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Treatment and Outcome of Feline Sporotrichosis In a Long Term Hyperendemic Area

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Abstract

Background

Sporotrichosis caused by Sporothrix brasiliensis is a major zoonotic public health problem in Brazil and an emerging neglected tropical disease worldwide. Southern Rio Grande do Sul has been a hyperendemic area since the 1990s; however, a lack of knowledge regarding the treatment and outcomes of cats still persists.

Subjects and Method

We aimed to evaluate the management, treatment, and outcomes of feline sporotrichosis, as well as owners' knowledge about the disease, in a hyperendemic city in southern Brazil. A retrospective analysis was performed including cases diagnosed between January 2021 and December 2024, followed by interviews with cat owners.

Results

Among 293 feline sporotrichosis, 62 owners participated. Most cats were male (75%), had outdoor access (55%), and disseminated cutaneous lesions (56%). Itraconazole monotherapy was the most frequent treatment (77%), with a mean duration of 147 days. Clinical cure occurred in 63% of treated cats, while 37% died. Treatment with compounded itraconazole was significantly associated with death (p=0.036). The mean treatment cost was USD 167, representing a substantial financial burden for owners. Nearly half of participants (42%) learned about sporotrichosis only after the cat diagnosis, and 16% reported zoonotic transmission.

Conclusion

Our findings highlight treatment challenges, limited public awareness, and the need for free antifungal therapy programs and educational actions. Strengthening public health policies and veterinary support is essential for effective control of feline and zoonotic sporotrichosis.

Keywords: Sporothrix Brasiliensis, Zoonosis, Rio Grande Do Sul, Itraconazole

1. Background

Sporotrichosis caused by *Sporothrix brasiliensis* is recognized as a serious public health problem in Brazil and has been classified as an emerging neglected tropical disease worldwide (WHO, 2023). Brazil alone has reported more than 10.000 human cases and 8500, considering only those documented in the literature. Additionally, other South American countries such as Argentina, Chile, and Paraguay have reported outbreaks or case series of S. brasiliensis infection in both humans and animals. As a result, sporotrichosis became a notifiable disease across the entire Brazilian territory; however, this designation, limited to human cases, was only established in 2025, more than two decades after the first reported zoonotic case by *S. brasiliensis*

The Domestic cats are is the central pillar of zoonotic sporotrichosis, serving as both the primary victim as the main transmitter of *S. brasiliensis*. This is largely because cats frequently develop severe forms of the disease (disseminated and extracutaneous presentations), associated with a high fungal burden. Transmission of *S. brasiliensis* occurs readily through scratches and bites, leading to traumatic inoculation of the skin, or through contact of infectious secretions with mucous membranes [1-5].

One of the major challenges in controlling the disease in animals, and its consequent impact on public health, is related to difficulties during the treatment, which often leads to unfavorable outcomes in infected cats. A recent systematic review showed that, in Brazil, most cats have free access to the streets and are predominantly male, factors that contribute to the dispersion of *S. brasiliensis* Regarding treatment, the study reported that itraconazole monotherapy was commonly used, with prolonged therapy durations and favorable clinical outcomes. However, the financial cost of this treatment was not evaluated, which likely influences treatment adherence by cat owners, especially considering Brazil's significant socioeconomic disparities. Furthermore, the study found statistically significant associations between clinical outcomes and the clinical manifestations of sporotrichosis, the type of antifungal therapy, and antifungal side effects. These findings highlight the need to investigate such associations hyperendemic regions of Brazil [6-8].

Another critical issue surrounding sporotrichosis is the lack of knowledge about the disease, even in hyperendemic regions. For example, the southern region of Rio Grande do Sul (RS) was one of the first areas in Brazil to report zoonotic sporotrichosis cases in humans during the 1990s, alongside the state of Rio de Janeiro. Despite being hyperendemic for over two decades, a significant lack of awareness persists among both cat owners and healthcare professionals regarding key aspects of the disease, such as its etiologic agent, transmission routes, clinical manifestations, and preventive measures. Therefore, clinical and epidemiological data on feline sporotrichosis, the key of *S. brasiliensis* transmission, mainly considering treatment and outcome variables, are essential for understanding the broader public health impact of the disease, along with evaluating the knowledge of cat owners. Thus, this study aimed to assess the management, treatment, and outcomes of cats diagnosed with sporotrichosis, as well as to evaluate their owners' knowledge about the disease in a hyperendemic city in southern Brazil [9-11].

2. Subjects and Method

2.1. Study Design

A retrospective study was conducted using data from the Mycology Laboratory, covering the period from January 2021 to December 2024. The laboratory is located in the city of Rio Grande, Rio Grande do Sul, Brazil (-32.034777721750054; -52.11199494580826), a hyperendemic area for sporotrichosis since the 1990s .Since 2010, the laboratory is a regional reference offering free diagnostic services for animals with sporotrichosis suspicious, through a university outreach project, supporting public medical veterinary professionals from Rio Grande city [9].

2.2. Population and Sample

All feline sporotrichosis cases diagnosed by the Mycology Laboratory during the study period were reviewed in order to invite the animals' owners (tutors) to participate in the study. All animal's tutor with the availability of a valid phone number were contacted. Cases were excluded if the phone number was incorrect or if the contact could not be reached after three tentative in distinct periods of a day and distinct days of week.

2.3. Study Variables

All participants that accepted to participate in the study were included and interviewed by a questionary consisting of 29 questions regarding the management, treatment and outcomes of their cats with sporotrichosis, as well as their knowledge about preventive measures and other cases of the disease in the neighborhood.

2.4. Operational Definition of Variables

The variables analyzed for associations were: clinical manifestation (fixed or disseminated) versus outcome (death or cure); type of itraconazole (commercial or compounded) versus outcome; and route of drug administration (mixed with food or administered orally) versus outcome. The monetary cost of treatment was estimated based on the owners' reports and converted to U.S. dollars. A p-value ≤ 0.05 was considered statistically significant.

2.5. Study Instruments

All variables were collected using a structured questionnaire.

2.6. Data Analysis

Data were analyzed using frequency distributions and chi-square tests in the Statistical Package for the Social Sciences (SPSS), version 25.0 (IBM Corporation, Armonk, NY, USA).

2.7. Research Ethics

This study was approved by the Ethics Committee of FURG under protocol number CAAE 77193424.9.0000.5324. All participants (cat owners) were informed about the objectives and procedures of the study and provided their consent by electronically signing the Informed Consent Form.

3. Results

From a total of 293 cats with confirmed sporotrichosis 150 (51%) had an owner's phone number available in the database. After at least three tentatives of contact by phone without success, 88 were excluded, resulting in 62 participants in this study. Most of the cats from the owners included were male (75%; 45/60) and castrated (76%; 45/59 – 1 missing data), being 15% (7/45) undergoing the procedure after the diagnosis of sporotrichosis. About a half of cats had free access to the streets (55%; 34/62) and presented disseminated cutaneous lesions (56%; 35/62). According to the owners, the median period of apparent

lesions until the diagnosis and the beginning of the treatment were 76 days (range: 1–730 days). Three animals died before the beginning of the treatment and three tutors were unable to recall the name of the drug used for sporotrichosis.

Itraconazole was the drug of choice in the remaining 56 animals, administered as monotherapy in 77% (43/56) of cases and in combination with potassium iodide in 23% (13/56). The mean duration of treatment was 147 days (range: 1–1095 days). According to the owners, the monetary cost of treatment was up USD 753, with a mean of USD 167. Most of the animals received the drug orally (71%; 40/56), while the remaining ones received it mixed with food (29%; 19/56).

Clinical cure was achieved in 61% (34/56) of treated cats, while 39% (22/56) died (n=20) or were lost by the tutors (n=2). Relapse of the disease was observed in 37.5% (21/56) of the animals. The correct discharge of the body from dead animals (cinder) occurred in just one case (5%; 1/20), the others were mainly buried in the backyards of the owners houses (55%, 11/20), improperly buried in vacant lot (25%, 5/20) and improperly discarded in domestic waste bins (15%, 3/20).

The clinical manifestation of sporotrichosis (fixed or disseminated) was not associated with outcome (p=0.28), as well as the route of drug administration (mixed with food or administered orally) (p=0.533). However, the type of itraconazole used showed a significant association: 76% of cats treated with compounded itraconazole died, compared with 45% of those treated with commercial itraconazole (p=0.036).

About half of the owners (53%; 33/62) reported not using personal protective equipment when handling infected animals, and 42% (26/62) were only made aware of sporotrichosis at the time of their cat's diagnosis. More than half of the participants (52%; 32/62) reported observing other cats with lesions suggestive of sporotrichosis in their neighborhood, and 10% (6/62) reported transmission of *S. brasiliensis* within their household to another animal (cat or dog). Zoonotic transmission was confirmed in 16% of owners (10/62), who developed fixed or lymphocutaneous sporotrichosis after being scratched or bitten by their infected cat.

4. Discussion

For the first time in southern Brazil, a region considered hyperendemic since the 1990s, we report the treatment management and outcomes of cats with sporotrichosis. An alarming finding was the high rate of unfavorable outcomes, resulting in about half of the infected animals dead or presenting a relapsing of the disease. We also highlight here the substantial monetary costs of treatment borne by the owners. Considering the central role of cats in the dispersion and maintenance of *S. brasiliensis*, these results reaffirm a concerning epidemiological scenario in our region, one of the relevant areas for sporotrichosis in Brazil and worldwide. Moreover, most of the affected cats were male, had free access to the streets, and presented lesions for a prolonged period (on average more than two months) prior the diagnosis. This is a well-known scenario that facilitated the dispersion of the fungal pathogen to other animals and human hosts, which is further aggravated by the data showed here regarding owners' limited knowledge about the disease and poor adherence to preventive measures. Therefore, the need for more effective treatment strategies is urgent in hyperendemic areas.

A key finding of our study relates to the monetary cost of treatment for cat owners. Brazil is a socioeconomically unequal country, and the average treatment cost of USD 167 represents nearly 60% of the national minimum wage (~USD 250), corresponding to a substantial portion of household expenses such as rent. This financial burden negatively impacts adherence to treatment for cats, and is probably one of the causes of the high mortality and relapsing rate showed in our cases. Although some Brazilian states or municipalities provide antifungal therapy for cats free of charge, this is not a nationwide policy, leaving areas such as ours without access to subsidized treatment . These findings underscore the urgent need to implement free treatment for feline sporotrichosis at the national level [10-19].

Itraconazole is a highly active drug against sporotrichosis. Thus, besides the possible fails to treatment adherence another hypothesis for the unfavorable outcomes of cats from our study could be related to their infection by more resistant strains, since non-wild-type isolates of *S. brasiliensis* have been reported in our region. In addition, we showed that the use of compounded itraconazole was significatively associated with the outcome death. In fact, although it has been recommended to be avoided by guidelines, its use for the treatment of animals with sporotrichosis persists due to the lower cost in comparison with the commercial one. Interestingly, the administration of the drug by opening the capsule and mixing their content with food did not negatively influence the treatment outcomes. Since this approach not only facilitated once-daily dosing in cats as well as contribute to avoid bites and scratches we suggest that it can be chosen instead forcing the cat to swollen the drug. Nevertheless, further studies are needed to evaluate plasma concentrations of itraconazole trough it administration with food.

Another important finding concerns the knowledge about sporotrichosis among owners of infected cats. Approximately half of the participants became aware of the disease only after their pet's diagnosis. This is particularly concerning given that our region has been hyperendemic since the 1990s and educational activities have been conducted since around 2011. Despite these efforts, public knowledge remains limited, underscoring the urgent need for stronger public health interventions at both municipal, state and national levels, as academic initiatives per si appears insufficient. Equally concerning is the lack of protective measures adopted by owners when handling infected cats. More than half of them did not follow safety

recommendations, which likely contributed to the zoonotic transmission observed in our study and frequently reported in our region. These findings reflect not only local but also global neglect of sporotrichosis (WHO, 2023), which poses significant challenges to controlling the spread of cases in both humans and animals. A positive finding, however, was that most animals were castrated, and many underwent the procedure after diagnosis. This highlights sporotrichosis as a motivating factor for castration, which is a recommended preventive measure for sporotrichosis and other zoonotic and infectious diseases.

Our study has some limitations, such as potential bias related to the questionnaire-based design and the use of a convenience sample, which may have introduced errors in the final variables and findings. Nevertheless, this study represents an important first step toward understanding the outcomes and treatment of infected cats in hyperendemic areas of Southern Brazil and contributes to guiding future research in this field. Therefore, our study highlights the urgent need for public health measures including surveillance, assistance, treatment and education to disseminate and apply interventions to promote effective strategies for sporotrichosis control and prevention [20-25].

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Conflict of Interest

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

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