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Majocchi Granuloma in the Face of an Immunocompetent Child: A Case Report

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Abstract

Introduction: Majocchi granuloma (MG) is a rare infection, generally caused by the dermatophyte *Trichophyton rubrum*. This disease results from the proliferation of the fungus along the hair follicle into the dermal or subcutaneous tissue, causing suppurative folliculitis. Most affected patients are immunocompromised, but it is not restricted to them. Its evolution is due to prolonged use of topical steroids.

Case: We would like to introduce an interesting case of an 8-year-old female with MG in face who was treated incorrectly for several months with steroid and antibiotic that worsened the condition. After the disease was suspected, it was possible to provide adequate treatment with Terbinafine and thus, its complete regression.

Discussion: This is a presentation of MG that was treated successfully after months using incorrect drugs. We want to highlight the frequent and indiscriminate use of corticosteroids and what their abuse can lead to. The patient was treated with Terbinafina which led to resolution of the case.

Keywords: Majocchi Granuloma, Tinea cutis, MG

Introduction

Majocchi Granuloma (MG) is a dermatophytosis caused by fungus called dermatophytes. Also called Majocchi's granulomatous tinea, trichophytic or dermatophytic granuloma, is a rare skin infection resulting from the penetration of the fungus along the hair follicle into the dermal and subcutaneous tissue, leading to suppurative folliculitis. Its transmission occurs through direct contact (contaminated land, people-to-people or animals) or indirect contact (contaminated materials). Therefore, its clinical manifestation depends on several factors such as the site of infection, host defense, virulence of the microorganism and environmental factors [1]. Recent studies suggest that the disease prevails in females. This explains why women are more susceptible to developing it, since they are in the habit of performing skin waxing [2].

Trichophyton rubrum is the most common in immunocompromised and immunocompetent patients, followed by *Trichophyton violaceum, Trichophyton mentagrophytes, Microsporum audouinii, Microsporum gypseum, Microsporum canis* and *Epidermophyton floccosum* [3,4].

It mostly affects immunocompromised patients, but it is possible that immunosuppression is not found in some cases of dermatophytosis. The clinical characteristics can often be confused with other dermatological, inflammatory, and infectious conditions, which makes diagnosis difficult and delays. The etiology may be due to prolonged use of topical corticosteroids, skin trauma, etc. The mistaken diagnosis of other conditions and the use of inappropriate medications influence the clinical progression of the lesions [1,5,6].

There are two forms of MG, which will depend on the location and clinical condition of the affected individual. The perifollicular form, characterized by papules and superficial involvement. This follicular type usually occurs after trauma or typical use of topical corticosteroids. It occurs mainly in the

lower limbs of immunocompetent individuals, especially in women who have the habit of shaving their legs with a razor. The granulomatous form is characterized by subcutaneous nodules that generally appear on the upper extremities, face, scalp and affect immunocompromised individuals [2].

The clinical presentation of infections caused by dermatophytes depends on many factors: virulence of the microorganism, host defense, site of infection and environmental factors. Some symptoms may be similar in immunocompetent and immunosuppressed patients. The predominant forms were nodules and plaques. Lesions are more common on the extremities and rarely involve the head [2-4]. Clinical manifestations vary in immunocompetent and immunosuppressed individuals. Respectively, in the first group, clinical findings are characterized by erythematous and perifollicular papules. They may also present pustules. In immunosuppressed patients, the granulomatous form presents subcutaneous nodules and abscesses. Disease progression is associated with immune-mediated depression and the inflammatory response. However, systemic dissemination rarely occurs [7]. In addition to the papular and nodular forms, plaques, spots, and multiple forms, with or without crust, can also be observed in the lesions [8] (**Figures 1A and 1B**).

We would like to introduce an interesting case of an 8-year-old female with MG in face who was treated incorrectly for several months with steroid and antibiotic that worsened the condition. After correct diagnosis, treatment was started, and the condition was resolved. The progression of her face is documented in the Figures shown below.

Case Presentation

An 8-year-old female with no past medical history after falling from a bicycle and injuring her left hemiface, appeared on her face a papular, itchy and non-painful lesion. The mother reported that she sought medical attention and was prescribed oral antibiotics and topical steroids, without clinical improvement. There was progression in the size of the lesions and the mother chose to seek medical attention again, having been prescribed systemic and topical oral steroids, which the patient used for 7 months and got worse. On admission examination were notable erythematous, scaly, asymmetrical lesions in the left zygomatic and periorbital region (**Figure 2**). Given the clinical history, the diagnostic hypothesis of MG was suggested and advised not to use topical corticosteroids. Therefore, empirical treatment with oral Terbinafine 125 mg/day was started for 4 weeks. After 15 days of treatment, there was no immediate improvement in the facial (**Figures 3** and **4**). After 9 weeks, the patient presented fully remission of the lesions (**Figure 5**) and the drug was suspended. The patient had no clinical consequences from chronic steroid use and was discharged home from the dermatology clinic. Instructions were given to continue follow up appointment with pediatric outpatient.

Discussion

The pathogenesis of MG is not well understood, there are some theories, but they depend on several factors that are associated with the host and the microorganism. The most important factor of the host is the cutaneous physical barrier, which prevents fungal infections of the skin. Some physical

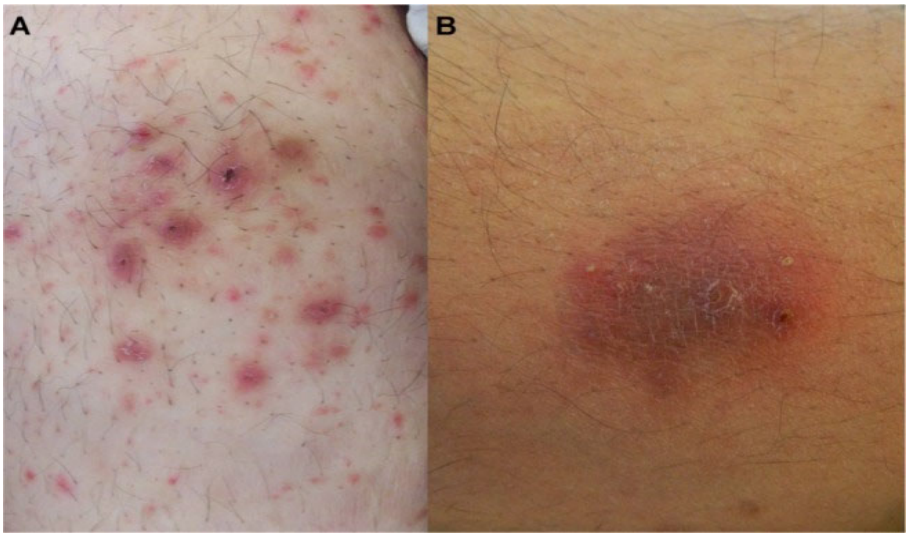

Figure 1. In image **(A)** multiple erythematous papules and nodules with scales and/or crusts are located on the anterior surface of the abdomen in a patient with GM. In image **(B)**, an erythematous plaque with pustules, scales and crusts is observed on the lateral side of the arm in a patient with Majocchi granuloma. Source [8].

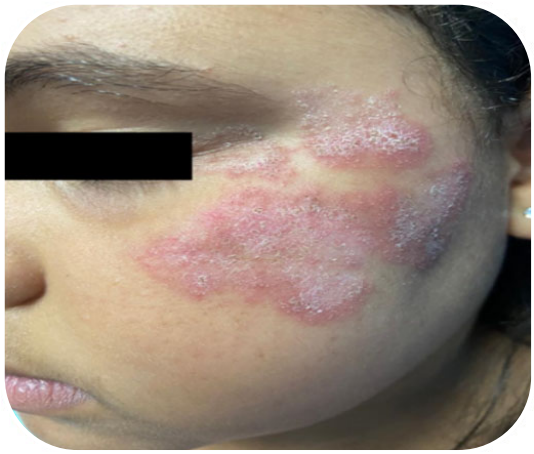

Figure 2. Taken at the admission: Erythematous and scaly lesions on the temporal and mandibular regions of the left face.

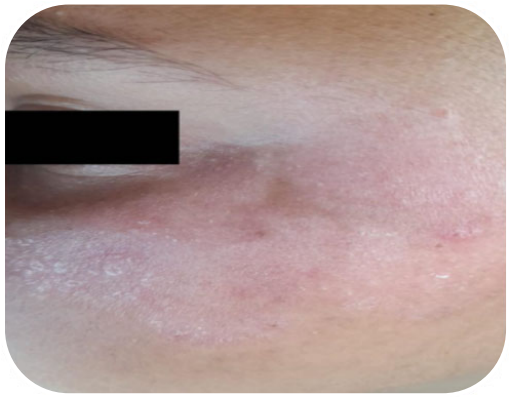

Figure 3. Image after 15 days of using Terbinafine.

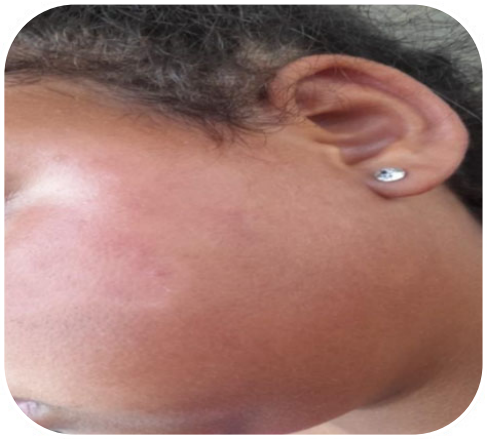

Figure 4. Image provided by the patient´s mother showing hiperemic lesion.

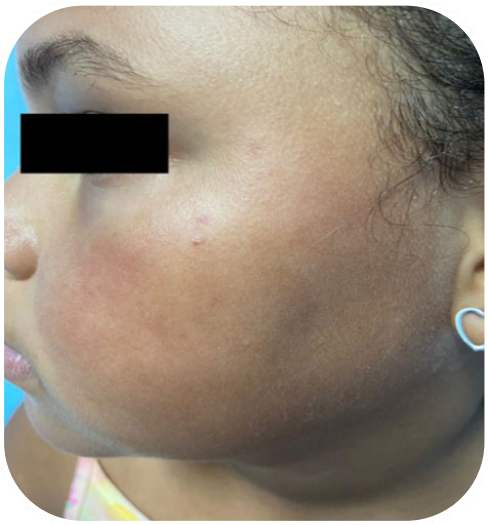

Figure 5. Image after 9 weeks showing completed remission of the lesion.

skin trauma such as scratching, shaving or shaving can cause a fungal invasion. Thus, microorganisms, keratin and necrotic materials can enter the dermis, causing an inflammatory response during infection. Dermatophytes can cause deep and invasive infections under some acquired or congenital immunosuppressive condition [8].

Topical corticosteroid is a medicine often prescribed in medical practice because it is a medication of easy acquisition and used for various therapeutic purposes. Indiscriminate use is seen causing several side effects. It´s pharmacodynamic properties are vasoconstriction, antiproliferative effect, immunosuppression and anti-inflammatory effect. The responsiveness of diseases to topical corticosteroids is variable, as well as the potency of the steroid and its mineralocorticoid power. In addition, the penetration of the steroids varies according to the site of the skin. For example, on the eyelid, penetration is four times higher than on the face and 36 times higher than on palms and plants. Bare and inflamed skin also provides increased penetration of the drug, as well as occlusion with plastic film, which potentiates the action of corticosteroids by up to 100 times. It is worth mentioning that when topical steroids are indicated for the treatment of diaper rash or dermatitis, it should be noted that the use of diapers enhances absorption by its occlusive effect [8,9].

In pediatric use, most of the time, low-potency topical corticosteroids are used and therefore rare side effects are observed when used for short periods, without occlusion, due to the lower metabolization capacity. In restricted cases, for example, in premature infants due to increased skin sensitivity, greater penetration of the substance is observed, which should be administered cautiously. Although rare, systemic adverse effects may also occur. The most common are stretch marks, skin atrophy, acneiform rash, perioral dermatitis, purpura and are usually related to application on larger body surface. However, excess absorption can cause adrenal crisis with nausea, anorexia, postural hypotension, and vascular collapse. When use is done in a chronic and indiscriminate way, it can cause suppression of the pituitary-adrenal axis, causing growth retardation and Cushing syndrome, although rare with topical use. Prolonged use of steroids, chemotherapy, and antineoplastic therapy or other immunosuppressive conditions can also lead to MG. Steroids affect the functions of macrophages and neutrophils and reduce the immune response mediated by Th1. In addition, after the use of steroids, the lesions may become atypical and may delay the resolution of fungal infections [8,9].

The gold standard diagnosis of MG is the histopathological study by optical microscopy, which consists of the detection of granulomas in the dermis, usually consisting of dermatophytic structures, identified in the form of filaments or spores, often with fragments of hair follicle (**Figure 6**). When MG is suspected, some diagnostic tests, such as direct microscopy, may be performed in which skin scrapings, affected nails or removal of hair are performed. The material is diluted in potassium hydroxide and thus, there is the recognition of dermatophytes, by the microscope, as septated tubular structures, hyphae and some arthropods, and peripheral granulomatous inflammation [10]. However, this test is insufficient to distinguish superficial and invasive dermatophytosis [8,11].

In histopathological examinations, the choice of color used is very important. The hematoxylin-eosin (HE) staining, which is routinely used in histopathology, may be insufficient in detecting fungal elements (**Figure 6**). Thus, the most indicated staining methods are the periodic acids-Schiff (PAS) (**Figure 7**) and methenamine of Grocott-Gomori Silver (GMS). It is better to use staining with PAS in samples containing suspected

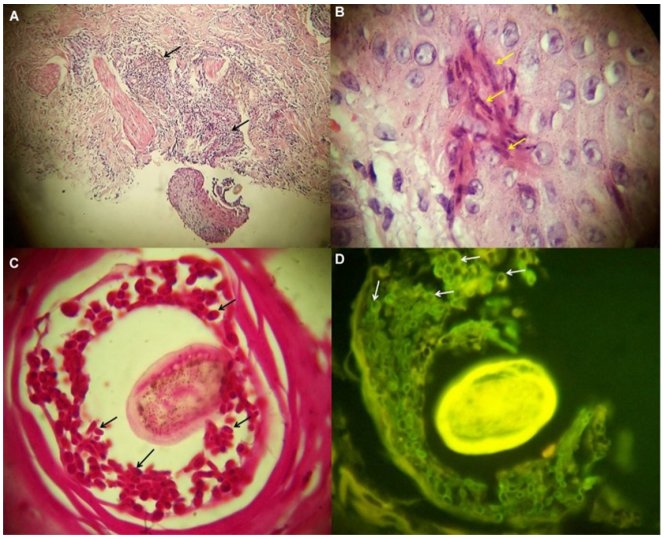

Figure 6. (A) Histopathology of granulomatous peripheral inflammation. **(B)** presence of hyphae with great magnification. **(C)** Peripheral spores were stained positively with PAS staining. **(D)** In the slides stained with HE, the spores (arrows) showed autofluorescence under immunofluorescence microscope. Source [8].

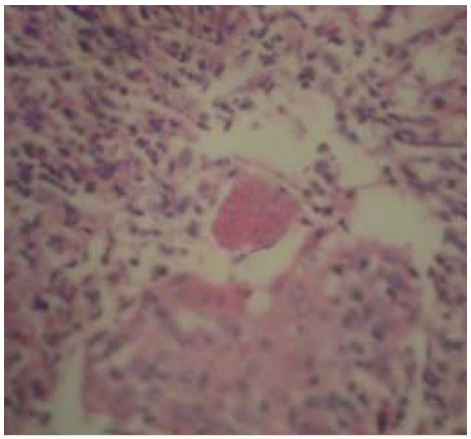

Figure 7. Histopathology of Majocchi's Granuloma: Follicular canal topography reveals the presence of hyphae and positive PAS spores, abscess and peripheral granulomatous reaction contour compatible with fungal folliculitis. Source [7].

fungal infection than with GMS because the execution is easier and, in addition, has greater sensitivity and negative predictive values. On the other hand, GMS staining presents higher contrast than PAS staining, in some cases. However, it still cannot be concluded that one method is superior to the other. Although GMS staining has an advantage over PAS, since there is better detection in low and intermediate power microscopy [8,11].

The differential diagnosis is extremely varied due to its location and clinical picture. It includes many dermatological diseases such as: lupus, acne vulgaris, granulomatous rosacea, sarcoidosis, cutaneous tuberculosis, cutaneous leishmaniasis, bacterial or fungal cellulitis, eosinophilic cellulitis, eosinophilic paniculitis or other, eczematization of psoriasis, reverse psoriasis, Kaposi sarcoma, foreign body granuloma and contact dermatitis. The disease should be differentiated from several diseases that are present with papules, nodules or plaques. Lesions are usually confused as symptoms of bacterial infections, and this results in patients receiving antibiotic treatment. Histopathological findings may be confused with other granulomatous diseases if confirmatory stains are also negative. In addition to histopathology, bacterial, fungal, and parasitic examinations, as well as polymerase chain reaction

and other molecular diagnostic tools, are crucial for reliable detection of organisms [5,12].

The first line of choice for treatment is Terbinafine, which has fungistatic and fungicidal action, in which it is highly effective against dermatophytes. Treatment should be performed for 1 to 6 months and may extend to complete regression of lesions. This medication has low drug interaction and some of its side effects are dyspepsia, abdominal pain, diarrhea, nausea, dysgeusia, and temporary loss of taste [6]. Exanthema, urticaria, headache, visual disorders, arthralgia, myalgia, depression and fatigue have also been described. It is worth mentioning that liver function should be evaluated before the beginning of the medication and monitored 4-6 weeks after the use. It is necessary to suspend it if there is a change in liver enzymes. As well as the follow-up of the complete blood count because there are reports of pancytopenia, thrombocytopenia, and neutropenia during the use [5]. Other therapeutic alternatives are itraconazole, posaconazole and voriconazole that will act by inhibiting the growth and cell replication of fungi and promoting the rupture of their cell membrane. Side effects may inclide nausea, diarrhea, alopecia, peripheral neuropathy, rash, photosensitivity, Stevens-Johnson syndrome, etc. [6,13].

Conclusion

Majocchi granuloma is an uncommon fungal infection usually due to a cutaneous physical trauma, in which follicle rupture and the gateway to pathogens occur. As observed in the study above, it mainly affects immunosuppressed individuals, but is not restricted only to them, being also seen in immunocompetent patients. The diagnosis is made through a complete anamnesis, which will correlate with clinical and epidemiological characteristics, associated with complementary tests that will be essential for an accurate diagnosis. However, in some services there are no resources available to perform the diagnosis by the "gold standard" method, and often a therapeutic test or even empirical treatment is performed. MG can simulate other dermatophytosis and often treatments with topical corticosteroids are performed indiscriminately, aggravating the condition, and causing iatrogenia. Therefore, early diagnosis and treatment, with adequate doses and period are important factors that modify the outcome of the disease and the quality of life of the patient.

Consents

The patient's mother consented to publication of the case by signing a consent form. This case report does not include any personal information that might lead to the identification of the patient.

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