

Recurrent Breast Abscess Caused by *Gordonia bronchialis* in an Immunocompetent Patient

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We present the first reported case of a recurrent breast infection caused by *Gordonia bronchialis*. The infection occurred in a 43-year-old immunocompetent female, and species level identification was obtained with 16S rRNA sequencing.

CASE REPORT

A 43-year-old female presented to hospital with a 4-day history of a tender mass in her left breast. On examination, there was marked fullness with erythema on the lateral aspect of the left breast extending to the areola and a palpable mass measuring 4 to 5 cm in diameter. Ultrasonic examination showed an extensive area of inflammatory changes but no abscess formation. There was no mammographic evidence of malignancy. Microscopic examination of a core biopsy showed acute inflammatory changes and intra- and extracellular gram-positive organisms. The peripheral white blood cell count remained normal, a human immunodeficiency virus antibody test was negative, and immunoglobulin levels were normal. The histological diagnosis was granulomatous mastitis with no evidence of malignancy.

Intravenous penicillin and flucloxacillin therapy was started, but this was changed to oral amoxicillin-clavulanate and metronidazole after 3 days. A further 3 days later, she was discharged from hospital taking oral doxycycline (100 mg daily) and oral clindamycin (150 mg 4 times a day), which was continued for 12 days. In the following 2 weeks, the area of inflammation enlarged and an abscess formed, requiring readmission to hospital. The abscess was incised, and approximately 10 ml of purulent material was drained. At this stage, she was recommenced on doxycycline (200 mg daily). Two further drainage procedures were required, after which the skin healed and the induration resolved, leaving a small palpable lesion thought to be scar tissue. Antibiotic therapy was stopped after 5 months of continuous treatment, but within 2 weeks pain returned and the abscess reformed.

Of note in the patient's past medical history is a pituitary adenoma with galactorrhea detected 3 years before. This has been controlled with cabergoline. There was no history of prior breast abscess, breast implants, trauma to the breast, or other conditions that might predispose to breast abscess formation.

Dry, crinkled, creamy-white colonies were seen on culture of pus aspirated at the time the abscess was first incised. A Gram stain could not be performed at this time, as there was an

insufficient amount of specimen available. Morphologically similar colonies were identified from a follow-up swab taken 5 days after the lesion was first incised and from a swab and aspirate taken a further 5 days later. On this occasion, gram-positive cocci were seen in the aspirated material with microscopy. After the second incision and drainage, cultures of three further wound swabs and one tissue specimen all grew the previously isolated organism. Coagulase-negative staphylococci were coisolated from two of the samples, but no other microorganisms were cultured.

Upon nonstandardized susceptibility testing by disk diffusion, the organism was found to be sensitive to penicillin, erythromycin, vancomycin, tetracycline, and ciprofloxacin (break-points used for the interpretation of the resulting zone sizes were those established by NCCLS for *Staphylococcus* spp.) (7). Using Etest (AB BIODISC, Sweden), the minimum inhibitory concentrations of the drugs against the organism were 0.25 µg/ml for penicillin and clindamycin, 1.0 µg/ml for vancomycin, and 2.0 µg/ml for ceftriaxone.

More-extensive phenotypic and genotypic testing was performed on the first and last isolates, and the following characteristics were observed. The organism grew after 3 days of incubation at 37°C in 5% CO₂ on chocolate and 5% sheep blood agar. No growth occurred anaerobically. The colonies showed two distinct morphologies: a dry, wrinkled, crumbly, cream-colored colony and a smooth, larger colony variant. Both colonial variants were nonhemolytic and produced no aerial hyphae, and a yellow-orange pigmentation was observed in older cultures. On Gram stain, the isolate was a beaded gram-positive bacillus, weakly acid fast by modified Ziehl-Neelsen stain. The isolate was initially incorrectly identified as a *Rhodococcus* sp. by a commercial identification system (API Coryne, bioMérieux) with the API code 1111104, a misidentification that has been previously reported (11). Biochemically, the isolate was positive for catalase, nitrate, and urease. The identification as *Gordonia bronchialis* of the initial isolate and the isolate from the most recent clinical recurrence of the patient's breast abscess was confirmed by 16S rRNA bacterial sequencing using eubacterial primers described elsewhere (12). There was a 100% match of both isolates to *G. bronchialis* (GenBank accession number X81919.1) over the 517-bp sequence. The other species with the closest matches were *Gor-*

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donia rubropertinctus (GenBank accession number X81915.1) and *Gordonia desulfuricans* (GenBank accession number X101417.1), both with 98% matches. To our knowledge, this is the first reported case of breast infection and associated granulomatous mastitis caused by *G. bronchialis*.

Gordonia species, previously classified as a *Rhodococcus* species and as a *Gordona* species, are a recognized pathogen in immunocompromised as well as immunocompetent patients, causing bacteremia (2, 6, 8, 10, 11), endocarditis (6), and central nervous system infections (3, 4). *G. bronchialis* has been reported to date only in a case of bacteremia in a patient with a sequestered lung (11) and in sternal wound infections after coronary artery bypass surgery (9).

A recent case report describes *G. terrae* infection in an immunocompetent patient who developed granulomatous mastitis following nipple piercing (13). Biochemically, *G. bronchialis* and *G. terrae* cannot always be distinguished conclusively; however, the two species can be separated by 16S rRNA gene sequence differences (4).

The inability to clear the infection in our case with prolonged antimicrobial therapy deserves special attention. The recurrence of infection with *Gordonia* species has been described previously (3, 4, 8), usually with subsequent clearance. More frequently, the infections were cleared only after prolonged antimicrobial treatment and surgical debridement where appropriate (2, 6, 8, 9, 10, 11).

The nonstandardized antimicrobial susceptibility testing in this case, as well as in other reported cases, indicates a high level of in vitro susceptibility to a wide range of commonly used antibiotics. However, other factors could have been responsible for the failure of treatment in our patient, such as the known ability of *Gordonia* to form sessile communities (1, 5). It is conceivable that the formation of sessile communities contributes to chronic infections, such as infections caused by *Gordonia* spp., and that the associated decreased activity of antimicrobials in this setting is responsible for relapses and treatment failures.

The slow growth of the organism not only hinders the effect of antimicrobial agents but also makes isolation of the bacterium in the laboratory less reliable. *Gordonia* spp. can be missed in clinical specimens if a laboratory follows standard procedures and limits incubation times to less than 72 h. *Gordonia* can also be misidentified as commensal coryneform bacteria, which are not uncommonly found as contaminating floras, especially in cutaneous abscesses. In clinically relevant

cases such as the case presented here, Analytab Products strip identification of a gram-positive bacillus as a *Rhodococcus* sp., a *Gordonia* sp., or any other morphologically related bacterium may not be correct. Additional testing using conventional biochemical tests or 16S rRNA sequencing, most likely to be performed at a reference center, is recommended.

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