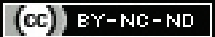


# Port-site Infection with Atypical Mycobacteria Post-laparoscopic Procedure: A Case Series

C VINODINI<sup>1</sup>, MG BINU<sup>2</sup>, S RAMKUMAR<sup>3</sup>, T SRINIVASAN<sup>4</sup>

## ABSTRACT

Surgical site infections with atypical mycobacteria are uncommon but not unheard of. Atypical mycobacteria are abundantly present in soil and water and can cause infections when the immune system is compromised. We present four cases of atypical mycobacterial infections at the port site following laparoscopy. In the first case, a laparoscopic cholecystectomy, there was histopathologic evidence of mycobacterial infection, although the smear and culture tests were negative. The second case, post-laparoscopic sterilisation, also showed histopathologic evidence, but the smear test was negative. Similarly, the third case, post-laparoscopic appendectomy, had histopathologic evidence but a negative smear. The fourth case, a post-laparoscopic hernia repair, had histopathologic evidence, a positive smear, and positive culture. The Cartridge-Based Nucleic Acid Amplification Test (CBNAAT) for *Mycobacterium Tuberculosis* (MTB) was negative for all four patients, indicating the absence of tuberculous infection. The first three patients were treated with conventional anti-tubercular treatment using four drugs: Isoniazid (INH), rifampicin, ethambutol, and pyrazinamide, along with an additional quinolone. The fourth patient was treated with a combination of Ciprofloxacin, Clarithromycin, and doxycycline. All four patients responded well to treatment. The use of tap water to dilute disinfectants is considered a risk factor for atypical mycobacterial infection.

**Keywords:** Anti-tubercular treatment, Cartridge based nucleic acid amplification test, Liquid culture, Surgical wound infection

## INTRODUCTION

Postoperative surgical wound infection is one of the most common complications faced by surgeons worldwide, despite the advancements in antibiotics and their extensive use [1]. While surgical port-site infection can occur in all types of laparoscopic procedures, mycobacterial infection is rare [2]. Tuberculosis is a prevalent infection, primarily caused by MTB, and is commonly found in developing countries, with pulmonary infections being the most common. Atypical mycobacterial infections are frequently observed in immune-compromised individuals [3].

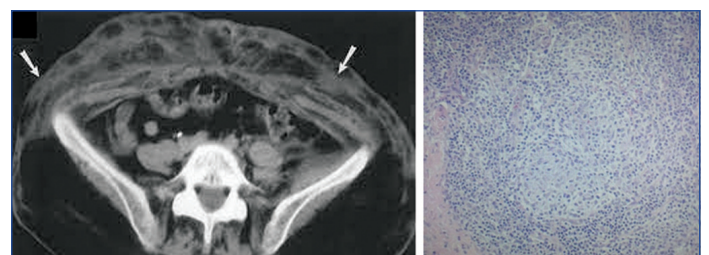
## CASE SERIES

### Case 1

A 54-year-old female with no significant past illnesses other than well-controlled type 2 diabetes underwent a laparoscopic cholecystectomy at a tier-2 hospital in Palghat, Kerala. Her postoperative recovery was uneventful. However, she later visited the outpatient clinic with a history of swelling, pain, and redness at the umbilical port site, which started 20 days after the procedure and lasted for four weeks. Additionally, she complained of irritation at the right hypochondrial port site. There were no fever, cough, or weight loss symptoms reported.

On examination, she was found to be obese with a BMI of 30.26, and she had a significant amount of abdominal fat. The umbilical port-site wound showed redness around the margins with a 1.5 cm induration. A serous discharge was observed. The rest of her abdomen appeared normal, and there were no significant lymph node enlargements. Routine blood tests, including complete blood count, renal function tests, random blood sugar, and HbA1C, all came back normal. A CT abdomen was advised, which revealed a fluid collection (as shown in [Table/Fig-1]). A wound swab smear examination and culture were performed, and she was started on oral Co-Amoxycylav along with supportive treatment. She

experienced symptomatic relief and was followed-up. However, after 15 days, she presented with an unresolved infection. A biopsy was taken from the margin and sent for histopathology and CBNAAT for MTB. The wound was thoroughly debrided. The histopathology report indicated chronic granulomatous inflammation with multiple epithelioid granulomas on microscopy, along with the presence of Langerhans giant cells, suggesting a tuberculous etiology (as shown in [Table/Fig-2]). CBNAAT was negative for MTB, and liquid culture in *Mycobacterium Growth Indicator Tube* (MGIT) was also negative.



**[Table/Fig-1]:** CT abdomen axial view shows abscess formation and fluid collection. (white arrows). **[Table/Fig-2]:** Histopathology: Non caseating granulomas and lymphocyte infiltrates, suggestive of atypical mycobacterial infection (H&E stain, scanner view). (Images from left to right)

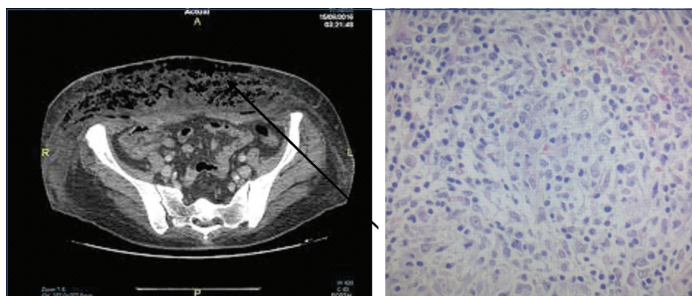
She was subsequently started on Anti-Tubercular Treatment (ATT), which included INH, rifampicin, pyrazinamide, and ethambutol, along with Levofloxacin (750 mg/day). A one-month follow-up showed complete resolution, and ATT was continued for six months.

### Case 2

A 28-year-old female underwent laparoscopic sterilisation at a government facility. Subsequently, she developed redness and induration of the abdominal wall below the umbilicus, ten days after the procedure. She experienced mild fever and noticed a rise in temperature in the evenings. She received treatment at a tertiary care center in the city, where an incision and drainage of the wound abscess were performed. Cultures taken from the secretion and

blood were negative. She was treated with Cefuroxime axetil and Linezolid, and experienced symptomatic relief after the procedure. She presented to our outpatient clinic with a history of fever, abdominal swelling, and pain lasting for fifteen days. On examination, she was found to be overweight with a BMI of 27.2. Abdominal wall induration below the umbilicus and serous discharge from the port site wound were observed. An ultrasound scan revealed fluid collection in the muscular plane and fat. An MRI scan confirmed the presence of fluid and ruled out any intra-peritoneal extension [Table/Fig-3].

Under general anesthesia, she underwent exploration of the wound, and a thorough debridement was performed. A biopsy was taken from the margin and sent for CBNAAT and histopathology. Histopathology revealed chronic granulomas with Langerhans giant cells, and CBNAAT tested negative for MTB [Table/Fig-4].



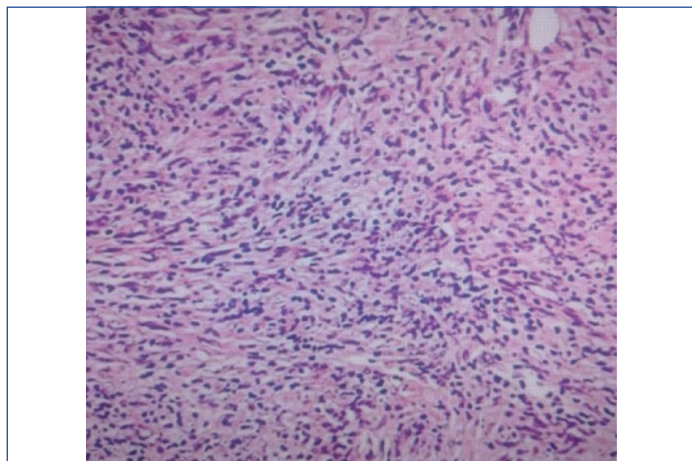
**[Table/Fig-3]:** MRI abdomen shows necrotic abdominal wall fat and intermuscular plane with fluid collection. **[Table/Fig-4]:** Histopathology: Ill-defined noncaseating granulomas and a small number of giant cells favour non tuberculous mycobacteria over tuberculosis H&E stain (10x). (Images from left to right)

She was initiated on Category-1 ATT with four drugs, along with moxifloxacin 400 mg per day. Follow-up showed gradual resolution over a period of more than a month, and ATT was continued for six months.

### Case 3

A 41-year-old individual with no known comorbidities underwent laparoscopic appendectomy one month prior to presentation. They experienced itching and swelling at the infra-umbilical port site, as well as irritation at the right lateral port site. On examination, they were mildly obese, and the umbilical port site and surrounding abdominal wall showed redness and swelling. The skin exhibited excoriation, and there was serous fluid oozing from the port site wound.

The individual was prescribed an oral antibiotic, cefpodoxime proxetil 200 mg twice daily, along with supportive measures, cleaning, and dressing, which provided some symptomatic relief. After two weeks, they returned with a discharging sinus, surrounding erythema, and induration. The sinus was explored under local anesthesia and debrided. A biopsy taken from the side revealed non-caseating epithelioid granuloma with Langerhans giant cells [Table/Fig-5]. CBNAAT test results were negative for MTB.

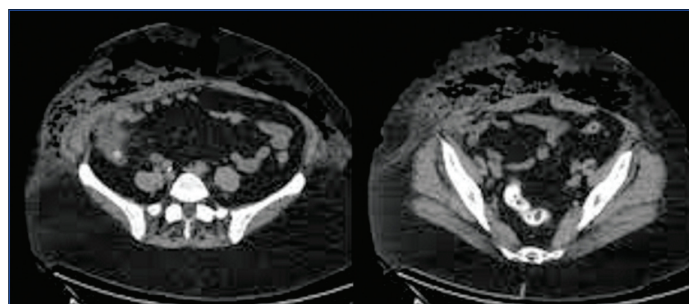


**[Table/Fig-5]:** Histopathology: Granulomatous inflammation without necrosis, and a small number of giant cells H&E stain (10x).

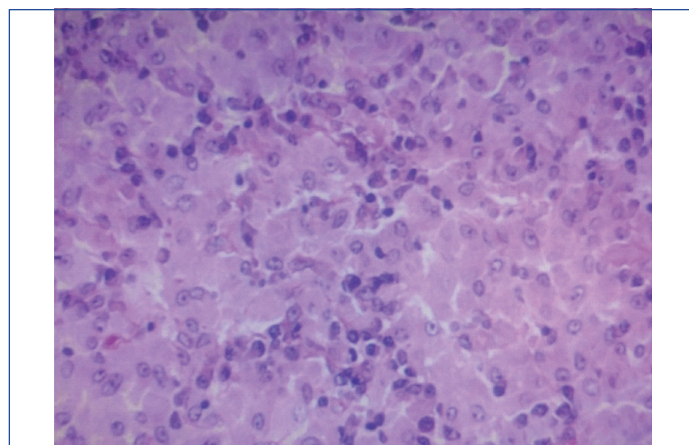
The individual was initiated on Anti-Tubercular Therapy (ATT) with four drugs, along with Levofloxacin 750 mg per day. By the third week, their symptoms had resolved, and ATT was continued for six months.

### Case 4

A 32-year-old male underwent laparoscopic hernia repair at a hospital in a satellite town two months prior to the presentation. He was apparently normal for three weeks after the procedure, with good initial wound healing. By the end of the third week, he developed redness and itching at the right-sided port site, along with swelling. He also reported serosanguinous discharge from the port site. He visited the same hospital where incision and drainage was performed, and he was prescribed broad-spectrum antibiotics (two courses). Routine evaluations were unremarkable, except for a raised Erythrocyte Sedimentation Rate (ESR). Magnetic Resonance Imaging (MRI) of the abdomen revealed the presence of a necrotic abscess in the abdominal wall in the intermuscular and fat planes [Table/Fig-6]. After visiting us, he underwent wound debridement and a biopsy. A smear for Acid Fast Bacilli (AFB) was taken from the discharging fluid, and it tested positive. However, the Cartridge-Based Nucleic Acid Amplification Test (CBNAAT) from the biopsy specimen was negative for Mycobacterium Tuberculosis (MTB). The biopsy showed a chronic granulomatous lesion with multiple granulomas and Langerhans giant cells [Table/Fig-7]. Liquid culture from the secretion in Mycobacteria Growth Indicator Tube (MGIT) showed positive results within forty-eight hours. The bacteria were identified as Mycobacterium chelonae using the Matrix-Assisted Laser Desorption-Ionisation-Time Of Flight (MALDI-TOF) technique. The patient was started on Ciprofloxacin 500 mg twice daily, Clarithromycin 500 mg twice daily, and Doxycycline 100 mg daily for four weeks, followed by Clarithromycin and Ciprofloxacin 500 mg each twice daily for four months. He experienced symptomatic relief during the first four weeks of treatment.



**[Table/Fig-6]:** MRI of the abdomen was done, which showed the presence of necrotic abscess in the abdominal wall in the intermuscular plane and fat planes.



**[Table/Fig-7]:** Histopathology: Lymphoid tissue is replaced by large histiocytes admixed with a small number of lymphocytes and plasma cells H&E stain (40x).

## DISCUSSION

Atypical, non-tuberculous mycobacteria are commonly present in soil and water [3]. Due to the unavailability of sufficient data, their

prevalence in India is not well known. The inadequacy of laboratory facilities also contributes to the lack of Indian data [4].

The ability of these bacteria to form biofilms makes them resistant to many adverse conditions [5]. Usually less virulent, these bacteria do not cause disease in a healthy host [6].

Port site infection is a preventable complication of laparoscopic surgery, which nullifies the advantages of this technique over conventional surgery [7]. Despite advances in anti-microbial treatments, sterilisation techniques, and operation theatre environments, surgical wounds are still susceptible to infections. The infection is not associated with the technique of primary port entry [8]. Many species of Mycobacteria, including the fortuitum-chelonae complex, are known to cause diseases in humans and animals [9].

In the present series of four cases, three were negative for acid-fast bacilli and showed negative cultures when tested. The one case that tested positive was identified as Mycobacterium chelonae and was treated with ciprofloxacin, clarithromycin, and doxycycline. The other three cases were treated with conventional Anti-tubercular Treatment (ATT) along with added quinolones. All four cases responded well to treatment.

As of today, guidelines for the management of atypical mycobacterial infections are lacking. However, treatment with first-line ATT often fails due to bacterial resistance. The addition of quinolones to conventional treatment can be beneficial. Mycobacterium fortuitum-chelonae complex may respond to macrolides only, thus requiring a macrolide-based regimen [10].

A recent study from Haryana, including fourteen cases of port site infections following laparoscopic surgery in a tertiary hospital, showed acid-fast bacilli that grew in Lowenstein-Jensen medium within a week, suggesting the possibility of atypical mycobacteria [11]. In this series, treatment was administered using clarithromycin, linezolid, and ciprofloxacin. The cases included cholecystectomy and appendicectomy. In the present series, authors included cholecystectomy, sterilisation, appendicectomy, and hernia repair procedures. Most of our patients were treated with conventional anti-tubercular treatment along with added quinolones, except

for one patient who received clarithromycin, ciprofloxacin, and doxycycline.

The practice of using tap water to dilute disinfectants, such as glycerinaldehyde, which is then used to sterilise laparoscopic equipment, has been accused as a cause for the development of atypical mycobacterial port site infections.

## CONCLUSION(S)

Port-site infections, although not uncommon, can be relentless to routine treatments when caused by atypical mycobacteria. Therefore, prompt clinical suspicion is essential for evaluating and treating such cases. Recognising these infections is important because they respond well to targeted and appropriate treatment.

## REFERENCES

- [1] Rehman-u, Farooqui F, Waseem S, Lee KY, Mamoona N, Riaz U, et al. Port site tuberculosis, a rare postoperation entity: A case report. *Annals of Medicine and Surgery*. 2022;78:103703.
- [2] Siddique SS, Khan MAI, Khan MAU, Sayeed S. Port site infection following laparoscopic cholecystectomy. *Bangladesh Journal of Medicine*. 2022;29(2):51-58.
- [3] Gayathri Devi DR, Sridharan D, Indumathy VA, Babu PRS, SandhyaBelawadi MR, Swamy ACV. Isolation of Mycobacterium chelonae from wound infection following laparoscopy. A case report. *Indian J Tube*. 2004;51:149-51.
- [4] Sharma M, Goutham D, Devi LS, Sardar M. Nosocomial outbreak of port-site infection due to atypical mycobacteria following laparoscopy: Suggested infection control strategies. *J Clin Diagn Res*. 2021;15(7):DC22-DC25.
- [5] Schulze-Robbecke R, Janning B, Fischeder R. Occurrence of mycobacteria in biofilm samples. *Tuber Lung Dis*. 1992;73(3):141-44.
- [6] Lahiri KK, Jana J, Pannicker KK. Mycobacterium fortuitum infections insurgical wounds. *MJAFI*. 2009;65(1):91-92.
- [7] Sasmal PK, Mishra TS, Rath S, Meher S, Mohapatra D. Port site infection in laparoscopic surgery: A review of its management. *World Journal of Clinical Cases*. 2015;3(10):864-71.
- [8] Molloy D, Kaloo PD, Cooper M, Nguyen TV. Laparoscopic entry: A literature review and analysis of techniques and complications of primary port entry. *Aust N Z J Obstet Gynaecol*. 2002;42(3):246-54.
- [9] Muthusami JC, Vyas PL, Mukundan U, Jesudason MR, Govil S, Jesudason SR. Mycobacterium fortuitum: An iatrogenic cause of soft tissue injury in surgery. *ANZ J Surg*. 2004;74(8):662-66.
- [10] Chaudhari S, Sarkar D, Mukerji R. Diagnosis and management of atypical mycobacterial infection after laparoscopic surgery. *Indian J Surg*. 2010;72:438-42.
- [11] Duarte RS, Lourenco MC, Fonseca LS, Leao SC, Amorin TEL, Rocha ILL, et al. Epidemic of postsurgical infections caused by mycobacterium massiliense. *J Clin Microbiol*. 2009;47(7):2149-55.

### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Surgery, Coimbatore Medical College, Coimbatore, Tamil Nadu, India.
2. Professor, Department of General Medicine, KMCH Institute of Health Sciences and Research, Coimbatore, Tamil Nadu, India.
3. Professor and Head, Department of General Medicine, KMCH Institute of Health Sciences and Research, Coimbatore, Tamil Nadu, India.
4. Professor and Head, Department of General Surgery, Coimbatore Medical College, Coimbatore, Tamil Nadu, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. MG Binu,  
41, 4<sup>th</sup> Cross, Nethajinagar Extension, Nanjundapuram PO,  
Coimbatore-641036, Tamil Nadu, India.  
E-mail: dr.binumg@hotmail.com

### PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Apr 20, 2023
- Manual Googling: Jul 24, 2023
- iThenticate Software: Jul 28, 2023 (9%)

### ETYMOLOGY: Author Origin

EMENDATIONS: 6

### AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Apr 17, 2023**

Date of Peer Review: **Jul 17, 2023**

Date of Acceptance: **Jul 29, 2023**

Date of Publishing: **Nov 01, 2023**