

Breast Abscess Due to *Mycobacterium Abscessus*: A Case Report

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Abstract: The prevalence of nontuberculous mycobacterial (NTM) infections are rising and *Mycobacterium abscessus* is a fast-growing NTM that is frequently linked to infections of skin and soft tissues. We report the case of a 31-year-old immunocompetent woman who presented with a history of a painful right breast lump with discharge following five days of antibiotic therapy in a community health facility with no discernible improvement. The patient underwent quadrantectomy at our hospital after being diagnosed with breast abscess. Histopathological examination revealed Granulomatous Mastitis with abscess formation of right breast. Ziehl-Neelsen stain was positive for Acid Fast Bacilli, Gram staining of representative tissue and pus revealed pus cells with free of microorganisms and GeneXpert MTb/Rif assay revealed no MTb, indicating *Mycobacterium* other than tuberculosis infection. Non-tuberculous *Mycobacteria* were detected in the acid-fast bacilli (AFB) culture and MALDI-TOF further identified the isolate as *Mycobacterium abscessus*. Antimicrobial susceptibility test by broth microdilution assay revealed susceptibility to clarithromycin, amikacin, ciprofloxacin, linezolid and intermediate susceptibility to ceftazidime. The patient was prescribed clarithromycin, linezolid, amikacin resulted in a stable and uneventful discharge.

Keywords: Breast Abscess, *Mycobacterium Abscessus*, Non-Tuberculous *Mycobacteria*.

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INTRODUCTION

In recent years, there has been a significant increase in the global incidence of Nontuberculous mycobacterium (NTM) related disease spanning across all continents. Moreover, recent reports highlight a concerning increase in the prevalence of *Mycobacterium abscessus*, a rapidly growing and hard-to-treat NTM [1]. Pulmonary, skin and soft tissue infections are the most

common clinical manifestations of *M. abscessus* which is predominant in soil, aquatic environments [2].

Culture with susceptibilities and if feasible, isolation of the particular subspecies is used to diagnose an *M. abscessus* infection [3]. Because *M. abscessus* is initially very resistant to medication, treatment is very challenging showing a significant impact on the antibiotic selection. Second-generation macrolides,

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third-generation tetracyclines, amikacin, ceftazidime and clofazimine have been the most widely used antibiotics due to best in vitro antimicrobial activity with low rates of resistance [4]. Extensive multi-drug resistance is frequently observed in *M. abscessus* isolates. Antibiotic susceptibility testing (AST) plays a pivotal role in the development of treatment regimens for NTM infections, although it is imperative to consider several critical factors because of significant correlation between clinical outcomes and in vitro susceptibility patterns [5].

There is an emerging need for clinicians to be aware of the possibility of extrapulmonary NTM infections and the importance of timely, accurate identification of NTM along with drug susceptibility in view of increasing drug resistance. Here we present a case of breast abscess due to *M. abscessus* in an immunocompetent woman of reproductive age group.

CASE REPORT

A 31-year-old female visited our surgical outpatient department with history of swelling in the right breast for 10 days. She was previously treated at a local hospital with a course of antibiotics. Local examination of right breast revealed a painful mass of 8x4 cm, filling the upper lateral quadrant of the breast associated with local warmth and milky discharge from nipple. There were no palpable lymph nodes in the axilla and the left breast was normal. Her past history was insignificant other than a C-section 8 years ago. The ultrasonographic (USG) examination, showed focal subcutaneous fat inflammation with mild underlying prominence of ducts seen in lateral half of right breast and no atypical axillary lymph nodes. Laboratory investigations revealed Hb

13.8gm, TLC 12.9 /cumm with neutrophilic leukocytosis. Chest X ray was normal. HIV was non-reactive. The differential diagnosis based on clinical and imaging findings was ductectasia with complex cystic mass or mastitis with abscess. Fine needle aspiration cytology (FNAC) of right breast did not reveal any further information, so right breast quadrantectomy was done. Gram staining of the specimen and pus showed numerous pus cells but no microorganisms and Ziehl-Neelsen stain was positive for acid fast bacilli (Figure 1). GeneXpert MTb/Rif assay indicated no *Mycobacterium tuberculosis* DNA depicting a probable *Mycobacterium* other than tuberculosis. The tissue and pus culture on 5% Columbia sheep blood agar and MacConkey's agar showed no growth at the end of 72 hrs incubation at 37°C. Middlebrook 7H9 Broth (BACTEC MGIT 320 system) showed growth of some AFB colonies on day five. The isolate was identified as NTM by a rapid immunochromatographic card test (Abbott Bioline TB Ag MPT64) which is specific for the MPT 64 antigen of *Mycobacterium tuberculosis* complex. The isolate was further speciated by MALDI-TOF as *Mycobacterium abscessus*. Histopathological examination of specimen revealed Granulomatous Mastitis with abscess formation of right breast (Figure 2). Isolates tested by broth microdilution assay revealed susceptibility to clarithromycin, amikacin, ciprofloxacin, linezolid whereas intermediate to ceftazidime. The patient was put on oral clarithromycin (500 mg, two times daily), oral linezolid (600 mg, two times daily), IV amikacin (1 gm, once a day). Patient experienced no subsequent recurrence of the infection, improved clinically, her health condition was stable and was discharged with a follow up review after 3 weeks.

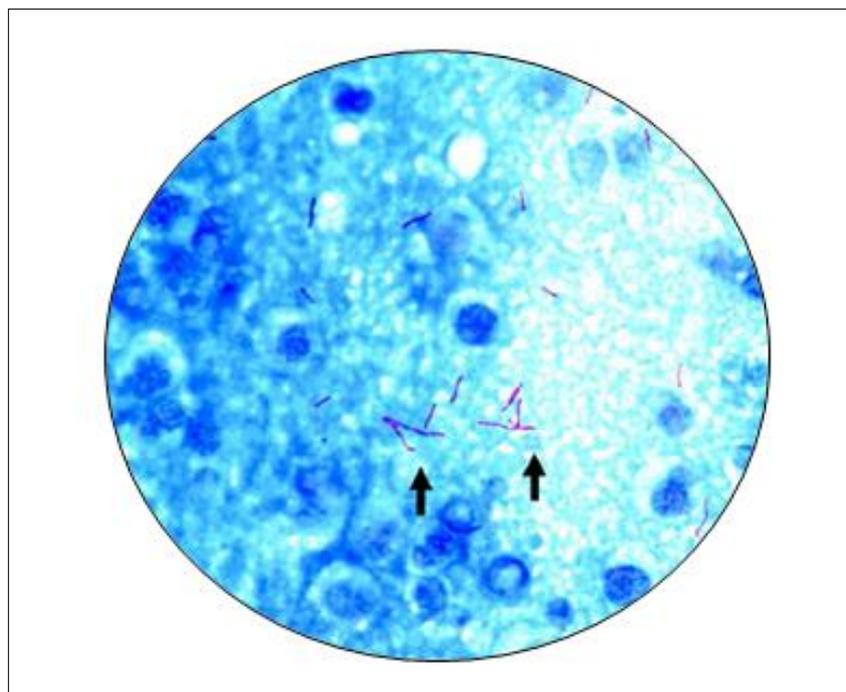


Figure 1: Ziehl-Neelsen stain was positive for acid fast bacilli

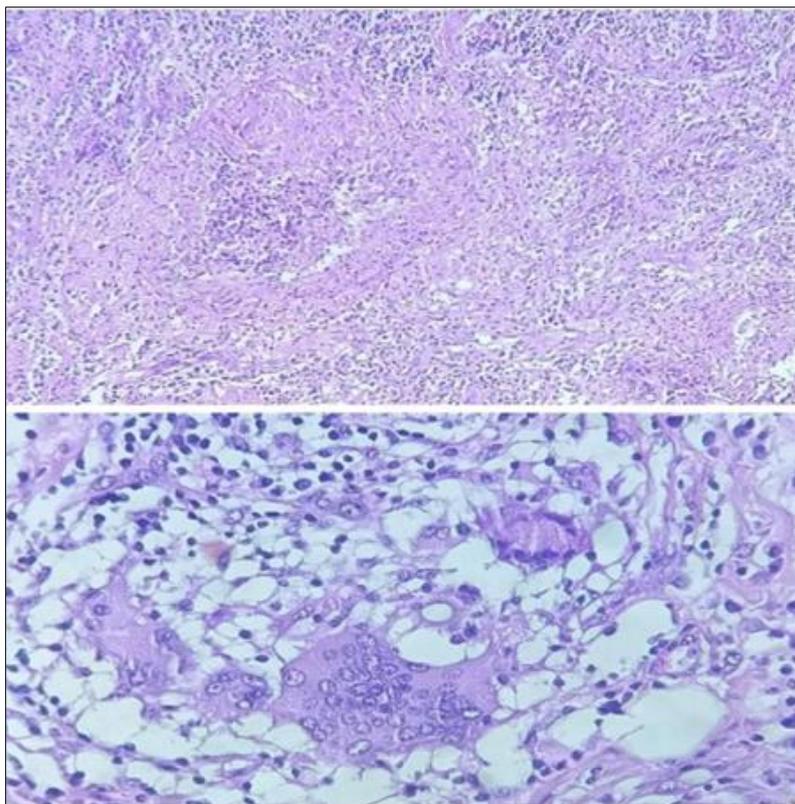


Figure 2: Histopathological examination of specimen revealed Granulomatous Mastitis with abscess formation of right breast in both (H&E 4x10), (H&E 40x10)

DISCUSSION

Infections due to nontuberculous mycobacteria (NTM) are being increasingly identified in recent years. A growing cohort of at-risk populations and continuously advancing diagnostic capabilities are two likely contributing factors to the rise in NTM infections [6]. *M. abscessus* has been implicated as a cause of pulmonary, skin and soft tissue infections that have involved both immunosuppressed and immunocompetent hosts with an antecedent history of nipple piercing, breast implants, mesotherapy spontaneous breast abscess [7, 8]. Our patient was not immune-compromised and had no history of breast surgery or implant insertion in the past and could have had a spontaneous *M. abscessus* breast infection. The treatment is multifaceted. It consists of a combination of antimicrobial therapy and potential source control surgery for an optimal outcome.

In the present case, the representative samples pus and tissue from right breast was positive for acid-fast bacilli on Ziehl Neelsen staining and Mycobacterium tuberculosis was not detected by Cartridge-based Nucleic Acid Amplification Test (GeneXpert). NTM infections cannot be detected by standard tests like Gram staining. Ziehl–Neelsen staining is a key method for diagnosing NTM [9].

Drug susceptibility testing was done by broth microdilution method and results interpreted as per clinical laboratory standards institute (CLSI) [10].

In instances where treatment response is inadequate or the condition progresses rapidly, it becomes crucial to contemplate the implementation of in vitro susceptibility testing at regular intervals to determine the most effective and appropriate course of action [11]. In our case Acid fast bacilli (AFB) cultures revealed rapidly growing NTM identified as *M. abscessus* susceptible to clarithromycin, amikacin, ciprofloxacin, linezolid and intermediate susceptible to ceftazidime.

Guidelines for treatment plans involving multiple drugs against nontuberculous mycobacteria (NTM) have been jointly developed by the American Thoracic Society (ATS), European Respiratory Society (ERS), European Society of Clinical Microbiology and Infectious Diseases (ESCMID), and the Infectious Diseases Society of America (IDSA). These regimens consist of three active in-vitro agents for *Mycobacterium avium* complex (MAC) and *M. abscessus* with a treatment period of 6-12 months [12]. The recommended guidelines suggest clarithromycin as the gold standard of monotherapy combined with amikacin or ceftazidime and resistance rates of clarithromycin ranges up to 20%, while ceftazidime and amikacin yield around 10% [13]. *M. abscessus* remains a significant challenge for healthcare providers, owing to its extensive range of virulence factors and resistance mechanisms [14]. Several authors have documented the successful management of the *M. abscessus* complex through a multidrug approach, utilizing a combination of macrolides, amikacin,

fluoroquinolones, imipenem/cilastatin, ceftazidime due to high rates of antimicrobial resistance of *M. abscessus* [15]. Agents for rapidly growing mycobacteria have also been reported to include linezolid, imipenem, ceftazidime, amikacin, and fluoroquinolones. Our patient was put on combination therapy consisting of clarithromycin, linezolid and amikacin. Combination therapies can effectively treat skin and soft tissue infections in 3-6 months with a high chance of recovery, whether or not concurrent surgical debridement is performed [16].

CONCLUSION

Mycobacterium abscessus have variable antimicrobial susceptibility and is resistant to common antituberculosis agents. For treatment plans of NTM, accurate organism identification and drug susceptibility tests are essential. To improve patient outcomes, a multidisciplinary approach involving clinical microbiologists, infectious disease specialists, surgeons, pathologists and primary care physicians is required.

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Declarations

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