

Case Report

Non-tuberculous mycobacterial infection over abdomen: an interesting case report

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ABSTRACT

Non-tuberculous mycobacteria (NTM) are *Mycobacterium* species other than *M. tuberculosis* and *M. leprae* - referred to as 'atypical'. They are acid-fast bacilli residing in soil and water that cause cutaneous infections primarily after trivial trauma, surgery and cosmetic procedures. Skin and soft tissue infections (SSTI) caused by NTM species are increasing in incidence. They have a wide spectrum of clinical manifestations. NTM SSTI should be suspected when the skin infection does not respond to empirical antibiotics; Although, even with a sound clinical suspicion, the relatively low sensitivity of AFB and Fite staining as well as non-specific histopathology findings, the diagnosis is difficult. Optimal therapy is not well established, but usually is species dependent and includes use of multiple antibiotics for several months and potential use of adjunctive surgery. We report a case of 40-year-old female presented with chief complaint of multiple painful swellings over abdomen for 2 years not subsiding with standard antibiotic and surgical management. Investigations were done to rule out cutaneous tuberculosis, mycetoma and septic panniculitis; automated mycobacterial culture on modified Middlebrook 7H9 broth showed growth of NTM after 13 days of aerobic incubation. Though species could not be identified due to lack of resources, she was treated with combination of Rifampicin, Clarithromycin and Minocycline for 6 months; Good response was seen within 3 weeks and complete clearance of abscess was seen after 2 months of follow-up.

Keywords: Non-tuberculous mycobacteria, Atypical mycobacteria, Skin and soft tissue infections, *Mycobacterium avium* complex, *Mycobacterium chelonae*

INTRODUCTION

Non-tuberculous mycobacteria (NTM) are *Mycobacterium* species other than *M. tuberculosis* and *M. leprae* - referred to as 'atypical', as they were thought to be unusual *M. tuberculosis* strains.¹ NTM are non-motile, slender, free-living acid-fast bacilli, that are ubiquitous in the environment, and have been isolated from soil, water, plants, and domestic and wild animals including fish.^{2,3} Of the more than 140 NTM species reported, 25 species have been strongly associated with diseases in humans. The remaining are environmental organisms rarely encountered in clinical samples.⁴

About 94% of the infections involve pulmonary system and only 3% involve skin.⁵ The NTM are being recognized as causal organisms in skin and soft tissue infections more often these days. The contributing factors for this could be an increase of mycobacterial infection sources in the environment, many susceptible individuals, awareness about the diseases, along with improved laboratory detection techniques.⁶ These infections could occur both in the immunocompetent and the immunocompromised patients. The commonest NTM that cause cutaneous infection are members of the *M. fortuitum* complex (*M. fortuitum*, *M. peregrinum*, *M. chelonae*, *M. abscessus* and *M. mucogenicum*), *M. marinum* and *M. ulcerans*.

Treatment is challenging and requires multiple antimicrobial combinations and surgical intervention depending on the causative organism.

Herein, we report a case of 40-year-old female who presented with recurrent extensive painful nodules over abdomen. She was thoroughly investigated leading to diagnosis of NTM infection and was successfully managed with combination of Rifampicin, Clarithromycin and Minocycline.

CASE REPORT

A 40-year-old female who is a housewife, came to MGH dermatology outpatient department (OPD) with chief complaint of multiple painful swellings over abdomen for 2 years. The patient was apparently asymptomatic 2 years ago and then she developed single painful swelling above umbilicus. The swelling gradually enlarged in size, softened and discharge of purulent material was seen with loss of overlying skin – over a period of 3 weeks. Later she developed similar swellings over multiple areas, gradually covering the entire lower abdomen. There was no history of trauma, prick injury, fever, cough, dyspnoea, weight loss. Family history was not significant.

These swellings were incised and drained by general surgeon in multiple sittings and sent for histopathological examination, revealing chronic nonspecific inflammation, but new lesions continued to develop over last 8 months. Past history was not significant. On dermatological examination, multiple deep subcutaneous nodules were present discretely over the lower abdomen. A single linear ulcer of size 2 cm was seen above umbilicus at the site of previous incision and drainage. Multiple post inflammatory hyperpigmented macules and linear atrophic scars were seen at the places where previous incision and drainage was done (Figure 1).

By history and the clinical examination, a differential diagnosis of cold abscess/ cutaneous tuberculosis, atypical *Mycobacterium* infection, mycetoma, and septic panniculitis were considered. Complete blood picture, serum biochemistry and chest X-ray was normal. Mantoux showed 8mm induration. QuantiFERON gold test from discharge was negative. Pus for culture showed no growth. Pus for gram staining, KOH mount and ZN stain was negative. Automated mycobacterial/TB culture on modified Middlebrook 7H9 broth showed growth of NTM after 13 days of aerobic incubation.

Based on clinical picture, imaging studies and microbiology reports, the case was diagnosed as NTM infection affecting the skin. The patient was treated with tablet Rifampicin 450 mg once daily, tablet Clarithromycin 500 mg twice daily and capsule Minocycline 50 mg once daily for 2 months, followed by Rifampicin 450 mg once daily and capsule Minocycline 50 mg once daily for 4 months. She was reviewed on weekly basis and good response was seen within 3 weeks.

Complete clearance of abscess was seen after 2 months (Figure 2) and no new lesions were seen even after 6 months of follow up (Figure 3).



Figure 1: Multiple deep subcutaneous nodules seen discretely over the lower abdomen (yellow arrow), linear ulcer seen above umbilicus (black arrow) and multiple post inflammatory hyperpigmented macules and linear atrophic scars are seen.



Figure 2: Clearance of subcutaneous nodules is seen after 2 months.



Figure 3: Complete clearance of nodules and healed ulcer is seen at 6 months of follow-up.

DISCUSSION

NTM have emerged as a significant source of skin infections; Although not posing an immediate life-threatening risk, these infections can result in significant morbidity and adversely affect the quality of life for

affected individual.⁶ Notably, there has been a global increase in reported cases of superficial NTM infections with contributing factors including the expanding population of immunocompromised individuals who face heightened susceptibility during injury or cosmetic procedures. Furthermore, the rise in NTM infections can be attributed, in part, to the ongoing adaptation of NTM to the human host. NTM's remarkable capacity to thrive within the diverse skin environment, while effectively evading immune responses, also plays a role in the escalating incidence of these infections.⁷

NTM possess a lipid-rich cell wall, which functions as a biofilm and allows organisms to adhere to hard surfaces such as pipes, drains, and tubing, and confers resistance to decontamination with standard antiseptics.⁸ They can therefore thrive in a hospital environment causing nosocomial outbreaks. The common modes of infection are post-traumatic wound infections, subcutaneous, intra-articular injections, cardiac surgery, cosmetic surgery, implantation with prosthetics, peritoneal dialysis catheter, fresh water, salt water, swimming pools, and aquariums.^{9,10}

Skin and soft tissue infections (SSTI) caused by NTM are difficult to diagnose; even with a sound clinical suspicion, due to their wide spectrum of clinical presentations, relatively low sensitivity of AFB and Fite staining, and non-specific histopathology findings underscores the necessity of tissue cultures.^{11,12} Molecular techniques such as restriction fragment length polymorphism (RFLP) and polymerase chain reaction (PCR)-based methods for identifying the *hsp65* gene differentiate closely related NTM species.¹³

NTM are traditionally classified based on the rate of growth *in vitro* as rapid-growing mycobacteria (RGM) and slow-growing mycobacteria (SGM).¹⁴ They are further classified based on pigment production following exposure to light. RGM grow rapidly in culture and hence can be isolated within 7 days.¹⁵ SSTIs are the most common presentation for some RGM species including *M. abscessus*, *M. fortuitum*, and *M. chelonae*. Of the SGM species, *Mycobacterium avium* complex (MAC: *M. avium*, *M. intracellulare*, *M. chimaera*), *M. ulcerans* (Buruli ulcer), *M. marinum* (fish-tank granuloma), *M. haemophilum*, and a few other rarer species have been implicated in SSTI and are being increasingly reported in recent years. While these are the most common agents, virtually any species of NTM can cause cutaneous disease. NTM infection should be considered in all patients with treatment resistant SSTI. The common drugs used in the treatment of NTM infections are rifampicin, azithromycin/clarithromycin, minocycline/doxycycline, moxifloxacin.

Our case presented with multiple abscesses with discharging sinuses in an unusual location. Other differential diagnosis was excluded based on blood investigations, microscopic examination,

histopathological examination and culture. Modified Middlebrook 7H9 broth was used for growth of NTM. Though the species identification was not done, most probable species of NTM in our case might be *Mycobacterium avium* complex (MAC)/*M. kansasii*/*M. chelonae*. Most probable mode of transmission was following trivial trauma. The case was treated a combination of Rifampicin, Clarithromycin and Minocycline for initial 2 months, followed by Rifampicin and Minocycline for 4 months resulting in complete remission of the disease.

CONCLUSION

Our case highlights the unusual presentation of NTM with multiple abscesses and discharging sinuses over abdomen. Other differential diagnosis was excluded based on thorough investigations. Modified Middlebrook 7H9 broth was not available in our locality, hence the specimen was sent to higher center. Satisfactory resolution of the disease was achieved with use of multiple anti-microbial drugs.

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