INTRODUCTION

Nocardia are aerobic, gram positive, partially acid fast filamentous bacteria and are found as saprophytic organisms in soil. N. asteroides is the main pathogenic organism for primary cutaneous infection.1

Cutaneous nocardiosis presents either as a part of disseminated infection or as a primary infection resulting from inoculation into the skin. Primary Cutaneous Nocardiosis (PCN) is an uncommon disease. It is usually seen in immunocompetent patients.2 PCN comprises 5% of all cases of nocardiosis,3 and is most commonly caused by Nocardia asteroides and Nocardia brasiliensis.

This report describes an unusual case of PCN.

CASE REPORT

An 88 years old man presented with a 3-day history of red painful skin lesions on his forehead. Three days before he visited our outpatient department, he had developed grain-sized red papules on the left side of his forehead, and these had progressed to superficial pustules with tenderness and localized swelling. He was initially diagnosed with Herpes zoster. However, after treatment with antiviral drugs for 3 days, the skin lesions did not improve but rather enlarged. The patient reported that he was retired from his profession and fond of gardening, but denied any history of insect bites, trauma or infections. He was otherwise healthy, and had no relevant family or medical history.

The patient was generally in good physical condition with no significant cardiac, pulmonary or abdominal symptoms or signs. A physical examination revealed no lymphadenopathy, and respiratory and neurological examinations showed no abnormalities. He had 1 x 1 mm red papulovesicles with yellow secretions on the left side of the forehead with marked tenderness and swelling (Figure 1A). His white blood cell count was 12.6 x 10^9/l, and hemoglobin level was 134 g/l. Liver-function and kidney-function tests yielded normal results. A cerebral computed tomography scan and chest radiograph were also normal. No immunosuppression was identified; he had normal serum protein electrophoresis and immunoglobulin values, and tested negative for human immunodeficiency virus 1 and 2. Direct smears showed gram-positive, acid-fast, beaded, branching filaments (Figure 1C). White friable rough colonies grew on blood agar after 48 hours of incubation at 37°C (Figure 1D). The results of biochemical reactions were as follows: gelatin liquefaction, negative; 0.4% gelatin solution, negative; milk peptonization,
negative; casein hydrolysis, negative; tyrosine decomposition, negative; xanthine decomposition, negative; and 8-hour activity test at 50°C, positive. A culture of pus samples was identified as *N. asteroides*. Susceptibility tests showed that the organism was sensitive to cotrimoxazole.

Based on these findings, a diagnosis of PCN was established. The patient was treated with oral cotrimoxazole tablets (sulfamethoxazole, 800 mg + trimethoprim, 160 mg), two tablets at a time, administered twice daily. The clinical response was good. Antibiotic treatment for 2 weeks completely resolved the lesions on his forehead, and these have not recurred for 2 years now (Figure 1B).

**DISCUSSION**

More than 80 species of *Nocardia* causing different types of human infections have been identified. The important pathogenic species are *N. asteroides*, *N. braziliensis*, *N. caviae*, *N. nova* and *N. abscessus*. The normal habitat of *Nocardia* is soil and, therefore, *Nocardia* infections are usually caused by trauma and contamination with soil.4

PCN is a rare clinical entity.5 In China, few cases of *Nocardia* infections have been reported. PCN typically occurs in immunocompetent hosts following a local trauma caused predominantly by plants or a wound contaminated by soil. Farming and vehicle accidents resulting in abrasions have also been reported in the literature as risk factors for PCN.6,7

Cutaneous *Nocardia* infections can be classified into the following three types: (a) superficial skin infection (cellulitic and sporotrichoid forms), (b) disseminated disease (most commonly secondary to pulmonary involvement) and (c) mycetoma caused by *Nocardia*.6 Deep inoculation in subcutaneous tissue leads to mycetoma formation, whereas superficial inoculation results in pustules or abscess formation. Occasionally, from the primary pustular lesion formed at the site of inoculation, the infection spreads through the lymphatics, resulting in the lymphocutaneous form.

Superficial skin infections manifest as nodular-pustular lesions that may progress in a sporotrichoid fashion or lead to cellulitis, ulcerative/bullous lesions, linear/keloid-like lesions, granulomas and abscesses.8 This patient had PCN with the classical features of superficial skin infection: he was immunocompetent and had red papulovesicles with yellow secretions on the left side of the forehead, with marked tenderness and swelling.

Nocardiosis is often misdiagnosed because of its rarity and non-specific clinical picture.9 This patient was initially misdiagnosed with *Herpes zoster*, because of the unilateral distribution of the papulovesicles and the presence of pain. However, since he responded poorly to antiviral therapy, we cultured pus samples and identified *N. asteroides*. The differential diagnosis of acute PCN includes *Staphylococcus aureus* induced pyoderma and infections with organisms such as non-tuberculous mycobacteria and leishmania, which typically cause a sporotrichoid pattern of skin infection.9 Appropriate staining and culture examinations are required to identify the organism responsible, and ensure appropriate therapy.

Treatment should be offered to all patients with *Nocardia* infection, including immunocompetent patients with localized cutaneous disease. Likewise, susceptibility tests must be conducted in all patients. The treatment of choice remains trimethoprim-sulfamethoxazole. Alternative drugs are amikacin, minocycline, imipenem, third-generation cephalosporins and linezolid. The duration of therapy depends on clinical factors, including immunosuppression, and type and location of the infection. This patient was treated with oral cotrimoxazole tablets (sulfamethoxazole, 800 mg + trimethoprim, 160 mg), two tablets at a time, administered twice daily. After 2 weeks, the lesion had completely resolved, and has not recurred for 2 years.

In summary, PCN can present in various forms. A high degree of clinical suspicion and the expertise of a microbiologist are required to diagnose PCN and isolate the causative organism.10 Cotrimoxazole is the mainstay of therapy. Increased awareness about nocardiosis and the performance of specific investigations are required to reduce the misdiagnosis of this rare condition.

**REFERENCES**