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SCIENTIFIC LETTER

Disseminated nocardiosis caused by *Nocardia asteroides* resistant to trimethoprim-sulfamethoxazole

Nocardiosis diseminada por *Nocardia asteroides* resistente a trimetoprim-sulfametoxazol

Nocardiosis is a rare opportunistic infection that predominantly affects immunocompromised patients, but it can also occur in immunocompetent individuals with chronic obstructive pulmonary disease (COPD). Disseminated infection is defined as the involvement of at least two noncontiguous organs or isolated central nervous system (CNS) involvement.[1] Although trimethoprim-sulfamethoxazole (TMP/SMX) is the treatment of choice, resistant strains exist, making empirical management difficult and potentially influencing prognosis.[2] We present the case of a man with disseminated nocardiosis involving the lungs and probable CNS and spinal cord involvement, in whom TMP/SMX resistance was documented.

A 57-year-old man with a past medical history of type 2 diabetes mellitus, hypertension, dyslipidemia, COPD, and cervical and lumbar spondyloarthrosis on chronic corticosteroid therapy for pain exacerbation in recent months, was admitted in December 2024 for bilateral pulmonary thromboembolism. Thoracic computed tomography (CT) revealed the presence of 2 newly developed pseudonodular lesions. A PET-CT scan demonstrated uptake in the left upper lobe lesion, suggestive of an inflammatory–infectious rather than neoplastic origin.

Two months after discharge, he presented to the emergency department (ED) with radiculopathy refractory to conventional analgesia and lower-limb weakness. Neurological examination revealed flaccid paresis of both lower limbs (0/5) and the right upper limb (2/5). Magnetic resonance imaging (MRI) showed multiple space-occupying lesions (12 in total) in infra- and supratentorial regions (Fig. 1), as well as an intramedullary abscess at C5–C6 level (Fig. 2).

During hospitalization, the patient developed impaired consciousness (Glasgow Coma Scale 8) and hypoxemia. Cranial CT was unremarkable, and he was transferred to the intensive care unit (ICU). Due to low consciousness level and refractory hypoxemia despite noninvasive mechanical ventilation (NIMV), orotracheal intubation, lumbar puncture, and bronchoscopy with sample collection were performed. Upon ICU admission, empirical therapy was initiated with TMP/SMX (15 mg/kg/day) and isavuconazole (loading dose 200 mg every 8 h for the first 2 days) given the suspicion of an opportunistic infection in a patient on corticosteroids. Procalcitonin at admission was 0.08 ng/mL. Cerebrospinal fluid (CSF) analysis was normal. A pleuropulmonary nodule biopsy from the left upper lobe was performed on ICU day 1 by interventional radiology. However, the sample was insufficient.

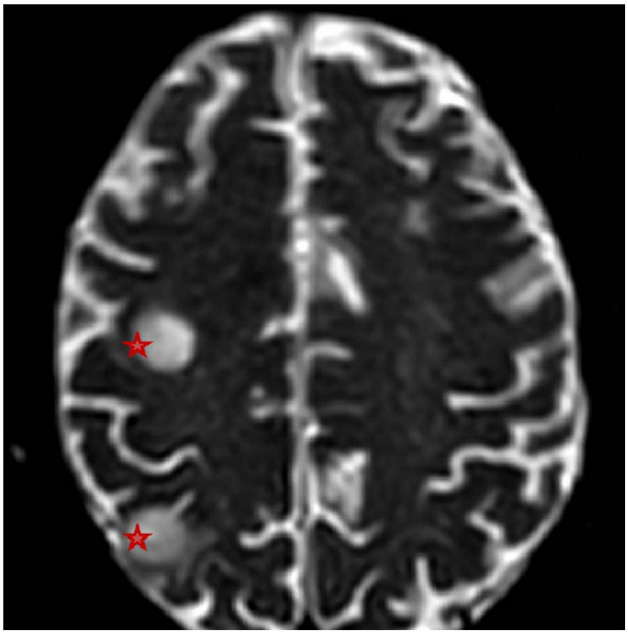

Figure 1 Two right cerebral hemispheric space-occupying lesions.

Two days after bronchoscopy, the microbiology laboratory reported isolation of branched Gram-positive bacilli compatible with Nocardia spp. in bronchoalveolar lavage. Given the diagnosis of disseminated nocardiosis with probable CNS involvement, meropenem 2 g every 8 h was added to the regimen, isavuconazole was discontinued, and TMP/SMX was maintained as combination therapy pending suscep-

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Figure 2 Fusiform collection with peripheral enhancement consistent with an intramedullary abscess extending from the C5 to C6 levels.

tibility testing. Within the first ICU days, the patient experienced myoclonus and seizures, requiring deepened sedoanalgesia and initiation of antiepileptic therapy. Electroencephalography showed diffuse slow electrical activity without epileptiform discharges. Gradually, the patient improved respiratory function and hemodynamic stability, and after withdrawal of sedation, no further seizures occurred.

Twelve days after the preliminary Nocardia spp. result, microbiology identified Nocardia asteroides with susceptibility to meropenem (minimum inhibitory concentration [MIC] 0.5 μg/mL) and ceftriaxone (MIC 0.125 μg/mL), but resistance to TMP/SMX (MIC 8 μg/mL), an uncommon resistance pattern in this species. However, despite this atypical resistance profile, N. asteroides was adequately covered by the previously initiated combination therapy for disseminated nocardiosis. Based on these findings, TMP/SMX was discontinued, and antibiotic therapy was de-escalated from meropenem to ceftriaxone (75 mg/kg/day divided into 2 doses).[3,4]

The patient showed progressive neurological and respiratory improvement, with initiation of physical therapy. Apart from right-dominant tetraparesis due to known myelopathy and critical illness myopathy, no new focal deficits were observed. He was successfully extubated with NIMV support after 17 days of invasive ventilation. After 1 month in the ICU, he was transferred to the general ward for continued functional recovery.

This case underscores the importance of considering nocardiosis in the differential diagnosis of patients on corticosteroid therapy, as well as in immunocompetent patients with COPD presenting with multiple brain lesions. Spinal involvement in the form of an intramedullary abscess is a rare presentation requiring a high index of suspicion. Resistance to TMP/SMX has been documented in several Nocardia species,[5] though it is rare for N. asteroides to exhibit TMP/SMX resistance.[6] Early initiation of combination therapy with at least 2 or 3 antibiotics[7] and prompt microbiological diagnosis are essential for appropriate targeted treatment.

CRediT authorship contribution statement

All authors contributed equally to the writing of this manuscript.

Declaration of Generative AI and AI-assisted technologies in the writing process

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