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Case report

Mycobacterium fortuitum abscess following breast nipple piercing

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ABSTRACT

Mycobacterium fortuitum is a non-tuberculous rapidly growing mycobacteria (RGM). We present a case of a 30 year old female who developed a right breast subareolar abscess due to *M.* fortuitum four months after a nipple piercing. She failed to respond to an initial three-week course of monotherapy with trimethoprim-sulfamethoxazole despite aspiration of abscess and removal of offending nipple piercing. Our patient was successfully treated with dual antimicrobial therapy. This report also includes a brief literature review of prior reported cases caused by this organism. It is important to keep *M. fortuitum* and other RGM species on the differential if there is failure of resolution of abscess and infection with routine antimicrobial therapy.

Background

Mycobacterium fortuitum is a species of rapidly growing mycobacteria (RGM) that was previously also known as *M. ranae*. It is commonly found in soil, dust, water, and human saliva. *M. fortuitum* is associated with cutaneous, cardiac, bone, pulmonary, and disseminated disease. Skin and soft tissue infections of *M. fortuitum* are associated with penetrating trauma and injury with abscess, nodule, and potentially fistula formation.

Case presentation

A 30 year old female presented for evaluation of a right breast lump. The patient reported undergoing a nipple piercing of her right breast four months ago. She developed some pain after the piercing however this eventually resolved. Four months later, she noticed a lump on her right breast at the 2 o'clock position at the areolar edge and reported no pain, fevers, chills, sweats, nausea, vomiting, or unintentional weight loss. She denied any nipple discharge or skin dimpling in her breasts. Her family history was significant for ovarian cancer in her maternal grandmother and her social history was significant for cigarette smoking, occasional alcohol use, and she denied any intravenous drug use.

Physical exam of right breast showed a mobile, non-tender, 2.5 cm subareolar mass at the 2 o'clock position. No erythema of the overlying breast skin was present on initial exam. No lymphadenopathy was present. No nipple retraction was noted bilaterally. The left breast had no evidence of mass and appeared normal on examination.

The patient underwent a right breast ultrasound which showed a $2.6 \times 1.5 \times 0.9$ cm fluid collection at the 2 o'clock position along the areolar edge which corresponded to the patient's lump. There was no mass seen. Aspiration of fluid was performed the same day. The nipple piercing was subsequently removed. The aspirated fluid was negative for malignant cells. There was growth of acid fast bacilli after about 3 days, later identified as *Mycobacterium fortuitum complex.* Antimicrobial susceptibilities were performed and are listed in Table 1.

The patient wished to avoid intravenous antimicrobials and therefore was treated with oral trimethoprim-sulfamethoxazole for three weeks by her primary care provider. She noted persistent breast lump with no significant change in size despite completing her three week treatment. She developed focal erythema over her breast lump and was referred to an Infectious Disease specialist.

After monotherapy failed, she was started on a triple-combination therapy of oral linezolid, levofloxacin, and trimethoprim-sulfamethoxazole (TMP-SMX) for an initial duration of three months. She developed Achilles tendon pain ten days after starting levofloxacin, resulting in cessation of this antimicrobial. She was seen in the infectious disease clinic eleven weeks after initial consult and reported compliance with her dual antimicrobial therapy. Eventually all symptoms resolved and she completed a 3 month course of treatment successfully.

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Table 1
In vitro Antimicrobial Susceptibilities.

Antimicrobial	MIC (mcg/mL)	Susceptibility
Amikacin	≤ 1	Sensitive
Cefoxitin	64	**Intermediate**
Ciprofloxacin	≤ 0.12	Sensitive
Doxycycline	16	**Resistant**
Imipenem	4	Sensitive
Linezolid	4	Sensitive
Minocycline	8	**Resistant**
Moxifloxacin	≤ 0.25	Sensitive
Trimethoprim-Sulfamethoxazole	$\leq 0.25/4.8$	Sensitive
Clarithromycin	≥ 32	**Resistant**

Discussion

Mycobacterium fortuitum is commonly found in soil, dust, water, milk, and human saliva. It is a non-tuberculous rapidly growing mycobacteria (RGM). RGM encompasses many different organisms, however the most clinically relevant organisms include *M. abscessus, M. chelonae, and M. fortuitum*. RGM are distinct from other groups of mycobacteria as they form mature colonies on agar within 7 days unlike other slow-growing mycobacteria [1]. *M. fortuitum* forms non-pigmented smooth and/or rough colonies. Optimal temperatures for growth are between 28–37 °C and they produce suppurative granulomas on histology [2].

M. fortuitum can cause a large variety of diseases ranging from local to disseminated infections. In addition to pulmonary infections, *M. fortuitum* is known to cause extrapulmonary infections, particularly skin and soft tissue infections. Cutaneous and subcutaneous disease is usually associated with penetrating trauma or surgery [2,3]. Infection classically presents as abscess, nodule formation, cellulitis, ulcers, or draining sinus tracts 4–6 weeks after initial injury. Our patient developed an abscess after enduring penetrating trauma with a nipple piercing. Other common presentations include nodule and abscess formation

Table 2
Reported cases of breast abscess due to *M. fortuitum*, presentation, risk factors for infection, and antimicrobials used.

Year of report	Age	Presentation	Risk factors for infection	Method of Diagnosis	Treatment and Antimicrobials	Outcome	Reference number as in text
2004	29 year old female	Initially presented with enlarged painless left breast mass and then developed mass in right breast as well. No constitutional symptoms, focal swelling, or erythema.	Bilateral nipple piercing 4 months prior to onset of breast mass.	A core needle biopsy showed granulomatous mastitis. Open biopsy cultures grew *M. fortuitum*. She developed another mass in the opposite breast and *M. fortuitum* was again confirmed.	IV amikacin and cefoxitin for two weeks and then transitioned to oral TMP-SMX and clarithromycin for total of six months.	Patient did well with resolution of symptoms and no evidence of breast disease 1 year following.	[4]
2008	17 year old female	Right breast swelling and pain	Right nipple piercing 4 months prior to symptom onset	Underwent first incision and drainage and cultures grew diphtheroids. Symptoms failed to improve and a second I&D was performed which grew *M. fortuitum* and *Prevotella melanogenica*.	Initially treated with amoxicillin/clavulanic acid after first I&D. After second I&D she treated with amoxicillin/clavulanic acid and metronidazole for anaerobic infection, and ciprofloxacin and clarithromycin for *M. fortuitum* for a planned 6–12 months.	Patient did well for 3 months. However, she stopped her antimicrobials for 1 month and required repeated drainage. Cultures were negative. She resumed her antimicrobials and 2 months later was doing well.	[5]
2012	42 year old female	Pain, tenderness, and erythema of left breast nodule	Nipple piercing and swimming/jet skiing in oceans several months prior to onset of symptoms. History of hot tub use.	Biopsy showed necrotizing granuloma with acute/chronic inflammatory changes. Cultures grew *M. fortuitum*.	Oral regimen of levofloxacin and azithromycin for 4 months.	At 1 month follow-up patient had significant improvement with resolution of symptoms within 3 months.	[6]
2014	21 year old female	Painless lump with no erythema, swelling, or fevers	1 month prior to symptom onset, patient went swimming in pond water. Nipple piercing several months prior to symptoms.	Underwent mammogram which showed signs of abscess. Underwent aspiration and grew *Nocardia* species, however intraoperative cultures after eventual surgical debridement grew only *M. fortuitum*.	Initially took cephalexin with no improvement after removal of piercing. Underwent aspiration of her abscess and was treated with monotherapy of TMP-SMX with no improvement. After repeat aspiration and debridement, she was treated with TMP-SMX and Levofloxacin. After she became pregnant, she was changed to TMP-SMX and azithromycin for a total of 6 months	Improvement at her follow-ups at infectious disease clinic and at 1 year had no residual symptoms.	[7]

after mesotherapy, surgical wounds, punch biopsies, and venous catheterizations. *M. fortuitum* has also been found to cause furunculosis after pedicures in whirlpool baths [2,3]. As per our literature review using PubMed, there have been a few other reported cases of breast abscess due to the organism (Table 2).

Interestingly, in 2016 a study in China was reported by Nanpeng et al. describing the potential treatment for *M. fortuitum* with photodynamic therapy as adjuvant treatment [8]. They presented a 44 year old female with painful, erythematous lesions and abscess formation on the back of her hands. Cultures after drainage grew *M. fortuitum*. She underwent incision and drainage and was treated with amikacin, rifampin, and clarithromycin. After worsening of her symptoms, she underwent treatment with 5-aminolevulinic acid phototherapy (ALA-PDT) with red light irradiation two weeks later. She received ALA-PDT every 10 days while simultaneously receiving clarithromycin, rifampin, levofloxacin, and ethambutol. The pain and erythema responded to treatment after just 2 sessions of ALA-PDT. After one month, the patient's symptoms had dramatically improved and cultures were negative from her lesions. There are no specific guidelines for treatment and duration of *M. fortuitum* infections, however available literature suggests prolonged treatment with multiple antimicrobials. The use of phototherapy is significant as it could shorten the course of therapy and potentially prevent development of antimicrobial resistance.

Diagnosis of *M. fortuitum* can be challenging. Typical infectious symptoms such as erythema, pain, and swelling are not always present as initially demonstrated by our patient and other reported cases. Although infection classically presents 4–6 weeks after initial trauma, our patient and most cases described above reported lumps and masses months after initial piercing. This can cause delay in correct diagnosis. In our patient, the correct diagnosis was made relatively quickly but she failed to respond to monotherapy. Based on our literature review, *M. fortuitum* infection should be treated with a minimum of at least 2 agents. Drug susceptibilities should be performed and used to direct specific treatment. Based on prior case reports, *M. fortuitum* has been found to be susceptible to amikacin, clarithromycin, doxycycline, linezolid, sulfonamides, and imipenem/cilastatin. Macrolides should be used with caution as there are some studies now that report *M. fortuitum* resistance to macrolides with the *erm* gene [2,3]. Source control of infection by surgical drainage is the key to adequate treatment and resolution of infection. There are no specific guidelines for treatment and duration of *M. fortuitum* infections, however available literature suggests prolonged treatment with multiple antimicrobials.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author statement

NS wrote the initial manuscript and performed revision of the manuscript. **MR** and **SA** edited the manuscript. All authors performed data collection, data designing, and compilation. All authors reviewed and approved the final manuscript.

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Declaration of Competing Interest

None

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