

Ascending Erythematous Nodules on the Arm

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A 54-year-old woman called her primary care provider to report a painful pink nodule on the left wrist 1 week after sustaining thorn injuries while weeding in her garden. She started cephalexin and noted a pink streak with additional nodules extending up the arm over the next 2 days. She was admitted to an outside hospital for incision and drainage of the wrist nodule and a 3-day course of intravenous vancomycin. Bacterial culture was negative, and she was discharged on oral clindamycin and doxycycline. Two days later, she presented to our emergency department with pain in the left axilla. Physical examination revealed 3 tender erythematous nodules in a linear distribution on the left arm with crusting at the incision and drainage site and painful left axillary lymphadenopathy. The patient was afebrile and otherwise asymptomatic.

WHAT'S THE DIAGNOSIS?

- leishmaniasis
- primary cutaneous nocardiosis
- Sporothrix schenckii* infection
- staphylococcal abscesses
- streptococcal cellulitis

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The authors report no conflict of interest.

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THE DIAGNOSIS: Primary Cutaneous Nocardiosis

Comprehensive metabolic panel and complete blood cell count were unremarkable; human immunodeficiency virus screening was nonreactive. Punch biopsies were obtained for histopathology, as well as bacterial, fungal, and mycobacterial cultures. Histopathologic examination of a 4-mm punch biopsy of the forearm nodule showed a dermal abscess with neutrophilic infiltration in the dermis (Figure 1). No organisms were seen on Gram, methenamine-silver, periodic acid-Schiff, or acid-fast bacteria stains. Given the clinical suspicion for lymphocutaneous sporotrichosis, the patient was started on itraconazole. She reported modest improvement but subsequently developed a morbilliform eruption necessitating medication discontinuation.

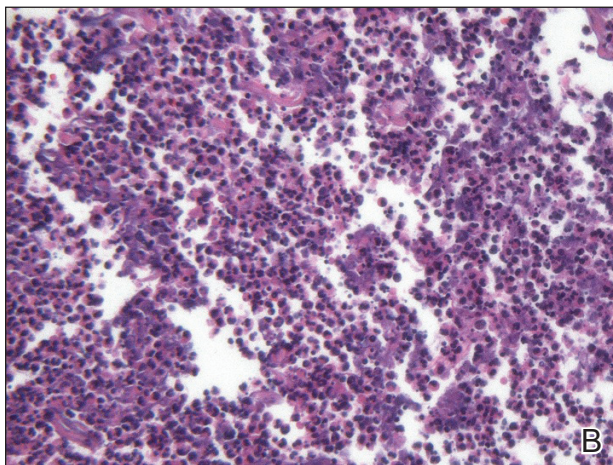
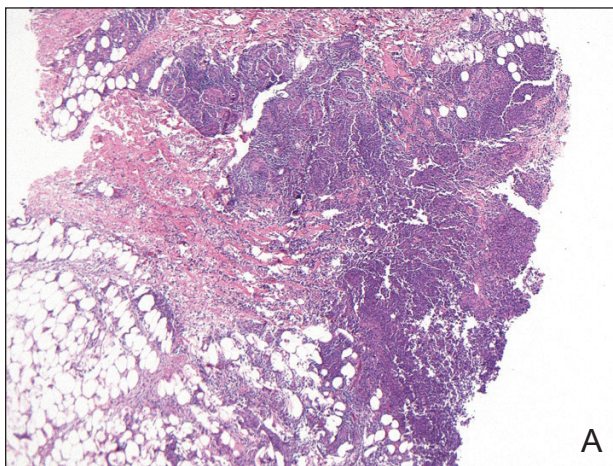


FIGURE 1. A, A dermal abscess with neutrophilic infiltration of the dermis (H&E, original magnification $\times 100$). B, No organisms were visible on higher magnification (H&E, original magnification $\times 400$).

Eighteen days after obtaining the tissue culture, acid-fast organisms grew in culture. These organisms were subcultured on Middlebrook 7H11 agar (Sigma-Aldrich) with growth noted at 30°C and 37°C. Gram stain revealed filamentous gram-variable bacteria (Figure 2) that were identified as *Nocardia brasiliensis* by 16S ribosomal DNA analysis. Given the patient's sulfonamide allergy, she started oral minocycline 100 mg twice daily. She responded to the therapy and subsequent testing confirmed susceptibility.

The genus *Nocardia* consists of more than 50 species of gram-positive, weakly acid-fast, aerobic actinomycetes that can cause primary cutaneous infection via percutaneous inoculation. *Nocardia brasiliensis* is the leading cause (approximately 80% of cases) of primary cutaneous or subcutaneous nocardiosis and is found ubiquitously in soil and decaying vegetation.¹ The clinical presentation varies, rendering definitive diagnosis a challenge without histopathologic and microbiologic testing.² Patients presenting with nocardial cellulitis often are suspected to have *Streptococcus pyogenes* or *Staphylococcus aureus* infections. The differential diagnosis for patients presenting with nocardial nodular lymphangitis, also known as lymphocutaneous syndrome, includes atypical mycobacterial infections, leishmaniasis, and lymphocutaneous sporotrichosis.²

Histologic examination of nocardial nodules typically shows granulomatous or neutrophilic inflammation, and organisms may appear in small collections resembling sulfur granules.² The organism itself is weakly positive on acid-fast stain, and useful stains include acid-fast

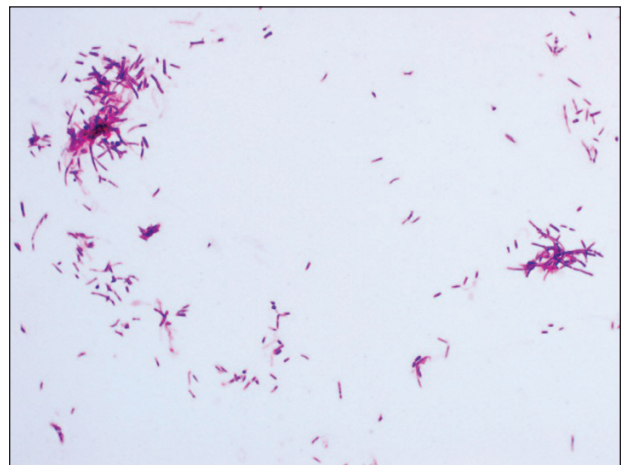


FIGURE 2. Filamentous gram-variable bacteria, later identified as *Nocardia brasiliensis*, isolated from subculture on Gram stain (original magnification $\times 1000$).

bacteria, methenamine silver, and periodic acid–Schiff.² Tissue culture often provides the definitive diagnosis, as the histology is nonspecific and organisms may not be visualized.

Oral trimethoprim-sulfamethoxazole 2.5 to 10 mg/kg and 12.5 to 50 mg/kg, respectively, twice daily is the treatment of choice for primary cutaneous nocardiosis. Minocycline 100 to 200 mg twice daily is an accepted alternative in case of sulfonamide allergy, as in our patient. Antibiotics should be tailored according to the susceptibility profile of the isolated organism.³

This case highlights the importance of forming a broad differential diagnosis for patients presenting with lymphocutaneous syndrome. The incidence and prevalence of *N brasiliensis* infection is difficult to determine due to its nonspecific clinical presentation and a lack of recent epidemiologic studies. Although primary cutaneous nocardiosis in the United States often is diagnosed in the South or Southwest, cases have been reported in other regions.⁴⁻⁶ Traumatic inoculation of

contaminated soil, plants, and other organic matter, a well-known method of *Sporothrix schenckii* transmission, also is a method of *N brasiliensis* transmission. Because this organism may not be detected on histologic examination, empiric treatment should be considered if the diagnosis is suspected.

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