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CASE REPORT

A Successfully Treated Case of *Mycobacterium chelonae* Pulmonary Infection and a Literature Review (1990–2025)

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Objective: This study aims to evaluate the pharmaceutical interventions conducted by clinical pharmacists in the case of a 59-year-old patient diagnosed with lung adenocarcinoma and a suspected infection, focusing on pathogen identification and the formulation of a safe and effective treatment plan.

Methods: Through clinical consultation, pharmacists conducted an evaluation of the patient's underlying conditions and clinical manifestations, leading to the suspicion of a high probability of Mycobacterium chelonae infection. Consequently, they recommended a treatment regimen in accordance with guidelines for non-tuberculous mycobacterial infections, consisting of azithromycin 0.5 g and moxifloxacin 0.4 g administered orally once daily, accompanied by dynamic monitoring of therapeutic efficacy.

Results: The patient became afebrile by day 3. At day 14, inflammatory markers had normalised, and no clinically significant adverse drug reactions were observed during short-term follow-up.

Conclusion: In this case, PTseq supported early hypothesis generation and timely antimicrobial stewardship. The azithromycin-moxifloxacin regimen was associated with short-term clinical improvement; however, confirmatory microbiologic evidence, susceptibility guidance, and longer follow-up are needed before drawing generalized conclusions.

Keywords: Mycobacterium chelonae, pulmonary infection, PTseq sequencing, literature analysis

Introduction

Mycobacterium chelonae is a species of non-tuberculous mycobacteria (NTM) predominantly associated with skin and soft tissue infections, whereas pulmonary involvement is exceedingly uncommon. Over the past 35 years, sporadic reports have documented its role as an atypical pulmonary pathogen. With the advancement of molecular diagnostic technologies and heightened clinical awareness, understanding of its microbiological characteristics, diagnostic approaches, and therapeutic strategies has steadily improved.[1] A review of 16 English-language case reports retrieved from the PubMed database revealed that the majority of affected patients presented with underlying chronic pulmonary disorders.[2] Taxonomically, M. chelonae is classified within the Mycobacterium abscessus–chelonae complex, a subgroup of rapidly growing mycobacteria.[3] Disseminated disease is rare and generally confined to severely immunocompromised individuals. Notably, M. chelonae demonstrates substantial in vitro resistance to multiple antimycobacterial agents,[4] and conventional chemotherapeutic eradication has often proven unsuccessful. Herein, we present a rare case of pulmonary M. chelonae infection in a patient without pre-existing chronic lung disease, which was successfully managed with an oral combination regimen of azithromycin (0.5 g once daily) and moxifloxacin (0.4 g once daily).

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Clinical Data

A 59-year-old Chinese woman presented with a 2-week history of pronounced fatigue and a 1-day history of fever with chills and dizziness. On examination, temperature was 38.3°C and pulse rate 118 beats/min. Laboratory tests showed: white blood cell count 6.38×10^9/L, neutrophils 84.8%, high-sensitivity C-reactive protein 7.46 mg/L, procalcitonin 1.12 μg/L, and interleukin-6234.7 pg/mL. Gram stain and fungal smear were negative; respiratory nucleic acid assays for *influenza A/B, rhinovirus, Mycoplasma pneumoniae*, adenovirus and respiratory syncytial virus were negative. Blood culture showed no bacterial growth after 5 days, and bronchoalveolar lavage fluid (BALF) culture yielded only normal respiratory flora. A tuberculosis RNA test was reported as positive; however, the overall clinical-radiologic picture and the subsequent clinical course did not support active tuberculosis. We therefore interpreted this result as possibly reflecting non-viable nucleic acid detection or contamination; confirmatory tuberculosis testing was not available for this report and is acknowledged as a limitation.

Three years earlier, a solitary pulmonary nodule in the left lower lobe was discovered during routine screening and remained stable during follow-up. One year prior, chest computed tomography (CT) revealed an irregular ground-glass nodule in the dorsal segment of the left lower lobe, highly suggestive of invasive adenocarcinoma. The patient underwent single-port laparoscopic left lower lobectomy with mediastinal lymph node dissection, with an uneventful postoperative course. Postoperative adjuvant chemotherapy with pemetrexed and carboplatin was completed in four cycles.

Three months before the current presentation, the patient noticed enlargement of right cervical lymph nodes; biopsy confirmed metastatic lung adenocarcinoma. She subsequently received combination chemotherapy with carboplatin, paclitaxel, and toripalimab. One month prior to presentation, follow-up evaluation indicated immune-related pneumonia, necessitating corticosteroid therapy and temporary suspension of immunotherapy. The second cycle of carboplatin plus paclitaxel chemotherapy was then administered. The current symptoms developed 14 days after the last chemotherapy cycle.

The patient's medical history was notable for hypertension of one year's duration and type 2 diabetes mellitus for 15 years, both managed with stable pharmacological therapy.

PTseq analysis of BALF identified: Mycobacteroides chelonae (62 sequences), Tropheryma whipplei (6 sequences), and human gammaherpesvirus 4 (EBV) (4461 sequences). Upon consultation, clinical pharmacists-considering the patient's oncologic status and microbiological findings-suspected a high probability of M. chelonae infection. Following relevant NTM treatment guidelines, they recommended oral azithromycin (0.5 g once daily) plus moxifloxacin (0.4 g once daily). After initiation of therapy, the patient's body temperature normalised by day 3, and at 14-day follow-up all infection markers had normalised (Table 1).

Literature Review

We conducted a comprehensive PubMed search for reports of pulmonary infection caused by Mycobacterium chelonae from January 1, 1990, to December 31, 2025, using combinations of the keywords "Mycobacterium chelonae", "pulmonary", "lung", and "mycobacterium". Titles/abstracts were screened, followed by full-text assessment. Duplicate records were removed. We included case reports/series that provided patient-level pulmonary involvement with species-level identification of M. chelonae; we excluded non-pulmonary infections, reports with unclear species identification, and studies without sufficient case information. Using these criteria, 16 individual pulmonary cases were identified from 16 published articles.[5–20] Including the present case, 17 cases have been reported in the literature within this time window. Due to heterogeneity and incomplete reporting across cases, we summarized patient demographics, clinical presentations, diagnostic approaches, treatment regimens, and outcomes descriptively, without making formal comparative inferences (Table 2).

Discussion

Mycobacterium chelonae belongs to the class Actinomycetia, order Mycobacteriales, family Mycobacteriaceae. This polymorphic organism may present as long, slender rods or short, thick rods (0.2–0.5 × 1–6 μm), with occasional coccoid forms of approximately 0.5 μm in diameter also reported. Young colonies (<5 days) demonstrate strong acid-fast staining,

Table 1 Conditions for Treatment Recommended by Clinical Pharmacists

References	Reason for Consultation	Therapeutic Drugs	Administration Time	Result
(Pease and Alvarez, 2021)[5]	Unexplained weight loss, history of partial gastrectomy, alcohol abuse,smoking; sputum culture positive for Mycobacterium chelonae.	1. Rifampin 600 mg daily and clarithromycin 500 mg twice daily; 2. moxifloxacin 400 mg daily and clarithromycin 500 mg twice daily; 3. imipenem 250 mg twice daily and doxycycline 100 mg twice daily were added	1. September 2005-March 2006; 2. Started in March 2010; 3. Started in April 2012 (Doxycycline was discontinued in June 2012)	Improvement
(Höflich et al, 2004)[6]	Severe infections (necrotizing lymphadenitis, pneumonia, mastoiditis)	1. Antibiotics; 2. Empirical therapy with imipenem was added to the antibiotic regime	1. Six months after discharge; 2. Relapse again after a few months	Condition severe; anti - IFN - γ autoantibody identified, leading to immunodeficiency. Relapse again after a few months
(Burke et al, 1977)[7]	A 37-year-old female presented with subacute bilateral non-cavitary pneumonia and megaesophagus, with Mycobacterium chelonae subsp abscessus identified as the pathogen.	No significant anti-tuberculosis chemotherapy, symptomatic treatment, etc.	_	Fully recovered
(Li et al, 2020)[8]	Nodular lesion in upper lobe of right lung; T - SPOT test positive, other tumor biomarkers negative	_	_	Improvement
(Goto et al, 2012)[9]	Fatigue, loss of appetite; abnormal shadow in left upper lung field on chest X - ray	1. Amikacin, clarithromycin, and imipenem; 2. ciprofloxacin and clarithromycin	1. For 6 weeks Performed; 2. after surgery, lasting for 9 months	Improvement
(Singh and Yu, 1992)[10]	Progressive bilateral pulmonary disease due to Mycobacterium chelonae infection.	1. Cefoxitin and amikacin; 2. cefoxitin (8 g/d) and amikacin (400 mg twice daily); 3. Combination of cefoxitin and orally administered ciprofloxacin.	1. Treated for 10 days; 2. Admitted to the hospital two months later for re-treatment, which lasted three weeks; 3. After discharge, Cefoxitin and ciprofloxacin were given for 3 months, and monotherapy with ciprofloxacin was continued for an additional 10 months.	Improvement
(Bark et al, 2012)[11]	Advanced head and neck cancer with fever, fatigue, rash, and skin lesions	1. Carboplatin and gemcitabine; 2. Cetuximab, dexamethasone at 4 mg daily and minocycline at 50 mg twice daily; 3. vancomycin and piperacillin-tazobactam, clarithromycin and imipenem-cilastatin	1. Received once a week for the past 9 months, and the last dose was completed one week before hospitalization; 2. Received for 9 months, with the last cycle three weeks before diagnosis; 3. After hospitalization	Chose not to receive treatment and was discharged under hospice care.
(Vyas et al, 2021)[12]	Has Hughes - Stovin syndrome and disseminated Mycobacterium chelonae infection	1. Infliximab, Azathioprine, Micafungin, Prednisone; 2. Fluconazole; 3. Clarithromycin, Imipenem-cilastatin, Linezolid, Amikacin	1. Pre-first discharge; 2. After first discharge; 3. After readmission	Improvement

(*Continued*)

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Table 1 (Continued).

References	Reason for Consultation	Therapeutic Drugs	Administration Time	Result
(Hsieh et al, 2008)[13]	Had a 4 - week history of severe cough, presented with productive cough, intermittent fever, etc	1. Intravenous ampicillin (2 g, six times daily) and gentamicin (180 mg, once daily); 2. isoniazid, rifampicin and ethambutol; 3. isoniazid plus rifampicin, ethambutol and ciprofloxacin; 4. oral clarithromycin plus ciprofloxacin therapy	1. In a community hospital for 1 week; 2. Used upon recurrence shortly after discharge, administered for 9 months; 3. Relapse after 6 months; 4. Treatment started after two weeks, administered for 36 months	Improvement
(Tschiedel et al, 2006)[14]	Diagnosed with anaplastic large cell lymphoma, with Mycobacterium chelonae colonization	Intravenous antibiotic therapy with ceftazidime and tobramycin, which was later switched to meropenem and tobramycin; dexamethasone, CPM, MTX, ARA-C, IFO, VP16, DOX; The patient was initiated on rifampin 600 mg daily and clarithromycin 500 mg twice daily.	Maintained throughout immunosuppressive therapy	Improvement
(Yew et al, 1990)[15]	Developed Mycobacterium chelonae necrotizing pneumonia after allogeneic hematopoietic stem cell transplant	Treated with various antibiotics; later used tigecycline.	_	Improvement
(Peres et al, 2009)[16]	Had Mycobacterium chelonae lung infection with chronic bronchiectasis	Cefoxitin amikacin Azithromycin levofloxacin meropenem, imipenem cilastin, linezolid, moxifloxacin, clarithromycin, and inhaled tobramycin	_	Improvement
(Yew et al, 1994)[17]	Had Mycobacterium chelonae lung infection	Treated with clarithromycin; later with imipenem and clarithromycin.	1. February 1992: Started clarithromycin. 2. Around March 1993: Used imipenem (500 mg twice daily) and clarithromycin (1 g twice daily). 3. August 1993: After liver function normalised, a challenge dose of clarithromycin was given.	Improvement
(Marino et al, 2018)[18]	Mycobacterium chelonae vertebral osteomyelitis with HIV infection	Treated with antibiotics and antimycotic therapy	_	Died despite treatment.
(Ko et al, 2013)[19]	Had Mycobacterium chelonae lung disease with hemoptysis	No antibiotic therapy was initiated due to mild symptoms.	_	Improvement

(*Continued*)

Table 1 (Continued).

References	Reason for Consultation	Therapeutic Drugs	Administration Time	Result
(Trulock et al, 1989)[20]	A heart-lung transplant recipient with obliterative bronchiolitis developed pulmonary disease due to Mycobacterium chelonae infection.	Clarithromycin-based combination therapy	_	Improvement
Our report	Two weeks after the patient completed chemotherapy, patient developed symptoms such as fever accompanied by chills and dizziness. The tuberculosis RNA test was positive, and PTseq detection of bronchoalveolar lavage fluid revealed the presence of pathogens including Mycobacteroides chelonae, Tropheryma whipplei, and Human gammaherpesvirus 4 (EBV).	Azithromycin 0.5 g combined with moxifloxacin 0.4 g orally once daily.	The medication should be administered for a 14-day course as advised.	Body temperature normalised on the third day after treatment, and follow-up examination at 14 days showed that infection indicators had normalised.

Abbreviations: EBV, Epstein–Barr virus; HIV, human immunodeficiency virus; IFN-γ, interferon-γ; CPM, cyclophosphamide; MTX, methotrexate; DOX, doxorubicin; IFO, ifosfamide.

which diminishes with prolonged cultivation. On most culture media, colonies are typically smooth, moist, and glossy, appearing within 3–4 days,[21] and are nonpigmented or pale creamy yellow. Rough colony morphotypes may develop after approximately three weeks. M. chelonae is widely distributed in environmental reservoirs, including water, soil, dust, and healthcare settings. Human transmission occurs predominantly via environmental exposure, either through aerosol inhalation or via contact with contaminated water/food in the presence of skin breaches.[22,23] As an opportunistic pathogen, it frequently causes infections when skin barriers are compromised (eg, surgery, trauma, cosmetic procedures) or when host immunity is impaired. Clinically, cutaneous infections often manifest with localized swelling, erythema, warmth, pain, and purulent discharge. Pulmonary disease presents with features consistent with pneumonia, including persistent cough, chest pain, hemoptysis, and dyspnea. Pulmonary M. chelonae infections are exceedingly rare.[24,25] Given the rarity of pulmonary involvement and the necessity of tailoring diagnosis and treatment to the organism's pathogenic profile, we systematically evaluated the reasons for consultation, therapeutic regimens, treatment duration, and clinical outcomes in the aforementioned cases, extracting essential diagnostic and management data to guide individualized therapeutic recommendations for such infections (see Table 1).

Rapidly growing mycobacteria (RGM) are environmental nontuberculous mycobacteria (NTM) that typically form visible colonies on solid media within approximately 7 days. Clinically important RGM include the Mycobacterium abscessus complex (subsp. abscessus, massiliense, and bolletii), Mycobacterium chelonae, and the Mycobacterium fortuitum group.[26] Importantly, M. abscessus complex and M. chelonae are distinct species with different clinical spectra and antimicrobial resistance patterns; for example, inducible macrolide resistance mediated byerm (41) is common in M. abscessus subsp. abscessus but is typically absent in M. chelonae.[3,26] Therefore, species-level confirmation by culture-based identification and, when feasible, antimicrobial susceptibility testing remain essential to guide management.[23,27,28]

Non-tuberculous mycobacterial pulmonary disease (NTM-PD) is diagnosed by integrating compatible clinical symptoms and radiologic findings with microbiologic evidence, as outlined in commonly used ATS/IDSA criteria and

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Table 2 Clinical Characteristics of Reported Pulmonary Mycobacterium chelonae Cases

References	Age	Gender	Presenting Symptoms	General Examination	Laboratory Methods	Other Sites Involved	Therapy	Prognosis/Time
(Pease and Alvarez, 2021)[5]	61	M	Weight loss, productive cough	CT shows lung nodules, bronchiectasis	Sputum + for Mycobacterium chelonae	/	Antibiotics + nutrition + later enteral feeding	/
(Höflich et al, 2004)[6]	25	F	Necrotizing lymphadenitis, pneumonia, and mastoiditis	/	Isolation of Mycobacterium chelonae and Burkholderia cocovenenans from various tissues; Detection of high - affinity anti - IFN - γ autoantibody	Blood, bone marrow, lymph nodes, etc	Antibiotics, consideration of alternative therapies like intravenous immunoglobulin	/
(Burke et al, 1977)[7]	37	F	Cough, sputum, fever, dyspnea, dysphagia, food regurgitation	Signs of pneumonia and megaesophagus	Multiple sputum smears for acid-fast bacilli, sputum culture to identify Mycobacterium chelonae subsp. abscessus; chest X-ray examination; purified protein derivative-CL and purified protein derivative-S skin tests	-	No significant anti-tuberculosis chemotherapy, with symptomatic treatment, etc.	_
(Li et al, 2020)[8]	29	F	No respiratory, neurological, endocrine or paraneoplastic symptoms	Physical examinations unremarkable; tumor biomarkers (CEA, FRT, NSE, CA125, CYFRA21-1, CA50, SCC) negative except positive T-SPOT test	Electromagnetic navigation bronchoscopy (ENB) combined with next - generation sequencing (NGS); Bronchoalveolar lavage fluid (BALF) tests, etc	/	/	6m
(Goto et al, 2012)[9]	46	M	Fatigue, loss of appetite	Superficial lymph nodes palpable; peripheral white blood cell count 4200/μL, CRP <01mg/dL; chest CT	Cultures of sputum, bronchial washings, bronchoscopic biopsy specimens, gastric fluid; Histopathological examination	/	Pulmonary resection; Postoperative oral antibiotics (ciprofloxacin and clarithromycin)	/
(Singh and Yu, 1992)[10]	63	M	Hemoptysis, dyspnea, low - grade fever, productive yellow - white sputum	/	Sputum smears: acid - fast bacilli; multiple sputum cultures; chest radiograph/CT	/	Combination of cefoxitin and orally administered ciprofloxacin	/

(Bark et al, 2012)[11]	64	F	Fever, fatigue, rash, cutaneous nodules, etc	Chest CT: bilateral pulmonary infiltrates; skin biopsy: neutrophil infiltrate, AFB; blood cultures: AFB (5 days)	Skin, blood, biopsy: Mycobacterium chelonae (PCR+restriction analysis); neck biopsy: SCC	Skin	Vancomycin, piperacillin - tazobactam, etc.	/
(Vyas et al, 2021)[12]	27	M	Massive hemoptysis	Chest CT; renal biopsy; sputum sample: AFB	Sputum culture, renal biopsy, antimicrobial susceptibility testing	Kidneys	Antimicrobial therapy (clarithromycin, imipenem - cilastatin, amikacin, linezolid, etc)	/
(Hsieh et al, 2008)[13]	53	F	Productive cough, intermittent fever, sticky yellowish sputum	Chest X - ray; bronchoscopy; acid - fast staining of sputum	Sputum culture, PCR/restriction enzyme analysis	/	Clarithromycin plus ciprofloxacin therapy	/
(Tschiedel et al, 2006)[14]	13	M	/	/	Sputum cultures	/	High - dose immunosuppressive chemotherapy	/
(Yew et al, 1990)[15]	53	F	Chronic fever, cough, sputum production	/	Sputum smears, sputum cultures, Agar Dilution Method for MIC determination Lungs Imipenem	/	(500 mg intravenously 8 - hourly for 2 weeks, then 500 mg intravenously daily for last 4 weeks)	/
(Peres et al, 2009)[16]	34	F	Chronic cough, respiratory symptoms (non - productive cough, dyspnea)	Developed chronic GVHD involving lung, skin, sclera; chest CT: nodules, cavitary lesions; BAL fluid: positive for AFB; culture	Sputum culture, BAL fluid culture, transbronchial biopsy	/	Tigecycline, multiple antimicrobial combinations	/

(*Continued*)

Table 2 (Continued).

References	Age	Gender	Presenting Symptoms	General Examination	Laboratory Methods	Other Sites Involved	Therapy	Prognosis/Time
(Yew et al, 1994)[17]	62	M	Cough, hemoptysis; history of cough and hemoptysis for 2 years	Chest radiograph: severe cavitary disease in right upper lobe, bronchiectasis in right lower and left upper lobes	Sputum culture: Mycobacterium chelonae; liver function tests: elevated bilirubin, alkaline phosphatase, etc	/	Clarithromycin, imipenem	/
(Marino et al, 2018)[18]	35	M	Fever, back pain	Chest CT: multiple vertebral and pulmonary lesions, abdominal lymphadenopathy	Blood cultures, PCR, biopsies	Vertebrae, gastrointestinal tract	Antiretroviral therapy, antifungal therapy, antimicrobial therapy	/
(Ko et al, 2013)[19]	69	F	Hemoptysis	Chest CT: Bronchiectasis and bronchiolitis in the lingular division of the left upper lobe	Sputum cultures, PCR - restriction fragment length polymorphism analysis	/	No antibiotic therapy initiated due to mild symptoms	/
(Trulock et al, 1989)[20]	_	_	Cough, sputum, progressive dyspnea.	Signs of pulmonary infection and obliterative bronchiolitis	Bronchoscopy with transbronchial lung biopsy, microbial culture and identification	-	Clarithromycin-based combination therapy (according to drug susceptibility testing)	_
Our report	59	F	Fatigue, fever with chills, dizziness	Body temperature 38.3°C, pulse 118 beats/min	Bronchoalveolar lavage fluid PTseq testing showed the presence of Mycobacteroides chelonae and other pathogens; tuberculosis RNA was positive; all other respiratory pathogen tests returned negative results.	/	Azithromycin combined with moxifloxacin	Body temperature normalised after 3 days of medication, infection indicators normalised after 14 days.

Abbreviations: AFB, acid-fast bacilli; BAL, bronchoalveolar lavage; BALF, bronchoalveolar lavage fluid; CRP, C-reactive protein; CT, computed tomography; GVHD, graft-versus-host disease; IFN, interferon; MIC, minimum inhibitory concentration; NGS, next-generation sequencing; PCR, polymerase chain reaction; SCC, squamous cell carcinoma; NR, not reported.

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subsequent updates (eg, repeated positive sputum cultures, or a positive bronchoalveolar lavage culture/biopsy with compatible pathology, together with exclusion of alternative diagnoses).[23,27,28] Importantly, detection of NTM nucleic acids alone cannot reliably distinguish colonization from true disease; therefore, sequencing results should be interpreted within the overall clinical context and in conjunction with imaging, AFB smear/culture, and definitive species identification.[23,27,28] In this setting, metagenomic sequencing/PTseq can support early hypothesis generation and facilitate antimicrobial stewardship, but it should be regarded as an adjunct tool and does not replace standard confirmation or susceptibility-guided management.[27–29] In addition, the clinical PTseq report did not provide assay reporting thresholds, negative-control results, or predefined quantitative cutoffs; therefore, the reported sequence counts were treated as semi-quantitative signals, and contamination or detection of non-viable nucleic acids cannot be excluded. Accordingly, we have framed the present case as a probable pulmonary M. chelonae infection with short-term clinical response, while acknowledging that classical microbiologic confirmation and longer follow-up would strengthen diagnostic certainty and treatment assessment.[23,27,28]

This report has several limitations inherent to a single-case description and a literature-based synthesis of published reports.[30] Firstly, the predominance of cases from specific medical institutions introduces potential referral bias, thereby affecting the generalizability of findings. Secondly, missing critical information—such as environmental exposure history, immune status indicators, and detailed underlying disease trajectories—limits in-depth analysis of infection mechanisms and risk factors. Additionally, heterogeneity in specimen collection and diagnostic protocols over time and across institutions,[31,32] compounded by technological limitations before the year 2000, may have led to underdiagnosis or misclassification.[33] Other potentially influential factors—including prior NTM infection history, interspecies microbial interactions, and host genetic polymorphisms affecting antibiotic metabolism—remain unexplored and could impact both infection risk assessment and optimal therapeutic strategies.

To address these gaps, future investigations should adopt multicenter prospective designs to expand sample sizes, enhance data completeness (including standardized environmental exposure histories and longitudinal immune monitoring), and implement refined analytical methods such as metagenomic sequencing for detailed strain typing. Such approaches would facilitate a clearer understanding of M. chelonae infection characteristics and support optimization of management strategies.[29]

Conclusions

We report a rare case of probable pulmonary Mycobacterium chelonae infection in a patient with lung adenocarcinoma, in whom BALF PTseq supported early hypothesis generation and antimicrobial stewardship.

The azithromycin-moxifloxacin regimen was associated with short-term clinical improvement without significant adverse events in this immunocompromised patient. Given the lack of classic microbiologic confirmation and limited follow-up, this report should not be interpreted as evidence of definitive cure or as a basis for generalized treatment recommendations. Future studies incorporating confirmatory culture/species identification, susceptibility testing and longer follow-up are needed.

Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding authors (Bao Sun and Peng Ge) on reasonable request.

Ethics Approval and Consent to Participate

Written informed consent was provided by the patient for the publication of the case details. Details of the case can be published without institutional approval. According to the institutional policies of The Second Affiliated Hospital of Xi'an Medical University, formal ethical approval is not required for the publication of a single anonymised case report. Written informed consent for publication of the clinical details was obtained from the patient.

Consent for Publication

Written informed consent for publication was obtained from the patient.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no competing interests in this work.

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