Isolation of *Mycobacterium thermoresistibile* following Augmentation Mammaplasty

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This is the first case report of a *Mycobacterium thermoresistibile* infection following augmentation mammaplasty and is the fourth human case report of *M. thermoresistibile* infection. Antimicrobial susceptibility results determined by a modified proportion method using a 3-day incubation were the same as those determined by the standard 3-week assay.

*Mycobacterium thermoresistibile* was first isolated from soil in 1966 by Tsukamura (9), who described it as a rapidly growing mycobacterium capable of growth at 52°C. In 1981, *M. thermoresistibile* was first recognized as a human pathogen when isolated from a case of pneumonia (13). Subsequently, *M. thermoresistibile* was reported as the causative agent of a pulmonary granuloma (6) and a cutaneous infection following a cardiac transplantation (7). There has been an additional report of an infection in a cat with cutaneous lesions and local lymph node involvement (14). This is the fourth human case report of an infection caused by *M. thermoresistibile*.

**Case report.** The patient is a 41-year-old healthy Caucasian female who underwent bilateral subpectoral augmentation in August 1988. She had no prior history of mycobacterial disease. She did well initially but developed a seroma in the right breast 3 weeks after surgery. Aerobic and anaerobic cultures of the aspirated fluid were negative. Approximately 2 1/2 months after surgery, she developed a contracture in her right breast, and the implant was removed. Aerobic and anaerobic cultures were again negative. Three weeks after the implant was removed, *Staphylococcus epidermidis* was isolated from drainage at the incision. The patient was treated with antibiotics on the basis of the results of the susceptibility test, and the clinical symptoms were resolved.

In August 1989, the patient underwent a second augmentation mammaplasty of her right breast. Three months postoperatively, she again developed a contracture in her right breast, and the implant was removed. It was found to be coated with a thick yellow fluid which was negative on aerobic, anaerobic, and fungal culture. A heavy serous drainage from the incision site continued for 9 months. During this period, the patient remained afebrile. In August 1990, an abscess that formed above the incision was drained. Routine cultures were negative, but a mycobacterial culture was not done.

In September 1990, an atypical mycobacterium was recovered from sinus drainage from another breast abscess by a local hospital laboratory. The culture was referred to the Orange County Public Health Laboratory and subsequently identified as *M. thermoresistibile*. Therapy consisting of rifampin (600 mg daily) and ethambutol (1,600 mg daily) was begun. Because of potential toxicity, the dosage of ethambutol was reduced to 1,000 mg daily after 4 months.

Four months after initiation of therapy, a newly formed breast abscess was aspirated, and *M. thermoresistibile* was again isolated. Nine months after therapy began, the patient was clinically improved, with one small abscess remaining. Sixteen months after therapy began, the patient was fully recovered.

**Microbiological tests.** The submitted culture was shown to contain an acid-fast coccobacillus by a Ziehl-Neelsen stain. Upon subculture on Löwenstein-Jensen slants at 37°C, cream-colored growth was seen at 4 days and confluent growth was seen at 10 days. The colonies became light orange after 2 weeks of incubation. Colony morphology on 7H10 medium was smooth with an apron. Results of temperature studies and biochemical tests are presented in Table 1. Optimal growth was seen at both 42 and 52°C. The identification of *M. thermoresistibile* was confirmed by the National Jewish Center for Immunology and Respiratory Medicine, Denver, Colo. High-performance liquid chromatography (HPLC) analysis of mycolic acids performed by the Centers for Disease Control also identified the isolate as *M. thermoresistibile*.

Antimicrobial susceptibilities determined by the proportion method (4) with incubation at 37°C for 3 weeks (standard procedure) and at 42°C for 72 h (modified procedure) were the same. Results are presented in Table 2. Results for additional antimicrobial agents tested by the disk elution procedure (8) for rapidly growing mycobacteria are also presented in Table 2. The disk elution test was incubated for 72 h at 42°C instead of 35 to 37°C (the temperature recommended in reference 8) or 30°C (the temperature normally used in our laboratory for *M. chelonae* and *M. fortuitum*), because 42°C was the lowest temperature at which optimum growth occurred with this isolate.

Biochemically, this isolate was very similar to previous human, animal, and environmental isolates (Table 1). However, one previous isolate was reported to be nitrate negative (13) and one was reported as tellurite positive (7). A major difference is that all of the reported human isolates have been Tween-80 hydrolysis positive, while the 14 soil isolates tested by Tsukamura were all negative (10). Whether this is due to variations in testing procedures is not known. Resistance to isoniazid (INH) and *p*-aminosalicylic acid was also reported by others who performed susceptibility tests (6, 7, 13). There was one report of resistance to low levels of streptomycin (2 µg/ml) (13), which is in contrast to our result.

While this is the first report of an *M. thermoresistibile* infection after an augmentation mammaplasty, postmamma-
plasty infections caused by *M. fortuitum* and *M. chelonea* are well documented (1, 2, 11). Clinically, this case has features reported to be common to those caused by *M. fortuitum* and *M. chelonea*; the incubation time is close to a reported mean of 32 days, there was no history of fever, the establishment of an etiologic agent was delayed, and when the implant was removed, serosanguineous or purulent material was present (1).

The specific source of *M. thermoresistibile* in this infection is unknown. *M. thermoresistibile* has been isolated from soil samples (9). However, it is not known whether this organism is as ubiquitous as *M. fortuitum* and *M. chelonea*, which are common environmental isolates (5) that have also been isolated from hospital water sources (3, 12). Thus, this type of surgical infection may represent the result of a low-level environmental contamination. The possibility of a common source of contaminated implants or other surgical supplies was addressed by an epidemiologic study of post-mammaplasty mycobacterial infections. The results of the study indicated no evidence for a common contaminated product (1).

The incidence of *M. thermoresistibile* infections appears to be low, but problems with the misidentification of this organism as *M. flavescens* or *M. gordonae* due to similar pigmentation may contribute to the low frequency of reported isolation. With increasing evidence that this organism can cause serious infections, efforts should be made by laboratories to properly identify *M. thermoresistibile*. Testing all suspected scotochromogens for rapid growth by incubating a subculture on a Löwenstein-Jensen slant at 52°C for 4 days is a method we have incorporated to easily screen for *M. thermoresistibile*. *M. phlei*, another mycobacterium which grows at 52°C, is also a rapid grower at 25°C and differs from *M. thermoresistibile* in biochemical reactions.

Modification of the proportion susceptibility test method was successful in our laboratory and reduced the time for results from 3 weeks to 72 h. Modification of the incubation temperature of the disk elution test also allowed us to determine resistance to several drugs. Since these are unstandardized techniques, as are all susceptibility tests for rapidly growing mycobacteria, the results must be utilized with caution, taking into account previously published susceptibility patterns and patients’ responses to treatment. Further studies are necessary to confirm the accuracy of these modified techniques for other isolates of *M. thermoresistibile*.

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### REFERENCES


