

## Primary Cutaneous Sporotrichoid Nocardiosis Caused by *Nocardia brasiliensis*

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Nocardiosis is an uncommon infection caused by several species of bacteria belonging to the genus *Nocardia* (N), which are Gram-positive, partly acid-fast, filamentous, and branched bacilli. The infection may be classified into systemic and cutaneous types. Primary cutaneous nocardiosis is usually caused by *N. brasiliensis*, and may present in any one the following ways: 1) mycetoma, 2) lymphocutaneous (sporotrichoid) infection, 3) localized superficial skin infection such as cellulitis, abscess, or granuloma, and 4) disseminated infection with cutaneous involvement. Sporotrichoid nocardiosis usually involves the upper extremities. Sulfamethoxazole is the drug of choice<sup>1–5</sup> to treat this condition. There have been three reported cases of sporotrichoid primary cutaneous nocardiosis in Korean dermatological literature<sup>1–3</sup>.

A 75-year-old male patient presented with painful skin lesions on his left arm of one-week duration. He recalled suffering a minor puncture injury to his hand while he was picking fruit. Examination of the skin revealed multiple erythematous ulcers and nodules on the left hand, forearm, and elbow (Fig. 1A). Abnormal laboratory test results included a total white blood cell (WBC) count of 9,460 cell/ $\mu$ L with 68% neutrophils. No other abnormal findings were revealed on the chest X-ray, electrocardiograph, blood biochemistry, or urine examination. Biopsy of the skin lesions and histopathological examination showed mild perivascular and interstitial infiltrate of lymphocytes and neutrophils (Fig. 2A). Culture of the biopsy material on blood agar and Ogawa medium at

37°C was performed. The cultured organisms appeared as whitish, wrinkled, dry colonies on the blood agar plate after two days of incubation (Fig. 2B), and whitish, wrinkled, heaped up, dry colonies on 3% Ogawa medium at 37°C after five days of incubation (Fig. 2C). Fungal culture was negative. Gram stain of the cultured colonies showed Gram-positive branching bacilli (Fig. 2D). The 16S ribosomal RNA gene sequencing of the clinical isolate was 99% identical to that of *N. brasiliensis* (GenBank accession number NR 041860.1). Following these investigations, the patient was diagnosed with primary sporotrichoid cutaneous nocardiosis caused by *N. brasiliensis*. He received trimethoprim/sulfamethoxazole 160/800 mg twice daily for two months as definitive treatment of his *Nocardia* infection. At his two-month follow up, he was noted to have made a complete recovery (Fig. 1B).

Sporotrichoid infection of nocardiosis can be misdiagnosed as sporotrichosis, cellulitis, and mycobacterial infection. We report the case of a patient with primary sporotrichoid cutaneous nocardiosis which was different from the usual clinical presentation of cutaneous nocardiosis. We have reported this case in order to emphasize and highlight the importance of histological examination, culture (bacterial, fungal, and mycobacterial), and molecular analysis to enable correct diagnosis and treatment in atypical and difficult cases.

**Key Words:** *Nocardia brasiliensis*, Nocardiosis, Sporotrichoid

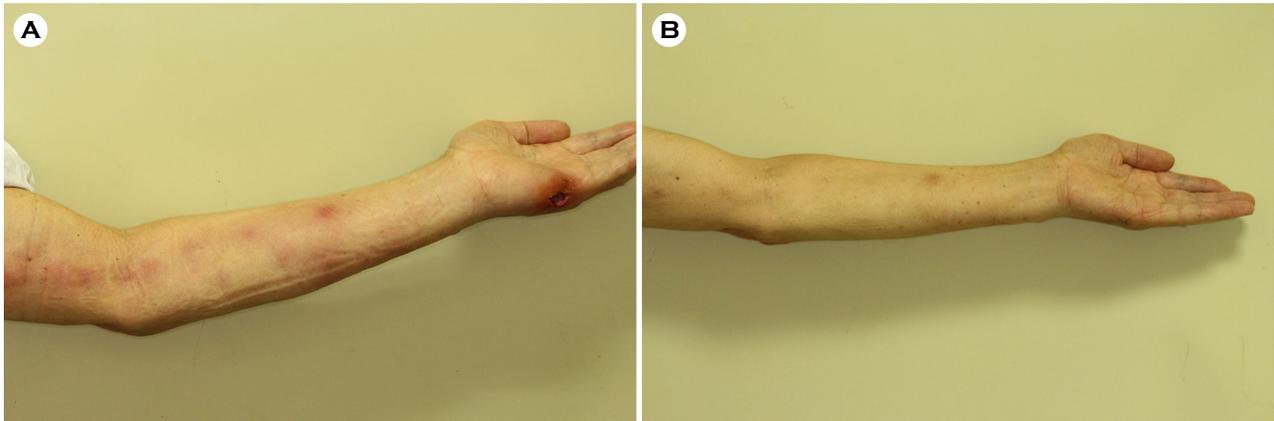
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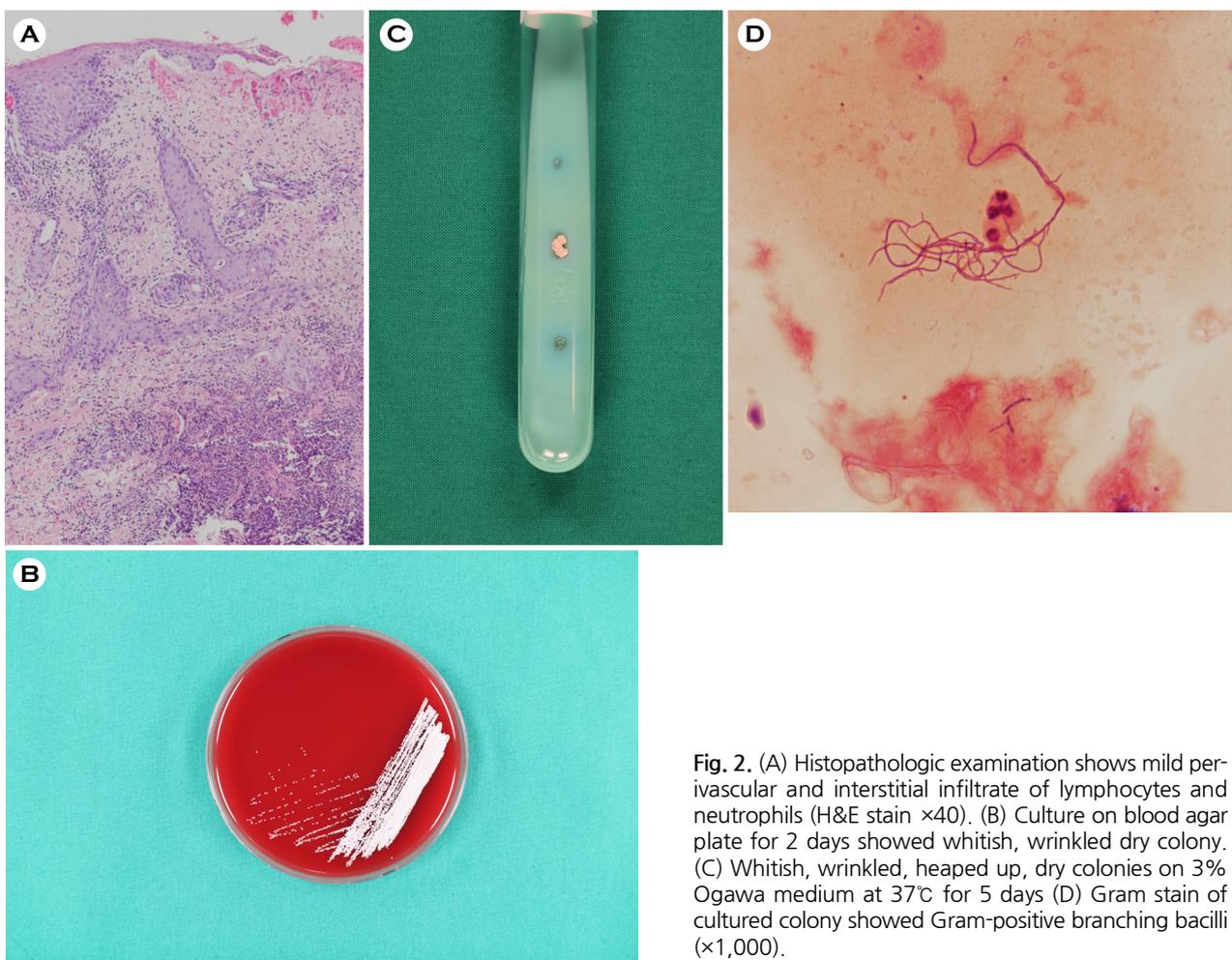
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**Fig. 1.** (A) The patient presented with multiple painful erythematous ulcer and nodules on the left hand, forearm, elbow (B) After 2 months of treatment with trimethoprim/sulfamethoxazole



**Fig. 2.** (A) Histopathologic examination shows mild perivascular and interstitial infiltrate of lymphocytes and neutrophils (H&E stain  $\times 40$ ). (B) Culture on blood agar plate for 2 days showed whitish, wrinkled dry colony. (C) Whitish, wrinkled, heaped up, dry colonies on 3% Ogawa medium at  $37^{\circ}\text{C}$  for 5 days (D) Gram stain of cultured colony showed Gram-positive branching bacilli ( $\times 1,000$ ).

## CONFLICT OF INTEREST

In relation to this article, we declare that there is no conflict of interest.

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## PATIENT CONSENT STATEMENT

The patient provided written informed consent for the publication and the use of his images.

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