

Cryotherapy for the treatment of Monsel tattoo

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INTRODUCTION

Monsel solution is a commonly used hemostatic agent comprised of ferric subsulfate. Rarely, Monsel solution causes a tattoo reaction secondary to iron particle deposition in the dermis. We present a case of Monsel solution tattoo successfully treated with 4 rounds of cryotherapy, which we hypothesize is a consequence of blister formation allowing for elution of intradermal iron particles.

CASE REPORT

An 80-year-old white woman with skin phototype I-II underwent a shave biopsy of a suspicious lesion on her nose. Monsel solution was used for hemostasis. Pathology results showed a hyperthrophic actinic keratosis. After the biopsy site healed, there was a reddish-brown indurated discoloration at the biopsy site. A tattoo reaction developed, which is a known but rare complication of this hemostatic agent. The color and intensity of the tattoo were unchanged 14 weeks later (Fig 1, A). The patient was treated with 2 cycles of cryotherapy to induce blister formation. After 4 rounds of cryotherapy 14, 17 (Fig 1, B), 21, and 25 weeks after initial biopsy, the patient's Monsel tattoo fully resolved with no visible signs of pigment (Fig 1, C).

DISCUSSION

Monsel solution is a commonly used hemostatic agent consisting of 20% ferric subsulfate solution. It stimulates protein precipitation via its acidity and the oxidizing potential of its subsulfate group.^{1,2} The precipitated proteins, in turn, occlude vessels. A known but rare complication of Monsel solution is a tattoo reaction formed from iron particles that settle in the dermis.¹ A Gomori's stain for iron reveals both

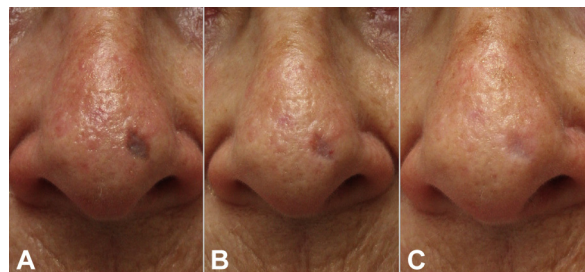


Fig 1. Monsel tattoo at baseline before treatment (A), after 2 cryotherapy sessions (B), and 1 month after the fourth cryotherapy session (C).

intracellular granules and weakly stained collagen fibers in the papillary dermis.³

There are several known methods for treatment of Monsel tattoo. Rao et al² compared known treatment options on a single Monsel tattoo divided into 4 quadrants: control, 2 cycles of cryotherapy, a 532-nm, and a 1064 Q-switched neodymium-doped yttrium aluminum garnet laser.² Therapies were performed at 17 and 23 weeks after biopsy.² Cryotherapy was superior to laser and control, with no clinical signs of tattoo at 30 weeks and maximum reduction of iron deposits on pathology at 44 weeks compared with other treatment options.² Rapid resolution of Monsel tattoo is critical not only for cosmetic outcomes but also because pigmented lesions can mask recurrent melanocytic lesions, and radiographically opaque iron deposits in Monsel tattoos can be mistaken for bony involvement.²

We confirm that cryotherapy provides rapid treatment for Monsel tattoo and propose a mechanism of action. The formation of intracellular ice crystals results in cell lysis and release of intracellular iron deposits into the extracellular space.⁴ Freezing separates the epidermis from the dermis with resultant blister formation.⁴ We hypothesize that the fluid

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within the overlying blister elutes intradermal iron complexes and the disrupted dermal-epidermal junction allows for transepidermal elimination of pigmented complexes. Histologic evidence of this mechanism has been established in human and animal studies using a nonablative fractional laser. Nonablative laser therapy similarly promotes dermal tissue damage and dermal-epidermal junction separation via thermal injury with subsequent migration of dermal particles through the epidermis.^{5,6} Multiple cryotherapy sessions mimic this mechanism, fading the Monsel tattoo as iron complexes are removed via cryoelution and transepidermal elimination. Cryotherapy is an effective, low-cost, and widely available method for removal of Monsel solution tattoo.

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