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Brief Original Article

Diagnosis of human sporotrichosis in Campos dos Goytacazes, Rio de Janeiro, Brazil

Adriana Jardim de Almeida[1], Edilbert Pelegrini Nahn Júnior[2], Olney Vieira da Motta[1], Camila da Silva Lourenço[1], Maria de Lourdes Amaral Bernardino[1]; Gabriel Portal Barros Pellegrini Nahn[2]

[1] Center for Agricultural Science and Technology, Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF), Campos dos Goytacazes, RJ, Brazil
[2] Adult Health Department, Campos School of Medicine, Campos dos Goytacazes, RJ, Brazil

Abstract

Introduction: Sporotrichosis is an infectious fungal zoonosis associated with traumatic implantation in the skin of dimorphic fungi of the *Sporothrix schenckii* complex. The objective of this study was to diagnose sporotrichosis in patients in the city of Campos dos Goytacazes, and to establish correlations between positive laboratory results and dermatological and topographical aspects of the lesions and personal traits of the patients, such as sex, age and profession.

Methodology: We collected samples from 22 patients with suspect lesions, which were sent to the laboratory for direct microscopic analysis after Gram staining, followed by mycological culture by seeding the material in 4% Sabouraud dextrose agar (Himedia®) supplemented with chloramphenicol (50 mg/Lt) and cycloheximide (400 mg/Lt - Sigma-Aldrich, USA). The dishes were incubated at 25-30ºC. For confirmation of the diagnosis, the strains isolated in mycelial form were converted to yeast form by culture in yeast-peptone-dextrose (YPD) agar at 37ºC for up to 15 days.

Results: The positive results demonstrated that the disease was most frequently diagnosed in women between the ages of 19 and 60 years, and that 18 (81.8%) of the patients reported having contact with pet cats. The occupations of those positive for sporotrichosis were not related to the disease. The upper limbs were the body region most often afflicted, with observation in the majority of cases of ulcerated lesions, although five patients also had nodular lesions. Additionally, the observation of lymphatic cords was frequent.

Conclusion: In recent years, sporotrichosis has been diagnosed with relative frequency in Campos dos Goytacazes, causing great concern among public health officials and practitioners.

Key words: *Sporothrix*; prevention; public health; zoonosis.

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Introduction

Sporotrichosisis an infectious fungal disease associated with traumatic implantation in the skin of dimorphic fungi of the *Sporothrix schenckii* complex, which inhabit soil and plants and can cause pathology in animals and humans [1]. With the fungal invasion of the dermis and subcutaneous tissue, the disease can evolve in localized (cutaneous-lymphatic) form or become generalized [2-3].

S. schenckii is a complex formed by cryptic species that have been identified by gene sequencing, among them *Sporothrix albicans*, *Sporothrix brasiliensis*, *Sporothrix globosa*, *Sporothrix luriei* and *Sporothrix mexicana*. The species *S. brasiliensis* is considered to be the most prevalent and pathogenic in Brazil [4].

The transmission of sporotrichosis to animals, especially pet cats, is increasingly common in the state of Rio de Janeiro [5]. Transmission to humans is four times greater among patients who have contact with pet cats [6], and Brazilian public health agencies categorized sporotrichosis as an infectious disease of compulsory notificationin the state of Rio de Janeiro [7].

A solid understanding of dermatological zoonosis is necessary among both veterinarians and physicians, and sporotrichosis is one of the main such diseases that afflict dogs and cats [8].

Regarding the epidemiology, sporotrichosis stands out for being a fungal disease that can be found in virtually all regions of the world, but with greater frequency in tropical and subtropical environments. Although prevalent in the United States, it has greater epidemiological importance in Central and South

America, especially Mexico (central region) and Brazil [9].

Curiously, the disease has not reached epidemic proportions in any Brazilian state other than Rio de Janeiro [10-11], where between 1998 and 2004 a total of 2,326 cases were registered (759 in people, 64 in dogs and 1,503 in cats). The human patients reported that the condition started after having been bitten and/or scratched by cats in 55.8% of the cases [5].

The epidemiology of sporotrichosisin cats in Brazil reflects the combination of high fungal virulence with host susceptibility and inadequate sanitary conditions. In this context, lower-class suburban areas of Rio de Janeiro are considered endemic for the mycosis, both in animals and humans [12].

The treatment of sporotrichosis involves administration of antifungal drugs, among them first-generation azole and triazole derivatives such as itraconazole and fluconazole [13]. Furthermore, although their mechanism of action is not yet fully understood, the iodides have also proved effective in cases of humans with cutaneous and lymphocutaneous lesions [14].

Because of the distribution and amplitude of the cases of this pathology, the aim of this study was to diagnose sporotrichosis cases in humans with suspect lesions in the city of Campos dos Goytacazes, RJ, and to investigate the existence of correlations between positive laboratory results and the dermatological and topographical characteristics of the lesions and patient traits, such as sex, age and profession.

Methodology

The study was approved on ethical grounds via the "Plataforma Brasil" system on October 2, 2017, through CAAE Protocol 76313317.0.0000.5244.

Sample

The sample was composed of 22 patients presenting lesions compatible with sporotrichosisin a period comprehended between 04/2017 and 04/2018. The patients were recruited through a partnership program between Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF) and the Campos School of Medicine, both located in the city of Campos dos Goytacazes, Rio de Janeiro, Brazil. The majority of patients were fowarded to a dermatological specialist soon after their pets were previously attended at the department of clinical ofs mall animal at Veterinary Hospital UENF, and a story of cutaneous lesions difficult to heal.

The material from the lesions was collected with sterile swabs and sent to the Animal Health Laboratory of the Center for Agricultural and Science and Technologies (LSA/CCTA/UENF), accompanied by an individual record sheet containing personal and clinical data on each patient.

Laboratory Analysis

The cytological aspects of the samples were examined under a light microscope (100× magnification) after Gram staining. For isolation of the mycelial form of the fungus, the swabs were first gently swiped over the surface of a medium composed of 4% Sabouraud dextrose agar (Himedia®) supplemented with chloramphenicol (50 mg/Lt) and cycloheximide (400 mg/Lt - Sigma-Aldrich®, St Louis, USA) contained in Petri dishes, which were incubated in an incubator system of air circulation within the chamber at 25-30ºC for 10 days. To confirm the diagnosis, the isolated strains in mycelial form were converted into yeasts by culturing in yeast-peptone-dextrose (YPD) agar at 37ºC for seven days.

The fungal structures were identified by observing the morphological traits under a light microscope (100×) after incubation at temperatures of 25 to 30°C and 37°C.

Results

The 22 patients, all positive for sporotrichosis, with ages ranging from two to 78 years (average of 35), with 14 females (63.6%), 8 males (36.4%), 18 (81.8%) of the patients reported having had contact with sick pet cats, and only one of the patients related a contact with a dog and no return was obtained from all other patients concerning any contact with domestic animals.

The body region most often affected in this study was the upper limbs (10; 45.5%), followed by the hands (4; 18.2%) and lower limbs (4; 18.2%). Lesions were also identified on the fingers (2; 9.1%) as well as multiple lesions on an upper limb and thorax (2; 9.1%) – Figure 1. A large portion of the patients (10) presented ulcerated lesions (45.5%), while three (13.6%) had nodular lesions. Other types of lesions were also noted, such as infiltration (1; 4.5%) and skin peeling (1; 4.5%). Also, different types of lesions were observed on the same patient, namely: ulcer and scab (3; 13.6%) and nodular with scab (2; 9.1%). Ulcerated nodular lesions and erosions with scabs were observed in only one patient for each symptom (4.5%). The occurrence of lymphatic cords was an important clinical symptom in this survey, having been observed in 13 patients (59.1%).

In this study the afflicted patients were students (5, 22.7%) and most of professions without any pattern of risk to contract sporotrichosis, according to literature available: a school teacher, school cafeteria worker, salesman, physiotherapist, lawyer and social assistant, among other largely indoor workers.

Discussion

The 22 patients, all positive for sporotrichosis, had ages ranging from two to 78 years, with 63.6% of females. Likewise, Barros *et al*. [15] observed positive lab results for sporotrichosis in people between 5 and 89 years old (average of 39), composed of 122 (68%) females and 56 (32%) males. The retrospective study of Song *et al.* [16] reported a male/female ratio of 1:1.42, while studies conducted in the state of Rio de Janeiro, reported that the patients were predominantly females (66.9%), in the age range from 21 to 60 years old (67.5%) [17] leading to the inference that women tend to interact more with pet cats, placing them at higher risk of contamination by the fungus.

Sporotrichosis can afflict people independently of individual factors, such as sex and age [18]. The epidemiological profile is mainly composed of children, the elderly and women, groups that tend to have more frequent contact with animals, especially pet cats [6]. In contrast, in this study only four children were diagnosed as having the disease (cutoff age 11 years, 18.2%), four teenagers with ages between 12 and 18 years (18.2%), and four elderly people (older than 61 years, 18.2%), with the people most often afflicted with the disease being young adults and adults, with ages between 19 and 60 years (10 people, 45.4%).

The occurrence of the disease is associated with profession, whereby people who work largely outdoors, especially farm workers who are in contact with soil and plant matter, along with professionals who deal with animals, are more prone to the disease, and can even act as vectors for family outbreaks [5,19,20,21]. In this study, none of the positive patients were farm workers, but students and indoor workers. In short, the profile of the group was different than found in other studies. Otherwise, Barros *et al*. [15] reported that of the people positive for sporotrichosis in their sample, 30% were maids, 18% students and 5% veterinarians. Silva *et al*. [17] reported detection of the disease in patients with different educational levels and job statuses. In their sample, 55.5% of the subjects positive for sporotrichosis were formally employed and 44.5% were not. The second category included homemakers, retirees, unemployed people, students and children. Of the 973 individuals holding formal jobs, 96 (5.2%) worked in homes, as maids or cleaning ladies, and 37 (2%) worked in pet shops or veterinary clinics.

Figure 1. Patients diagnosed as positive for *Sporothrix* spp. A: ulcerated lesion in the tip of finger; B: Ascendant lesions of lymphatic cords of the upper limb. Campos dos Goytacazes, RJ.

Cats play an important role in outbreaks of sporotrichosis, by transmitting the fungus to humans through biting and/or scratching. For this reason, cats are considered important sources of infection and propagation of the disease [12]. A previous study reported a correlation between outbreaks of sporotrichosis in cats and prevalence in humans caused by *S. brasiliensis* in the same geographic area ofthis study, suggesting that the existence of the disease in cats directly influences the prevalence in humans. It was also noted that *S. brasiliensis* was the most common etiological agent of feline sporotrichosis in Brazil [12].

The results of this study corroborate the findings of the mentioned previous studies, since 81.8% of the patients reported having had contact with pet cats. This reinforces the concern that health care professionals should have regarding transmission of the fungus via bites and/or scratches from cats. Further in this respect, Barros*et al.* [15] reported that between 1998 and 2001, 178 human cases were reported in the city of Rio de Janeiro, of which 156 involved contact with pet cats diagnosed as positive for sporotrichosis and 97 involved bites or scratches by cats. Likewise, Silva *et al.* [17] observed that 65% of the patients surveyed who were afflicted with the disease had pet cats, and among those subjects, 80.3% had acquired the disease from a cat in the home.

Lopes*et al*. [22] observed that approximately 80% of the patients presented the lymphocutaneous form of the disease. In these cases, the lesion initially has a

papulonodular appearance between two and four weeks after the injury, the inoculation site of the fungus. In this period, the lesion can ulcerate, fistulate and release a purulent secretion. The lesions, generally nodular, progress along the lymphatic cords in ascending direction after a few weeks. The fixed cutaneous form consists of a single lesion, without lymphatic dissemination. In some cases, the disease can develop into large ulcers, with well-defined borders, that are erythematous, papulopustular, infiltrative or scabby. Some patients suffer from multiple cutaneous lesions, disseminated on the skin surface, without systemic invasion, and with polymorphic appearance, all concomitant. Any mucosa area can be affected by sporotrichosis, but the ocular mucosa is most often involved, possibly causing conjunctivitis, episcleritis, uveitis, choroiditis and retrobulbar lesions, among other maladies [23-25]. Bones and joints can be affected by direct injury, by invasion through an existing cutaneous lesion, or be secondary to hematogenous dissemination. Osteoarticular sporotrichosis can originate as monoarthritis, associated or not with cutaneous lesions [26,27]. In thus survey, none of the patients presented sporotrichosis lesions in the ocular mucosa or osteoarticular involvement.

In Brazil, a total of 782 hospitalization and 65 deaths were recorded as a consequence of sporotrichosis in the period between 1992 and 2015. HIV co-infection was observed in 6% of hospitalizations and 40% of deaths registered by health authorities. In the state of Rio de Janeiro alone there were 250 (32%) hospitalizations and 36 (55,4%) deaths, with a progressive tendency to increase the cases, over the period afore mentioned. Other two states, São Paulo and Goiás, were also highlighted, with 16,4% and 8,8% of hospitalization, respectively. In 612 (89,7%) cases sporotrichosis was the primary diagnosis, with 220 (35,9%) of cases showing the lung form of the disease, 129 (21,1%) lymphocutaneous form, 76 (12,4%) as disseminated form,70 (11,4%) described as other form and 117 (19,1%), as non-specified sporotrichosis. Immunosupressive conditions such as HIV infection, alcoholism, malnutrition, and other immunosupressive conditions registered as secondary cause in hospitalizations and deaths seem to interfere on this vulnerable group prone to severe story of the disease [28]. In the present work there were no recordsof death caused by sporotrichosis.

Conclusion

Sporotrichosisis frequently diagnosed in patients residing in Campos dos Goytacazes, RJ, a pattern of concern to public health authorities in the city. The most common manifestation is in women of all ages, mainly presenting ulcerated lesions of the upper limbs, also with frequent observation of lymphatic cords.

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Corresponding author

Adriana Jardim de Almeida
Center for Agricultural Science and Technology, Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF), Campos dos Goytacazes, RJ, Brazil
Tel: 555-123456
Fax: 555-123456
Email: jardim@uenf.br

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