

74185\_Auto\_Edited.docx

**Name of Journal:** *World Journal of Clinical Cases*

**Manuscript NO:** 74185

**Manuscript Type:** CASE REPORT

**Catheter-related infections caused by *Mycobacterium abscessus* in a patient with motor neurone disease: a case report**

Catheter-related infections caused by *M. abscessus*

Su-Fei Pan, Yuan-Yuan Zhang, Xiao-Zhen Wang, Jing-Jing Sun, Shao-Ling Song, Yu-Rong Tang, Ji-Liang Wang

## Abstract

### BACKGROUND

*Mycobacterium abscessus* (*M. abscessus*) is a rapidly growing mycobacterium and ubiquitous in the environment, which infrequently causes disease in humans. However, it can cause cutaneous or respiratory infections among immunocompromised hosts. Due to the resistance to most antibiotics, the pathogen is formidable and difficult-to-treat.

### CASE SUMMARY

Here, we present a case of catheter-related *M. abscessus* infections in a patient with motor neurone disease. Catheter and peripheral blood cultures of the patient showed positive results during Gram staining and acid-fast staining. The alarm time of catheter blood culture was 10.6 h earlier than that of peripheral blood. After removal of the peripherally inserted central catheter, secretion and catheter blood culture were positive. *M. abscessus* was identified by matrix-assisted laser desorption ionization-time of flight mass spectrometry and 16S rDNA sequencing.

### CONCLUSION

For catheter-related *M. abscessus* infection, rapid diagnosis and timely and adequate antimicrobial therapy are crucial.

**Key Words:** case report; catheter-related infections; diagnosis; motor neurone disease; *Mycobacterium abscessus*.

Pan SF, Zhang YY, Wang XZ, Sun JJ, Song SL, Tang YR, Wang JL. Catheter-related infections caused by *Mycobacterium abscessus* in a patient with motor neurone disease: a case report. *World J Clin Cases* 2022; In press

**Core Tip:** *Mycobacterium abscessus* (*M. abscessus*) is a rapidly growing mycobacterium and ubiquitous in the environment, which infrequently causes disease in humans. However, it can cause cutaneous or respiratory infections among immunocompromised hosts. Due to the resistance to most antibiotics, the pathogen is formidable and difficult-to-treat. Here, we present a case of catheter-related *M. abscessus* infections in a patient with motor neurone disease. *M. abscessus* was identified by matrix-assisted laser desorption ionization-time of flight mass spectrometry and 16S rDNA sequencing. For catheter-related *M. abscessus* infection, rapid diagnosis and timely and adequate antimicrobial therapy are crucial.

## **INTRODUCTION**

*Mycobacterium abscessus* (*M. abscessus*) is a rapidly growing non-tuberculous mycobacteria and ubiquitous in the environment [1]. Recent gene sequence analysis has showed that *M. abscessus* can be divided into three different subspecies (*M. abscessus* subsp. *bolletii*, *M. abscessus* subsp. *abscessus*, and *M. abscessus* subsp. *massiliense*) [2]. *M. abscessus* can cause a variety of clinical manifestations including cutaneous infections, catheter-related infections, post-surgical soft tissue infections, and respiratory diseases [3]. Besides, the incidence of pulmonary non-tuberculous mycobacteria infection has been increasing [4]. Of all the rapidly growing mycobacteria, *M. abscessus* is the most common cause of pulmonary infections. *M. abscessus* is also one of the mycobacteria that are most often isolated from patients with cystic fibrosis [5]. However, *M. abscessus* is resistant to most antibiotics in vitro, and thus is a formidable and difficult-to-treat pathogen [6]. At present, little is known regarding the diagnosis and management of catheter-related *M. abscessus* infections due to only limited numbers of cases have been reported [7,8]. Here, we present a case of catheter-related *M. abscessus* infections in a patient with motor neurone disease.

## **CASE PRESENTATION**

### ***Chief complaints***

In February 6, a 62-year-old Chinese man presented with mild skin edema at the site of peripherally inserted central venous catheter (PICC, median cubital vein) which had been inserted for 30 days, without skin redness and inflammatory exudation.

### *History of present illness*

He presented with a two-day history of dyspnea and was admitted to our emergency intensive care unit with a diagnosis of motor neurone disease in January 7, 2019. The patient received comprehensive symptomatic treatment including invasive ventilator assisted ventilation, pulse oxygen saturation measurement, expectorant, and nutritional supplement.

1

### *History of past illness*

There was no history of past illness.

### *Personal and family history*

There was no personal and family history.

### *Physical examination*

Physical examination revealed that he was stuporous with a Glasgow coma scale of E1VTM1. His body temperature was 35.0°C, heart rate 66 beats per minute, blood pressure 90/54 mmHg, and respiratory rate 23 breaths per minute.

### *Laboratory examinations*

Routine blood tests revealed  $3.7 \times 10^9$  cells/L white blood cells (reference range,  $4.0$ – $10.0 \times 10^9$  cells/L) and 67.2% neutrophils (reference range, 40–75%). Catheter and peripheral blood cultures were performed in February 10. In February 11, he presented with elevated body temperature (37.1°C), white blood cells ( $10.2 \times 10^9$  cells/L) and neutrophils (86.7%). The serum procalcitonin and C-reactive protein levels was 0.99 ng/mL (reference range, 0–0.05 ng/mL) and 184.9 mg/L (reference range, 0–5 mg/L),

respectively. The patient began to receive anti-infective treatment with vancomycin. In February 19, the blood culture showed positive results during Gram staining (**Figure 1A**) and acid-fast staining (**Figure 1B**). The alarm time of catheter blood culture was 10.6 h earlier than that of peripheral blood culture. Treatment regimen of the patient was changed to combination therapy with vancomycin and amikacin.

In February 23, repeat blood cultures showed positive acid-fast bacilli, and the treatment regimen was adjusted to amikacin plus clarithromycin. On the second day, his body temperature was 35.3°C, heart rate 74 beats per minute, white blood cells  $7.4 \times 10^9$  cells/L, and neutrophils 77.6%. After removal of the PICC in March 11, secretion culture and catheter blood culture were all positive. The blood culture isolate was identified as *M. abscessus* by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) (**Figure 2A**) and 16S rDNA sequencing (**Figure 2B**).

#### *Imaging examinations*

None

#### **FINAL DIAGNOSIS**

The patient was finally diagnosed with catheter-related infections caused by *M. abscessus*.

#### **TREATMENT**

He continued to receive anti-infective treatment with amikacin plus clarithromycin.

#### **OUTCOME AND FOLLOW-UP**

His body temperature was maintained at a basic level (35°C-36.3°C). Unfortunately, the patient gave up treatment due to unsatisfactory response to respiratory failure and shock, and was discharged in April 13.

## DISCUSSION

*M. abscessus* was a terrible and difficult-to-treat mycobacterial pathogen, which is resistant to most antibiotics in vitro [9]. It was ubiquitous in the environment including soil, water, and dust, and survived extreme temperatures and nutritional deprivation [10]. It can cause soft tissue and skin infections after surgical procedures or trauma, pulmonary infections and disseminated diseases among immunocompromised hosts [11]. Infections in immunocompetent patients tend to be more localized, and usually due to contamination of wounds or abrasions with soil, water, dust, or other materials [12]. While, infections in immunosuppressed patients are often deeper and more diffuse, involving subcutaneous tissue, and leading to formation of abscess. Catheter-related infections often occurred in the setting of central venous access devices [13]. In present study, we present a case of catheter-related *M. abscessus* infections in a patient with motor neurone disease.

Catheter-related bloodstream infection (CRBSI) is the most common complication associated with the use of intravascular catheters [14]. Our patient was a 62-year-old man with motor neurone disease. He had been treated in our hospital for many times due to respiratory failure, shock and electrolyte disorder. During the hospitalization, the patient used PICC for blood controls, which was high risk factor for CRBSI. No other obvious source of bloodstream infection was found, except for PICC. He presented with fever, and mild skin edema at the site of PICC. Routine blood tests revealed elevated white blood cells and neutrophils, procalcitonin and C-reactive protein. Catheter and peripheral blood cultures of the patient showed positive results during Gram staining and acid-fast staining. The alarm time of catheter blood culture was 10.6 h earlier than that of peripheral blood. He was diagnosed with catheter-related infections. Gram positive cocci (such as staphylococcus epidermidis, staphylococcus aureus and enterococcus) have been historically the leading cause of CRBSI [15]. Catheter-related *M. abscessus* infection is relatively rare, with limited literature reports [7,8]. In present study, *M. abscessus* was identified by matrix-assisted laser desorption ionization-time of flight



mass spectrometry and 16S rDNA sequencing. The patient was finally diagnosed with catheter-related infections caused by *M. abscessus*.

The main threat of *M. abscessus* is its antibiotic resistance. *M. abscessus* may be the most resistant species among pathogenic rapidly growing mycobacteria, and its antimicrobial therapy is still a challenge [8]. Previous study showed that the treatment strategy of *M. abscessus* infections was the combination of multiple antibiotics, including amikacin, ofloxacin, ciprofloxacin, clarithromycin, and doxycycline [16]. In vitro studies showed that clarithromycin was the most effective of these antibiotics [17]. In present study, the patient received anti-infective treatment with amikacin plus clarithromycin. In addition, 5 in the case of catheter-related *M. abscessus* infections, removal of the catheter is necessary due to the high incidence of relapsing or uncontrolled bacteremia [8]. After removal of the PICC of our patient, he continued to receive anti-infective treatment with amikacin plus clarithromycin, and his body temperature was maintained at a basic level (35°C-36.3°C). Unfortunately, the patient gave up treatment due to unsatisfactory response to respiratory failure and shock, so the long-term treatment results were not obtained.

## CONCLUSION

In conclusion, we reported a case of catheter-related *M. abscessus* infections in a patient with motor neurone disease. For catheter-related *M. abscessus* infection, rapid diagnosis, and timely and adequate antimicrobial therapy are crucial.



# 12%

SIMILARITY INDEX

### PRIMARY SOURCES

- |          |   |               |
|----------|---|---------------|
| <b>1</b> | <a href="http://www.wjgnet.com">www.wjgnet.com</a><br><small>Internet</small>   | 39 words — 2% |
| <hr/>    |   |               |
| <b>2</b> | <a href="http://www.pubfacts.com">www.pubfacts.com</a><br><small>Internet</small>   | 30 words — 2% |
| <hr/>    |   |               |
| <b>3</b> | <a href="#">Nakanaga, K., T. Sekizuka, H. Fukano, Y. Sakakibara, F. Takeuchi, S. Wada, N. Ishii, M. Makino, M. Kuroda, and Y. Hoshino. "Discrimination of Mycobacterium abscessus subsp. massiliense from Mycobacterium abscessus subsp. abscessus in Clinical Isolates by Multiplex PCR", Journal of Clinical Microbiology, 2014.</a><br><small>Crossref</small> | 18 words — 1% |
| <hr/>    |   |               |
| <b>4</b> | <a href="http://pesquisa.bvsalud.org">pesquisa.bvsalud.org</a><br><small>Internet</small>   | 18 words — 1% |
| <hr/>    |   |               |
| <b>5</b> | <a href="http://www.ncbi.nlm.nih.gov">www.ncbi.nlm.nih.gov</a><br><small>Internet</small>   | 17 words — 1% |
| <hr/>    |   |               |
| <b>6</b> | <a href="#">Sayaka Fukuda, Mio Kaneta, Mayuko Miyake, Takashi Ohya, Kei Miyakawa, Mari Iwamoto, Shuichi Ito. "A case of multisystem inflammatory syndrome in children in a Japanese boy: with discussion of cytokine profile", Modern Rheumatology Case Reports, 2021</a><br><small>Crossref</small>  | 16 words — 1% |
| <hr/>    |   |               |
| <b>7</b> | <a href="http://f6publishing.blob.core.windows.net">f6publishing.blob.core.windows.net</a><br><small>Internet</small>   |               |

14 words — 1%

8 Choi, G.-E., K.-N. Min, C.-J. Won, K. Jeon, S. J. Shin, and W.-J. Koh. "Activities of Moxifloxacin in Combination with Macrolides against Clinical Isolates of Mycobacterium abscessus and Mycobacterium massiliense", Antimicrobial Agents and Chemotherapy, 2012.

13 words — 1%

Crossref

9 Hebing Guo, Jianbo Tan, Yongchao Cui, Haofeng Xiong et al. "Case Report: Extracorporeal Membrane Oxygenation In Curing A Young Man Post-Operative of The Modified Fontan Operation", Research Square Platform LLC, 2021

13 words — 1%

Crossref Posted Content

10 Wen-Juan Guo, Wei-Yun Chen, Xue-Rong Yu, Le Shen, Yu-Guang Huang. "Intraoperative thromboelastography-guided transfusion in a patient with factor XI deficiency: A case report", World Journal of Clinical Cases, 2022

12 words — 1%

Crossref

EXCLUDE QUOTES ON

EXCLUDE MATCHES

< 12 WORDS

EXCLUDE BIBLIOGRAPHY ON