E-CASE REPORT

Majocchi's Granuloma Caused by *Trichophyton mentagrophytes* in 2 Immunocompetent Patients

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**KEYWORDS**
Majocchi granuloma; Dermatophytes; *Trichophyton mentagrophytes*

**PALABRAS CLAVE**
Granuloma de Majocchi; Dermatofitos; *Trichophyton mentagrophytes*

**Abstract**
Majocchi granuloma is an uncommon deep follicular inflammation caused by dermatophytes and affects immunocompetent and immunocompromised patients. The clinical findings overlap with other skin conditions such bacterial infections and inflammatory skin diseases, thereby delaying correct diagnosis. We describe 2 cases in immunocompetent patients. © 2016 AEDV. Published by Elsevier España, S.L.U. All rights reserved.

**Introduction**
Dermatophytes are keratinophilic fungi capable to colonize nail, hair and the epidermis usually causing common and superficial infections like tinea corporis and onychomycosis.

Occasionally these fungi can penetrate deeper than the basal layer causing more inflammatory symptoms such as abscesses and ulcerations seen in Kerion celsi and Majocchi granuloma (MG). 1,2 The clinical presentation of MG ranges from folliculitis to nodules, and infiltrated painful plaques that sometimes ulcerate. Lesions can mimic various skin diseases such as bacterial cellulitis, atypical mycobacterial infections, and noninfectious skin diseases, thereby delaying correct diagnosis and adequate treatment. 3,4 We report 2 cases of MG in immunocompetent adults attended in our clinic.

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Majocchi granuloma (MG) is an unusual presentation of dermatophytosis. It was first described by Majocchi in 1883 as "granulomatous skin infection due to dermatophytes commonly affecting healthy women exposed to trauma of the lower extremities." The predisposing factors for deep penetration by dermatophytes are scratching, occlusion, friction, repeated shaving, local treatment with topical corticosteroids, and systemic immunosuppression.

Two forms of MG have been described, a dermal perifollicular papular form which affects healthy individuals and the deep subcutaneous nodular form which usually occurs in immunocompromised patients such as organ transplant recipients.
The follicular invasion in MG is usually at the endostrix and *Trichophyton rubrum* is the most common dermatophyte associated with this condition, but other dermatophytes such as *Trichophyton violaceum*, *T. mentagrophytes*, *Epidermophyton floccosum*, and *Microsporum canis* have also been described as agents causing infections in immunocompetent patients.  

In order to survive in a more alkaline environment like the dermis, the dermatophytes needs the keratinous material that provides a potent substrate for the organism. Moreover the resulting cellular destruction and the activation increase the amounts of mucopolysaccharide acid, so lowering the pH in the dermis and creating a more suitable dermal environment. 

It has been reported that *T. mentagrophytes* can induce interleukin (IL)-8 and tumor necrosis factor (TNF) production by keratinocytes to chemotact and activate neutrophils. This may explain the fever and malaise that our patients developed during the course of the disease.

There is no consensus on treatment but topical antifungals are ineffective because of the deep location of the infection. The recommended treatments for MG are systemic antifungals such as itraconazole 200 mg daily or terbinafine 250 mg daily for 4–8 weeks.

Our 2 cases share similarities in that they were immunocompetent patients who had been using topical potent steroids for long periods before developing the deep fungal infection. The first patient contributed with local trauma by shaving the affected area and the second patient had a prosthesis that caused occlusion of the skin thus facilitating the dermatophytic penetration. Both responded successfully to the same treatment with terbinafine.

In conclusion Majocchi granuloma is an uncommon dermatophytic infection that is difficult to identify because of its misleading clinical appearance. This delays the correct diagnosis and treatment. It is also important to highlight that the sample used for direct microscopy and culture should include the hair shaft due to the fungal predilection for the endostrix. Biopsy with appropriate staining is the gold standard for the diagnosis. This deep fungal infection should be well recognized among dermatologists and included in the differential diagnosis of infiltrated skin lesions that do not respond to conventional treatments.

**Ethical disclosures**

**Protection of human and animal subjects.** The authors declare that no experiments were performed on humans or animals for this investigation.

**Confidentiality of data.** The authors declare that they have followed the protocols of their work center on the publication of patient data.

**Right to privacy and informed consent.** The authors must have obtained the informed consent of the patients and/or subjects mentioned in the article. The author for correspondence must be in possession of this document.

**Conflict of interests**

The authors declare no conflict of interest.

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**References**