



Tattooing as a gateway to *Sporothrix brasiliensis* infection

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ABSTRACT

Recently, sporotrichosis caused by *Sporothrix brasiliensis* transmitted during tattooing process was described in the epicenter of the Brazilian epidemic sporotrichosis. We report a similar case of this mycosis in a patient recently tattooed, but probably infected by a sick cat instead of via a contaminated procedure. Clinical cure was attained after two months of oral itraconazole. In the hyperendemic *S. brasiliensis* regions of sporotrichosis, health professionals must be aware of atypical transmissions of this fungus.

1. Introduction

Sporotrichosis is an implantation mycosis, in which the infection by *Sporothrix* spp. occurs mainly through traumatic inoculation [1]. Although uncommon, the disease can also develop by contact of mucosa or non-intact skin with contaminated surfaces or fluids [2,3]. Atypical presentations of sporotrichosis associated with these uncommon forms of transmission are described in the Brazilian hyperendemic zoonotic sporotrichosis area, caused by *S. brasiliensis* [1,2,4,5].

Recently, the first two cases of sporotrichosis by *S. brasiliensis* associated with tattooing in the Rio de Janeiro state (RJ), the Brazilian epicenter of zoonotic presentation, were described [3]. We report the third case of sporotrichosis by *S. brasiliensis* in a recent tattooed man, but here probably associated with cat-transmission, and from another region, southern Brazil.

2. Case presentation

A man, 39 years-old, from Porto Alegre City, Rio Grande do Sul (RS), Brazil, was admitted to the Hospital Irmandade Santa Casa de Misericórdia de Porto Alegre on November 30th, 2021 (day 0), showing an ulcerative lesion in his right hand, with erythematous nodules ascending his arm

and ipsilateral lymph node enlargement (Fig. 1). After examination, a swab sample from the ulcerated lesion and its secretions was collected and sent to the Laboratory of Mycology of the Universidade Federal de Ciências da Saúde de Porto Alegre.

He reported that the lesion began two weeks before the admission (Fig. 1), and one week after a tattooing at the site. During this first week of his tattooing his son had adopted a cat with ulcerative lesions suggestive of sporotrichosis (Fig. 1-A). The cat was taken to the veterinarian and the laboratory diagnosis (cytopathological) of sporotrichosis was confirmed. The patient reported no known scratches or bites from the cat.

On December 6th, 2021 (day 6) (Fig. 1), the patient sample confirmed the diagnosis of sporotrichosis: Microscopy by Gomori-Grocott staining showed elongated blastoconidia and *Sporothrix* spp. colonies were isolated in mycological culture. Fungal DNA was extracted by a commercial kit (High Pure PCR Template Preparation Kit – Roche Diagnostics®) and species-specific PCR, using the primers and conditions described by Rodrigues et al. [6], confirmed the identification as *S. brasiliensis*.

Antifungal therapy (itraconazole 200 mg/day) was prescribed for six months. Two months after the beginning of the treatment, clinical cure was attained (Fig. 1).

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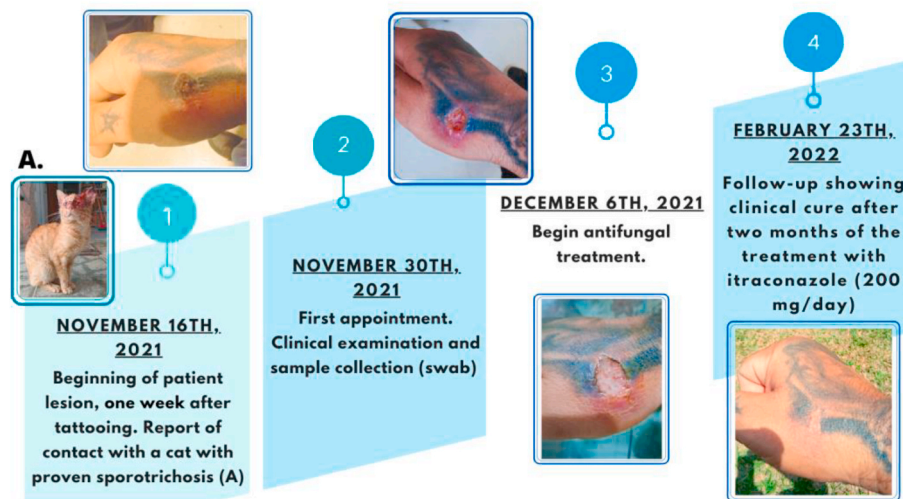


Fig. 1. Timeline showing the clinical evolution of a patient from southern Brazil, who developed sporotrichosis after tattooing and adoption of a cat with proven sporotrichosis (A).

3. Discussion

We describe a case of sporotrichosis caused by *S. brasiliensis* associated with tattooing in the Brazilian hyperendemic sporotrichosis area. In the Brazilian hyperendemic area of zoonotic sporotrichosis cases, atypical forms of *S. brasiliensis* transmission have been described [2,3]. In the two tattoo-associated cases previously published, from RJ, the patients denied having contact with any cat, and it was hypothesized that the transmission of *S. brasiliensis* occurred during the tattooing procedure (contamination of the needles, tattoo ink or water used for ink dilution) [3]. Fomites in the environment, outside the home, can however bear infected feline material, even though cat contact is unrecognized.

In contrast, we present an alternative explanation for tattoo-associated cases: the patient adopted a cat with proven sporotrichosis concurrently. We suggest that the disruption of his skin barrier, by the recent new tattoo, could act as a portal of entry of *S. brasiliensis* owing to the highly contaminated secretions of the sick cat that he was living with (indirect transmission). Such cats usually have lesions carrying a high fungal load [7].

Our patient was from Porto Alegre City, capital of RS, which is localized in a different region (Metropolitan) of RS, 300 km from the most hyperendemic area of zoonotic sporotrichosis in this state (south region of RS) [8]. Although historically sporotrichosis in the Metropolitan region was predominantly a saprozoitic disease, caused by *S. schenckii* stricto sensu [9], more recently a series of feline sporotrichosis cases caused by *S. brasiliensis* is an alert regarding the propagation of the fungus, and the probable beginning of a change in the epidemiological scenario of sporotrichosis: a marked increase in this mycosis due to cat-transmission [10]. Our case report is consistent with this possibility and affirms that physicians and other health professionals must be aware of the possibility of zoonotic sporotrichosis in the region. Most important, we provide an alternative explanation for putatively tattoo-associated cases, and offer an alternative explanation in such cases that must be considered, when there is an apparently unrelated penetration of intact skin (in this case, a tattooing needle).

In conclusion, in endemic areas of *S. brasiliensis* infection, health professionals must be alert to atypical transmission of this fungus, and consider all possible implantation sources of infection, in order to lead to a correct diagnosis of and treatment for sporotrichosis.

Ethical form

Written informed consent was obtained from the patient or legal guardian(s) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Conflict of interest

All authors declare that they have no conflicts of interest pertaining to this work.

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References

- [1] T.M. Brandolt, I.M. Madrid, V.R. Poester, K.O. Sanchotene, R.P. Basso, G.B. Klafke, et al., Human sporotrichosis: a zoonotic outbreak in southern Brazil, 2012–2017 [Internet], *Med. Mycol.* (2018), 1–7. Available from: <https://academic.oup.com/mmy/advance-article/doi/10.1093/mmy/myy082/5108494>.
- [2] A.O. Liborio Neto, T. Rubim Caetano, N.H. Pestana Gervasio, R. Camargo Carneiro, Conjunctival and Bulbar Sporotrichosis as Parinaud's Oculoglandular Syndrome Acquired by Blood Inoculation, vol. 11, *GMS ophthalmology cases*, 2021, p. Doc02.
- [3] V. Fichman, D.F.S. Freitas, P.M. de Macedo, A.C.F. do Valle, F. Almeida-Silva, R. M. Zancopé-Oliveira, et al., Sporotrichosis after tattooing caused by *Sporothrix brasiliensis* [Internet], *Mycopathologia* (2022), <https://doi.org/10.1007/s11046-021-00611-8>. Available from: .
- [4] A.M. Lacerda Filho, C.M. Cavalcante, A.B. Da Silva, C.P. Inácio, R.G. de Lima-Neto, M.C.L. de Andrade, et al., High-virulence cat-transmitted ocular sporotrichosis [Internet], *Mycopathologia* (2019), <https://doi.org/10.1007/s11046-019-00347-6>. Available from: .
- [5] R.C. Schechtman, E.M.M. Falcão, M. Carard, M.S.C. García, D.S. Mercado, R.J. Hay, Sporotrichosis: hyperendemic by zoonotic transmission, with atypical presentations, hypersensitivity reactions and greater severity, *An. Bras. Dermatol.* (2021 Dec).
- [6] A.M. Rodrigues, G.S. Hoog, Z.P. Camargo, Molecular diagnosis of pathogenic *Sporothrix* species, *Internet*, *PLoS Negl Trop Dis.* 9 (12) (2015), e0004190. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4666615&tool=pmcentrez&rendertype=abstract>.
- [7] I.D.F. Gremião, E. Martins da Silva da Rocha, H. Montenegro, A.J.B. Carneiro, M. O. Xavier, M.R. de Farias, et al., Guideline for the management of feline sporotrichosis caused by *Sporothrix brasiliensis* and literature revision, *publication Brazilian Soc Microbiol, Brazilian J Microbiol* (2020 Sep).
- [8] V.R. Poester, A.S. Mattei, I.M. Madrid, J.T.B. Pereira, G.B. Klafke, K.O. Sanchotene, et al., Sporotrichosis in Southern Brazil, towards an Epidemic? *Zoonoses Public*

- Health [Internet], 2018;(June, pp. 1–7. Available from: <http://doi.wiley.com/10.1111/zph.12504>.
- [9] ACM da Rosa, M.L. Scroferneker, R. Vettorato, R.L. Gervini, G. Vettorato, A. Weber, Epidemiology of sporotrichosis: a study of 304 cases in Brazil, *Am. Acad. Dermatol.* 52 (3) (2005) 451–459.
- [10] A. Spanamberg, R. Araujo, A.P. Ravazzolo, D. Driemeier, R.M.S. Driemeier, L. Ferreira, *Sporothrix brasiliensis* on cats with skin ulcers in Southern Brazil, *Med. Mycol.* 59 (3) (2021 Mar) 301–304.