

Breast reconstruction after prosthesis-related mycobacterial infection. A case report

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Background

Nontuberculous mycobacteria, isolated mainly from soil or water, are pathogens best recognized for their association with clinical infections in immunocompromised hosts. However, nontuberculous mycobacteria can also affect surgical wounds of all sorts. Complications range from wound issues to poor cosmetic results, nerve damage, and implant failure. Postoperative complications are not only physically, also psychologically, and financially damaging to the patient[1].

Keywords: mycobacterial infection, breast reconstruction.

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Case Report

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The breast harbors significant concentrations of endogenous bacteria. Even under sterile operating conditions, this bacteria remains a concerning presence, one that may translate into the contamination of a foreign body placed around the breast[8]. The most common organisms identified are species considered to be normal skin flora including coagulase-negative *Staphylococcus* species and *Staphylococcus epidermidis*[4,6]. Implant infections after augmentation mammoplasty have shown that acute and subacute result from gram-positive organisms. Late-onset have been associated with gram-positive and gram-negative bacteria (e.g., *Enterobacter*). Less common causes include *P. aeruginosa*, *Bacteriodes fragilis*, and nontuberculous mycobacteria[2].

Mycobacteria can be classified according to their growth rate, into rapidly growing mycobacteria (RGM) and slowly growing mycobacteria. Most of them are environmental bacteria (95%), saprophytes or non-pathogenic to humans. Many NTM species are easily identifiable in water networks, tap water, dust, soil and in plant-soil interfaces. Importantly, many mycobacterial species, including *M. abscessus*, can survive in amoeba trophozoites and subsequent cyst stages. In addition, NTM are highly resistant to many deleterious compounds, such as antibiotics, antiseptics, biocides, sterilizing agents and disinfectants, and thus they are able to survive in hostile nutritionally deprived environments such as surgical wounds and

avascular periprosthetic pockets[1]. Contaminated water sources are the most important and most well established environmental source of NTM infection [3].

Most periprosthetic mycobacterial infections are caused by the nonpigmented rapidly growing mycobacteria. Reports of bacterial transmission include isolation from medication vials such as gentian violet and methylene blue, and from reusable sizers[1].

Nontuberculous mycobacteria are not subject to public reporting and may be misdiagnosed as seromas or chronic breast swelling. Local inflammation in the absence of any growth on routine cultures or systemic illness is typical[1]. The granuloma is the hallmark of mycobacterial infection, and represents a dynamic host-pathogen interface usually containing the infection[3]. Lesions may take weeks to months to evolve and result in rashes, papules, nodules or abscesses. SGM are more likely to involve multiple body sites than RGM infections[4].

Case report

This case presents a 25-year-old woman with no history of comorbidities, in good general health. She was referred to this institution from a private hospital with septic shock.

The previous two weeks, patient had bilateral breast implants via retroareolar approach, abdominal liposuction, and gluteal lipofilling. Presented to

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Figure 1. Left breast lesion at the arrival time to hospital. Extended compromise of periareolar skin. Drainage showing watery and blood tinged discharge.

emergency room 3 days posterior to the procedure with fever. She was evaluated and treated with non-specific antibiotics as an out-patient at private hospital. Ten days later she continued with fever, besides pain, discharge, redness. An open wound in left breast and entry sites of the cannulas, with symptoms of systemic inflammatory response. Physical examination revealed erythema, swelling, wound dehiscence in left breast with discharge watery in nature but sometimes purulent and blood tinged. There was torpid evolution so she was admitted to operation room to get implants removed and surgical lavage where cultures were taken. Previous assessment of infectology department, it was decided to start empirical antibiotic administration with vancomycin and meropenem. Then, patient was sent to our hospital for evaluation. There was poor improvement despite multiple surgical lavages and antibiotic therapy, with all cultures negative to bacterial growth. It was a high suspicious of mycobacterial infection. Surgical team decided to



Figure 2. After debridement and surgical lavage of affected tissue from left breast. Anatomical loss of periareolar region with most of the skin.



Figure 3. A year and six months later, showing affected breast with ptosis as a sequel after healing by secondary intention.

make a biopsy. Surgical specimen was sent for histopathology and microbiological examination. The results:

- **Ziehl-Neelsen stain:** Negative
- **Mycology culture:** Negative
- **Mycobacterial culture:** *Mycobacterium sp.*
- Rapidly growing mycobacteria (RGM)

Based on results, antibiotic therapy with azithromycin, levofloxacin, linezolid and meropenem for 9 months were prescribed. Patient reached complete therapeutic response and the wound healed by secondary intention, leaving as a sequel left breast ptosis.

A year later, patient came back to consulting room asking for breast symmetrization protocol. Surgical team decided to place textured breast implants, 400 cc in right breast and 420 cc in left breast. Through submammary incision and

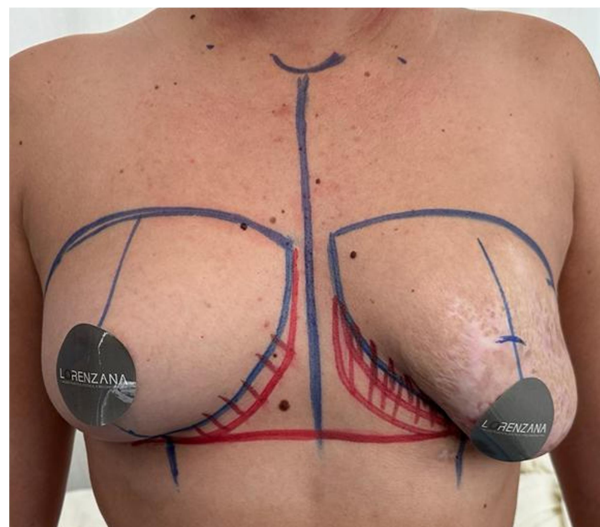


Figure 4. Previous to procedure marks, as a guide to making the reconstruction: sternal notch to nipple distance, base diameter of breast, nipple to inframammary crease on stretch, 3-cm "n touch zone", distance to lower inframammary fold, implant footprint and incision location.



Figure 5. Final result after bilateral implants placement. Right breast: 400 cc. Left breast: 420 cc.

subglandular technique, with appropriate immediate post surgical result.

Discussion

Surgical site infection (SSI) is a risk in every surgical procedure. Wounds classified as “clean wounds” have such a low incidence of infection. Breast surgery is a “clean surgery” by definition[5]. Current guidelines for prophylaxis in aesthetic breast surgery indicate that for clean breast procedures in patients without risk factors for infection, no antibiotics should be administered[6]. ABP is recommended in plastic surgery in the presence of certain risk factors in addition to general risk factors (implant use, skin radiation, and procedures below the waist)[5]. A single dose of intravenous cephalosporin may be administered preoperatively because cephalosporins are effective against the strains we identified on the breast skin, including methicillin-susceptible *S. aureus* and CoNS[6].

In the postoperative stage, “Infection” is defined as any episode where antibiotic treatment was initiated in addition to the prophylactic postoperative regimen, or a prosthetic device was explanted due to any clinical signs of infection. Early and late infections are those that occur 30 days and >30 days postoperatively, respectively. In the augmentation mammoplasty population, late periprosthetic infections occurred more frequently and were more severe than early infections[2]. Biofilms are now believed to be responsible for approximately 80% or more of all human infections[4]. Foreign body seeding in the form of a biofilm is not only difficult to diagnose but may be very difficult to treat, especially with routine antibiotics. Once established, the resultant biofilm allows for the binding of other species of bacteria (e.g. *Mycobacteria*), as well as a decrease in metabolism that contributes to antibiotic resistance[8]. From the NTM group, commonly associated with SSTIs include the *Mycobacterium fortuitum* group, *M. chelonae*, *M. abscessus*, *M. haemophilum*, *M. ulcerans*

(Buruli ulcer), and *M. marinum* (fish-tank or swimming-pool granuloma)[7].

Rates for implant-associated infection range from 1.1 to 2.5 percent following augmentation and 1 to 35 percent following reconstruction, and are consistently higher following breast reconstruction. In the study by Halabi et al. most infections occur following bilateral breast augmentation (73 percent) through an inframammary incision. Meticulous hemostasis, use of nipple shields, and submuscular device placement may contribute to a lower incidence of infection[4].

Most patients present with breast pain or tenderness, swelling, and redness. Fever and constitutional symptoms, discharge associated usually serous or cloudy with wound dehiscence[1]. Postoperative complications are not only physically, psychologically, and financially damaging to the patient. These complications range from wound issues to poor cosmetic results, nerve damage, and implant failure.

The mainstay of treatment involves removal of the infected device, copious pocket irrigation, and capsulotomy or capsulectomy if a thickened capsule is present. Targeted prolonged antimicrobial therapy should be initiated followed by delayed reimplantation of the prosthesis once the infection has resolved. Delayed reimplantation is recommended 3 to 6 months after completion of antimicrobial therapy.

For RGMs and when other NTMs are susceptible, clarithromycin is considered the oral agent of choice, preferably in combination with another agent to which the organism is susceptible, particularly so in the immunocompromised patient[7]. Antimicrobial treatment including vancomycin and broad-spectrum cephalosporin should be initiated empirically until targeted culture-guided therapy can be implemented. Antimicrobial treatment is continued for at least 22 weeks and requires close follow-up and long-term surveillance for recurrence[1].

Bartsich et al. recommend that for patients who are undergoing placement of a foreign body in the breast—and especially for those in whom a periareolar incision is planned—broader-spectrum antibiotics should be considered, along with triple-antibiotic irrigation of the implant pocket[8].

Conclusion

NTM are emerging pathogens that can cause a substantial but often underappreciated burden of disease worldwide. The lack of experience in their detection and management poses a risk for increased morbidity and spread. Given that the management of a seeded implant is exponentially more difficult than the management of a routine postoperative infection, prevention is Paramount. They often require treatment

with multiple antibiotics, result in additional interventions and surgeries, and take an emotional toll on the patient. Undoubtedly, substantial effort is required to improve the diagnosis of NTM infections in general, and specifically of infections with *M. abscessus*, and to develop safer and more effective treatment regimens.

Conflicts of interests

There was no conflict of interest during the study, and it was not funded by any organization.

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