

Paracoccidioidomycosis after eyebrow micropigmentation: Unusual reactivation or a new form of transmission by cutaneous inoculation?

Vítor Falcão de Oliveira, Mariane Taborda, Adriana Satie Gonçalves Kono Magri, Anna Sara Shafferman Levin, Marcello Mihailenko Chaves Magri*

Department of Infectious and Parasitic Diseases, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil

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ABSTRACT

We report a case of unusual paracoccidioidomycosis reactivation after eyebrow micropigmentation in a Brazilian patient. The cutaneous lesion was the only clinical manifestation. Direct cutaneous inoculation in dermal tissues with *Paracoccidioides* sp. is extremely rare, explaining why paracoccidioidomycosis is not classically considered a cutaneous implantation mycosis.

1. Introduction

Paracoccidioidomycosis (PCM) is the most important invasive mycosis in Latin America, with the majority of cases reported from Brazil [1,2]. The major risk factor for acquiring infection is a activity related to the management of soil contaminated with the fungus, such as agriculture. *Paracoccidioides* spp. are thermally dimorphic fungi, usually transmitted by inhalation of conidia which switch morphology into the invasive yeast form [3]. However, transmission by direct inoculation has not been described previously. However, the implantation transmission in cosmetic procedures was not previously described.

2. Case

A previously healthy 52-year-old Brazilian female presented with a facial lesion after performing eyebrow micropigmentation. The lesion originally began as a small ulcerative papulonodular lesion, but it evolved to vegetative plaque, occupying the entire right eyebrow, with purulent secretion that developed two months after the aesthetic procedure (Fig. 1A).

Skin biopsy revealed yeasts suggestive of *Paracoccidioides* sp (Fig. 2). Immunodiffusion serology for *Paracoccidioides brasiliensis* was positive and counterimmunoelectrophoresis (CIE) found titers of 1/256. Fungal culture of biopsy was negative. Chest computed tomography showed no sign of fungal infection. Treatment with 3 mg/kg of liposomal

amphotericin B was given for seven days, followed by trimethoprim/sulfamethoxazole 160/800 mg tablet form, orally, every 8 h. After five months, we changed the antifungal therapy to itraconazole 200 mg daily because of persistent elevated CIE titers (1/256). At nine months, the patient presented complete improvement of the skin lesion (Fig. 1B) and a decrease of CIE titers (1/64).

3. Discussion

Cutaneous lesions in PCM generally occur as a consequence of haematogenous fungal dissemination, originating from the lungs. The patient presented persistent high titers of antibodies in serology, reinforcing systemic involvement of PCM. However, our patient had no evidence of pulmonary disease in her chest CT, and the cutaneous lesion after micropigmentation was the only clinical manifestation.

Direct cutaneous inoculation in dermal tissues with *Paracoccidioides* spp. is extremely rare [1], explaining why PCM is not classically considered a cutaneous implantation mycosis [4]. Although very rare, cutaneous fungal infections after aesthetic procedures were described for dermatophytes including *Trichophyton rubrum*, *Epidermophyton floccosum*, *Microsporum canis*, *Nannizzia gypsea* (formerly *Microsporum gypseum*), *Trichophyton tonsurans* or other fungi as *Purpureocillium lilacinum*, Mucorales, *Aspergillus fumigatus*, *Acremonium* sp. and *Fusarium* sp. [5–11]. Sporotrichosis is a subcutaneous mycosis mainly transmitted by direct inoculation and a so-called implantation mycosis. *Sporothrix*

* Corresponding author.

E-mail address: marcello.magri@hc.fm.usp.br (M.M.C. Magri).

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Fig. 1. Facial lesion after eyebrow micropigmentation

A: Large vegetative plaque on the right eyebrow, with purulent secretion; B: The lesion cleared after 9 months of oral itraconazole (200 mg/day).

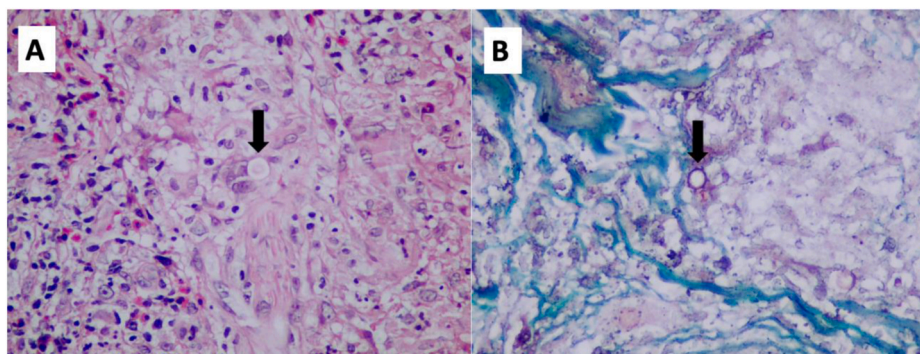


Fig. 2. Skin biopsy revealed yeasts suggestive of *Paracoccidioides* sp.

A: Hematoxylin and eosin staining showing yeast cells with multiple buds; B: Histological section stained by the Grocott method.

brasiliensis infection following tattoos was related in three cases in Rio de Janeiro and Porto Alegre, Brazil [12,13].

In our case, we could not ensure that there was a fungal contamination of the instrument involved in the trauma, which is difficult considering that the transmission occurred through a traumatic injury. Furthermore, it is hard to understand how the instruments and/or the material used in the aesthetic procedure could be contaminated. *Paracoccidioides* sp. is considered a soil-dwelling fungus, and soil serves as its primary reservoir. It is not a usual agent that could colonize the skin.

It is important to highlight that the occurrence of the skin lesion a few months after the procedure could be coincidental, or the traumatism let the local skin more vulnerable in the context of an acute form of PCM. Despite the limitations, we are not believed that inoculation may have occurred due to contamination of the wound during the procedure, however the disease is limited in the skin traumatic local and temporally related after the procedure. In the past, it was thought that inoculation occurred due to the patient's practice of chewing vegetable residues and using plant fragments as toothpicks, but the role of trauma in the pathogenesis of this mycosis remains incompletely understood [14]. The experimental study in mice infected by intra-oral inoculation of *P. brasiliensis* conidia had been successful, resulting in sporadic dissemination to internal organs [14].

This case highlights a case of unusual PCM reactivation after aesthetic procedure, and brings again the discussion about the possibility of transmission by inoculation. PCM can be a challenging diagnosis, even in countries where it is endemic. To our knowledge there are

no proven cases in the literature of transmission of PCM by inoculation.

Declaration of competing interest

The authors have no conflict of interest.

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CRediT authorship contribution statement

Vítor Falcão de Oliveira: Writing – original draft, Ideas, preparation, creation and/or presentation of the published work, specifically writing the initial draft. **Mariane Taborda:** Visualization, Preparation, creation and/or presentation of the published work, specifically visualization/ data presentation. **Adriana Satie Gonçalves Kono Magri:** Visualization, Preparation, creation and/or presentation of the published work, specifically visualization/ data presentation. **Anna Sara Shafferman Levin:** Critical review. **Marcello Mihailenko Chaves Magri:** Writing – original draft, Oversight and leadership responsibility for the research activity planning and execution, Critical review, commentary or revision – including pre-or post-publication stages, All authors have approved the final manuscript draft.

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