Breast Infections With Atypical Mycobacteria Following Reduction Mammaplasty

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Abstract

Reduction mammaplasty is one of the most common plastic surgery procedures performed in the US, with the goal of correcting symptomatic macromastia. More than 70,000 cases were performed in 2009, with few complications and low infection rates. The authors present two cases of breast infections with *Mycobacterium fortuitum* and one with *Mycobacterium chelonei* following bilateral reduction mammaplasty. Infection with these organisms is exceptionally rare following breast surgery in the absence of a prosthetic implant. All of the patients had a delayed presentation following complete wound healing and were refractory to first-line antibiotic therapy. All three required long-term antibiotics in consultation with an infectious disease specialist. The patients all required surgical drainage, and two patients also required formal operative debridement. All three patients eventually went on to complete wound healing.

Keywords

reduction mammaplasty, breast reduction, atypical mycobacteria, mycobacterium fortuitum, breast infection

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Reduction mammaplasty is one of the most common plastic surgical procedures performed in the US, at a rate of over 70,000 per year. Breast reduction is generally a very well-tolerated procedure with few complications. Major wound infections are rare, with skin flora (including *Staphylococcal* species) as the usual culprit. Infrequently, atypical mycobacteria (ATM) may be the causative agent. *Mycobacterium fortuitum* and *chelonei* (also spelled *cheloneae*) are acid-fast, nontuberculous, atypical mycobacteria (Table 1). Together, they comprise the *Mycobacterium fortuitum* (*M. fortuitum*) complex. This complex is classified within group IV in the Runyon classification system (Table 2), which is a commonly-employed system for classifying ATM based on growth rate, production of pigment, and other metabolic characteristics. *M. fortuitum* is mainly found in soil and water but has also been found to cause infection in the human body, as has *M. chelonei*. In the plastic surgery literature, these bacteria have been reported with increasing frequency as atypical pathogens isolated from various wound infections, especially following augmentation mammaplasty. Prior to this report, published case series with these organisms as the causative agent have involved only periprosthetic infections related to breast implants.

CASE PRESENTATIONS

Three patients developed postoperative breast infections with ATM infections following bilateral reduction mammaplasty—two with *M. fortuitum* and one with *M. chelonei*. All three patients’ medical records were thoroughly reviewed, with special attention paid to presentation timing and characteristics, medical and surgical treatments,

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wound cultures and sensitivities, and the role of infectious disease consultation. The available literature relating to previously-described ATM infections was also reviewed and evaluated. Diagnosis, surgical treatment, infectious disease consultation, and medicolegal management issues relating to ATM infections are detailed and discussed.

**Patient 1**

A 55-year-old woman with symptomatic macromastia presented for bilateral reduction mammoplasty. Her past history was significant for prior benign breast biopsies and tobacco use. Her right breast was asymmetrically larger than the left, with grade III ptosis bilaterally. She underwent uncomplicated Wise-pattern reduction with 380 grams and 540 grams of tissue removed from the right and left breasts, respectively. She did well postoperatively, with normal wound healing. She returned to the office nine months postoperatively complaining of a mass on her medial left breast. On initial evaluation, the mass appeared to be an infected fluid collection or sebaceous cyst. Incision and drainage was performed, and the patient was prescribed amoxicillin-clavulanate. Another area in the central vertical scar opened and began to drain two weeks later. This area was also incised, drained, and cultured. The initial culture showed only a contaminant. However, the second set of cultures grew *M. fortuitum*. Infectious disease consultation was obtained and the patient began a course of clarithromycin for four to six months. She tolerated this well, open lesions healed, and the infection cleared. Unfortunately, one month later, she had a new area of drainage. New cultures were obtained and her antibiotic therapy changed to trimethoprim-sulfamethoxazole and levofloxacin. Further operative debridement was performed to clear these areas of refractory infection. The areas of prior drainage were also resected, including a tract from the middle periareolar area. Following her last debridement and an additional six weeks of antibiotic treatment, the patient healed without any signs or symptoms of residual infection. Accusations of mismanagement and other threats of litigation continued until the definitive diagnosis was obtained (see Figure 2).

**Patient 2**

A 73-year-old woman with symptomatic macromastia presented for bilateral reduction mammoplasty. She had grade III ptosis, with her left breast asymmetrically larger than the right. She underwent an uncomplicated Wise-pattern reduction with 560 grams and 540 grams of tissue removed from the right and left breasts, respectively. She called the office complaining of small amounts of clear drainage from the periareolar closure of the right breast. She was placed on amoxicillin-clavulanate and instructed to follow up in our office later that week. On presentation, she had two small abscesses that had opened in the prior scars, one periareolar and one in the inframammary closure. These healed over the following three weeks. Nine weeks postoperatively, the patient presented with increasing pain and evidence of fluid collection in the inframammary area. This abscess was incised and drained, and the fluid was sent for cultures. The patient was placed on levofloxacin and the site was packed open. One week later, the patient returned with an additional area of periareolar dehiscence. Her prior gram stains showed possible acid-fast bacilli. The patient was then referred to an infectious disease specialist for assistance with management. The cultures eventually grew *M. fortuitum* and the patient was prescribed a course of clarithromycin and ciprofloxacin for 30 days. Subsequently, the patient was switched to minocycline and ciprofloxacin after organism sensitivities returned, revealing a resistance to clarithromycin. She went on to heal with no further surgical debridement (see Figure 1).
A 27-year-old woman with symptomatic macromastia and breast asymmetry presented for breast reduction. She was otherwise healthy, with the exception of a prior full-thickness burn with extensive scarring over 60% of her left breast. The patient underwent uncomplicated bilateral Wise-pattern reduction mammoplasty. Resection weights

Figure 1. (A) This 55-year-old woman with symptomatic macromastia presented for bilateral reduction mammoplasty. Her past history was significant for prior benign breast biopsies and tobacco use. Her right breast was asymmetrically larger than the left, with grade III ptosis bilaterally. (B) Nine months after bilateral reduction mammoplasty and atypical microbacterial infection treatment, with evidence of successful healing.

Figure 2. (A) This 73-year-old woman with symptomatic macromastia presented for bilateral reduction mammoplasty. She had grade III ptosis, with her left breast asymmetrically larger than the right. (B) Six weeks after bilateral reduction mammoplasty. (C) Nine months after reduction mammoplasty, the patient’s preoperative debridement markings can be seen, highlighting breakdown in the central subareolar area. (D) The patient is shown intraoperatively during resection, where the sinus tract can be seen.

Patient 3

A 27-year-old woman with symptomatic macromastia and breast asymmetry presented for breast reduction. She was otherwise healthy, with the exception of a prior full-thickness burn with extensive scarring over 60% of her left breast. The patient underwent uncomplicated bilateral Wise-pattern reduction mammoplasty. Resection weights
were 1200 grams on the right and 850 grams on the left. Ten days postoperatively, she returned with small areas of drainage from the inferior portion of the left breast and a course of cephalexin was started. One month later, a small area of dehiscence had developed, along with a fluctuant mass. This was incised and drained, and ciprofloxacin was initiated. She continued to experience increased drainage along the inframammary fold. An ultrasound of the breast was obtained, showing multiple serous fluid collections. On the basis of her clinical progression as well as the ultrasound evidence, the patient was admitted to the hospital for intravenous antibiotics and formal exploration and debridement. Multiple sites were opened, debrided, and packed. On follow-up, the patient appeared to be doing well and was healing by secondary intention. However, one month later, she returned with recurrent drainage. Repeat ultrasound showed recurrent fluid collection and an interventional radiology specialist placed a drain into the main cavity. Drainage persisted and the patient was placed on antifungal medication by infectious disease to maximally broaden coverage. All cultures remained negative to this point. The patient underwent a second and finally a definitive third operative debridement. Tissue cultures from this last debridement grew *M. chelonei* and the patient was started on clarithromycin by an infectious disease specialist. The patient then returned six months later, again with recurrent swelling and drainage in left upper breast. New cultures returned with sensitivities showing the strain of *M. chelonei* to be highly resistant, except to quinolones. She followed up with the infectious disease department and was initiated on a regimen of ciprofloxacin and azithromycin, finally healing nearly one year after her initial surgery. Throughout the patient’s extended course of diagnosis and treatment, she had been referred to multiple additional plastic surgeons and infectious disease physicians for second opinions. However, as before, there were accusations of mismanagement and lawsuits were threatened throughout the prolonged process (Figures 3 and 4).

**Figure 3.** (A) This 27-year-old woman with symptomatic macromastia and breast asymmetry presented for breast reduction. She was otherwise healthy, with the exception of a prior full-thickness burn with extensive scarring over 60% of her left breast and upper arm. (B) Three weeks after bilateral reduction mammoplasty, the patient presented with periareolar dehiscence on the lateral aspect of her left breast.

**Figure 4.** (A, B) Actual histologic slides of the patient in Figure 3, demonstrating mastitis with granulomatous change. Courtesy of Spectrum Health Laboratories. Reprinted with permission from Spectrum Health.
DISCUSSION

ATM infections have been described in association with augmentation mammoplasty. Infection usually involves the implant, often resulting in removal of the device and significant morbidity. In addition, there are less-frequently-described infections associated with other aesthetic procedures, including lipectomy and rhytidectomy.1,2 Outbreaks of ATM infections have also been reported in US patients traveling abroad for surgery, particularly in lay clinics.12 Furthermore, there have also been scattered reports of ophthalmologic operative infections.13 Although M. fortuitum is known to cause cutaneous infections, this is the first case series of M. fortuitum complex infections of the breast where an implant was not involved. One breast reduction case was briefly alluded to in an anonymous survey and one report of an infection associated with “breast ptosis correction” has been reported, although the exact nature of the procedure was not described.6,14 In addition, there was a single description of an infection involving reconstruction with a latissimus flap.15 Therefore, we believe this to be the first formal description and discussion of a series of ATM infections following reduction mammoplasty.

In light of these reports, practitioners should have a high level of suspicion for an ATM infection when managing any nonhealing or recurrent postoperative breast infection. If the patient heals primarily and then develops a delayed infection weeks to months later, surgeons should investigate for possible ATM infection. As this pathogen is rare, requires specialized growth mediums for detection, and is treated with antibiotics that are not first-line wound infection drugs, the surgeon must actively consider this pathogen in his or her differential diagnosis in order to diagnose and treat in a timely fashion. If ATM is not in the differential diagnosis until late in the course, there can be a substantial delay in diagnosis and treatment.

Although the overall infection rate with ATM is unknown, these patients represent approximately 0.13% (3/2200) of patients in the authors’ two practices who have undergone breast reductions over the past 12 years. In addition, there is an even lower incidence when considering the entire Grand Rapids area, as no other ATM infections (with the exception of two related to breast implants) have been documented or reported.

Previous descriptions and presentations of M. fortuitum complex have demonstrated a high degree of variability. Similarly, our cases also showed great variability in their timing and presentation, presenting from two weeks to nine months postoperatively. Although some typical wound infections may present at two weeks, presentation at nine months postoperatively would be exceptionally delayed. Most classic wound infections should be evident within a few days to a week following surgery. Because these are atypical pathogens, many clinicians are unfamiliar with their presentation pattern and timing.

All of our patients received antibiotics and had serous-like fluid collections requiring drainage. The fluid is an unusual gray-to-clear, nonmalodorous drainage. The infections also commonly track with eruption in areas of prior scars. Clarithromycin is one of the classic first-line drugs for ATM infection and the drug often first initiated by infectious disease consultants. Other antibiotics classically employed include fluoroquinolones, amikacin, minocycline, and trimethoprim-sulfamethoxazole (Table 3). Unfortunately, increasing development of resistance to clarithromycin monotherapy has been reported.16 The pathogen in our first patient was found to be resistant to clarithromycin. Sensitivities were available in the early stages and this infection cleared without operative debridement after initiation of correct antibiotics. The two other patients required formal operative debridement after ultimately failing antibiotic therapy alone, with one patient requiring multiple debridements. One of these patients also was eventually proven to carry a clarithromycin-resistant strain, further emphasizing the importance of early, accurate sensitivities. Delayed or unavailable sensitivities ultimately hinder effective treatment and potentially increase the likelihood of requiring operative debridement. However, the literature does clearly support early surgical debridement as a standard approach to these infections, along with targeted sensitivity-based antibiotic therapy.17-19 These cases confirm that long-term targeted antibiotic therapy based on accurate, early sensitivities along with operative debridement as necessary can effect cure.

These patients were part of two separate practices, were operated on at two different sites, and were spread over a nearly 12-year period. As a result, we have been unable to find commonality between them in trying to establish a source or cause. There does not seem to be anything inherent about the patients, locations, or surgeons that may have predisposed our patients to these infections. Established risk factors such as immunocompromise were never found to be present in any of our patients. However, two of our patients had undergone prior breast surgery and one had a severe burn. There was also reported tobacco use in one patient and diabetes in another. It is conceivable that these prior injuries and procedures, as well as comorbidities, may have played a

Table 3. Common Antibiotics for Treating ATM Infection

- Clarithromycin
- Ciprofloxacin
- Minocycline
- Cefoxitin
- Rifampin
- Amikacin
- Isoniazid
- Streptomycin
- Rifabutin

*Clarithromycin is the traditional first-line choice for initial antibiotic therapy.

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role in facilitating infection. When an immunologically-compromised patient, or a patient with prior trauma or significant scarring, experiences postoperative infection that does not respond to standard antibiotic therapy, ATM should be considered.

As seen in two of our cases, when a patient heals normally and then develops a delayed infection or does not respond to formal debridement and antimicrobial therapy, accusations of malpractice and even threats of litigation may occur. Directed second opinions from additional plastic surgeons and infectious disease consultations are recommended to both assist in diagnosis and treatment, as well as to defuse allegations.

CONCLUSIONS

This report represents the first case series of atypical mycobacterial infections of the breast without an associated breast implant. The *M. fortuitum* complex involves atypical acid-fast bacilli previously described in our literature, in association with wound infections related to breast implants. Our three cases of breast infection following reduction mammoplasty reveal the need for plastic surgeons to have a high level of suspicion for these atypical bacteria in any postoperative breast infection that is refractory to first-line diagnosis and therapy (see Tables 4 and 5). Early culture and sensitivity information will prove invaluable in directing specific antibiotic therapy (see Tables 4 and 5). Early culture and sensitivity information will prove invaluable in directing specific antibiotic therapy (see Tables 4 and 5). Early culture and sensitivity information will prove invaluable in directing specific antibiotic therapy (see Tables 4 and 5). Early culture and sensitivity information will prove invaluable in directing specific antibiotic therapy (see Tables 4 and 5).

**Table 4.** Summary of Recommendations Regarding Clinical Management of Atypical Mycobacteria Breast Infections

<table>
<thead>
<tr>
<th>Recommendations</th>
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<tbody>
<tr>
<td>• Have a high index of suspicion with diagnosis</td>
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<tr>
<td>• Gram stain must include acid fast</td>
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<tr>
<td>• Cultures must include fungus and acid-fast bacilli</td>
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<tr>
<td>• Culture may take more than one month</td>
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<tr>
<td>• Employ combination therapy</td>
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<tr>
<td>Surgical debridement</td>
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<tr>
<td>Long-term, multiagent antibiotic therapy</td>
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<tr>
<td>• Manage medicolegal risks with second opinions</td>
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**Table 5.** Summary of Approach to Diagnosing Atypical Mycobacteria (ATM) Infections of the Breast

**Think Atypical**

Be highly suspicious of ATM infection if:

- The patient heals normally but develops late infection
- Infection tracks to previous scars
- Discharge is serous and nonodorous
- The infection is unresponsive to typical wound infection antibiotics

REFERENCES


