Abstract

*Mycobacterium fortuitum* is ubiquitous in nature and can cause a wide variety of lesions in humans with immunocompromised or antecedent chronic illness. Clinical diagnosis is difficult and relapses are seen. This is due to the fact that they are not critically investigated and are not responded to traditional antitubercular treatment and other antibiotics. Herewith, we report a case of *M. fortuitum* causing laparotomy port infection-causing repeated multiple abscess on the anterior abdominal wall and treated with amikacin and clarithromycin. The wound healed completely and the patient recovered after administering a combination of amikacin and clarithromycin. We conclude that strict standard operating procedures should be followed to prevent mycobacteria other than tuberculosis (MOTT) infections during and after surgical procedures. Any postoperative, chronic infection which is not responding to conventional antibiotics should be highly suspected for such MOTT infections. Antibiotic susceptibility testing should be performed so as to identify the required antibiotic combination and treated accordingly to prevent further complications and to reduce the cost of treatment.

Keywords: Laparotomy wound infection, mycobacteria other than tuberculosis, *Mycobacterium fortuitum*, postsurgical infection

Introduction

Mycobacteria other than tuberculosis (MOTT) such as *Mycobacterium fortuitum*, *Mycobacterium abscessus*, and *Mycobacterium chelonae* are widely distributed in nature, which are isolated from tap water, soil, surgical solutions, and even from disinfectants. These rapidly growing mycobacteria (RGM) are opportunistic pathogens, which mainly infect immunocompromised patients and those suffering chronic ailments. Most frequently reported human infections are postsurgical, pulmonary, and primary cutaneous cases, presenting a wide range of clinical symptoms. Infection of surgical sites is usually caused when water or surgical solutions contaminated with such pathogens are used to clean the catheters, surgical instruments, or other equipment used during or after the procedure.[1,2] Due to the delayed onset of the infection and resistance of these bacteria to conventional antibiotics, clinical diagnosis is difficult. Herewith, we report a case of postoperative laparotomy wound infection in the abdominal wall which failed to respond to initial treatment with conventional antibiotics. A detailed laboratory investigation concluded that the infection was caused by RGM, *M. fortuitum* which is sensitive to the antibiotics, amikacin and clarithromycin. The surgical site may be infected with the organism during or after the procedure from contaminated water or disinfectant used for cleaning.

Case Report

A 35-year-old businessman from rural area was referred to Dr. Prabhakar Kore Charitable Hospital and Medical Research Centre Belagavi, Karnataka, India, due to purulent discharge from a chronic nonhealing wound in the anterior abdominal wall (The Institute Ethical Committee approved the study). He had undergone a laparotomy appendicectomy 2 years back.

Address for correspondence: Dr. Mahantesh B. Nagmoti, Department of Microbiology, J. N. Medical College, KLE University, Belagavi, Karnataka, Maharashtra, India. E-mail: drmbnagmoti@gmail.com

ORCID: https://orcid.org/0000-0002-4927-8690

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Post-surgery, he was presented to the same surgeon with pain and multiple swellings in the anterior abdominal wall with pus discharge from the incision. He was readmitted and the wound was not healing even after re-excision. After 20 days, the patient revisited the hospital with large sinus discharge and multiple abscesses. The pus reported having antibiotic-sensitive Staphylococcus aureus in laboratory investigations. Seven days post-admission, the symptoms were reduced, and the patient was discharged and advised to take ciprofloxacin 500 mg twice daily. As there was a relapse, antibiotics were administered to the patient through both oral and intravenous routes, in another hospital without any definitive microbiological investigations. Vital signs of the patient were normal except for discomfort in the abdominal wall. On admission, a previous surgical scar was present on the anterior abdominal wall with a large keloid. There was no apparent mass over the abdomen, but many sinus openings were present over the anterior abdominal wall [Figure 1] with discharging sinus. On palpation, tenderness was present over and around the sinus. The sinus opening was yellowish and undermined which was discharging a serosanguinous exudate admixed with pus.

HIV test showed negative result, and erythrocyte sedimentation rate was raised to 40 at the end of 1st h. Other biochemical and hematological parameters were normal. The incision and drainage of the abscesses yielded 50 ml of pus and sent for the bacteriological investigations along with continuing tablet ciprofloxacin 500 mg twice a day.

Pus samples were processed for Gram and Ziehl–Neelsen (ZN) staining. The sample was inoculated onto sheep blood agar, MacConkey’s medium, Kanamycin-Vancomycin Laked Blood agar, and Bacteroides Bile Esulin agar. Gram staining of the pus samples showed presence of gram positive cocci in single and in groups along, with pus cells. ZN staining revealed acid fast bacilli (AFB). Later, pus sample was inoculated onto four plain Lowenstein–Jensen (LJ) media with the control. Within 5 days of incubation, colonies appeared on LJ medium. LJ culture smears showed AFB and the isolate was identified as a rapid grower as per the growth on LJ medium. These reports were informed to a clinician and requested to change the regimen. These colonies were further tested for biochemical tests [Table 1] and susceptibility tests for primary and secondary antitubercular drugs [Table 2]. The results of the biochemical tests were suggestive of M. fortuitum susceptible to antibiotics, amikacin and clarithromycin.

**Treatment**

The patient was started with tablet amikacin and tablet clarithromycin (500 mg twice daily) and responded to the drugs with a reduction in symptoms. The patient was discharged after 15 days and asked to continue the treatment for another 60 days. After 2 months, the follow-up examination of the patient showed that the wound healed completely and no clinical symptoms were present.

**DISCUSSION**

Infections with MOTT are reported frequently after laparoscopic procedures which may be due to contamination from water, surgical solutions used to clean the catheters, equipment, and scopes used for the procedures or the

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**Table 1: Biochemical tests for the isolate**

| Biochemical tests | Control strain | Test strain |
|-------------------|----------------|-------------|
| Key biochemical tests |               |             |
| Growth at 42°C     | +ve            | +ve         |
| Nitrate reduction test | +ve          | +ve         |
| Arylsulfatase test (3 days) | +ve | +ve |
| Growth on LJ containing 5% NaCl | +ve | +ve |
| Growth on MacConkey’s agar | −ve | −ve |
| Mannitol utilization test | −ve | −ve |
| Inositol utilization test | −ve | −ve |
| Other biochemical tests |            |             |
| Niacin reduction test | −ve          | −ve         |
| Semiquantitative catalase | +ve | +ve |
| Urease test         | +ve            | +ve         |
| Tween-80 hydrolysis 7 days | −ve | −ve |
| Tween-80 hydrolysis 10 days | +ve | +ve |

+ve: Positive, −ve: Negative, LJ: Lowenstein-Jensen

**Table 2: Drug susceptibility test for Mycobacterium fortuitum**

| Drug      | MIC (μg/ml) | S/R | Cut off |
|-----------|-------------|-----|---------|
| Amikacin  | <0.5        | S   | >16     |
| Clarithromycin | <0.5   | S | >4 |
| Ofloxacin | <0.5        | S   | >16     |
| Sulfamethoxazole | <0.5 | S | >64 |
| Doxycycline | <0.5 | S | >2 |
| Strept  | 8           | R   | >4      |
| INH      | 16          | R   | >8      |
| Rif      | 4           | S   | >8      |
| Etham    | <0.5        | S   | >4      |

INH: Isoniazid, Rif: Rifampicin, Etham: Ethambutol, S: Sensitive, R: Resistant, MIC: Minimum inhibitory concentration, Strept: Streptomycin
disinfectants.[3-5] It was observed that the patient in this study was in the third stage of postlaparotomy infections.[2]

Improper cleaning or use of contaminated water or disinfectants for cleaning might have introduced MOTT organisms into tissues during the procedure.[2] MOTT species are resistant to conventional antibiotics and glutaraldehyde disinfectants.[6,7]

Therefore, caution required when using invasive instruments to prevent such nosocomial infections.

In this patient, the surgical wound healed immediately postsurgery, and the infection appeared after a long duration of time. Although the symptoms reduced after treatment, a relapse with resistance to conventional antibiotic treatment occurred again which is reported in 80% of the surgical infections due to MOTT.[8] Such infections are difficult to diagnose only by clinical investigations due to varied and chronic clinical symptoms and require a thorough microbiological investigation to confirm the diagnosis.[9,4] A delayed/improper diagnosis may lead to increased morbidity or mortality. In endemic regions like India, early diagnosis of such mycobacterial infections is very crucial which may otherwise spread through aerosols. Laboratory personnel must be informed about the clinical symptoms and possibility of slow-growing organisms, which require expertise for isolation and identification.

MOTT species cannot be treated with conventional antibiotics and may result in relapse. These species show variation of sensitivity to the antibiotics.[2] It is suggested that amikacin is a promising drug for the treatment of M. fortuitum infection.[10]

As per the recommendations of Sungkanuparph et al., we performed the susceptibility test to know the sensitivity pattern to treat our patient. The isolate was reported to be sensitive to antibiotics, amikacin and clarithromycin.[11-13]

Limitations

The limitations of this paper are that the exact source of infection could not be identified to prevent further infections. Identification is performed by conventional methods only which takes longer time as compared to automation and molecular techniques.

Conclusions

We recommend strict adherence to standard disinfection protocols to all the invasive surgical instruments to prevent such infections which may result in long-time suffering and increased cost of treatment to the patient. In India, M. fortuitum infections are underreported and have a low degree of suspicion in postsurgical cases. Any postoperative, chronic nonhealing ulcer cases should always be suspected for MOTT infection, and a detailed microbiological investigation should be performed before ruling out any mycobacterial infections. We recommend performing antibiotic susceptibility testing for MOTT organisms along with a detailed clinical history to conclude diagnosis and for choosing the proper antibiotic for treatment.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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