Catheter-Related Bacteremia Caused by the Nocardioform Actinomycete *Gordonia terrae*

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Five cases of catheter-related bacteremia caused by *Gordonia terrae* are reported. All patients who also had the primary diagnosis of cancer experienced nonneutropenic fever as a result of *G. terrae* infection. All patients were treated successfully with antibiotics, with the requirement of catheter removal for 2 patients who had systemic infections.

*Gordonia terrae*, which was previously known as “*Gordona terrae*” and “*Rhodococcus terrae*,” is a nocardioform actinomycete originally isolated from soil and from the sputum samples of patients with pulmonary disease [1–3]. It is closely related to *Rhodococcus* species, and it is partially acid fast because of the content of mycolic acid in the cell wall [1, 2]. The organism is rarely isolated clinically or known to be associated with infections in humans. To our knowledge, only 4 cases of infection have been reported: granulomatous skin infection in an otherwise healthy girl [4], meningitis and brain abscesses in an immunocompetent woman [5], brain abscess in an immunocompromised boy [6], and central venous catheter (CVC)—related bacteremia in a woman [7]. We report 5 additional cases of CVC-related bacteremia in patients with cancer.

These cases occurred during 1992–2001 at The University of Texas M. D. Anderson Cancer Center in Houston, a 500-bed tertiary care cancer center. The bacteria in all cases were isolated from blood cultures with use of Bactec bottles (BD Diagnostic Systems) and Isolator tubes (Wampole Laboratories). The Isolator tube, when (also) positive, allowed quantitation of bacterial colonies from 10 mL of blood cultured. Approximately 30,000 blood cultures were performed yearly at this institution. With the exception of these 5 cases, infections due to *Gordonia* species other than *G. terrae* were not noted during the 10-year period.

The organisms had previously been identified as probable *Rhodococcus* species on the basis of morphological characteristics and limited biochemical reactions noted at our laboratory or a reference laboratory (Houston City Health Laboratory, TX) [8]. In this study, the organisms were correctly identified as *G. terrae* or a variant of it (for strains recovered from patients 3 and 5) by sequencing analysis of the 16S rRNA gene [9]. In brief, genomic DNA from pure culture colonies was extracted and subjected to PCR amplification for a 1066-bp fragment of the 16S rRNA gene (corresponding to positions 42–1107 in *Escherichia coli*). The PCR primers used were 5′-GCGTGCTTACACATGCAAGTC-3′ (forward) and 5′-CGCTCGTTGCGGAGCTTAACC-3′ (reverse). The PCR amplicon was sequenced with 2 sets of primers, and the nucleotide sequence was analyzed with use of a GenBank BLAST query. All 5 strains matched best with the *G. terrae*—type strain (DSM 43249T; GenBank accession number X79286): 3 were 99.8%–99.9% identical, 1 (from patient 5) was 98.7% identical, and 1 (from patient 3) was 98.5% identical. The matches with other *Gordonia* species were all ≤97% identical. Morphologically, all of our strains were gram positive, bacillar to coccobacillar, and partially

![Figure 1. Typical rough and flat colonies mixed with variant smooth and raised colonies of a *Gordonia terrae* strain (recovered from patient 2) after 4 days of culturing on chocolate agar.](https://academic.oup.com/cid/article-abstract/36/4/524/442370)
<table>
<thead>
<tr>
<th>Patient</th>
<th>Age in years, sex</th>
<th>Primary disease or risk factor</th>
<th>WBC count, cells/mm³</th>
<th>Episodes</th>
<th>Blood culture findings, G. terrae colonies/10 mL of blood</th>
<th>Antibiotic therapy</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>28, M</td>
<td>Chronic myelogenous leukemia, splenectomy</td>
<td>4500</td>
<td>Admitted to hospital with fever (temperature, ≤39.5°C), chills, myalgia, and headache</td>
<td>101–200b Negative</td>
<td>Vancomycin, ceftazidime</td>
<td>Resolved; catheter not removed</td>
</tr>
<tr>
<td>2</td>
<td>44, F</td>
<td>Brain tumor</td>
<td>11,500</td>
<td>ED visit with fever (temperature, ≤37.9°C)</td>
<td>Quantity not knownc Not done</td>
<td>Vancomycin, ceftazidime</td>
<td>Resolved; catheter not removed</td>
</tr>
<tr>
<td>3</td>
<td>54, F</td>
<td>Acute myelogenous leukemia</td>
<td>3900</td>
<td>ED visit with fever (temperature, ≤38.5°C)</td>
<td>Quantity not known Negative</td>
<td>Imipenem, levofloxacin</td>
<td>Resolved; catheter not removed</td>
</tr>
<tr>
<td>4</td>
<td>46, F</td>
<td>Unknown primary cancer metastatic to the liver</td>
<td>4400</td>
<td>Clinic visit with fever (temperature, ≤39.7°C); admitted to hospital 1 week later with fever and chills</td>
<td>Initially, quantity not known; at relapse 7 days later, &gt;1000</td>
<td>Erythromycin, then vancomycin and imipenem</td>
<td>Resolved; catheter removed</td>
</tr>
<tr>
<td>5</td>
<td>60, M</td>
<td>Thyroid cancer with metastasis</td>
<td>4900</td>
<td>ED visits with fever (temperature, ≤38°C), chills, and orthostatic hypotension</td>
<td>&gt;1000; at relapse 9 days later, 500–1000</td>
<td>Aztreonam, then clindamycin and azithromycin</td>
<td>Resolved; catheter removed</td>
</tr>
</tbody>
</table>

**NOTE.** ED, emergency department.

- No quantity was available if there was no growth from the Isolator tube (Wampole Laboratories).
- Culture also yielded coryneform bacilli (501–1000 colonies/mL of blood) and Micrococcus species (51–100 colonies/mL of blood).
- Culture also yielded coryneform bacilli.
samples obtained through a CVC, with pure cultures of (patient 2). In all patients, the organism was isolated from blood and band forms) was noted in 1 patient who had a solid tumor of whether they had a primary diagnosis of leukemia or solid colony (figure 1).

The clinical features of the patients are summarized in table 1. All patients presented with nonneutropenic fever, regardless of whether they had a primary diagnosis of leukemia or solid tumor. A bacteremia with high colony counts and dissemination. Although the efficacy of monotherapy with 1 antibiotic cannot be adequately evaluated because of limited experience, a combination of 2 antibiotics, consisting of vancomycin, imipenem, a quinolone, or a third-generation cephalosporin, to which this bacterium is frequently susceptible may be effective. In most microbiology laboratories, *G. terrae* can be confidently differentiated from *Nocardia* species on the basis of morphological characteristics and phenotype; the latter organism is a long, branching, gram-positive rod and has a chalky-white colony. However, it may be difficult to differentiate between *G. terrae* and *Rhodococcus* species on the basis of morphological characteristics and phenotypic tests. In our experience, the *Rhodococcus* colonies are salmon-pink and shiny (almost runny), compared with the dry, dull, and more earthy-red *Gordonia* colony.

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**References**


