

Treatment of a refractory allergic reaction to a red tattoo on the lips with methotrexate and Q-switched Nd-Yag laser



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INTRODUCTION

Tattoos, including permanent makeup, are a popular and increasing form of body art. However, complications such as allergic reactions can occur and are difficult to treat.

CASE REPORT

A 51-year-old, otherwise healthy, woman was referred to the Tattoo Clinic with a painful and pruritic swelling of her recently red-tattooed lips. The cosmetic tattoo was placed 6 months prior to her visit to the patient clinic, and her first symptoms occurred 2 months after the tattooing procedure. Because of the painful swelling, she had difficulty eating and talking, which had a significant impact on her quality of life. On physical examination, both the entire upper and lower lip showed erythematousquamous plaques, sharply confined to the red-tattooed mucosa (Fig 1, A and B). After follow-up weeks later, the reaction had evolved into ulcerative plaques (Fig 1, C). There was no lymphadenopathy. Histopathology of a skin biopsy specimen revealed a lymphohistiocytic, nonsarcoid, granulomatous infiltrate surrounding the red tattoo pigment. Ziehl-Neelsen and periodic acid-Schiff-diastase stains were negative. Serum angiotensin-converting enzyme was within the normal range. Chest X-ray showed no signs of sarcoidosis or other abnormalities. Repeated cultures for bacteria and fungi were negative. Polymerase chain reactions for herpes simplex virus and varicella-zoster virus were also negative, as was serology for HIV.

On the basis of the clinical and histologic findings, we diagnosed her with a delayed allergic reaction to the red tattoo pigment. No patch testing was performed because no reliable patch tests for tattoo allergies are currently available.

Previous unsuccessful treatment included topical corticosteroids (clobetasol propionate 0.05%), topical antifungals, topical antibiotics, oral amoxicillin-clavulanate, oral ciprofloxacin, and prednisolone 30 mg/day for 2 weeks. Because of potential cutaneous atrophy, our patient was reluctant to receive therapy with intralesional corticosteroids. Therefore, and because of previous good results in other cases, treatment with hydroxychloroquine 200 mg twice daily was initiated.^{1,2} However, after 4 months of treatment, there was no clinical improvement. Consequently, hydroxychloroquine was discontinued, and treatment with cyclosporine 175 mg twice daily (3–4 mg/kg) was initiated. Unfortunately, after 3 months, no clinical improvement was observed. Because of her ongoing severe symptoms, she agreed to a single session of intralesional corticosteroid injections, but this only resulted in a minimal reduction of the ulceration and swelling. Because of the severe pain she experienced from the intralesional corticosteroid treatment and potential risk of skin atrophy, further treatment was rejected by the patient. As the next anti-inflammatory treatment, oral methotrexate 15 mg per week was started in combination with folic acid 5 mg per week. After 2 months, significant clinical improvement was observed, and after 3 months, the

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Fig 1. Allergic red-tattoo reaction of the tattooed lips before treatment: erythematous plaques (A, B) and later ulceration (C), sharply confined to the red-tattooed mucosa.

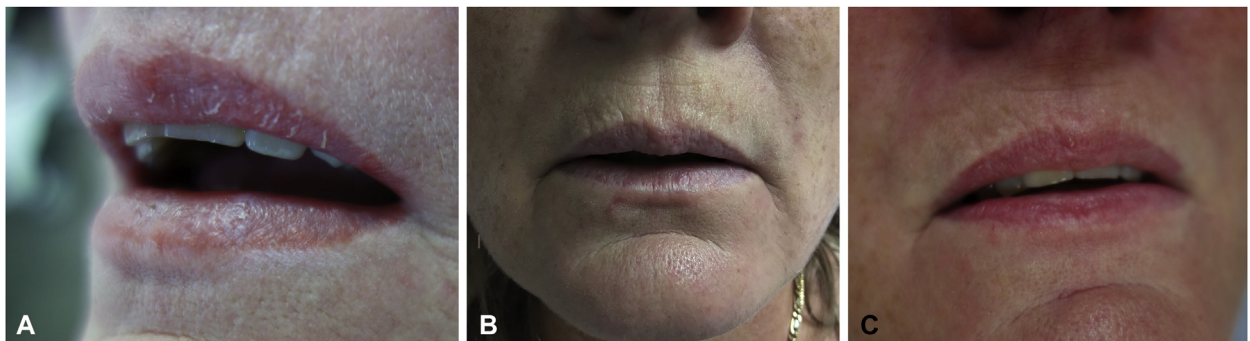


Fig 2. Allergic red-tattoo reaction of the tattooed lips after treatment with (A) methotrexate and, additionally, (B, C) Q-switched Nd-Yag laser.

swelling and ulceration had completely disappeared (Fig 2, A). Despite this good clinical result, a permanent treatment was desired because the symptoms were likely to reoccur if the methotrexate was discontinued. In order to establish this, complete removal of the tattoo pigments from the skin is needed. Surgical procedures, such as treatment with ablative CO₂ laser, dermatome shaving, or excision with mucosal transposition, could be employed; however, they were not advised because of the potential extensive scarring that could occur, which would lead to permanent physical disability. Therefore, after 6 months of continuous therapy with methotrexate, treatment with Q-switched Nd-Yag laser was initiated. Before starting this therapy, the patient was extensively counseled about the possible side effects and, more specifically, the risk of a generalized type IV allergic reaction.³

After 4 treatment sessions with a single pass Q-switched Nd-Yag laser (532 nm; 2 J/cm², 3-mm spot size, 6-ns pulse duration) (Q-plus C, Quanta Systems) with 4-weekly intervals, the red pigment was completely removed from the skin (Fig 2, B and C). During each treatment, extensive ecchymoses occurred, which resolved spontaneously within

1 week after each treatment. No allergic reaction or other adverse reactions occurred. After the final laser treatment, the methotrexate dosage was tapered and later discontinued, and after 3 months of follow-up, her symptoms were still in remission (Fig 2, B and C).

DISCUSSION

Although tattooing of the skin is generally regarded as safe, serious complications can occur.⁴ Allergic reactions to red tattoo ink are the most frequently encountered complications in dermatologic practice.⁵ These reactions are characterized by chronic pain and itch associated with swelling and hyperkeratosis, sometimes leading to ulceration and crusting, which is sharply confined to the red-tattooed skin.⁶ The histopathology is predominated by histiocytes, sometimes in granulomatous formation, and frequently in combination with an interface dermatitis.⁷ These reactions are thought to be a delayed type IV allergic reaction to components of the tattoo ink, but the exact allergen remains unknown. A recent study demonstrated the presence of several red azo pigments in allergic red-tattoo reactions.⁸ In the culprit tattoo ink of our case (LaBina

Mars Red; LaBina Permanent-Line, GmbH & Co KG), several of these azo pigments are present.

Unfortunately, the allergen causing the allergic reaction is permanently residing in the mid-to-reticular dermis. Therefore, a curative treatment for these red-tattoo reactions is difficult to achieve. First-line therapy includes anti-inflammatory drugs, such as topical or intralesional corticosteroids. However, clinical improvement is often insufficient and only temporary. Unfortunately, only few reports describing alternative therapies to treat these allergic reactions, including hydroxychloroquine and allopurinol, have been published.^{1,2,9,10}

Moreover, for a permanent treatment result, (complete) removal of the red pigment is usually necessary. Treatment modalities that may be considered include full surface and fractional ablative CO₂ laser therapy, surgical excision, or dermatome shaving.^{11,12} However, these therapies may lead to undesirable permanent scars, especially in permanent makeup. As an alternative, targeted treatment with a Q-switched nanosecond or picosecond laser at 532 nm (matching the red pigment chromophore) can be considered as a therapeutic option with a low scarring potential. However, this treatment should be performed with caution because a generalized type IV allergic reaction caused by the photomechanical breakdown of the tattoo pigments has previously been described after Q-switched laser treatment.³

In this case, treatment with various local and systemic immunosuppressive therapies had already been attempted. Because of the severe and persisting symptoms, new alternative therapies were sought. To our knowledge, this is the first report describing successful treatment of a recalcitrant allergic red-tattoo reaction with methotrexate and Q-switched Nd-Yag (532nm) laser therapy. This new combination treatment can be considered as a promising treatment option for patients with severe refractory allergic reactions to (cosmetic) red tattoos.

Conflicts of interest

None disclosed.

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