

보형물을 이용한 유방재건 수술 후 발생한 비정형 마이코박테리아 감염 1례: 증례 보고

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Nontuberculous Mycobacterial Infection after Breast Reconstruction with an Implant: A Case Report

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Purpose: Breast implant surgery is increasing in Korea. NTM (non tuberculous mycobacteria) infection after breast implant surgery is rare, but it has been there reported in several foreign countries. However, no report has been issued on NTM infection after breast reconstruction surgery with an implant in Korea. The purpose of this article is to report a case of NTM infection after breast reconstruction surgery with an implant.

Methods: A female patient who underwent total mastectomy and immediate breast reconstruction with a latissimus dorsi myocutaneous flap and an implant exhibited signs of inflammation after the surgery. Fluid cultures taken at the time of wound exploration were initially negative, but NTM was isolated by culture 10 days later.

Results: The implant was removed. *M. fortuitum* was identified by acid-fast culture and NTM-PCR. The patient was treated with combined antibiotic therapy.

Conclusion: Although it is difficult to diagnose NTM infection after breast surgery, it is important that surgeons include NTM infection in the differential diagnosis of a post mammoplasty infection after breast implant surgery.

Key words: Nontuberculous mycobacterium, NTM, Breast surgery, Implant

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I. INTRODUCTION

Breast implant is a popular means of conducting breast reconstruction and breast augmentation surgery with implant is one of the most common cosmetic procedures. Several reports of adverse events following breast implant surgery have been issued, and although infections are not common they account for 1% of complications and it can cause serious problems requiring implant removal and systemic antibiotic therapy.¹

Non-tuberculous mycobacteria (NTM) infections are often encountered as pulmonary infections, superficial lymphadenitis, soft tissue infections, or disseminated disease.² Recently soft tissue infections have been reported after cosmetic surgery, such as, body contouring surgery.³ Prosthetic breast implant infection by NTM is rare, although reports issued overseas concerning such infections are increasing.^{1,4-7} However, no case of NTM infection has yet been reported in Korea after breast implant surgery.

Nowadays in Korea, breast reconstructive surgery and augmentation mammoplasty are increasing, and the use of breast implant has become a popular procedure. Infections after implantation by bacteria have been well investigated and many studies have been conducted on methods of inhibiting bacterial infections. The described case had a NTM infection after breast reconstructive surgery conducted using a latissimus dorsi myocutaneous flap and an implant. This is the first case of a breast implant infection by NTM to be reported in Korea. Clinical symptoms in this case differed from those of other cases of bacterial infection, and the detection and treatment of NTM were difficult. Here, we describe this case, review the literature, and discuss diagnostic and management strategies.

II. CASE

A woman of 49 years of age underwent right total mastectomy with lymph node dissection for breast car

cinoma in 10 January 2011, and immediate breast reconstruction using a latissimus dorsi myocutaneous flap and a prosthetic implant (180 g Natrelle silicone filled breast implant style 110). Immediately after surgery, no systemic symptoms, such as, fever, nausea, or vomiting, were evident. Mild intermittent pain and mild erythema were recorded, but these were not severe and there was no tenderness, swelling, or heating sensation. Drain color was serous and not turbid, and drainage amounts reduced normally. After drain removal the patient was discharged on post-operative day 14. However, on the 15th February 2011, she visited the outpatient clinic complaining of right breast pain, swelling, a heating sensation, and flu-like symptoms. A clear fluid was observed during wound exploration and submitted for Gram staining and culture. A JP drain was inserted and patient was administered

tigecyclin to rule out MRSA. The clear fluid continued to drain at a rate of 20 cc to 30 cc per day. Six days later, the drainage amount had increased to 41 cc and the heating sensation had further developed. On the 24th February 2011, NTM was detected in the culture (Fig. 1).

The patient underwent surgical revision with breast implant removal and debridement of unhealthy soft tissues. A JP drain was inserted and a specimen was sent for gram staining, acid-fast staining, culture, and NTM-PCR. Preoperative lab tests revealed a normal leukocyte count, but a CRP of 1.72 mg/dL. Treatment with intravenous amikacin and oral clarithromycin and moxifloxacin were started after surgical revision.

After 7 days of surgical revision, NTM was isolated in the culture of the removed tissue specimen (Fig. 2). A microscopic examination of specimens yielded no

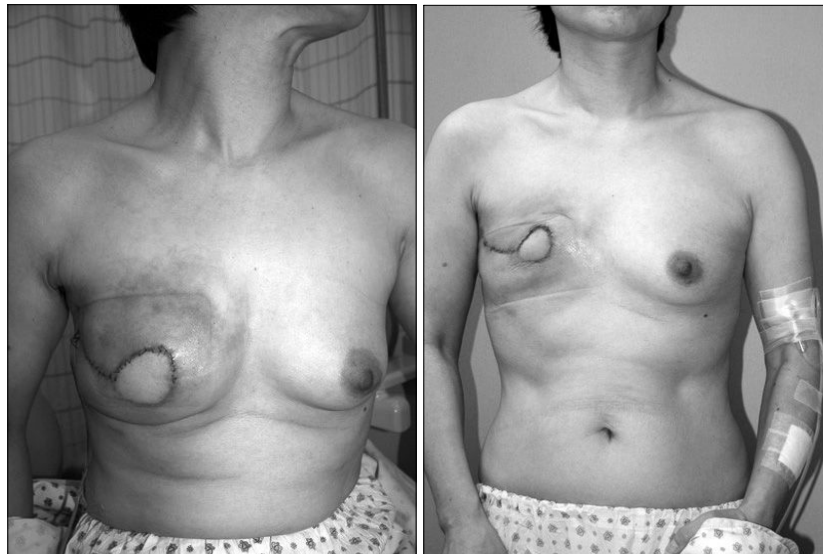


Fig. 1. (Left) Photograph taken on the 24th February 2011 after wound exploration, showing a mild erythematous right breast. At this time the patient complained of Rt. breast pain and a heating sensation. (Right) Photograph of the right breast after breast implant removal taken on the 9th March 2011.

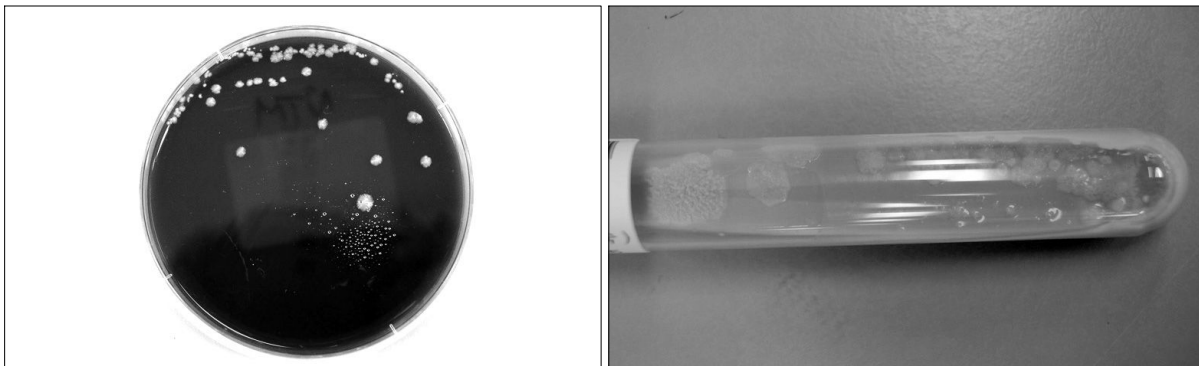


Fig. 2. NTM cultures from Rt. breast fluid. (Left) NTM cultured in blood agar, (Right) NTM Cultured NTM in Ogawa media.

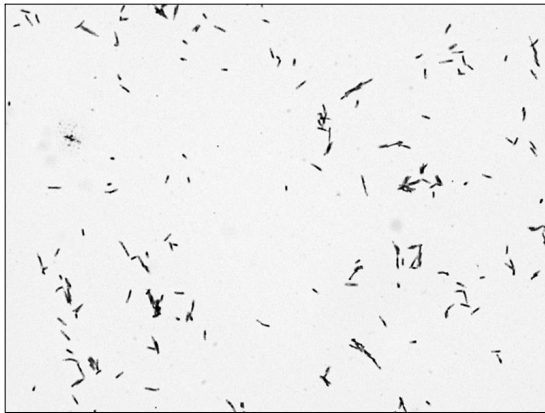


Fig. 3. Acid-fast staining of a cultured colony; mycolic acid in the lipid-rich bacterial cell wall causes acid fast staining. (original magnification $\times 1000$) *M. fortuitum* was identified by PCR.

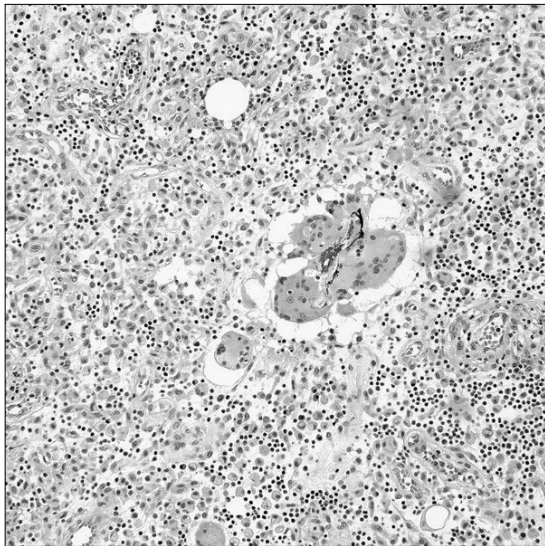


Fig. 4. Biopsy of right breast tissue; Multiple macrophages were observed in well formed granulomas (Hematoxylin and eosin; original magnification $\times 400$).

bacteria by gram staining, but NTM was detected by acid-fast staining (Fig. 3). *M. fortuitum* was identified by NTM-PCR.

Postoperatively, the drainage diminished markedly, and after 10 days the drain was removed. At this time her symptoms were relieved and CRP had decreased to 0.34 mg/dl. Treatment was continued with combined antibiotic therapy, despite complaints of drug-induced nausea (Fig. 1).

III. DISCUSSION

NTMs have been known since they were first described

by Robert Koch-previously they were dismissed as contaminants. However, advances in molecular microbiology and more knowledge of these organisms have resulted in NTMs being recognized as true pathogens and important causes of human infection. NTMs are free-living organisms that are ubiquitous in the environment. Important reservoirs include water, soil, animals, and dairy products. They can also colonize medical equipment, such as, endoscopes and surgical solutions. However, person-to-person spread has not been reported. The Runyon system classifies NTMs into four broad categories. Groups I to III are slow-growing, whereas group IV grow rapidly that are detectable in culture within 7 days. *M. fortuitum* is a member of this group.² NTMs are capable of producing a variety of clinical infections, that is, chronic pulmonary infections, superficial lymphadenitis, soft tissue and osteoarticular infections, disseminated disease, and iatrogenic infections. It is known that immunocompromised patients, such as, transplant recipients, patients undergoing chemotherapy, and HIV positive patients, are more susceptible to infection by this microorganism.

In plastic surgery, several reports have been issued on skin and soft tissue infections following the injection of contaminated solutions or after penetrating trauma by a metal object. Previously, we reported the case of NTM infection caused by body contouring surgery in Korea.³ NTM infection after breast implant surgery is rare, although some reports of NTM infection after augmentation mammoplasty have been published overseas.⁴⁻⁷ However, no previous report of NTM infection after breast implant surgery has been published in Korea.

Breast implant cosmetic surgery is becoming more popular in Korea, and although infection is low, it can result in significant morbidity, as infections result in fluid accumulation necessitating drainage and increase the risks of capsular contracture, wound dehiscence, and subsequent implant removal. Furthermore, when implant removal is required replacement must be delayed for several months to years, and in reconstructive cases, these problems can delay adjuvant chemotherapy.

NTM is a rare cause of infection after breast surgery and its clinical symptom differ to those of other infections, and thus, it is important to include it in the differential diagnosis of breast implant surgery infections to ensure early detection and treatment. In the literature, the onsets of clinical signs of infection have been reported to occur at 1 week to 2 years after the procedure.⁵ Presenting clinical features include swelling, tenderness, and erythema, whereas systemic symptoms, such as, fever, chills, and

other signs of sepsis may be absent. The discharge is usually odorless and serous, that is similar to that found in our case. Our patient presented with non-specific symptoms and mild right breast pain and erythema, which are no different to those of other patients who have undergone the procedure. Furthermore, during initial exploratory surgery, no significant infected tissue was found.

NTM is diagnosed by culturing the organism in fluid or tissue specimens, but isolation is difficult and may take several weeks. Gram stain smears may be negative. Group IV species, such as, *M. fortuitum*, *M. abscessus*, and *M. chelonae*, can be isolated by routine culture on blood agar plates in a minimum of one week, but the culture of slow growing NTM species takes several weeks. In our case, the isolated NTM was *M. fortuitum*, and the organism was detected after 10 days. The media used for NTM culture are Lowenstein-Jensen, Middle brook 7H11, or Ogawa media. Lowenstein-Jensen medium is traditionally used in the West, whereas Middle brook 7H11 medium (broth-based) and Ogawa medium (a solid phase medium) are usually used in Asia (Fig. 2). AFB staining can be helpful for detecting NTM early, but its detection rate is only 50% (Fig. 3). This ability of AFB staining to detect NTM early is believed to be due to the presence of mycolic acid in the lipid-rich bacterial cell wall. If NTM is suspected, AFB staining and culture are mandatory. Today NTM PCR also provides a good diagnostic method. Depending on the assay used and the specimen type and volume, reported sensitivities range from 50% to 100% and specificities are usually greater than 95%. These molecular tests also detect nonviable organisms and can be used to determine NTM species. In tissue biopsy samples, macrophages may be observed in well formed granulomas (Fig. 4). Furthermore, after an organism has been isolated and its sensitivities identified, antibiotics can be tailored appropriately. Although there is no current recommended antibiotic regimen, recommended treatments generally involve combinations of antibiotics for more than 4~6 months. Previous studies have shown that *M. fortuitum*, which is the most common pathogen responsible for NTM soft tissue infections, is usually susceptible to amikacin, imipenem, fluoroquinolones, and clarithromycin.² Several strains exhibit resistance to some of these agents, and therefore combination therapy is needed to avoid resistance. At the time of culture, antibiotic sensitivity test should be performed for the antibiotics regimen. The infected implant should be removed for treatment.

In previous case analyses, it was found to be difficult to determine the specific sources of organisms and no

specific risk factors of NTM infection were identified.¹ Our patient had not received chemotherapy and was not immunocompromised, and no risk factors of infection, such as, DM, alcohol, or another disease, were present. In one study, Safranec et al. suggested that gentian violet skin marking solution might have been the source of NTM infection.⁸ *M. fortuitum* complex is usually resistant to 10% povidone-iodine, 2% aqueous formaldehyde, and 2% alkaline glutaraldehyde,³ and thus, careful sterilization of surgical instrumentation and skin is required to prevent NTM infection.

The demand for cosmetic and reconstructive breast implant surgery is increasing in Korea. No case of NTM infection after breast implant surgery had been previously reported, but as the present report shows it does occur and its incidence is likely to increase. Furthermore, our knowledge and experience of this infection is minimal and its disease course differs to those of other infections, and thus, a high index of suspicion is important. Early suspicion and diagnosis and appropriate treatment will help prevent unnecessary complications, additional costs, and morbidities.

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