



Sporotrichosis After Tattooing Caused by *Sporothrix brasiliensis*

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Abstract Sporotrichosis is a subcutaneous mycosis caused by pathogenic species of the genus *Sporothrix*. Since 1998, the number of cases of sporotrichosis due to *Sporothrix brasiliensis* has grown significantly in Rio de Janeiro, Brazil. Nearly all cases are related to cats as the main source of fungal infection. We report two cases of sporotrichosis following tattoos, a transmission form of *S. brasiliensis* not yet reported. The first patient, a 22-year-old female, had cutaneous sporotrichosis, fixed form, over a tattoo in her lumbar region. The lesion appeared 12 weeks after she was tattooed. The second patient, a 27-year-old female, had a lymphocutaneous sporotrichosis over a forearm tattoo. The lesion appeared two weeks after she was tattooed. In both cases there was no history of contact with cats or other plausible source of infection. The present study highlights that other non-zoonotic forms of transmission of *S. brasiliensis* may occur in endemic areas.

Keywords Sporotrichosis · *Sporothrix brasiliensis* · Tattoo

A 22-year-old female was admitted to our hospital in August 2015 because of a two-month long ulcerated lesion over a tattooed area in her lumbar region (Fig. 1). The lesion appeared 12 weeks after she had got the tattoo in an informal studio in an economically

underserved community. Cutaneous sporotrichosis, fixed form, was diagnosed and itraconazole 100 mg/day was prescribed. After 4 months, due to a partial response, the dose was increased to 200 mg/day. As the patient moved to another city, she completed the treatment at another hospital. The total time from treatment to cure was one year.

The second patient was a 27-year-old female referred to our hospital in May 2018 due to a possible diagnosis of sporotrichosis in the right forearm. She had been taking itraconazole 200 mg/day, with little improvement. Seven months prior to admission she noticed a small papule in her right forearm over a tattoo she had got two weeks before in a motorcycle tradeshow, in a public space area. Over the next 20 days the lesion ulcerated, and new ones appeared over the tattooed area (Fig. 2). The patient had type 1 diabetes since she was 9 years old and was in regular use of NPH insulin. Lymphocutaneous sporotrichosis was diagnosed, the antifungal treatment was maintained, and four monthly cryosurgery sessions were performed as adjuvant therapy, with cure after 10 months.

The two patients lived in hyperendemic areas of sporotrichosis in Rio de Janeiro and they denied having had any contact with cats. In both cases, the diagnosis of the mycosis was confirmed following fungal isolation in culture from skin-biopsies (Fig. 3). The amplification of the calmodulin partial gene,



Fig. 1 Case 1: Ulcerated lesion over a tattooed area in the lumbar region (a). Healed lesion with hypertrophic scar after one year of treatment (b)



Fig. 2 Case 2: Lymphocutaneous lesion over a tattooed area in the arm, after the beginning of the treatment (a). When she was referred to our center, with an extensive ulcerated lesion destroying the tattoo (b)

using species-specific primers, identified the isolates as *S. brasiliensis*.

Sporotrichosis is a ubiquitous mycosis caused by pathogenic species of the genus *Sporothrix*. The infection generally occurs due to a traumatic inoculation of an organic matter harbouring the fungus within the subcutaneous tissue of humans or other susceptible animals. As an alternative way of infection, zoonotic transmission is mainly associated with cats' scratches or bites. The majority of sporotrichosis cases are caused by *Sporothrix schenckii* and

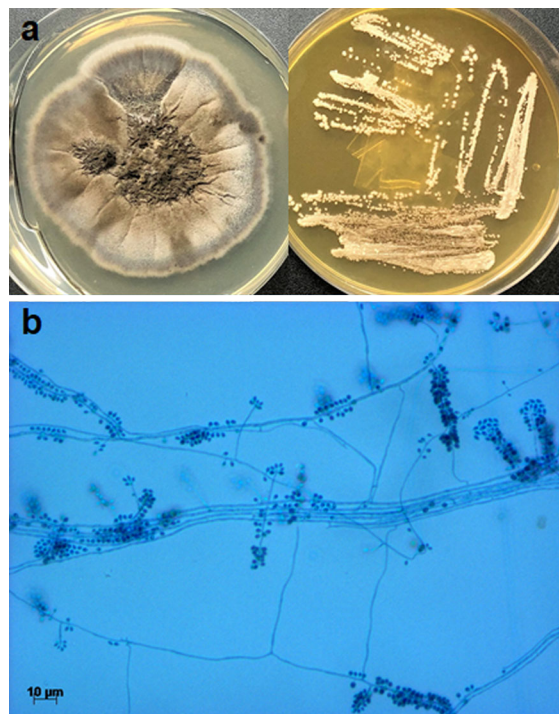


Fig. 3 Macromorphology of *Sporothrix brasiliensis*: filamentous colonies are smooth and wrinkled, white to creamy at first and then turning brown to black at 25 °C (Left); creamy white to tan yeast colonies at 37 °C (Right) (a). Micromorphology reveals branched septate hyphae with conidia forming a daisy-like pattern (cotton blue) (b)

Sporothrix globosa, both associated with the classic transmission. Zoonotic transmission is caused by *Sporothrix brasiliensis* and, to a lesser extent, by *S. schenckii*. Since 1998, the number of cases of

sporotrichosis due to *S. brasiliensis* has grown significantly in Rio de Janeiro (RJ), Brazil, where nearly all cases are related to cats as the main source of fungal infection. Sporotrichosis following body tattoo is a rare form of transmission.

In the two cases described, the tattoos were performed in studios that did not comply with the national health standards. Furthermore, both cases occurred in areas of high prevalence of *S. brasiliensis*. It is possible that the tattoo ink, the water used for ink dilution, or the tools necessary for the procedure were contaminated, with subsequent inoculation to the skin.

The present reports highlight that other non-zoonotic forms of transmission of *S. brasiliensis* may occur in endemic areas.

Authors' contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Vivian Fichman, Dayvison Francis Saraiva Freitas, Priscila Marques de Macedo, Antonio Carlos Francesconi do Valle, Fernando Almeida-Silva, Rosely Maria Zancopé-Oliveira, Rodrigo Almeida-Paes and Maria Clara Gutierrez-Galhardo. The first draft of the manuscript was written by Vivian Fichman and Maria Clara Gutierrez-Galhardo, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Code availability Not applicable.

Declarations

Conflict of interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

Ethics approval The study has been approved by the Ethical Committee of the INI/Fiocruz, (CAAE08097112.3.0000.5262). The patients' data were anonymized/de-identified to protect patients' privacy/confidentiality.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication The participants have consented to the submission of the cases reports to the journal.

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