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CORRESPONDENCE

Empyema thoracis due to *Nocardia otitidiscaviarum*



Dear Editor

We read with interest the article on pulmonary nocardiosis in southern Taiwan by Chen et al.¹ In their study, eight of the 20 patients with pulmonary nocardiosis had pleural effusion and three of these patients had empyema thoraces. Among these three nocardial empyema cases, the authors reported a 61-year-old man with diabetes mellitus and chronic liver disease suffering from an acute course of empyema caused by *Nocardia otitidiscaviarum*.¹ *N. otitidiscaviarum* is a rare pathogen among nocardial infections and pulmonary nocardiosis.^{2,3} We herein present another case of *N. otitidiscaviarum* empyema after a short course of corticosteroid for inflammatory arthritis.

A 42-year-old man with alcoholic liver cirrhosis, Child–Turcotte–Pugh score B, presented with esophageal varices bleeding initially. On the 8th day after admission, a 5-day course of corticosteroid with hydrocortisone (100 mg intravenously every 12 hours; equivalent dose = 50 mg prednisolone/day) was prescribed for inflammatory arthritis of bilateral knees. The dose of corticosteroid was then tapered to 20-mg prednisolone daily. On the 15th day, fever with shaking chills and purulent cough were noted. The chest X-ray revealed right lower lobe infiltrate, and within a day the right pleural effusion developed rapidly. Results of the pleural effusion study revealed the presence of exudate (pleural effusion/serum protein, 4.0/7.2 g/dL; pleural fluid/lactate dehydrogenase, 915/153 IU/L) with a cell count of 8653/mm³ and a predominance of polymorphic neutrophils (polymorphic neutrophils/monocytes: 87%/13%). No microorganism was identified with Gram staining and acid-fast staining of the pleural effusion. An antibiotic combination of piperacillin–tazobactam and vancomycin was used for treating hospital-acquired pneumonia. The clinical condition deteriorated and the patient was intubated on the 8th day after symptom onset. Because of a poor response to medical therapy, *video-assisted thoracoscopic surgery* (VATS)

decortication was performed on the 13th day after symptom onset. Thirteen days after the operation, the patient was discharged with oral ciprofloxacin; however, the right pleural effusion was still noted before discharge. Pus formation from the previous operation wound was noted 7 days after discharge. Another chest X-ray was performed, which revealed persistent right pleural effusion. A second VATS decortication was performed and the pleural effusion culture grew *Nocardia* spp. Therefore, we changed the antibiotic regimen to meropenem, trimethoprim–sulfamethoxazole (TMP–SMZ), and amikacin. After an 11-day combination therapy, we continued another 5-month course of the oral form of TMP–SMZ and the patient recovered uneventfully. There was no recurrence after 24 months of follow up. This isolate was further identified as *N. otitidiscaviarum* by 16S ribosomal RNA gene sequencing. The details of this method were described previously.²

N. otitidiscaviarum is a rare species among nocardial infections. In a multicenter study in Taiwan from 1998 to 2009, 5.7% of 138 clinical *Nocardia* species isolated were *N. otitidiscaviarum*.³ In the United States, *N. otitidiscaviarum* accounted for 4.44% of all *Nocardia* isolates (34/765) submitted to the Centers for Disease Control and Prevention for antimicrobial susceptibility testing.⁴ To our knowledge, only two other cases with *N. otitidiscaviarum* empyema have been reported in the English literature (Table 1). The mortality rate was 50% among these four cases. These two cases had long-term use of corticosteroid for their underlying diseases. Our patient developed acute empyema after a short course of corticosteroid for inflammatory arthritis. The empyema did not resolve well after the first VATS and relapsed under ciprofloxacin use. According to Lai and Hsueh,² among seven *N. otitidiscaviarum* isolates in Taiwan, the resistance rates of amikacin, ciprofloxacin, imipenem, and TMP–SMZ were 0%, 43%, 100%, and 0%, respectively. This result was similar to that reported by Uhde et al⁴ except for the susceptibility of TMP–SMZ. The

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Table 1 *Nocardia otitidiscaviarum* empyema in the English literature

Author/reference	Age (y)	Sex	Underlying diseases	Steroid use ^a	Clinical course	Other site involved	Treatment/antibiogram ^b	Outcome
Present case	42	Male	CLD	Short term	Acute	None	Meropenem, amikacin, TMP-SMZ → TMP-SMZ/NA	Survived
Chen et al ¹	61	Male	CLD, DM	Nil	Acute	None	NA/NA	Died
Yoshida et al ⁵	69	Female	Rheumatoid vasculitis	Long term	Acute	None	Imipenem, minocycline, TMP-SMZ → levofloxacin, gentamycin, TMP-SMZ/LVFX, GM	Survived
Pelaez et al ⁷	85	Female	COPD	Long term	NA	Brain abscess	Imipenem, TMP-SMZ → TMP-SMZ, linezolid/IPM, LND, TMP-SMZ, GM, AMK, CIP	Died

AMK = amikacin; CIP = ciprofloxacin; CLD = chronic liver disease; COPD = chronic obstructive pulmonary disease; DM = diabetes mellitus; GM = gentamicin; IPM = imipenem; LND = linezolid; LVFX = levofloxacin; NA = not mentioned; TMP-SMZ = trimethoprim-sulfamethoxazole.

^a Long term: steroid use for at least 2 weeks.

^b Antibiograms are expressed as the antimicrobial susceptible profiles.

resistance rate of TMP-SMZ is high (42%) in the United States.⁴ This may explain why our case had breakthrough empyema under oral ciprofloxacin use. The isolate reported by Yoshida et al⁵ was also nonsusceptible to imipenem and TMP-SMZ. An empirical multiple drug regimen is suggested in transplant patients with critical condition, disseminated nocardiosis, or central venous system involvement.⁶ At first, three drugs in combination were used in our case due to the rapid progression of empyema thoracis and the critical condition of the patient. Once the patient became stable, the antimicrobial therapy was shifted to monotherapy with TMP-SMZ.

We herein presented a patient who developed *N. otitidiscaviarum* empyema thoracis after a short course of corticosteroid for inflammatory arthritis. It is important to emphasize that the variable antimicrobial resistance may influence the treatment outcome. Species identification and susceptibility testing may be helpful for choosing the appropriate antimicrobial agent for patients with difficult-to-treat nocardiosis.

Conflicts of interest

The authors declare no conflicts of interest.

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