

# Surgical Treatment for Cutaneous *Mycobacterium abscessus* Infection Caused by Injections of Hyaluronic Acid

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**Background:** Facial injection has become popular in aesthetic dermatology. Although injections of these tissue fillers are considered a low-risk procedure, they are not without potentially significant drawbacks.

**Case Presentation:** We would like to report a case about cutaneous *Mycobacterium abscessus* infection after facial injection of hyaluronic acid in China, which obtained satisfactory clinical efficacy by drainage and surgical excision.

**Conclusion:** Biological techniques are useful in the diagnosis of cutaneous *M. abscessus* infection. Surgical excision of skin lesion is effective for cutaneous *M. abscessus* infection.

**Keywords:** hyaluronic acid, injection, cutaneous *Mycobacterium abscessus*, infection, surgical treatment

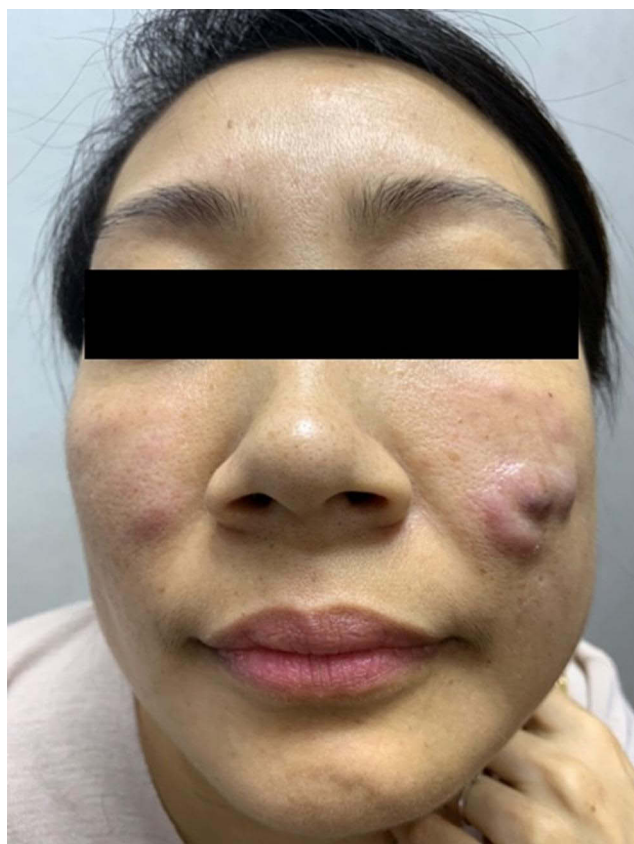
## Background

Facial injection has become popular in aesthetic dermatology. Although injections of these tissue fillers are considered a low-risk procedure, they are not without potentially significant drawbacks. For the past few years, an increase in the incidence of cutaneous non-tuberculous mycobacteria (NTM) infections has been observed.<sup>1</sup> Although there is no solid explanation for this phenomenon, it has been at least partially attributed to the increasing development of the cosmetic and aesthetic dermatological industries.<sup>2</sup> Skin and soft tissue infections caused by NTM have been increasingly described as a complication associated with cosmetic procedures.<sup>3</sup> Cases or outbreaks are therefore reported after mesotherapy,<sup>4</sup> hair transplant,<sup>2</sup> injection of botulinum toxin A,<sup>5,6</sup> illicit intramammary injections of silicone,<sup>7</sup> liposuction,<sup>8</sup> face lift,<sup>9</sup> piercing,<sup>10</sup> and tattooing.<sup>11</sup> However, few cases of secondary NTM infections after injection of hyaluronic acid filler have been reported. The treatment of NTM infection is also challenging. As NTM is resistant to various antibiotics and differs in antimicrobial sensitivities, surgical treatment is usually required as combination therapy. We would like to report a case about cutaneous *Mycobacterium abscessus* infection after facial injection of hyaluronic acid in China, which obtained satisfactory clinical efficacy by drainage and surgical excision.

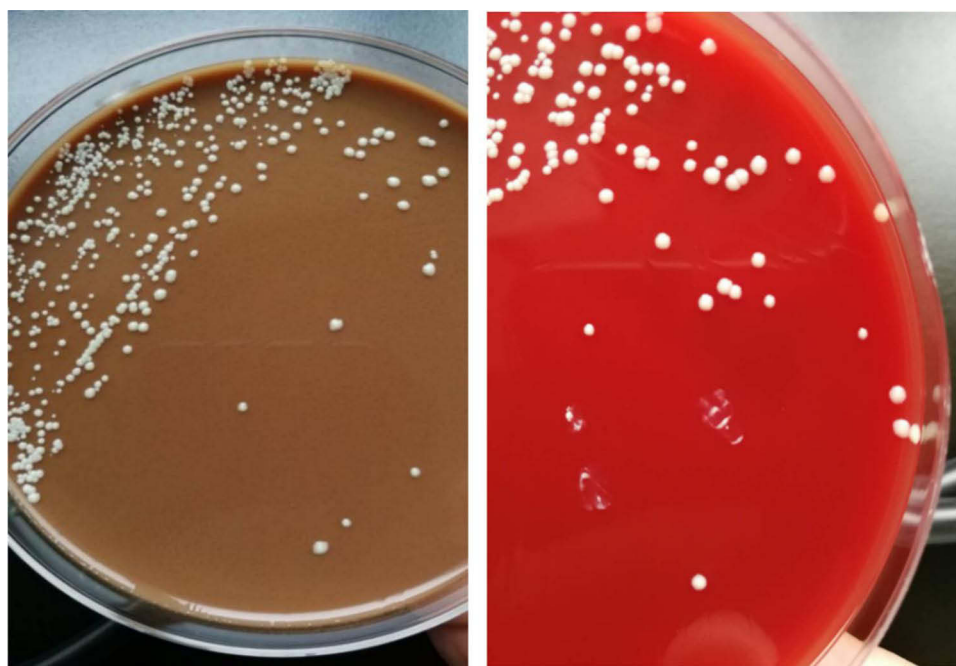
## Case Presentation

A 37-year-old woman complained the development of multiple, painful nodules and abscesses on both cheeks about one week after injection of a mixture containing hyaluronic acid (exact product name could not be recalled) for facial depression filling at a private clinic a month ago. The patient has received antimicrobial treatment (oral clarithromycin) for 3 weeks at another hospital, but the symptoms did not improve. The patient denied fever or other systemic symptoms. The patient had no previous filler injection or surgery on her face in the past. Dermatological examination revealed multiple erythematous, non-tender nodules on both cheeks, without palpable lymphadenopathy (Figure 1).

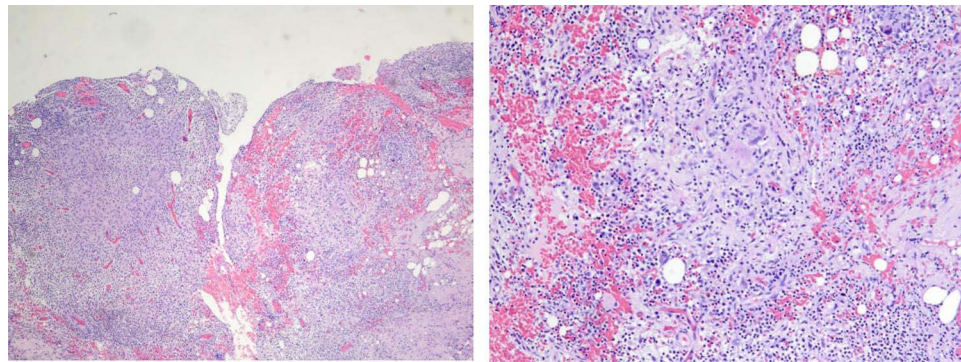
Results of routine laboratory tests were normal. Smear test of abscess fluid showed gram-positive cocci. Acid fast staining of the puncture fluid was also positive. *Mycobacterium abscessus* was identified in the bacterial culture of puncture fluid (Figure 2). Moreover, both the polymerase chain reaction (PCR) and mass spectrometry (MS) analysis



**Figure 1** Clinical picture of the patient.



**Figure 2** Muroid cream-colored colonies on agar and blood agar from puncture fluid specimens, which were identified as *Mycobacterium abscessus* by PCR and mass spectrometry analysis.



**Figure 3** Histopathologic results showed infectious granuloma with lymphocytes, plasma cells, multinucleate giant cells infiltrate in the surrounding tissues and heavy lymphocytes, plasma cells, neutrophils infiltrate in deep dermis (H&E stain, Original magnification×10; Original magnification ×40).

confirmed *Mycobacterium abscessus* in the puncture fluid of abscess. Histopathology showed infectious granuloma and infiltration of lymphocytes, plasma cells, multinucleate giant cells, as well as neutrophils in the dermis (Figure 3).

The patient explicitly resisted to take oral medicine because of potential side effects and a long course of treatment. Following needle aspiration of pus, abscesses were washed with 4.4 mL solution containing 7mg diprosan and 600u hyaluronidase. Seven months later, lesions on the left cheek completely disappeared, while lesions on the right cheek showed no significant change. Because of no improvement on the right cheek after an additional drainage and irrigation of the abscess, surgical excision of abscess was performed. The infected skin and subcutaneous tissue were removed during surgery. After operation, mupirocin ointment was applied outside the incision, and dressing was changed every other day until the stitching was removed after 1 week. No recurrence was observed during 18-month follow-up (Figure 4).

## Discussion

*M. abscessus*, together with *M. fortuitum* and *M. chelonae*, are the most common rapidly growing non-tuberculous mycobacteria (RGM) pathogens.<sup>5</sup> *M. abscessus* can live and last a long time in various external environments such as soil, decaying vegetation, bioaerosols, and water.<sup>11</sup> *M. abscessus* is capable of surviving longer due to their relative resistance to standard disinfectants such as chlorine, organomercurials, alkaline glutaraldehydes, and 2% formaldehyde.<sup>12,13</sup> *M. abscessus* also forms biofilms so that resistance can easily occur. Therefore, *M. abscessus* is frequently detected in health-care facilities and can appear after long incubation periods.<sup>4,14</sup> The source of the nosocomial infections could be the re-use of needles without proper sterilization and the contaminated gentian violet solution and tap water for medical procedures and instrument cleaning.<sup>14</sup> Besides, the use of unapproved medications may be another reason, and there have been reports of abscesses induced by the injection of a variety of contaminated solutions, such as local anesthetic agents and steroids.<sup>15</sup> In the present study, the patient underwent the injection of a bottle of dermal fillers contained “hyaluronic acid and epidermal growth factor mixed formulation” (exact name could not be recalled) at a unauthorized private clinic. The lesions occurred 7 days after the injection. The disease history and location of the lesions led us to conclude that the source of the infection in this case may be unapproved cosmetic medications or external environments and medical equipments without proper sterilization.

Common complications of facial injection include infections, bleeding, foreign body reaction, erythema, swelling, itching, bruising, induration, depigmentation, lumpiness, ulceration, and vascular complication,<sup>3,16,17</sup> among which RGM infection is rare. Any chronic cutaneous lesion located at any cutaneous site after a medical procedure must evoke the possibility of RGM infection.<sup>5</sup> It was reported that the mean time between the first injection and the appearance of the first symptoms was 9.5 weeks (range, 1–29 weeks).<sup>18</sup> However, treatment for *M. abscessus* can be challenging because currently there is no guideline to treat the associated skin and soft tissue infections.<sup>19</sup> The consensus is that the choice of therapy for infections with RGM depends on the condition of the patient. Patients who are immunocompromised or with disseminated disease require more aggressive therapy with intravenous antibiotics,<sup>7</sup> while for normal patient, optimal treatment is yet to be established, and the use of surgical treatment and/or antibiotic therapy needs to be evaluated on



**Figure 4** Picture of the patient at a 18-month follow-up after treatment.

a case-by-case basis.<sup>18</sup> Classic antibiotic therapeutic choices for *M. abscessus* infections are clarithromycin and azithromycin, and other antibiotic susceptibility panels could include amikacin, tigecycline, cefoxitin, ciprofloxacin, doxycycline, imipenem, and sulfonamide. It was reported that RGM frequently exhibits acquired resistance to a single antibiotic.<sup>20</sup> Consequently monotherapy was not recommended, and a double or triple antibiotic regimen formulated according to in vitro susceptibility results may be a legitimate choice. The course of antibiotic treatment for localized cutaneous infection is usually 2 through 4 months, and at least 6 months is recommended for the treatment of disseminated disease. It was reported that 10–20% patients experienced a relapse in disease after discontinuing antibiotic therapy at the time of wound healing, therefore therapy should be continued for 4–6 weeks after lesions healing.<sup>20</sup> Another study reported that among the 16 patients developed cutaneous infections by RGM, no recurrent abscess occurred in 3 patients (2 of whom had only undergone surgical treatment and 1 of whom who had undergone surgical treatment combined with antibiotic therapy), while in the remaining 13 treated patients, disease initially progressed despite an effective in vitro susceptibility to 2–3 antibiotics.<sup>21</sup>

In our study, the patient explicitly rejected oral drugs for potential side effects and prolonged course, therefore surgical puncture, drainage, and dissolving of foreign bodies were performed at an early stage. As a result, the lesions on her left cheek were cured with no evidence of recurrence after the first surgical interventions. However, the lesions on the right cheek had no significant change after drainage twice. Therefore, the patient underwent surgical excision and has not relapsed up to now.

This study has some limitations. The patient in this study could not adhere to adequate antibiotic therapy for 4–6 months and stopped taking antibiotics after 3 weeks of oral administration, so antibiotic therapy did not achieve good efficacy. The sample size of this study is too small, and the effect of surgical treatment still needs further research.



## Conclusion

The present case indicates that cosmetic dermal filler injections such as hyaluronic acid at unauthorized private clinics can cause *M. abscessus* infection. Biological techniques are useful in the diagnosis of cutaneous *M. abscessus* infection. Surgical treatment is an effective option for cutaneous *M. abscessus* infection when antibiotics do not respond well or patients are unable to insist on oral antibiotics.

## Ethics Approval and Consent to Participate

The patient in our case has signed the informed consent. This study was designed in accordance with the Declaration of Helsinki and approved by the ethics committee of Dermatology Hospital, Southern Medical University.

## Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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## Disclosure

The authors declare that they have no competing interests in this work.

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