Pulmonary and cutaneous infection caused by *Nocardi a farcinica* in a patient with nephrotic syndrome

A case report

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Abstract

**Rationale:** Nocardia species is known as conditional pathogenic bacteria. Disseminated infection caused by Nocardia species is rare and occurs primarily in immunosuppressed patients. Signs and symptoms of this infection are frequently nonspecific making early diagnosis and treatment difficult.

**Patient concerns:** We report a case of subcutaneous and pulmonary nocardiosis due to *Nocardia farcinica* (*N. farcinica*) in a patient with nephrotic syndrome who is undergoing long-term corticosteroid therapy. In this patient, systemic and pulmonary symptoms (usually found in nocardia infection) such as fever, cough, and expectoration were absent.

**Diagnoses:** Early diagnosis was made by pus culture from subcutaneous abscesses and 16S rRNA gene sequencing, which confirm the diagnosis of *N farcinica* infection.

**Interventions:** The patient was treated with combination therapy of cefatriaxone and trimethoprim-sulfamethoxazole (TMP-SMX) for 2 weeks, and the treatment with TMP-SMX continued to 6 months.

**Outcomes:** The abscesses were cured in 4 weeks and a lesion in the upper lobe of left lung resolved in 3 months.

**Lessons:** This case indicates that disseminated infection due to *N farcinica* could occur in patients with nephrotic syndrome, even during the period of maintenance therapy with a low-dose corticosteroid and common signs and symptoms of infections could be absent.

**Abbreviations:** *N farcinica* = *Nocardia farcinica*, TMP-SMX = trimethoprim-sulfamethoxazole.

**Keywords:** nephrotic syndrome, *Nocardia farcinica*, pulmonary and cutaneous infection

1. Introduction

Nocardia infections are uncommon and occur mostly in patients receiving immunosuppressive therapy, organ transplant recipients, or patients infected with human immunodeficiency virus (HIV).<sup>[1–3]</sup> Recognition of clinical isolates is vital because Nocardia species differ in the clinical spectrum of the disease they can cause and their susceptibility to antimicrobial agents.<sup>[4]</sup> Patients with nephrotic syndrome are at a high risk of infections, for example, Cryptococcus,<sup>[5]</sup> cytomegalovirus,<sup>[6]</sup> toxoplasmosis,<sup>[7]</sup> often augmented by the need for immunosuppressive therapy. Here, we present an unusual case of *Nocardia farcinica* in a patient with nephrotic syndrome on long-term corticosteroid therapy.

1.1. Case presentation

This case report has been approved by the ethics committee of Wenzhou People’s Hospital. A 60-year-old man was admitted to Wenzhou People’s Hospital with a 1-week history of a subcutaneous abscess on his left lower limb. He reported no constitutional symptoms or cough and had not incurred any trauma to his leg. On admission, the patient was tachycardic but not in septic shock and had a normal systems examination. The largest subcutaneous abscess on his left lower limb was 9 cm x 10 cm and was warm and tender with intact overlying skin. He later developed further abscesses on his buttock, which were 3 cm x 3 cm in diameter.

The patient had a background history of idiopathic membranous nephropathy diagnosed on renal 14 months before admission. He was initially treated with oral methylprednisolone and Tacrolimus and achieved a complete remission. However, he later relapsed and was treated with intravenous (IV) methylprednisolone and oral Tacrolimus. Due to a lack of clinical response cyclophosphamide, he was started on oral Cyclophosphamide with an accumulated dosage of approximately 8 g. Subsequently,
and organic matter. After inhalation or percutaneous inoculation, can be found worldwide in water, soil, dust, decaying vegetation, and organic matter. After inhalation or percutaneous inoculation, Nocardiae are common in the environment and 16S rRNA gene sequencing, are necessary for diagnosis.

The abscesses were drained and the patient was empirically treated with IV penicillin and oral trimethoprim-sulfamethoxazole (TMP-SMX). Culture subsequently yielded Nocardia, later identified as N farcinica on rRNA gene sequencing (Figure 2). Combination therapy of IV cefatriaxone (2g/day) and oral TMP-SMX (1.92g/d) was used according to drug sensitivity. The patient’s inflammatory markers and clinical state improved and inflammatory nodule in the upper lobe of left lung (Figure 1A). Ultrasound of abscesses revealed subcutaneous anechoic lesions. Blood cultures were sterile.

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2. Discussion

Nocardia farcinica is a gram-positive, partially acid-fast, methenamine silver-positive aerobic actinomycete. The genus-Nocardia contains more than 100 species that have been identified by phenotypic and molecular methods and 16S RNA gene sequencing. Nocardiae are common in the environment and can be found worldwide in water, soil, dust, decaying vegetation, and organic matter. After inhalation or percutaneous inoculation, particularly in immunocompromised hosts, Nocardia can induce multisystem infections that can be life-threatening. 

N farcinica is characterized by higher pathogenicity and also known to be resistant to multiple antibiotics. Timely diagnosis of the infection is important, as appropriate treatment can be lifesaving.

On the whole, early diagnosis of N farcinica infections remain challenging and treatment is often empiric. This patient’s clinical presentation was atypical. This may be explained by long-term corticosteroid therapy masking the symptoms and signs of infection. Because of the absence of history of percutaneous inoculation, it was assumed that the patient may have had inhaled N farcinica initially with dissemination to the skin. The patient’s blood cultures were negative, which is consistent with literature, as blood cultures for patients with Nocardia infection are rarely positive. Therefore, other tests, in this case the pus culture and gene sequencing, are necessary for diagnosis.

Standard treatment for this infection includes Ceftriaxone, Cefotaxime and, more commonly, TMP-SMX. Sulfonamides have been extensively used, with good outcomes; however, some strains of Nocardia, including N farcinica, may be resistant. Although the duration of therapy required remains controversial, reports in the literature recommend 6 months to 1 year in disseminated Nocardiosis. In our case, the patient received the treatment of TMP-SMX for 6 months and was completely cured.

In conclusion, this is the first report of pulmonary and cutaneous infection caused by N farcinica in a patient with nephrotic syndrome. Our case highlights that even on maintenance immunosuppression, patients can develop opportunistic infections such as Nocardia and can present atypically. Early diagnosis and treatment is the key to curing such patients, which may also avoid prolonged antimicrobial therapy.

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