

Lymphocutaneous Nocardiosis From Commercially Treated Lumber: A Case Report

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GOAL

To understand nocardial infections to better manage patients with the condition

OBJECTIVES

Upon completion of this activity, dermatologists and general practitioners should be able to:

1. Identify the organisms causing nocardial infections in humans.
2. Describe the presenting symptoms of nocardial infections.
3. Explain the treatment of nocardial infections.

CME Test on page 248.

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A case of primary lymphocutaneous nocardiosis caused by Nocardia brasiliensis in an otherwise-healthy 43-year-old man is described.

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The disease was transferred by a splinter from commercially treated lumber and was identified by culture. The patient was treated with a 4-month course of trimethoprim-sulfamethoxazole following incision and drainage, and the infection completely resolved.

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Nocardia species are Gram-positive filamentous saprophytes that are indigenous to the soil of a large part of the United States.¹ Although the genus harbors the potential to be pathogenic in humans, infections by this genus are uncommon, especially in immunocompetent hosts. Most

nocardial infections in humans result from *Nocardia asteroides*,¹⁻⁴ an organism often associated with multifocal lesions affecting more than one organ system via hematogenous seeding. On the other hand, infection with *Nocardia brasiliensis* is more likely to have cutaneous manifestations.¹ There have been a few case reports of *N brasiliensis* in immunocompetent patients.^{1,2,5,6} We present a case of lymphocutaneous *N brasiliensis* infection contracted from commercially treated lumber in an immunocompetent patient. To our knowledge, this is the first reported case of cutaneous nocardiosis from commercially treated raw materials.

Case Report

An otherwise-healthy 43-year-old man presented to our medical facility complaining of pain and swelling of his left hand. One week prior to presentation, the man's left ring finger was punctured by a large splinter from pressure-treated stained lumber. At the time of his injury, the man removed the wood from his hand; he treated himself further with soap, water, and hydrogen peroxide when he returned to his home. The patient was seen 3 days later at an outside clinic for increasing pain and redness over his left ring finger. A course of oral antibiotics (500-mg cephalexin twice daily) was initiated. The digit showed no improvement despite 4 days of oral antibiotics, and the man was referred to our institution for further care.

At presentation to our facility, the patient was afebrile but had a draining 1-cm lesion over the dorsoulnar side of his left ring finger, erythema extending over the extensor surface of the forearm, and tender subcutaneous nodules with epitrochlear lymphadenopathy (Figure). His laboratory values revealed a white blood cell count of 9700/ μ L, an erythrocyte sedimentation rate of 15 mm/h, and a C-reactive protein level of 2.39 mg/L. Incision and drainage with local debridement revealed a thick white purulence that was sent for culture and analysis with Gram stain. The patient was admitted to the hospital and placed on intravenous antibiotics (3.375 g of piperacillin-tazobactam 4 times daily) awaiting organism identification. No organisms were seen under a Gram stain.

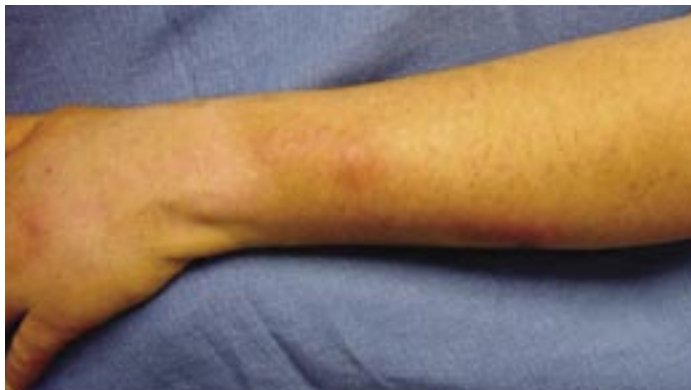
Over the next 3 days, the patient had no clinical improvement in either his pain or erythema, necessitating a repeat debridement. On this debridement, we did not notice a focal recollection of purulence or necrotic tissue. We also performed further testing to investigate the potential that our patient was immunocompromised. All tests for systemic disease that would cause immune compromise revealed negative

results. Four days after the patient's original debridement, cultures revealed a partially acid-fast, Gram-positive rod identified as *N brasiliensis*. The patient was started on oral trimethoprim-sulfamethoxazole (160-mg trimethoprim and 800-mg sulfamethoxazole), one tablet twice daily. With the initiation of this oral regimen, there was a dramatic improvement in his clinical condition, leading to discharge from the hospital 4 days later. This oral regimen was maintained for 4 months. At the patient's 8-month follow-up appointment, he demonstrated complete healing, absence of any functional deficit, and no recurrence of disease.

Comment

Bacteria of the genus *Nocardia* have several known pathogenic species in humans: *N asteroides*, *N brasiliensis*, *Nocardia caviae*, *Nocardia madurae*, and *Nocardia otitidiscaviarum*.^{1,7} *N asteroides* is the most common pathogen and accounts for 90% of nocardial infections.⁸ While other species are more prone to systemic infections, *N brasiliensis* most often is a cutaneous disease that may occur as a superficial cellulitis, abscess, mycetoma, or lymphocutaneous infection.^{6,7} Also unlike other species, *N brasiliensis* is more likely to cause a primary infection than to behave as an opportunistic invader.⁶ Worldwide, *N brasiliensis* is a fairly common pathogen and is responsible for more than 90% of mycetomas in countries such as Mexico.⁷

Primary lymphocutaneous infection with *N brasiliensis* is an uncommon diagnosis in the United States. Most reported US cases are from Texas, California, and the southeastern states.¹ When *N brasiliensis* is isolated as the infectious organism, it is often from hand injuries in otherwise-healthy individuals.⁸ Cutaneous manifestations may be underrecognized because of their resemblance to *Sporothrix* infection. When treated with potassium iodide, the common treatment for *Sporothrix* infections, *Nocardia* may begin to resolve.^{9,10}



Raised, erythematous, subcutaneous nodules extending proximally in a linear fashion over the dorsum of the forearm.

Cutaneous lesions caused by *Nocardia* form tender subcutaneous nodules that spread up the extremity in a linear fashion. These lesions also may produce sulfurlike granules similar to sporotrichosis. It is not unusual to see secondary skip-type lesions more proximal in the affected extremity.^{2,3,9,11}

Nocardia is relatively easy to grow in culture from cutaneous lesions, but a few idiosyncrasies should be noted. A native to soil and decaying vegetation, *N brasiliensis* grows easily on common culture mediums in aerobic conditions, but supplementation with 10% CO₂ may promote colony growth.⁶ The colonies themselves will develop a velvety appearance on the agar because of its aerial hyphae. These colonies start very small and may be slow growing; therefore, there is a risk of plate overgrowth by contaminant bacteria.^{2,6,11} Some laboratories will discard cultures after 3 to 7 days if there is no growth, which adds to the risk of delayed diagnosis. If *N brasiliensis* is considered in the differential diagnosis, the laboratory should be notified because the cultures may take several weeks to grow colonies large enough for identification.² Some authors recommend keeping *Nocardia* cultures for 6 weeks before discarding them as negative.¹⁰ More rapid diagnosis may be made by skin biopsy and microscopic evaluation of the lesion.¹¹

There is a tendency for local recurrence of the infection, which requires a longer course of oral antibiotics.^{1,6} Treatment of chronic lesions may demand up to one year of oral antibiotics. Trimethoprim-sulfamethoxazole has a high therapeutic-to-toxic ratio and synergistically inhibits folate metabolism in *Nocardia*, effectively killing the organism.¹ *N brasiliensis* also has demonstrated adequate sensitivity to minocycline, providing a viable second choice of therapy.⁶

Conclusion

N brasiliensis is an uncommon infectious agent. When infection does occur, it is often misdiagnosed, which prolongs the treatment course and increases the potential for chronicity. This organism

should be considered in penetrating hand injuries contaminated by soil; cutaneous infections that worsen despite surgical debridement and standard antibiotics; recurrent cutaneous infections; and infections in which sporotrichosis is a possible etiology.⁶ In suspected cases of *N brasiliensis* infection, clinicians should notify the laboratory to prolong the duration of incubation. When the diagnosis of *N brasiliensis* infection is made, a prolonged course of oral antibiotics is recommended.

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