

# A progressive erythematous plaque on the central face and nose after mesotherapy, an uncommon presentation of *Mycobacterium marinum* infection

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## ABSTRACT:

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*Mycobacterium marinum* is a slowly growing photochromogenic nontuberculous mycobacterium and its ability to cause localized skin and soft tissue infections in individuals with exposure to contaminated freshwater or salt water. So far, only small amount cases of *M. marinum* infection on the face have been reported worldwide and all cases have been linked to aquatic exposure. No previous documented history of cosmetic procedures related to *M. marinum* facial infection. We reported a case 32-year-old Thai female who presented with atypical infected site of multiple erythematous indurated plaques on predominately central face from *M. marinum* infection suspected from mesotherapy. Diagnosis was made by using polymerase chain reaction (PCR) technique from skin biopsy. She was treated with clarithromycin plus ciprofloxacin for 2 months then switched to azithromycin plus ethambutol for 7 months due to pregnancy. After total 9-month therapeutic treatment, the lesions healed gradually without scar.

**Key words:** *Mycobacterium marinum* infection, Cosmetic procedures, Facial infection

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## Introduction

*Mycobacterium marinum* is a slowly growing photochromogenic nontuberculous mycobacterium and its ability to cause localized skin and soft tissue infections in individuals with exposure to contaminated freshwater or salt water. Most cases of cutaneous infections take place among individuals who suffered puncture injuries or other types of trauma in freshwater or salt water, mostly transmitted from fish<sup>1</sup>. The clinical spectrum of cutaneous disease caused by *M. marinum* includes papule, plaque, or nodule that may ulcerate and then spreads in a sporotrichoid pattern (lymphangitic spread). Incubation period is 2 to 3 weeks, but it ranges from 1 week to 2 months<sup>1,2</sup>. Because its optimal temperature for growth is around 31°C, cutaneous lesions most frequently occur in the upper or lower extremities, but facial lesion is rarely reported<sup>3</sup>. There were few reports of *M. marinum* facial infection, which all have been linked to aquatic exposure. No previous documented history of cosmetic procedures related to *M. marinum* facial infection<sup>4-8</sup>.

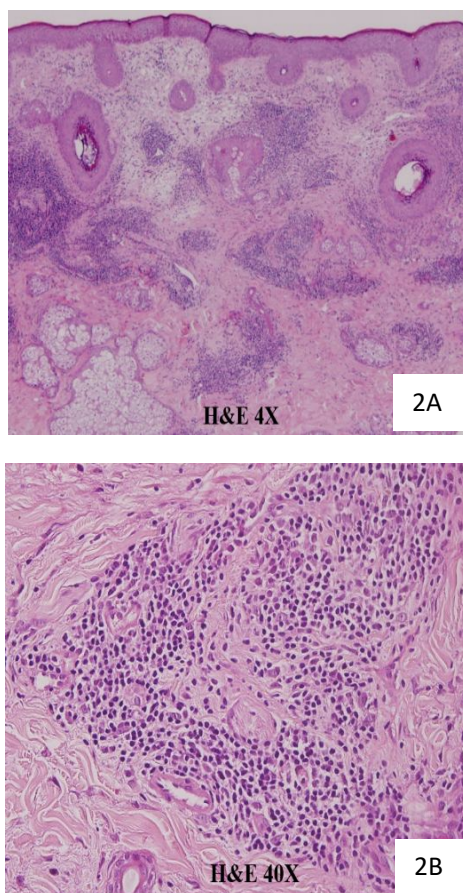
## Case Report

A 32-year-old housewife from central Thailand presented with multiple well-defined erythematous indurated plaques with pruritus on medial side of both cheeks and nose for 1 year. It had gradually increased in size and in amount without discharge after 1 month from last

mesotherapy. The rash progressed on left nasal bridge and, as a consequence, led to the involvement of medial side of both cheeks and nose. Apart from the rash, there was neither a systemic symptom nor any destruction of the nose. She was treated with topical corticosteroids and oral unknown antifungal drugs without improvement. She had no known underlying disease. Her family members and her close friends were not experienced the same condition with the patient. History of rhinoplasty and history of filler injection on forehead 2 year-ago were documented. A dermatological examination showed multiple well-defined non-scaly erythematous indurated plaques on medial side of both cheeks and nose (Fig. 1). Pinprick sensations on the plaques were normal. The cervical lymphadenopathy could not be palpated.

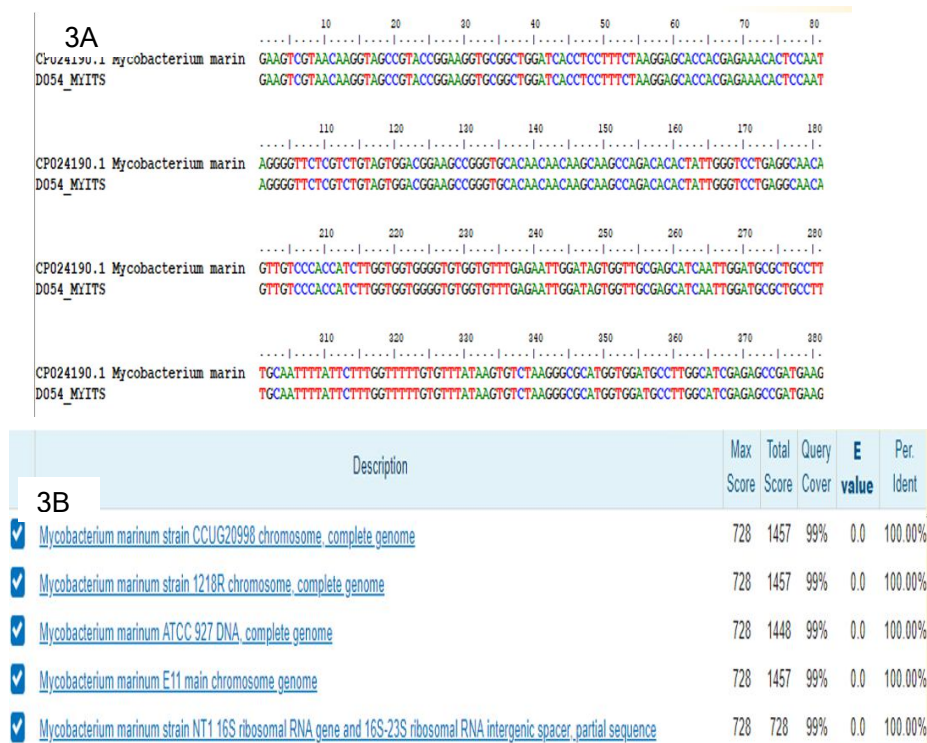


**Figure 1** Multiple well-defined non-scaly erythematous indurated plaques on medial side of both cheeks and nose



**Figure 2** Histopathological examination shows slightly irregular acanthosis with hyperkeratosis. Neither spongiosis nor interface change was seen. (H&E X 4) A. The dermis showed patchy infiltration of mixed inflammatory cell infiltration with some degree of fibrosis. The inflammation consisted of lymphocytes, plasma cells, and histiocytes. (H&E X 40) B

A skin biopsy was performed at the indurated erythematous border of the plaque on medial side of right cheek and the result revealed slightly irregular acanthosis with hyperkeratosis. Neither spongiosis nor interface change was seen. The dermis showed patchy infiltration of mixed inflammatory cell infiltration with some degree of fibrosis. The inflammation consisted of lymphocytes, plasma cells, and histiocytes (Fig. 2A and 2B). Furthermore, no distinct granulomatous formation was identified. No microorganism was seen in serial slide sections. Direct immunofluorescences showed negative all. Tissue culture for bacteria, mycobacteria, and fungi reported no growth. Then, the tissue PCR for mycobacteria and fungi were done. First, we obtained the specimen from tissue biopsy and identified a part of the internal transcribed spacer (ITS) by ribosomal DNA (rDNA) sequencing and amplification with PCR technique. After that, we compared the base pair sequence against the ITS of rDNA by reference database from National Center for Biotechnology Information (NCBI). The results from the ITS of rDNA method showed similarity by percentage of matched mycobacterial species. The result of our patient was a hundred percentages in similarity of *Mycobacterium marinum* (Fig. 3A and 3 B).



**Figure 3** Similar base pairs from the internal transcribed spacer (ITS) were compared between index case and standard reference. A National Center for Biotechnology Information (NCBI) database showed the result of ITS in similarity of matched mycobacterial species by percentage. B



**Figure 4** After dual antibiotics treatment, the facial lesions healed gradually without scar and had no recurrence lesion.

The overall findings are compatible with central facial skin infection from *Mycobacterium marinum*. In order to evaluate postulated source of infection, comprehensive history taking was reviewed and displayed neither swimming nor exposure to fish. History of unknown illegal mesotherapy from small infamous private beauty clinic was detected in 1 month before developed multiple facial lesions and was compatible with incubation period of this pathogen. The plaques progressed predominately on the central face and nose, corresponded with locations of optimal

low temperature for growth and related with injected sites from mesotherapy. We reported a case 32-year-old Thai female who presented with atypical infected site of multiple erythematous indurated plaques on predominately central face from *M. marinum* infection suspected from mesotherapy.

### Discussion

*Mycobacterium marinum*, slowly growing nontuberculous mycobacterium, can cause localized skin and soft tissue infections with exposure to contaminated freshwater, salt water, brackish water, or fish<sup>1</sup>. Several clinical manifestations have been reported including 60% solitary papulonodular lesion, 25% sporotrichoid lesion, and 10-15% pustular, ulcerative, granulomatous, verrucous plaques. Common locations occur in 80-90% the upper extremities, 10% the lower extremities, rarely in the central face and nose because its optimal temperature for growth is around 31°C. *M. marinum* may produce deep tissue involvement or disseminated disease among severely immunocompromised hosts<sup>2</sup>. Incubation period is 2 to 3 weeks, but it ranges from 1 week to 2 months, and disease courses of *M. marinum* skin infection often take several-month delay between the onset of the lesions and the patient's seeking medical care<sup>1,2</sup>. Our patient presented with a progressive erythematous plaque on medial side of both cheeks and nose,

an uncommon presentation of *M. marinum* infection. Differential diagnoses include other mycobacteria, cutaneous fungal infection, and lupus vulgaris. Otherwise, foreign body granuloma, pseudolymphoma, lymphoma, lymphocytic infiltration of Jessner, and lupus tumidus are differential diagnosis of non-infectious cause.

Diagnosing an infection due to *M. marinum* requires a high index of suspicion, a properly obtained exposure history, and knowledge of laboratory growth characteristics of the organism<sup>2</sup>. Though the diagnosis can be suspected clinically, especially when exposure is established, the diagnosis relies on isolation of a mycobacterium subsequently identified as *M. marinum* including by nontuberculous mycobacterial cultures or by molecular diagnosis that had specific nucleotide of rDNA genes of *M. marinum*<sup>9</sup>. Our patient was diagnosed by polymerase chain reaction (PCR) from skin biopsy tissue, positive for *M. marinum* with no growth culture.

An emerging group of skin and soft tissue infections by nontuberculous mycobacteria, especially by rapidly growing mycobacteria (50-60% *M. abscessus*, 20-30% *M. chelonae*, and 10% *M. fortuitum*), is associated with traumatic lesions, surgery and cosmetic procedures, such as tattoo, liposuction, and mesotherapy injections<sup>3,4</sup>. They often occur as outbreaks in immunocompetent persons. From systematic review of

nontuberculous mycobacterial infections after cosmetic procedures, the procedure that resulted in the highest proportion of the infections was mesotherapy<sup>4</sup>. Mesotherapy is a technique that involves injection of plant extracts, pharmaceuticals, vitamins, and other bioactive substances into the dermis and subcutaneous tissue for the purposes of cellulite reduction, brightening effect<sup>5</sup>. So far, only small amount cases of *M. marinum* infection on the face have been reported worldwide which all have been linked to aquatic exposure and unrelated to previous history of cosmetic procedures<sup>6-8</sup>. As long as we searched, our rare first case of *M. marinum* facial infection had been suspected from mesotherapy, linked to contaminated material being injected and unsterile techniques.

Treatment of *M. marinum* infection is effective for dual antibiotics such as clarithromycin plus fluoroquinolones or rifampicin or ethambutol<sup>10</sup>. The treatment can be modified based on antibiotics susceptibility testing, patient status e.g. pregnancy, side effects, and clinical responses<sup>5</sup>. Duration of treatment was recommended to continue with antibiotics therapy at least until the lesions heal and then for 2 additional months (total 3 to 9 months), especially in cases of infection extended to deeper structures. Surgical debridement should be limited to the cases with criteria known to be associated with poor prognosis, including steroid injection into the

lesion, a persistent drainage sinus tract after several months of antimicrobial therapy, deeper structure involvement, and persistent pain<sup>2</sup>. Our patient had taken clarithromycin (pregnancy category C) with ciprofloxacin for 2 months (pregnancy category C) then switch to azithromycin (pregnancy category B) with ethambutol (pregnancy category A) for 7 months due to becoming pregnancy. After total 9-month therapeutic treatment, the facial lesions healed gradually and had no recurrence lesion. Last several years, a surge in medical tourism and interests in cosmetic and aesthetic procedures on a global scale have witnessed. More stringent regulation and monitoring of procedures and aesthetic products going forward will help reduce baseline rates of these infections and prevent future outbreaks<sup>5</sup>.

In summary, we reported the rare skin manifestation of *M. marinum* infection after mesotherapy on the face. The patient presented with multiple well-defined non-scaly erythematous indurated plaques on medial side of both cheeks and nose. PCR for nontuberculous mycobacterium from skin biopsy was useful for diagnosis. After total 9-month therapeutic treatment, the lesions healed gradually without scar. Clinicians should be aware of the possibility of *M. marinum* infection, even if the history and location may be atypical.

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