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Case Report

안면부 지방이식 후 지방 채취 부위와 이식 부위에 발생한 마이코박테리움 포투이툼의 동시감염

고주영 · 양은정

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Mycobacterium fortuitum Infection Associated with Facial Fat Grafting: Simultaneous Infection of Liposuction and Liposculpture Site

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We report a case of *Mycobacterium fortuitum* infection of the face and abdomen in a 25 years old man following cosmetic autologous fat injection. The goal of this manuscript is to increase awareness and suspicion of such as atypical mycobacterial infections complicating liposuction and fat injection. The clinical presentation, laboratory studies utilizing acid-fast stains and cultures, prevention and treatment including surgical debridement, and pharmacologic regimens in the ultimate diagnosis for *Mycobacterium fortuitum* infections are discussed.

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Key Words: *Mycobacterium fortuitum*, Liposuction, Fat transplantation

I. INTRODUCTION

Autologous fat transfer has been widely used and increased for correction of facial scarring, enhancement of facial volume and improvement of facial aging.[1] Fat can be harvested through inconspicuous stab incisions and the harvesting does not leave a defect. It can be introduced to correct various deficiencies, it is not immunogenic, and it is readily available and inexpensive.[2] But unexpected infection can ruin all these merits and cause catastrophic results.[3]

Mycobacterium fortuitum (M. fortuitum) is a non-pigmented rapidly growing mycobacterium classified in Runyon group IV3 and found in soil and water including chlorine-treated water.[4] In several countries of South America, the United States, France and Spain, the liposuction and liposculpture have been associated with cutaneous infection outbreaks caused by rapidly-growing mycobacteria. Recently, invasive procedure such as mesotherapy, liposuction, fat graft, stem cell injection on plastic surgery field has been increased and the case reports have been rapidly increased.[5]

The purpose of this report was to describe a rapidly growing mycobacterial infection after liposuction and fat injection, and to emphasize that rapidly growing mycobacteria should be included in the differential diagnosis of skin and soft tissue infection after cosmetic surgery. And the treatment including surgical debridement and pharmacologic regimens in the ultimate diagnosis for *M. fortuitum* infections are discussed.

II. CASE REPORT

A 25 years old man presented with multiple painful lumps and discharges of both cheek, nose and periumbilical area on emergency room. He has had bilateral cheek and nose augmentation with structural fat grafting harvested from the lower abdominal wall in local clinic 2 months before.

He reported the development of swellings on both cheek and

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nose immediately after surgery and yellow discharge on nasal tip in 2 weeks later. So he visited the local clinic and started oral antibiotics for 2 weeks and then changed to intravenous antibiotics (ceftriaxone) for 1 week. But the inflammatory sign was not subside, and then he was treated with oral antibiotics for 2 weeks (cefaclor and ofloxacin, augmentin and norfloxacin).

On examination in emergency room, he had low-grade fever and bilateral swelling and erythematous nodule in both cheek and nose (Fig. 1). A computerized axial tomography scan was obtained and demonstrated highly suggested multiple abscess formation on bilateral anterior cheek (Fig. 2). He had also periumbilical tenderness and erythema, along with serous discharge above his umbilicus at the site of liposuction incision. Initial blood investigations were within normal limits, but inflammatory laboratory values included a segmented neutrophil count of 76%, with a mild elevation of his C-reactive protein to 0.47, and ESR (erythrocytes sedimentation rate) to 74. Needle aspiration was done on nasal tips and wound cultures and a gram stain taken in the emergency room demonstrated only a few polymorpholeukocytes and did not grow any organisms.

He was subsequently admitted to the hospital for intravenous antibiotics and local wound care. Blood cultures were taken and he was started on intravenous cefazolin and clindamycin. He had an initial incision and drainage of a fluctuant nodule on the nasal tip and both cheek (Fig. 3). Biopsy from the abscess wall was taken for histology and a swab from the abscess cavity was taken for microscopic examination and culture. Two tissue biopsies from lesions were taken, one for histopathology and another for microbiological studies. Molecular biology techniques based on polymerase chain reaction (PCR) and reverse hybridization were used for mycobacterium identification. Drug resistance profiles of the isolated strains were obtained.

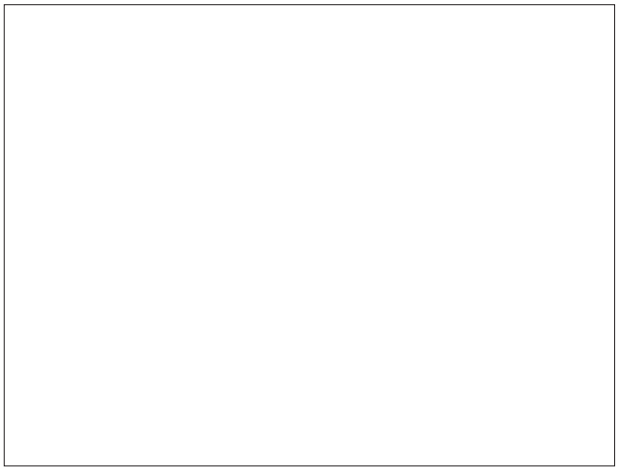

Fig. 1. Swelling and multiple skin nodules and abscesses in the both cheek and nose.

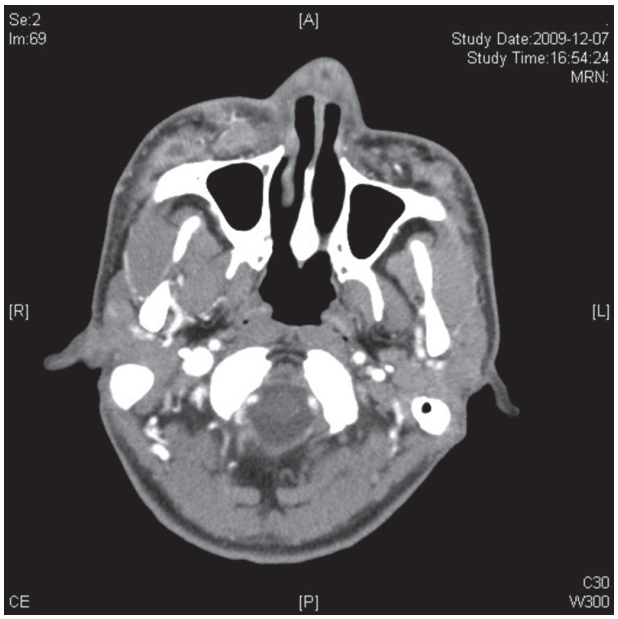

Fig. 2. A computerized axial tomography scan of face demonstrating highly suggested multiple abscess formation on bilateral anterior cheek.

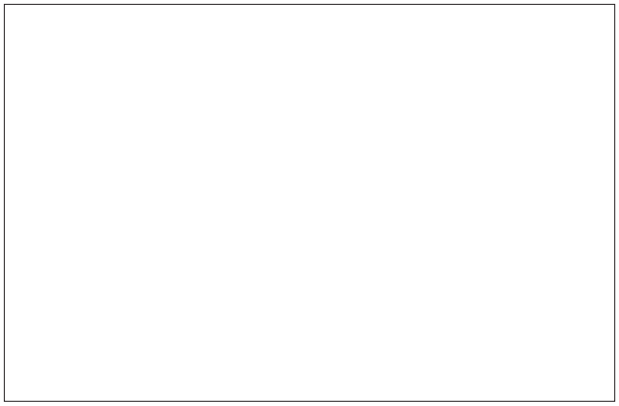

Fig. 3. An initial incision and drainage of a fluctuant nodule on the left cheek.

Fig. 4. Incision and curettage on tender and fluctuant abscess looking nodule on the periumbilical area.

He developed another tender and fluctuant abscess looking nodule on the periumbilical area (Fig. 4) within one week after hospitalization. Trunk ultrasonography demonstrated periumbilical heterogeneous hypoechoic tubular structure with somewhat increased peripheral vascularity (Fig. 5). And a computerized axial tomography scan demonstrated multiple anterior abdominal wall subcutaneous abscesses and edema (Fig. 6). It was also incised and curettaged. Histology showed chronic active suppurative inflammation with microabscess and granulation tissue formation, foreign body reaction and fibrinoid necrosis.

Stains for bacteria, fungi and mycobacteria were negative. Cultures from the swab and blood cultures were initially negative; however on prolonged incubation both grew isolates of *M. fortuitum*. He was treated with a quadriple intravenous antibiotic regimen (amikacin, imipenem, clarithomycin, cefoxitin D9, moxifloxacin, clarithromycin, cefoxitin, amikacin D11) Intravenous antibiotics were continued for 4 weeks, after that he was started on oral antibiotics for a further six months including IV amikacin, based on antimicrobial sensitivities (Table 1) (Amikacin, doxycycline and ciprofloxacin).

Table 1. Drug sensitivity test of NON-TUBERCULOUS MYCOBACTERIA (*M. fortuitum* complex)

Drug	Concentration	MIC(mcg/ml)	Results
Amikacin	1~128	2	S
Cefoxitin	2~256	256	R
Ciprofloxacin	0.125~16	0.25	S
Clarithromycin	0.5~64	16	S
Doxycycline	0.25~32	0.5	S
Imipenem	0.5~64	32	S
Moxifloxacin	0.125~16	0.25	S
Rifampin	0.125~16	>16	R
Sulfamethoxazole	1~128	128	R
Tobramycin	0.25~32	>32	R

MIC (Minimum Inhibitory Concentration), S (Susceptible), I (Intermediate), R (Resistant).

In 2 weeks after hospitalization, he developed more fluctuant nodules in right lower eyelid that had to be incised including orbicularis oculi muscle, squeezing and drainage were also done. This patient subsequently required 14 times of additional abscess drainage procedures in operating room during hospitalization for 2 months.

He had a good response to debridement and intravenous antibiotics with resolution of the swellings and discharge of cheek, nose and abdomen (Fig. 7). Follow up blood investigations were within normal limits, including a segmented neutrophil percentage of 55.3%, C-reactive protein count of 0.03, and ESR to 3. The lesions had cleared completely with minimal scarring.

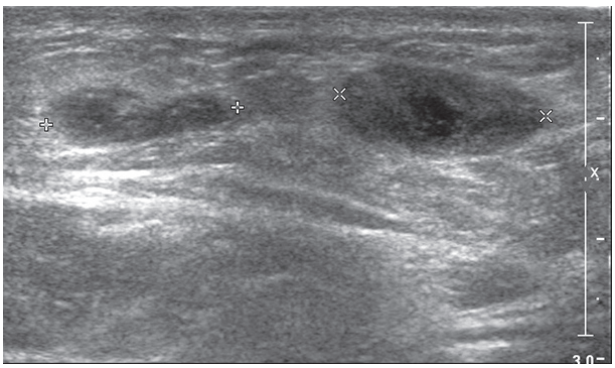

Fig. 5. Trunk ultrasonography of abdomen demonstrating periumbilical heterogeneous hypoechoic tubular structure.

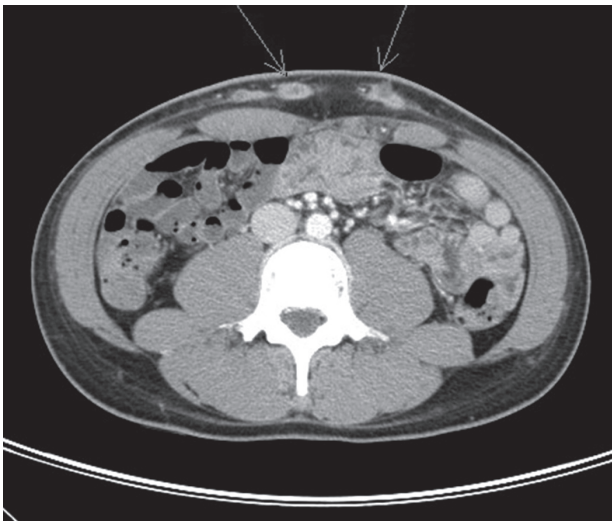

Fig. 6. Computerized axial tomography scan of abdomen demonstrating anterior abdominal wall subcutaneous abscesses and edema.

After 2 months of follow-up, no lesions relapsed.

III. DISCUSSION

Like other nontubercular mycobacteria, *M. fortuitum* group is ubiquitous in soil and water habitats.[4] *M. fortuitum* is a nonpigmented rapidly growing mycobacterium classified in Runyon group IV3 and *M. fortuitum* infections most commonly occur in immunocompetent individuals unlike *M. chelonei* and *M. abscessus*, which frequently cause disease in immunocompromised patients. Because of its widespread presence in the environment, everyone is exposed to this mycobacterium. The most important risk factors are exposures to contaminated solutions and medical equipment material used in surgical or clinical procedures.[5]

There are several reports of *M. fortuitum* complicating plastic surgery procedures caused by rapidly growing mycobacteria

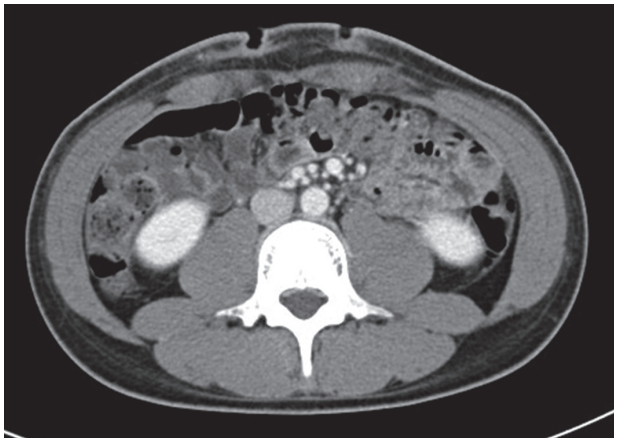

Fig. 7. After 2 weeks I & D, computerized axial tomography scan of abdomen demonstrating decreased subcutaneous abscesses and edema. due to op. related several skin defect of anterior abdominal wall.

Fig. 8. 2 months following incision and drainage, presented without significant irregular skin contour and scar.

following liposuction or lipoplasty.[6] Both surgical procedures involve small surgical wounds with limited environmental exposure; both require using cannulae for tissue suction and injection.[7] The infection in our patient likely arose from contaminated reusable instruments that were inadequately sterilized. The usual source of NON-TUBERCULOUS MYCOBACTERIA in nosocomial outbreaks is contaminated tap water or aqueous solutions used in cleaning cannulae during liposuction or fat injection. NON-TUBERCULOUS MYCOBACTERIA are resistant to eradication by the usual methods of disinfection, including chemical sterilization, elevated temperatures, and ultraviolet light.[8] Their high lipid content and triple-layered cell wall render mycobacteria is more resistant to disinfection, high temperature and ultraviolet light compared with other pathogenic bacteria that may colonize potable water. In addition, biofilms appear to support mycobacterial growth and protect the organism, which makes complete disinfection of colonized water systems difficult to achieve. Other factors that can contribute to outbreaks include incomplete disassembly of surgical instruments or defective sterilization equipment.

The manifestation of *M. fortuitum* infection develops after an inoculation period of 4 to 6 weeks. Superficial manifestation is attributable to direct inoculation and is localized to the injury site. Lesions can vary from painful nodules, abscesses, ulcers, draining sinus tracts, or cellulitis. There should be clinical suspicion when patients present with nonhealing furuncles on the liposuction and fat injection site.[6]

Granulomatous nodule or diffuse inflammation with mixed granulomas, and abscesses with mild granulomatous reaction can be seen on histopathology. Histopathology is variable and depends on the age of the lesion biopsied. Older lesions have a poor infiltrate, whereas acute lesions display suppurative granulomas without caseation, local tissue destruction, and a mixed infiltrate.

Although *M. fortuitum* is a rapid grower, in standard media, its growth requires more than two days. Therefore it is important to notify the laboratory about the possibility of acid-fast bacilli infection to ensure prolonged incubation. Culture for acid fast bacilli is necessary for the diagnosis of mycobacterial infection.

Once the diagnosis of *M. fortuitum* is made, an infectious disease consult may be helpful. Treatment of *M. fortuitum* infections depends on antimicrobial sensitivities as well as the clinical manifestation. Nowadays, combination therapy is recommended for usually 4 to 6 months, but longer treatment is sometimes required. Currently recommended antimicrobial regimens include amikacin, cefoxitin, imipenem, and clarithromycin, but sensitivity test must be obtained to ensure success. Multiple agents, too, may be necessary to combat rapid resistance patterns. In general, standard antituberculous agents have no efficacy in this setting.[8]

Prompt treatment begins with surgical debridement. The goal of surgical debridement should be to remove all nonviable, necrotic tissue; both surgeon and patient should be aware that multiple, serial debridements may be required. Several surgical debridements may be required over several months, depending on the response antimicrobial therapy and surgery. Wounds must be left open and packed to prevent early closure of the skin, which can result in reaccumulation of pus and reformation of new draining fistulas.

The prevention of nosocomial infections and pseudoinfections due to non-tuberculous mycobacteria is challenging. The effectiveness of disinfectants against mycobacteria depends on the composition and concentration of the active agent,

presence of organic material, disinfectant contact time, and duration of potency. In Vijayaraghavana et al. (2006), despite glutaraldehyde solutions being discarded by the tenth day as per hospital policy, the organisms probably survived within the biofilms that were inadequately removed during cleansing of the trays and, in turn, contaminated the trocars and/or instruments. An official ATS/IDSA statement about NON-TUBERCULOUS MYCOBACTERIA infection prevention in surgery department recommended not to use tap water and/or ice prepared from tap water in the operating room, especially during augmentation mammoplasty. They also recommended not to wash or contaminate open wounds with tap water and in outpatient facilities performing plastic surgery procedures such as liposuction or augmentation mammoplasty must carefully follow recommended sterilization guidelines.

Ⅳ. CONCLUSION

In conclusion, this case demonstrates the importance of suspecting mycobacterial etiology in patients with nodules and abscesses on the areas of liposuction and fat injection. Early microbiologic diagnosis, combined with an adequate antimicrobial agent and a prompt surgical approach, are very important in cosmetic invasive surgery wound and soft tissue infections. Rapid growing mycobacterium should be included in the differential diagnosis of wound and soft tissue infections after either liposuction or lipoplasty.

We insist on adherence to standard approved sterilization procedures for surgical instruments, medical equipments, skin-marking solutions, and water supplies, as well as proper preoperative skin cleansing, since all are important factors with a definite influence on the initiation of these infections.

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