Clinical-epidemiological characteristics of Sporotrichosis cases in Rio Grande do Sul, Brazil: a 16-year study

Características clínico-epidemiológicas dos casos de Esporotricose no Rio Grande do Sul, Brasil: um estudo de 16 anos

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ABSTRACT
Background: Sporotrichosis is a subcutaneous fungal infection that occurs worldwide, although its highest incidence is in tropical and subtropical areas. In Brazil, it is an hyperendemic disease that affects animals and humans. Objective: To report cases of sporotrichosis in a dermatology referral service, in the state of Rio Grande do Sul. Methods: Retrospective, observational, descriptive study, from 2003 to 2019. Data were selected from patients who had skin lesions suggestive of sporotrichosis, and who had positive direct and/or cultural mycological examinations of *Sporothrix* spp.. Clinical records were reviewed in charts. Results: 61 cases of sporotrichosis were identified, with an annual average of 4 cases. There was a predominance of males (54.1%; n=33) and white skin color (77.0%; n=47). The mean age was 45.9 years (standard deviation = 21.2), with the predominant age group between 25 and 60 years (41.0%; n=25). The sample consisted mainly of patients residing in the interior of the state of Rio Grande do Sul (47.5%; n=29). Conclusions: This study contributes with updates on the epidemiological situation of sporotrichosis in the state of Rio Grande do Sul.

Keywords: Sporotrichosis, epidemiology, mycoses, zoonosis, *Sporothrix* spp., neglected diseases, public health, observational study.

RESUMO


1 INTRODUCTION
Sporotrichosis is a chronic fungal infection that can affect humans and animals, whose etiological agents are the dimorphic fungi of the genus *Sporothrix*\(^1-3\). The fungal species of the *Sporothrix* complex are thermodynamic, presenting a saprophytic phase that grows as mycelium at 25°C, and as yeast at 35-37°C, constituting the parasitic phase. Geographic distribution, frequency of occurrence, ecological niche and virulence vary widely within the genus *Sporothrix*\(^1,4\). These fungi have already been isolated from soil, plants, water, algae, insects and spiders, marine animals, cats, dust and decaying organic matter. Due to this wide
distribution in nature, people involved in professions related to gardening, agriculture and construction are more predisposed to sporotrichosis. The main species of the genus *Sporothrix* causing sporotrichosis in humans and animals are *S. schenkii*, *S. brasiliensis* and *S. globosa*, with *S. brasiliensis* being the main species associated with zoonotic transmission by scratches and bites from infected animals\(^1\)\(^4\). A murine virulence model verified that *S. brasiliensis* is the most virulent species, followed by *S. schenkii* and then by *S. globosa*\(^1\)\(^5\).

The clinical manifestations are varied, from localized to disseminated infection, such as the cutaneous and extracutaneous lymphatic forms. Between 80% and 95% of cases are cutaneous lymphatic sporotrichosis, which spreads through the lymph nodes, occurring mainly on the face, upper and lower limbs\(^1\)\(^-\)\(^3\)\(^,\)\(^6\). These manifestations result from several factors, such as the host's immune response, the virulence of the fungal isolate, the amount of inoculum and the depth of inoculation\(^1\)\(^\)\(^,\)\(^6\). In humans and other mammals, the main route of entry is through the skin, traumatized by injury with material contaminated by the fungus. Another possibility of infection is through bites and scratches from infected animals\(^1\)\(^,\)\(^4\).

The treatment of sporotrichosis must be defined considering the type of clinical manifestation, the immunological situation of the host and also the causal species of *Sporothrix*\(^1\), as the species of the genus present different responses to antifungals *in vitro*\(^1\)\(^,\)\(^7\). Potassium iodide and/or itraconazole are the treatments initially indicated for cutaneous and lymphocutaneous sporotrichosis. Amphotericin B is used as a second-line treatment for cutaneous and lymphocutaneous sporotrichosis, in addition to being used in disseminated, systemic, pulmonary and osteoarticular forms. Terbinafine is suggested as a potent antifungal against *S. brasiliensis*, however, more studies are needed to confirm the effectiveness and safety of its use\(^1\)\(^,\)\(^7\)\(^,\)\(^8\).

Sporotrichosis is widespread throughout the world, however, in some places the disease is more frequent, such as in America, Asia and Africa\(^8\)\(^-\)\(^11\). In recent years, in Brazil, sporotrichosis in humans and cats by *S. brasiliensis* has become a public health problem, reaching epidemic levels mainly in the South and Southeast regions\(^1\)\(^,\)\(^5\)\(^,\)\(^7\)\(^,\)\(^10\). In other endemic regions, the disease is mainly related to environmental transmission by inoculation by contaminated plant debris and by zoonotic transmission, and the main etiological agents are *S. schenckii* and *S. globosa*\(^7\)\(^,\)\(^10\)\(^-\)\(^12\).

Considering that the southern region of Brazil presents a public health problem with sporotrichosis, it is essential to know the epidemiology of the disease. Thus, the aim of the present study is to report the clinical-epidemiological characteristics of sporotrichosis cases treated at a dermatology referral service in the state of Rio Grande do Sul, in southern Brazil.
2 MATERIAL AND METHODS

2.1 STUDY REGION

Rio Grande do Sul is located on the coast of the extreme south of Brazil, bordering Argentina and Uruguay. It covers 281,707,149 km², distributed in seven health districts (South, Vale, Metropolitano, Serra, Norte, Missão and Midwest). The estimated population is 11,422,973 inhabitants.\(^{13,14}\)

Retrospective, descriptive study carried out at the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil (30° 01’ 58” S 51° 13’ 48” O), from January 1, 2003 to December 30, 2019. This study is a follow-up to a previous study that analyzed cases of sporotrichosis in the same service, from 1967 to 2002.\(^{15}\)

Data were selected from patients who had skin lesions suggestive of sporotrichosis and for whom direct and/or cultural mycological examinations were positive for *Sporothrix* spp. Clinical data were reviewed in medical records to obtain demographic information and clinical characteristics of the disease in patients.

Data were organized in a Microsoft Excel spreadsheet (2010) and processed and analyzed in the software Statistical Package for Social Science (SPSS) version 26. Mean, standard deviation and percentage were used to describe the data. The Shapiro-Wilk test was performed to determine the normality of distribution in continuous variables. For parametric data, Student’s *t* test was used, and nonparametric data were analyzed using the chi-square test and Fisher’s exact test. The statistical significance level used was 0.05. The study followed the ethical criteria guided by the National Health Commission, respecting the confidentiality and anonymity of users.

3 RESULTS

In the period from 2003 to 2019, 61 cases of sporotrichosis were identified, with an annual average of four cases (Figure 1). The Center-South and East regions of Rio Grande do Sul were the regions that presented more than one case of sporotrichosis in our study (Figure 2). The male gender predominated in the sample (54.1%; *n*=33) and the most frequent skin color was white (77.0%; *n*=47). The mean age of the patients was 45.9 ± 21.2 years, with the predominant age group between 25 to 60 years (41.0%; *n*=25). The sample consisted mainly of patients residing in municipalities outside the metropolitan region of Porto Alegre, capital of the state of Rio Grande do Sul (47.5%; *n*=29) (Table 1).
Figure 1 – Number of sporotrichosis cases per year, in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.

Source: From Authors, 2023.

Figure 2 – Regional distribution of sporotrichosis in State of Rio Grande do Sul, Brazil.

Source: From Authors, 2023.
The lesions were classified into four groups, according to their location on the body: upper limbs, lower limbs, face and trunk. In 75.5% (n=43) of the cases, the lesions were in the upper limbs, and in this group, males had a higher incidence (62.8%; n=27). The cases in the lower limbs corresponded to 24.6% (n=15) of the total number of cases, being more present in females (60.0%; n=9) (Table 2). There was no association between lesion site and sex (p=0.91).

Table 1 – Sociodemographic data of patients diagnosed with sporotrichosis in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total N=61</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 24 years</td>
<td>14</td>
<td>23.0</td>
</tr>
<tr>
<td>25 – 60 years</td>
<td>25</td>
<td>41.0</td>
</tr>
<tr>
<td>60 years or &gt;</td>
<td>19</td>
<td>31.10</td>
</tr>
<tr>
<td>Not informed</td>
<td>3</td>
<td>4.90</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>45.9</td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>54.1</td>
</tr>
<tr>
<td>Race/Skin color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>47</td>
<td>77.0</td>
</tr>
<tr>
<td>Black</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>Not informed</td>
<td>11</td>
<td>18.0</td>
</tr>
<tr>
<td>Region of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porto Alegre</td>
<td>17</td>
<td>27.9</td>
</tr>
<tr>
<td>Metropolitan region</td>
<td>9</td>
<td>14.8</td>
</tr>
<tr>
<td>Outside the metropolitan region</td>
<td>29</td>
<td>47.5</td>
</tr>
<tr>
<td>Not informed</td>
<td>6</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Source: From Authors, 2023.

Table 2 – Clinical data of patients diagnosed with sporotrichosis in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.

<table>
<thead>
<tr>
<th>Injury site</th>
<th>Sex</th>
<th>Upper limbs %</th>
<th>Lower limbs %</th>
<th>Face %</th>
<th>Trunk %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>16</td>
<td>37.2</td>
<td>9</td>
<td>60.0</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>100.0</td>
<td>15</td>
<td></td>
<td></td>
<td>61</td>
</tr>
</tbody>
</table>

Source: From Authors, 2023.

4 DISCUSSION

In this study, a set of 61 cases of sporotrichosis diagnosed in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil, was presented in the period from 2003 to 2019. Currently, the Dermatology Service is one of the main references for assistance to patients residing in municipalities outside the metropolitan region, and approximately 60% of consultations per
month are performed with this public; therefore, almost half of the sample (47.5%; n=29) is expected to be patients from these municipalities.\textsuperscript{16}

Previous studies suggest that the state of Rio Grande do Sul is on the way to becoming an endemic state in cases of sporotrichosis in humans, considering the significant number of occurrences of the disease in felines, which usually precede cases in humans.\textsuperscript{10,16-18} Even so, when comparing with the annual average of cases of the previous study in the same Dermatology Service, which was 10.5 cases per year,\textsuperscript{15} there was a reduction in the number of cases of sporotrichosis in recent years. However, considering that the cases discussed in the present study come from a single care center, it is not possible to say that there was a reduction considering the state of Rio Grande do Sul as a whole.

Despite sporotrichosis being an emerging neglected disease that affects both animals and humans, with the potential to generate serious public health problems,\textsuperscript{17} it is still not considered by the Ministry of Health as a notifiable disease. This situation reduces the possibilities of carrying out analyzes to verify the incidence and prevalence of the disease. Existing studies are mainly based on medical records of care services, which often makes it difficult to define the epidemiological profile of sporotrichosis, mainly due to incomplete filling of medical records. It is observed that in the previous study in the same Dermatology Service, it was possible to document more complete results, including, for example, duration of symptoms, form of the disease and type of treatment.\textsuperscript{15} In the present study, due to incomplete medical records, these data, among others relevant, were not included.

Some characteristics of sporotrichosis cases were outlined, with the main occurrences of the disease in the economically active age group, in males and with a mean age similar to that found in the literature.\textsuperscript{19-21} However, there are studies in other regions of Brazil that indicate the predominance of females in cases of sporotrichosis.\textsuperscript{22} It was not possible to characterize the sample in terms of work activity, which could explain the predominance of cases in males and in the economically active age group.

The predominance of white skin color is in accordance with the predominant characteristics in the study area. In the state of Rio Grande do Sul, in 2019, according to the State Department of Economics and Statistics, 79\% of the population had white skin color.\textsuperscript{23} Therefore, the result obtained for this variable was already expected, also based on the data found in the literature.\textsuperscript{21} In addition, dermatological diseases are more easily identified and described in light skin. Dermatologists even use the Fitzpatrick skin color model that defines the phototype, categorizing white skin, but avoiding defining ethnicity.\textsuperscript{24}
The findings related to the location of the lesions are in agreement with the literature, with a higher frequency of cases with lesions in the upper limbs.13,26-27

5 CONCLUSIONS

Our data are significant for defining the epidemiological profile of sporotrichosis in southern Brazil, although it has limitations. The main difficulties encountered were in collecting data from medical records, which were incomplete in relation to several important epidemiological aspects. The fact that sporotrichosis is not a notifiable disease in Brazil, even though it is endemic, makes it difficult to carry out studies that can indicate the prevalence and incidence of the disease. Therefore, studies like ours, even with their limitations, are important to understand the public health impact caused by sporotrichosis in Brazil.
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