Central Venous Catheter–Associated Nocardia Bacteremia: An Unusual Manifestation of Nocardiosis

Nocardia bacteremia is very rare. We report 2 cases of central venous catheter–associated Nocardia bacteremia and review the literature. The limited clinical experience suggests that discontinuing the catheter and embarking on a relatively short course of appropriate antibiotics results in a good outcome.

Nocardia bacteremia is very rare and is almost always associated with either concomitant pulmonary nocardiosis or prosthetic valve endocarditis [1]. In this review, we report for the first time 2 cases of primary central venous catheter (CVC)–associated bacteremia caused by Nocardia asteroides and review the limited literature.

Blood culture sets consisted of a bottle containing aerobic 26 Plus resin, an anaerobic NR7 bottle (BACTEC/BDDIS, Sparks, MD), and an isolator lysis-centrifugation tube (Wampole, Cranbury, NJ). Culture of catheter tip was performed by use of the roll-plate method. The diagnosis of Nocardia was confirmed at the genus and species levels in accordance with common schemes [2]. In addition, a Medline search of the English language literature (1966–1999) for cases of catheter-associated nocardiosis was performed; references in these articles were reviewed for additional cases.

**Patient 1.** A 29-year-old woman with a history of relapsed Hodgkin’s disease who was receiving treatment with cytotoxic chemotherapy (Adriamycin [doxorubicin], bleomycin, vinblastine, and dacarbazine [ABVD]) plus interferon was admitted on 20 May 1999 complaining of a 2-day history of nonneutropenic fever and malaise following her third course of ABVD. She took oral ciprofloxacin for 2 days without a response. Additionally, the patient was an avid gardener; she had a right subclavian CVC, and she admitted that she once accidentally touched the CVC site with soiled hands when the dressing had come loose. Upon admission, the patient was febrile (37.7°C) but not acutely ill. The CVC site appeared normal, and we found no abnormal findings when we auscultated the lungs and heart. Skin and neurological examinations were also normal.

The patient’s white blood count was 27,000/mL with 45% neutrophils and 7% bands, and chest radiographs were normal. Blood cultures drawn through the CVC taken 2 days before her admission grew >1000 colonies of gram-positive branching rods that were subsequently identified as N. asteroides, whereas a peripheral blood culture taken the same day grew only 3 colonies of the organism. The CVC was removed upon admission, and culture of the catheter tip also grew >100 colonies of N. asteroides. The patient became afebrile with the discontinuation of the CVC and the initiation of oral trimethoprim/sulfamethoxazole (1 double-strength tablet 3 times a day) and minocycline (100 mg twice a day) treatment to which the Nocardia isolate was susceptible. A computerized tomography (CT) scan of the patient’s chest and head and a transthoracic echocardiogram did not show any abnormalities. A new CVC was inserted, and she received 3 more courses of ABVD plus interferon through it without complications. She chose to discontinue trimethoprim/sulfamethoxazole treatment after 4 weeks because of nausea and rash, but she continued minocycline treatment for a total of 2.5 months. Five months after the discontinuation of antibiotics, the patient’s Hodgkin’s disease was in complete remission, and there were no signs or symptoms of nocardiosis.

**Patient 2.** A 46-year-old woman with metastatic breast cancer being treated with docetaxel (Taxotere) and trastuzumab (Herceptin) chemotherapy was admitted to the hospital on 20 June 1999. She had a 6-day history of increasing nonneutropenic fever, chills, malaise, and right subclavian CVC site pain that failed to resolve despite an outpatient trial of oral ciprofloxacin and clindamycin. This patient was also an avid gardener, and she participated in a great deal of outdoor activity on the ranch where she lived. Upon admission, a blood culture taken through the CVC 5 days earlier grew gram-positive branching rods that were subsequently identified as N. asteroides, whereas a peripheral blood culture taken the same day was negative. Upon admission, the patient was febrile (37.7°C) but not acutely ill. The CVC site showed erythema and minimal purulent discharge. There were no abnormal findings in her lung, heart, or skin, and neurological examinations also found no abnormalities. Admission laboratory values and chest radiographs were within normal limits.

The CVC was removed when the patient was admitted, and culture of the catheter tip subsequently grew >15 colonies of N. asteroides. A culture of the CVC site was negative. The patient defervesced with the discontinuation of the CVC and the initiation of intravenous imipenem (500 mg every 6 h) and amikacin (7.5 mg/kg per day) treatment to which the Nocardia isolate was susceptible. CT scan of the chest, magnetic resonance image of the head, and transthoracic echocardiogram showed no abnormalities. A new central line was inserted, and she received antibiotics through it as an outpatient for a total of 3 months. Three months after the discontinuation of all antibiotics—and de-
Table 1. Clinical characteristics of patients with central venous catheter–associated Nocardia bacteremia.

<table>
<thead>
<tr>
<th>Age, in years/sex</th>
<th>Underlying condition</th>
<th>Nocardia species</th>
<th>Method of diagnosis</th>
<th>Management</th>
<th>Outcome</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/M</td>
<td>Acute lymphocytic leukemia</td>
<td>N. nova</td>
<td>+</td>
<td>+a</td>
<td>Iv ceftriaxone (28 d), no discontinuation of CVC</td>
<td>Relapseb</td>
</tr>
<tr>
<td>12/M</td>
<td>Thalassemia, post bone marrow transplant</td>
<td>N. caviae</td>
<td>+</td>
<td>+a</td>
<td>Discontinuation of CVC; Iv imipenem (14 d)</td>
<td>Cure</td>
</tr>
<tr>
<td>29/F</td>
<td>Hodgkin’s disease</td>
<td>N. asteroides</td>
<td>+</td>
<td>+d</td>
<td>Discontinuation of CVC; PO trimethoprim-sulfamethoxazole (28 d) and PO minocycline (70 d)</td>
<td>Cure PR</td>
</tr>
<tr>
<td>46/F</td>
<td>Breast cancer</td>
<td>N. asteroides</td>
<td>+</td>
<td>+d</td>
<td>Discontinuation of CVC; Iv imipenem and amikacin (90 d)</td>
<td>Cure PR</td>
</tr>
</tbody>
</table>

NOTE. BC, blood culture; CVC, central venous catheter; F, female; M, male; PO, by mouth; PR, present report; Ref., reference; +, positive; −, negative.

a Culture method was not specified.
b Relapsed 4 months later, with new positive BC and pulmonary involvement.
c CVC-to-peripheral colony ratio >100:1.
d Roll-plate method.

Nocardia bacteremia is a rare entity, and it represents a spillover of the organism to the bloodstream from either a pulmonary or endovascular source [1]. The notion of Nocardia species causing a device-associated infection is not new, as this organism has long been described to cause catheter-associated peritonitis in patients undergoing continuous peritoneal dialysis [3]. In addition, a Nocardia-like organism, Oerskovia xanthineolytica, has been known to cause CVC-associated bacteremia [4]. In addition to the patients we identified, we found only 2 other reported instances of CVC-associated Nocardia bacteremia that had differences in regard to the underlying disease, the Nocardia species involved, and the diagnosis and management of the bacteremia [5, 6] (table 1). Therefore, despite their rarity, Nocardia species should be included in the differential diagnosis of CVC-associated bacteremias, especially in patients who have a relevant exposure history.

Although clinical experience with CVC-associated Nocardia bacteremia is limited, the good response seen in the 2 patients we studied supports the prompt removal of the infected CVC and shorter course of antimicrobial therapy. In view of the known tropism of the Nocardia species to the skin, brain, and lungs and their association with endocarditis [1, 2], a systemic workup that includes a careful neurologic, cardiovascular, and cutaneous examination as well as a CT scan of the chest and head and a transthoracic echocardiogram should be considered to rule out secondary seeding of the organism. In addition, if there are any signs of thrombophlebitis, a Doppler ultrasound of the blood vessels should also be included in the workup. However, in the absence of a proven “metastatic” focus of infection that would dictate the usual prolonged therapy (6–12 months), CVC-associated Nocardia bacteremia may be managed successfully with discontinuation of the catheter and a 3-month course of antibiotics.

References