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CASE REPORT

Non-Tuberculous Mycobacteria Pulmonary Infection Could Be Easily Misdiagnosed Leading to Serious Consequences

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SUMMARY

Background: **Non-tuberculous mycobacteria (NTM) infection is on the rise worldwide. Chronic pulmonary infection can be difficult to diagnose, and thus easily misdiagnosed and mistreated in clinical practice, leading to serious complications.**

Case presentation, methods and results: **A patient with NTM pulmonary infection, who had undergone a lengthy treatment course in two different hospitals, resulting in drug related multi-organ damage, was presented. The patient was ultimately diagnosed with NTM infection via a culture of lymph node biopsy, a diagnosis was further confirmed by MALDI-TOF mass spectrometry. The patient's condition improved gradually and was discharged from hospital.**

Conclusions: **Clinicians are advised to be cautious of the likelihood of NTM pulmonary infection in febrile patients with patchy shadows in pulmonary imaging, especially after a failure to respond to a diagnostic anti-tuberculosis treatment. A lung biopsy for pathologic diagnosis and culture is necessary in order to avoid misdiagnosis and subsequent serious consequences.**

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KEY WORDS

Non-tuberculous mycobacteria (NTM), pulmonary infection, case report, lymph node biopsy, matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF)

LIST OF ABBREVIATIONS

NTM - Non-tuberculous mycobacteria
CT - Computed tomography
MALDI-TOF - Matrix-assisted laser desorption ionization time-of-flight mass spectrometry
WBC - white blood cell count
CRP - C-reactive protein

HREZ recipe - isoniazid, rifampicin, ethambutol, and pyrazinamide
RBC - red blood cell
PCR - polymerase chain reaction

INTRODUCTION

Non-tuberculous mycobacteria (NTM) belong to the mycobacterium tuberculosis complex. There are more than 140 NTM species identified to-date. NTM can cause a wide range of infections, with pulmonary infections being the most frequent (65 - 90 %) [1]. There is growing evidence that the incidence of NTM lung diseases and associated hospitalizations are on the rise, mainly in regions with low prevalence of tuberculosis [1]. Clinical manifestations and imaging results of NTM are similar to those of tuberculosis and lung cancer, making it difficult to make a differential diagnosis. To-date, treatments for NTM pulmonary disease are still arduous, lengthy, and costly [2]. Thus, early diagnosis of NTM infection is crucial for a patient's management in clinical practice [3,4]. Here, we report a case of misdiagnosed non-tuberculous mycobacterial pulmonary infection that had undergone a lengthy 453 days of treatment in two different hospitals, resulting in drug related multi-organ damage.

CASE PRESENTATION

A 43-year-old male patient was admitted for treatment in hospital A due to suffering from one month of chronic coughing with expectoration on January 6, 2016. Chest computed tomography imaging showed some patchy shadows in his left lung and enlarged lymph nodes were seen in his mediastinum, which were suspicious for cancer or tuberculosis of the lung and possible pneumonia of the upper lobe of right lung (Figure 1). He had a white blood cell count (WBC) of 25.57 x 10^9/L with 71.8% neutrophils and 9.7% eosinophils, C-reactive protein (CRP) of 100.4 mg/L, and an erythrocyte sedimentation rate of 92 mm/hour. Bacterial cultures of sputum, bronchoalveolar lavage fluid, blood, and bone marrow aspirate were negative. A lung biopsy was performed on January 22, 2016 and revealed pathologically chronic inflammation of the lungs, with no culture ordered. The patient failed to respond to a diagnostic anti-tuberculosis treatment (HREZ recipe: isoniazid, rifampicin, ethambutol, and pyrazinamide) and also failed to respond to various antibiotics (a combination of Piperacillin, Tazobactam, and Moxifloxacin, followed with Ceftriaxone, Amikacin, Vancomycin, Cefoperazone Sodium, and Sulbactam Sodium, and then a combination of Imipenem, cilastatin, and Linezolid). A diagnosis of hypersensitivity pneumonitis was considered during hospitalization, and patient was hence treated with two cycles of 40 mg of Methylprednisolone intravenous injection. Patient then received oral administration of the drug for 6 and then 10 days, each with no response. His condition showed no improvement after 62 days of treatment.

The patient was subsequently transferred to hospital B for additional treatment on March 8, 2016, and was diagnosed there with a bronchial talaromyces marneffei infection and treated with antifungal drugs; however, his condition worsened with repeated fever and body lymphadenopathy, as well as persistent elevation of WBC and CRP levels, indicating a disseminated bodily infection. The patient returned to hospital A on April 2, 2016 for continuing antifungal treatment after receiving treatment in hospital B for 29 days. By this point, he additionally developed low red blood cell count (RBC) (2.82 x 10^{12}/L), hemoglobin (75 g/L), and albumin (34.7 g/L); high serum urea (12.80 mmol/L), creatinine (225 μmol/L), cystatin C (2.27 mg/L), alkaline phosphatase (206.0 U/L), gamma-glutamyl transferase (116.0 IU/L), globulin (36.8 g/L), and high urine β2-microglobulin (12.40 mg/L) levels indicating dysfunction of hematopoiesis, liver, and kidneys.

A biopsy and culture of the inguinal lymph node were performed, and mycobacteria were identified by morphological examination that was further confirmed by MALDI-TOF Mass Spectrometry (Bruker Daltonik, Bremen, Germany) analysis on December 1, 2016. Patient was finally treated with a combination of anti-mycobacteria antibiotics Cephalosporine, Caramycin, Amikacin, and Moxifloxacin. His condition gradually improved, and he was discharged on March 29, 2017. The total days of hospitalization for treatment were 453.

DISCUSSIONS AND CONCLUSION

NTM caused chronic pulmonary infection can be easily misdiagnosed in clinical practice. The diagnostic criteria include patient manifestations, chest imaging results, and microbiological inspections to characterize mycobacteria from quality respiratory samples, which would help avoid lengthy, costly management and poor prognosis [1-4]. Bacterial culture is still a routine method for identifying NTM in laboratory practice. The MALDI-TOF Mass Spectrometry analysis is also a plus in confirming the species [5,6]. Because of the slow growth of most pathogenic mycobacteria, nucleic acid amplification assays are also excellent tools for direct identification in clinical specimens, of which, the multiplex real-time PCR assay was demonstrated to be especially useful and efficient in directly detecting multi mycobacterial species in clinical specimens [7,8]. In this case, a culture was missed when performing the lung biopsy for pathologic diagnosis on January 22, 2016 in hospital A. Thus, the diagnosis of bronchial talaromyces marneffei infection in hospital B was evidence insufficient, leading to mistreatment. The patient was properly diagnosed in the end via culturing of lymph node biopsy, further confirmed by MALDI-TOF Mass Spectrometry. He was then discharged from hospital with condition signifi-

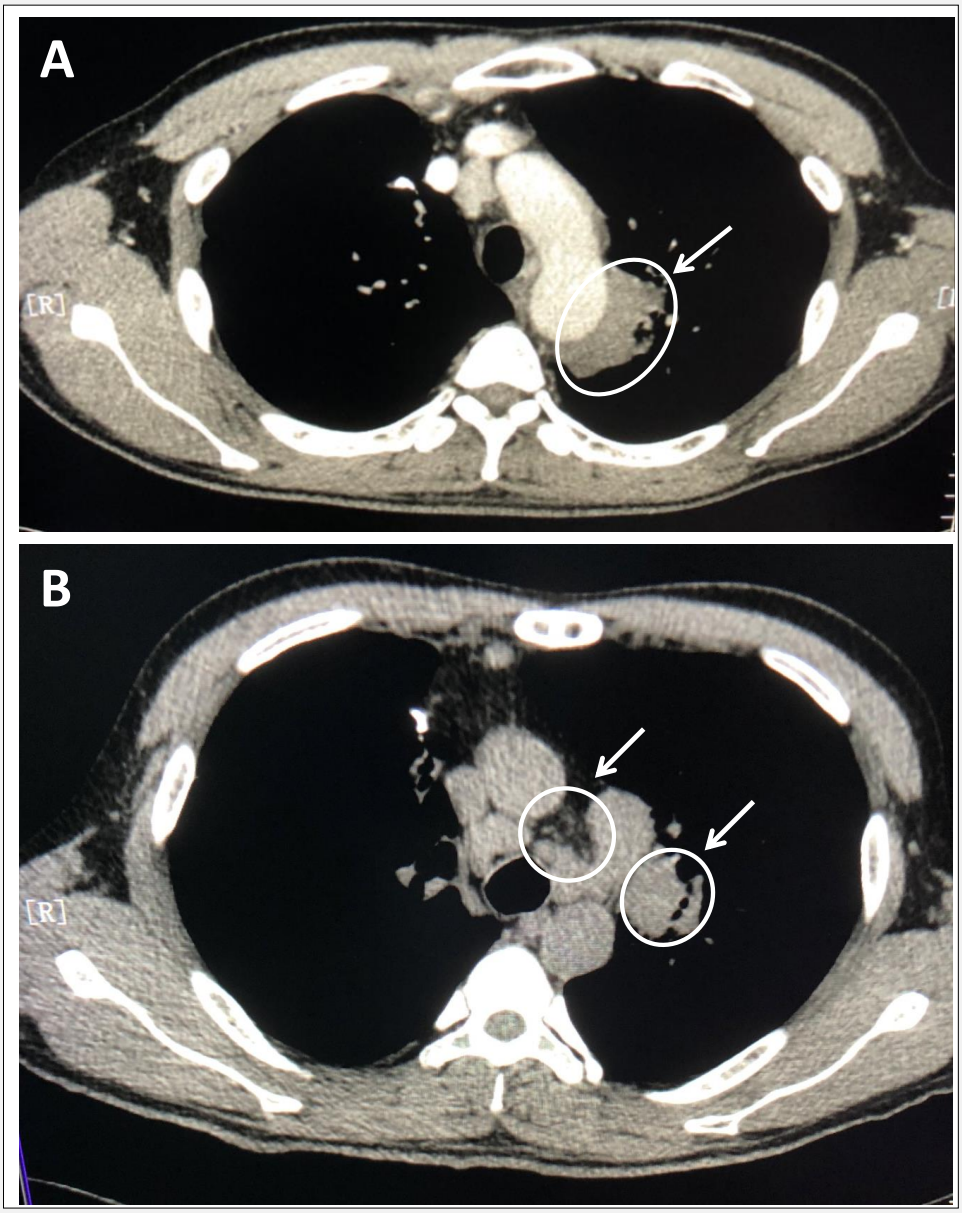

Figure 1. Computed tomography images of the chest.

A - the upper lobe of the left lung space-occupying lesion (arrow pointed). B - enlarged mediastinal lymph nodes (upper left, arrow pointed), and hilus of the left lung showing a space-occupying lesion (lower right, arrow pointed).

cantly improved and with continuing medication at home under doctor's prescription.

Ethics Approval and Consent to Participate:
The Institute Review Board of Guangxi Nationalities Hospital approved this report for the use of patient's medical data. A written informed consent to publish this information was obtained from the patient.

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Declaration of Interest:
The authors have no conflict of interest to declare.

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