months, there was persistent swelling of the little finger which seemed to be

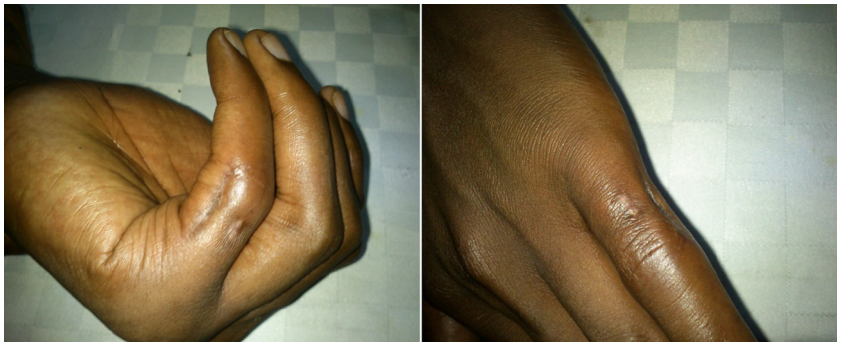

Figure 1. Primary cutaneous tuberculosis of the little finger (after debridement).

spreading to the hand (Fig. 1). This was accompanied with low-grade fever, night sweats, and subjective weight loss. He underwent a surgical debridement 6 months after the injury and was started on levofloxacin. Intraoperatively necrotic debris was found.

Radiographic examinations done during the course of illness showed no bone involvement. Serial blood counts done in the course of illness showed persistently elevated lymphocytes and a raised ESR. Liver function test and renal tests were normal.

Ten months later and with no improvement of symptoms, he underwent yet another surgical debridement. Histological examination of the tissue taken revealed a chronic inflammatory process (Fig. 2), granulomatous tubercles with epithelioid cells (Fig. 3), giant cells of Langerhans (Fig. 4), and a mononuclear infiltrate but no acid-fast bacilli (AFB) were demonstrated on Ziehl–Nelson stain.

He was started on rifampicin, isoniazid, pyrazinamide, and ethambutol for duration of 2 months to be followed

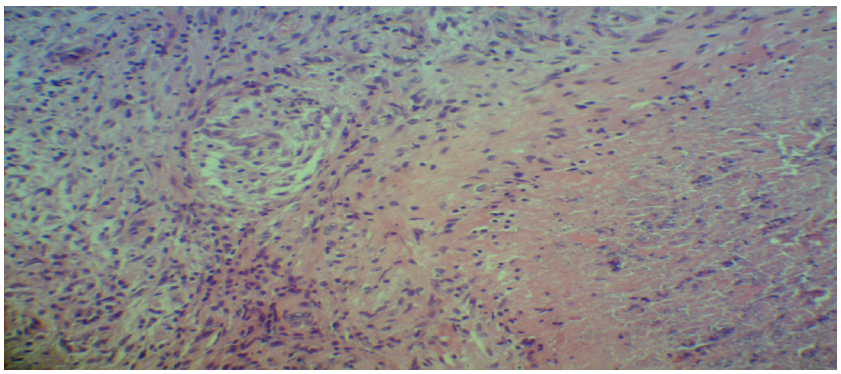

Figure 2. Inflammation; plasma cells and lymphocytes.

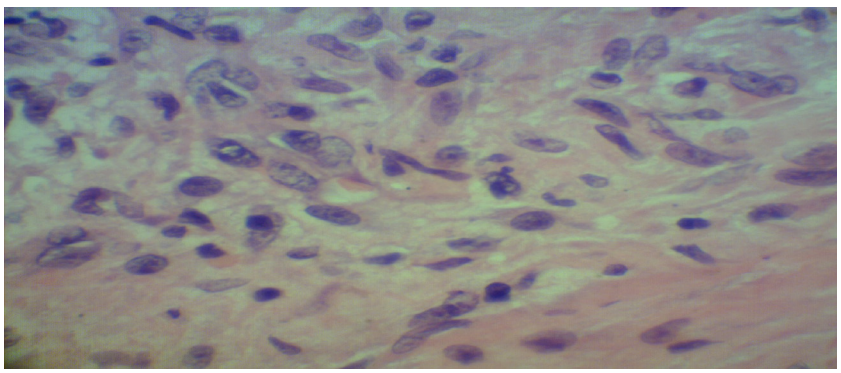

Figure 3. Epithelioid cells.

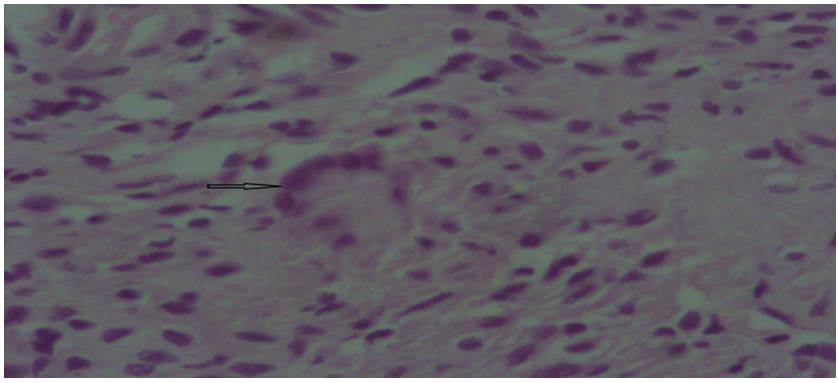

Figure 4. Giant cell of Langerhans.

by a 4-month course of rifampicin and isoniazid. The intern had complete recovery by the end of the 6 months. A rapid HIV test done at the end of the anti-TB treatment was negative.

Discussion

This is a case of primary cutaneous tuberculosis by direct inoculation. Tuberculosis continues to pose a significant public health problem and kills about 3 million people annually [4]. It is largely an airborne infection, but skin manifestations may be caused by hematogenous spread or contiguity from foci of infection which may be active or latent. Primary inoculation, another mode of transmission [5], results from direct inoculation of *M. tuberculosis* into the skin of a person who has no previous exposure and subsequently no immunity to the organism [6]. Cutaneous tuberculosis is rare and accounts for 0.1% of dermatology cases and only 1.5% of extra pulmonary tuberculosis cases [7, 8].

Once the traumatized skin of a previously uninfected person is inoculated with *M. tuberculosis,* a tuberculous chancre develops at that site within 3 weeks. A painless regional lymphadenopathy becomes prominent 3–6 weeks after inoculation, and a previously negative, intradermal, intermediate-strength purified protein derivative (PPD) test converts to a positive test [1].

Cutaneous tuberculosis is commonly seen amongst young adults because of their likelihood to sustain work-related injuries and inoculation of tubercle bacilli [9]. It is also common amongst hospital personnel [10, 11].

The diagnosis of tuberculosis in this case was masked by an initial culture growth of *S. aureus* which led to a delay in diagnosis and several months of morbidity for the medical intern. This is comparable to a case report by Opara et al. on tuberculous arthritis of the knee with staphylococcus super infection in which a delay in the diagnosis led to adverse outcome [12].

Diagnosis requires correlation of clinical and histopathologic findings but a Mycobacterial culture is the most reliable method of detecting mycobacteria and monitoring treatment response. An absolute diagnosis can be made when AFB is visualized on a Ziehl–Nelson-stained slide of a smear prepared from material from lesions [13]. Cutaneous tuberculosis that occurs by direct inoculation is a paucibacillary disease, sparse bacilli seen on histology and microorganisms are difficult to isolate [2]. Smears, Ziehl–Nelson staining, and mycobacterial cultures in Lowenstein–Jensen and BACTEC media are frequently negative [14]. Typical features of a tuberculous chancre of tuberculosis include granulomatous tubercles with epithelioid cells, Langerhans giant cells, and a mononuclear infiltrate [15]. Useful diagnostic tools in the diagnosis of cutaneous tuberculosis include histopathologic findings of tubercles, isolation of *M. tuberculosis* in cultures of biopsy material, or by polymerase chain reaction [16].

Management of cutaneous tuberculosis is the treatment with four-agent regimen given for 2 months followed by a two-drug regimen for the next 4 months as per tuberculosis treatment guidelines for tuberculosis in other organs [13].

Conclusion

Primary cutaneous tuberculosis is rare and should be suspected in all patients who present with skin lesions that do not respond to antibacterial treatment. Health care workers are at risk of direct inoculation of tuberculosis. A high index of suspicion is required to make the diagnosis of cutaneous tuberculosis because diagnostic methods are not sufficient and may lead to a delay in starting appropriate methods. Complete microbiological tests should be carried out for any persistent nonhealing wound or ulcer. Early management should be initiated to minimize morbidity.

Acknowledgments

We acknowledge the staff members of the histopathology lab at the Moi Teaching and Referral Hospital for the support with specimen preparation. We also acknowledge the affiliate institution Moi Teaching and Referral hospital in Eldoret, Kenya for allowing us access to patient information.

Conflict of Interest

None declared.

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