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Nontuberculous Mycobacterial Infection after Removal of the Exposed Hydroxyapatite

Dear Editor,

Numerous complications are associated with hydroxyapatite orbital implants. Implant exposure, the most important complication, differs by study but occurs in approximately 2% to 10% of patients [1].

Nontuberculous mycobacteria (NTM) are generally free-living organisms that can also inhabit body surfaces or cause secretions without causing disease [2]. It is also known that these organisms can cause infection through wound entry.

Reported herein is a case of abrupt NTM orbital cellulitis after removal of the exposed hydroxyapatite.

A 43-year-old male presented with orbital implant exposure occurring about 1 year earlier. A culture was performed of a sample from the exposure site, but no growth was observed. The patient had undergone evisceration surgery with hydroxyapatite implantation 23 years earlier, due to trauma. Orbital implant removal surgery was initially recommended, but the patient refused. He changed his mind 1 year later and was admitted to the hospital with no sign of infection at the exposure site (Fig. 1A). Prophylactic antibiotic treatment was started, then removal of hydroxyapatite, enucleation with hydroxyapatite reimplantation, and a dermis-fat graft were performed. There were no sign of infection on the removed hydroxyapatite or the surrounding sclera. The removed material was sent to the Laboratory Department for Culture. The operation site was initially stable, although swelling and erythema were noted on postoperative day (POD) #2. Based on these findings, intravenous antibiotic treatment was changed, and 5% ceftazidime and 2.5% vancomycin eyedrops were added. Despite this treatment, the lesion continued to worsen with increased discharge and development into an erythematous lesion (Fig. 1B and 1C). NTM was observed in the culture on POD #7, for which intravenous antibiotics were changed to fourth-generation cephalosporin and vancomycin and polymerase chain reaction (PCR) examination was conducted to identify the subtype of NTM. The lesion continued to worsen, however, and reoperation, graft and hydroxyapatite removal, debridement, and wound irrigation with antibiotics were performed on POD #8. The removed

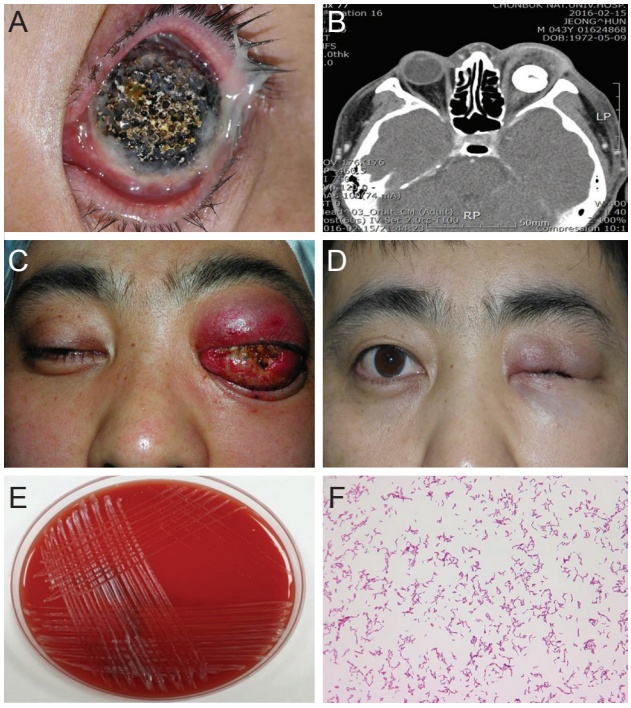

Fig. 1. (A) Photograph of exposed hydroxyapatite before the surgery. (B) Commuted tomographic image after hydroxyapatite reimplant with dermis fat graft. (C) Photograph of swelling of multiple erythematous lesions after hydroxyapatite reimplant with dermis fat graft. (D) Photograph of decreased erythematous lesion 1 month after starting nontuberculous mycobacterial therapy. (E) Blood agar plate with 5% sheep blood. Incubated at 37°C with 5% CO_2 for 3 days, whitish-gray tiny colonies observed, (F) Ziehl-Neelsen stain, ×1,000, with oil immersion, pinkish acid-fast rods seen.

material was again subjected to culture and PCR examination. *Mycobacterium abscessus* (*M. abscessus*) was found in the first culture on POD #15, which was then sent for antibiotic-susceptibility examination. Intravenous cefoxitin, amikacin antibiotic treatment, clarithromycin administration, fortified amikacin eyedrops, and topical clarithromycin [3], which is usually applicable to *M. abscessus*, were started. On the day after the reoperation, NTM was detected again in the first PCR examination and on the culture from reoperation. The lesion improved slowly 3 days after reoperation. The patient was diagnosed with orbital cellulitis caused by *M. abscessus*. One month later, no erythema or swelling was found (Fig. 1D).

The results of the antibiotic-susceptibility examination showed that *M. abscessus* from the lesion was susceptible to cefoxitin and clarithromycin. Seven weeks after the reoperation, *M. abscessus* was verified from the PCR examination of the reoperation results.

Kheir et al. [4] reported a systemic review of NTM ocular infection. Of 420 eyes, orbital infection was reported in five cases, one case that occurred 6 weeks after enucleation with Teflon ball implantation [5]. They also performed orbital implant removal surgery with anti-NTM medication. Most cases of NTM infection were directly preceded by intervention like laser-assisted *in situ* keratomileusis, blepharoplasty, scleral buckling, or cataract surgery [4]. Regardless of location, NTM infection after surgery accounts for 73% of all NTM ocular infection. Although the exact infection course of our case was not able to be ascertained, it was presumed that the surgery triggered direct inoculation of NTM from the normal flora of the skin and from the orbital implant through the operation site.

Cultures were performed from the removed hydroxyapatite. Three days after incubation at 37°C with 5% CO_2, tiny white colonies were observed on the blood agar plate (Fig. 1E), suggestive of gram-positive rods. Ziehl-Neelsen staining identified these colonies as acid-fast-positive rods (Fig. 1F). Such bacteria were also identified on 2% Ogawa solid media and liquid media after about 1 to 2 weeks of incubation. They were ultimately identified as *M. abscessus* with Advansure Mycobacterium Genoblot assay (LG Life Sciences, Seoul, Korea). This was confirmed with 16s rRNA sequencing, which showed a 100% homology with NR_074427.1 and NR_042917.1 in GenBank and CU458896 (ATCC 19977) in the EzTaxon server, respectively.

Postoperative infection is unpredictable and often progresses to a catastrophic status. If such an infection does not respond to primary antibiotic treatment or is rapidly aggravated, NTM infection should be considered as differential diagnosis.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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