

Osteomyelitis Caused by *Mycobacterium fortuitum*-a Case Report

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Abstract: Non-tuberculous rapidly growing mycobacteria have been known to cause a variety of skin and soft tissue infection. The diagnosis of NTM in bone and joint infections is easily missed because of non-specific signs and symptoms. We report a case of a 65 year old male with osteomyelitis of the right knee of 4 years duration. The patient had no prior history of trauma or injury and finally presented with discharging sinus and edema of the right knee. The discharge persisted in spite of empiric therapy with anti-tubercular therapy. Rapidly growing Mycobacteria was isolated from the exudate which was identified as *Mycobacterium fortuitum* based on biochemical analysis. The isolate was found to be susceptible to Clarithromycin, Clindamycin, Gentamicin, Amikacin, Tetracycline, Co-trimoxazole and Imipenem. The patient responded to medical therapy by oral Clarithromycin. An accurate diagnosis and effective treatment of an atypical mycobacteria infection of the musculoskeletal system is therefore mandatory to prevent severe bone and joint destruction. With non-specificity of imaging findings and clinical symptoms and signs, culture of mycobacteria becomes crucial in establishing the diagnosis.

Keywords: Osteomyelitis, *Mycobacterium fortuitum*, Clarithromycin

Introduction

Non-Tuberculous Mycobacteria (NTM) or atypical mycobacteria are mycobacteria other than mammalian tubercle bacilli which may occasionally cause human disease in both healthy and immunocompromised individuals. These bacteria can cause various infections such as skin and soft tissue infections, pneumonia, endocarditis and disseminated disease in immunocompromised patients (Eid *et al.*, 2007). Involvement of the musculoskeletal system occurs in approximately 5-10% of patients with atypical mycobacterial infections (Theodorou *et al.*, 2001). Infection is usually acquired through contamination from surgical procedures or penetrating injuries and hematogenous spread (Wolinsky, 1992; Resnick and Niwayama, 1995). Atypical mycobacteria strains usually implicated in causing these infections mostly include Rapidly growing Mycobacteria (RTM) belonging to Runyon Group IV such as *Mycobacterium fortuitum*, *Mycobacterium chelonae* and *Mycobacterium abscessus* (Eid *et al.*, 2007; Cruz and Antekieier, 2012; Set *et al.*, 2010). These organisms are characterized by their rapid growth in cultures; by definition, RGM require 7 days to

grow on subculture. *Mycobacterium fortuitum* has been known to cause a variety of manifestations ranging from skin and soft tissue infection to disseminated infections (Unni *et al.*, 2005). The onset of infection is usually non-specific, gradual and usually includes local pain and swelling, joint stiffness, low grade fever, sweats, chills, anorexia, malaise and weight loss (Theodorou *et al.*, 2001). These non-specific clinical manifestations of disease along with a lack of familiarity with these pathogens can result in a delay in diagnosis. Accurate diagnosis and effective treatment of an atypical mycobacteria infection of the musculoskeletal system is therefore mandatory to prevent severe bone and joint destruction. With non-specificity of imaging findings and clinical symptoms and signs, culture of mycobacteria becomes crucial in establishing the diagnosis.

Case Report

A 65 year old male was admitted to the Orthopaedic department with pain and swelling of the right knee of 4 years duration. There was no past history of trauma or injury which could have contributed to such pain. Over the period of 4 years, the patient had been treated on and

off for the pain in local clinics which was relieved temporarily. He finally presented to the Orthopaedic department with a small draining sinus from the affected knee. On examination, swelling and edema along with a small draining sinus tract of the right knee was noted. There was also tenderness at the site and movement of the right leg was restricted. A provisional diagnosis of was made and the patient was started on analgesics and Injection Cefotaxime. At the time of admission, routine laboratory examinations showed Haemoglobin of 12.3 gm%, Total WBC count of 11,200 cells/ μ L with neutrophilic leucocytosis (Neutrophil- 84%), Platelet count of $280 \times 10^3/\mu$ L and an elevated ESR of 68mm/h. Test for Rheumatoid factor was positive. Analysis of the synovial fluid revealed a total leucocyte count of 650 cells/cu mm with 75% polymorpho nuclear cells. Gram stain, Acid fast stain and bacterial culture of synovial fluid were negative. The sinus discharge persisted and grew worse inspite of antibiotic therapy. Subsequently pus from the discharge was sent for microbiological analysis. Smears were prepared and subjected to Gram stain and Ziehl Neelson stain. For bacterial culture, the specimen was inoculated on Blood agar and MacConkey agar, for fungal culture on Sabouraud Dextrose Agar (SDA) and SDA with chloramphenicol and cyclohexamide. For mycobacterial culture, the specimen was inoculated in Lowenstein-Jensen media and incubated at 25, 37 and 45°C both in the light and in the dark. MRI film of the right knee revealed medial femoral marrow edema, cortical irregularities, thickened synovium along with extensive periarticular inflammatory changes suggestive of infective arthritis and osteoarthritic changes of the knee. Empiric therapy with antitubercular drugs was also started. On the 15th day post admission, Ziehl Neelson stain revealed Acid fast bacilli whereas gram stain revealed pus cells with weakly gram positive bacilli. On the 17th day post admission, mycobacterial culture revealed small, non-pigmented colonies on Lowenstein Jensen media which were acid fast in nature. The organism also grew on Blood agar and MacConkey agar showing dry, non-haemolytic and non-lactose fermenting colonies respectively. The same organism was repeatedly isolated from 2 more samples collected 2 days apart. The rapidly growing isolate was further analysed for species identification by performing the appropriate standard bacteriological techniques. It was identified as *Mycobacterium fortuitum* based on its ability to grow in MacConkey agar at 25 and 37°C, ability to reduce nitrate, tolerance to 5% NaCl and being urease positive. Antimicrobial susceptibility of the isolate was assessed using Kirby Bauer disc diffusion method. The isolate was found to be susceptible to Clarithromycin, Clindamycin, Gentamicin, Amikacin, Tetracycline, Cotrimoxazole and Imipenem and resistant to Penicillin, Erythromycin. Based on the susceptibility pattern, oral Clarithromycin (500mg) was given 12 hourly which

resulted in a resolution of the edema as well as exudate from the draining sinus.

Discussion

NTMs are ubiquitous organisms being found in soil and water but are increasingly recognised as agents causing a variety of infections affecting almost all organs (Lazzarini *et al.*, 2002). Worldwide NTMs have been reported with varying frequencies. In India, the frequency of isolation of NTMs in different studies ranges from 0.7 to 34% (Chakraborti *et al.*, 1990). The most commonly reported manifestations of atypical mycobacterial infections involving the musculoskeletal system are osteomyelitis, septic arthritis, cellulitis, abscess, septic myositis, septic bursitis, septic tenosynovitis and carpal tunnel syndrome (Theodorou *et al.*, 2001). Localized pain, swelling and draining sinus tracts persisting for 4-8 weeks following accidental trauma is most commonly associated with osteomyelitis caused by NTMs (Theodorou *et al.*, 2001; Devi *et al.*, 2003). The diagnosis for such infection is usually delayed especially in healthy and immunocompetent patients. In this case report the patient had been having pain and edema for 4 years before presenting to the orthopaedic department. In the laboratory, the chance that these microorganisms be overlooked is high unless acid fast smear and culture is done for all cases of sub-acute and chronic osteomyelitis. Most of the clinical laboratories usually discard culture media for conventional bacteria within 48-72 h further decreasing the chances of isolation of NTMs. The optimal therapy for NTMs as recommended in most studies includes combined medical and surgical treatment. Most clinicians start empiric therapy with antitubercular drugs which are inactive against NTMs and hence have no role in therapy against rapidly growing mycobacteria. The choice of antimicrobial therapy should be guided by antimicrobial susceptibility testing and prolonged therapy is usually required. In this case report, the patient refused debridement and opted for medical monotherapy. He responded to oral clarithromycin (500mg) as evidenced by a resolution of the edema and the sinus discharge.

Conclusion

A high degree of suspicion for NTMs should therefore be entertained by the clinicians in all cases of non-healing wound infections which do not respond to antibiotics used for pyogenic infections and having sterile routine aerobic cultures. This would help in early detection of cases due to atypical mycobacteria so accurate therapy could be initiated at the earliest.

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Author's Contributions

Clarissa Jane Lyngdoh and Anne Khyriem: Concept, design and Interpretation of data and follow up of patient, writing of report.

W. Valarie Lyngdoh: Analysis and review of article.

Tashi Khonglah: Treatment of patient, follow-up and contribution to data.

Ethics

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.

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