IMPORTANCE OF CYTOPATHOLOGY IN THE SCREENING AND DIAGNOSIS OF FELINE SPOROTRICHOSIS AND ITS IMPORTANCE IN PUBLIC HEALTH

Importância da citopatologia na triagem e diagnóstico de esporotricose felina e sua importância na saúde pública

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Abstract

Sporotrichosis is a subacute to chronic zoonotic mycosis caused by fungi of the *Sporothrix* genus, with *S. schenckii var. brasiliensis* being the most relevant in Brazil. Domestic cats are the primary reservoirs and amplifiers of the infection, making the disease an increasing challenge for public and veterinary health. Early diagnosis is essential for effective clinical management and transmission control. Cytopathology stands out as an accessible, rapid, and sensitive diagnostic method, allowing for early infection identification. This study highlights its importance in the screening, diagnosis, and monitoring of sporotrichosis, as well as the key role of veterinarians in early detection, therapeutic guidance, and implementation of preventive measures. Epidemiological surveillance and mandatory reporting are crucial for disease control, along with the adoption of biosafety protocols to reduce the risk of zoonotic transmission. Veterinarians play a central role in mitigating the health and epidemiological impacts of sporotrichosis.

Keywords: Cytopathology. Diagnosis. Sporotrichosis. Zoonosis.

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Resumo

A esporotricose é uma micose subaguda a crônica, de caráter zoonótico, causada por fungos do gênero *Sporothrix*, com destaque para *S. schenckii var. brasiliensis* no Brasil. Felinos domésticos são os principais reservatórios e amplificadores da infecção, tornando a doença um desafio crescente para a saúde pública e veterinária. O diagnóstico precoce é essencial para o manejo clínico eficaz e a contenção da transmissão. A citopatologia destaca-se como um método acessível, rápido e sensível, permitindo a identificação precoce da infecção. Este estudo ressalta sua importância na triagem, diagnóstico e monitoramento da esporotricose, além do papel do médico-veterinário na detecção precoce, orientação terapêutica e implementação de medidas preventivas. A vigilância epidemiológica e a notificação compulsória são fundamentais para o controle da doença, assim como a adoção de protocolos de biossegurança para reduzir o risco de transmissão zoonótica. O médico-veterinário tem papel central na mitigação dos impactos sanitários e epidemiológicos da esporotricose.

Palavras-chave: Citopatologia. Diagnóstico. Esporotricose. Zoonose.

Introduction

Sporotrichosis is a subacute to chronic mycosis caused by dimorphic fungi of the genus *Sporothrix*, with particular epidemiological relevance of *Sporothrix schenckii var. brasiliensis* in Brazil. It is a zoonosis of increasing importance that affects several domestic species, with domestic cats acting as the main reservoirs (Bison; Parentoni; Brasil, 2020). The disease is more prevalent in stray or semi-domiciled cats, with a higher occurrence in males, and may occasionally affect humans. Clinically, sporotrichosis predominantly presents in localized cutaneous, lymphocutaneous, or lymphatic forms, with progression to disseminated or extracutaneous forms in rare cases. Typical clinical signs include papules, nodules, and ulcers, often accompanied by purulent or hemorrhagic exudate, mainly affecting the face, extremities, or tail (Gremião *et al*., 2015).

Currently, sporotrichosis is considered a notifiable disease in some Brazilian states, such as São Paulo and Paraná. However, it remains underreported due to socioeconomic barriers and limited access to diagnostic methods (Bison; Parentoni; Brasil, 2020). Diagnosis is crucial for disease control, given its relevance to both public and animal health. Cytopathology stands out as an accessible diagnostic tool, widely used because of its simplicity, rapidity, and high sensitivity. This technique is particularly valuable for the primary diagnosis of dermatopathies, including sporotrichosis, and is essential for guiding appropriate clinical management and contributing to the mitigation of its epidemiological impact.

The aim of this study is to demonstrate the importance of cytopathology as a primary diagnostic method for sporotrichosis, highlighting its potential for screening, therapeutic guidance, and disease monitoring, with the goal of improving diagnostic accuracy and clinical management efficiency in affected animals.

Epidemiology

The agent *Sporothrix schenckii* has a cosmopolitan distribution and is widely found in tropical and subtropical regions characterized by relative humidity of approximately 80% and temperatures ranging from 20°C to 30°C. These conditions make the disease particularly prevalent in South America, especially in Brazil and Mexico. The etiological agent is commonly isolated from soil, dry vegetation, and decomposing organic matter. Although the disease can affect all mammalian species, cats are the most susceptible companion animals (Gremião *et al*., 2015).

Infection usually occurs through bites or scratches, often associated with typical behaviors such as interactions during mating, play fighting, digging holes to bury feces, scratching trees, climbing

trunks, or jumping onto branches previously contaminated with fungus-infected material (Bison; Parentoni; Brasil, 2020). These habits contribute to the deposition of the pathogen on the animals claws, facilitating its spread. Transmission occurs both directly and indirectly, through contact with the agent in the environment or with infected cats, which are considered the main amplifying hosts. The most common route of infection involves traumatic lesions of the skin or mucous membranes in susceptible individuals, favoring fungal inoculation and establishment of the disease (Almeida *et al*., 2018).

The main risk factors associated with feline sporotrichosis include male, non-neutered cats aged between two and four years with free access to the outdoors. Although there is still no evidence that immunosuppressive conditions, such as feline immunodeficiency virus (FIV), feline leukemia virus (FeLV), or other diseases, predispose cats to the development of sporotrichosis, these conditions are recognized as aggravating factors in the clinical course of the disease (Larsson, 2011).

In Brazil, the first description of the fungus *Sporothrix schenckii* was made by Lutz and Splendore in 1907, based on isolates obtained from rodents with multifocal lesions on the extremities and tail. Between 1907 and 1964, cases of sporotrichosis in companion animals were documented, with 12 cases reported in dogs and eight in cats. These findings contributed to a shift in the perception that, during that period, the disease was considered epidemiologically infrequent, although records were concentrated in these two species (Freitas, 2014). At the end of the 20th century, sporotrichosis came to be recognized as a significant public health problem in Brazil, particularly in the state of Rio de Janeiro, which showed a high incidence of cases in humans and cats (Gremião *et al*., 2015).

Currently, sporotrichosis is recognized as a public health problem in several Brazilian states, with higher prevalence in urban areas, where interactions between humans and animals are intensified. The marked increase in cases among cats, associated with zoonotic transmission to humans, has drawn the attention of health authorities (Silva *et al*., 2019).

Sporotrichosis as an Occupational Disease

Sporotrichosis is a zoonosis of major relevance, posing a significant risk to individuals who have direct contact with infected animals. For this reason, it is classified as an occupational zoonosis, particularly among professional groups such as veterinarians, animal handlers, groomers, and animal welfare workers who handle infected animals (Assis *et al*., 2022). The high prevalence of the disease in cats, especially in stray or semi-domiciled populations, increases the risk of exposure among these professionals. Direct contact with purulent secretions, ulcerative lesions, or contaminated materials represents an important route of transmission, making these individuals more susceptible to infection (Gremião *et al*., 2017).

In addition to directly exposed professionals, individuals who maintain close contact with infected animals, such as family members and caregivers, are also at increased risk of acquiring sporotrichosis, particularly in cases involving exposure to open wounds or contaminated biological material (Gremião *et al*., 2015). In this context, the adoption of strict biosafety measures in the handling of animals with suspected or confirmed sporotrichosis is essential. The use of personal protective equipment (PPE), such as gloves, gowns, and masks, combined with proper hand and surface hygiene, constitutes a critical barrier to infection prevention (Assis *et al*., 2022; Gremião *et al*., 2015).

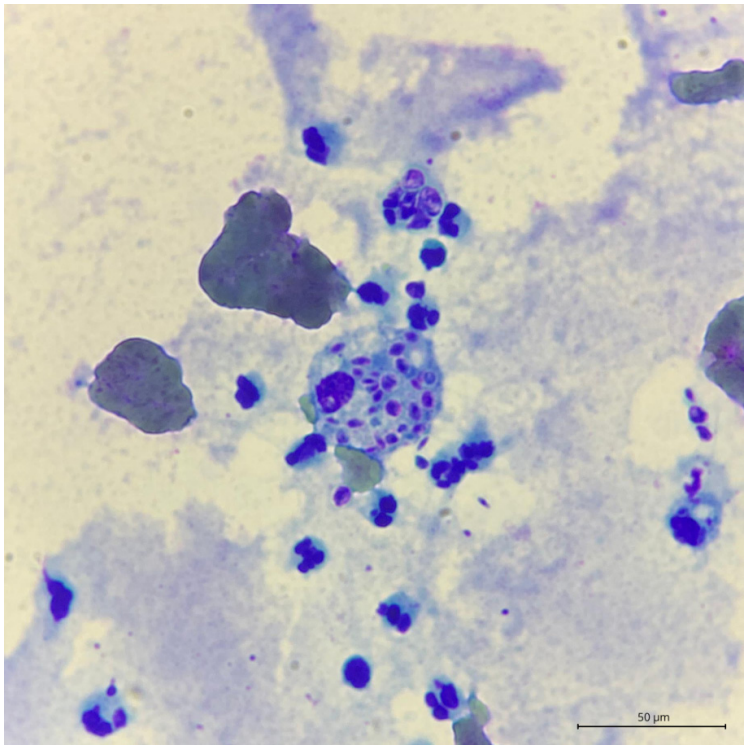
Equally important is the proper disposal of contaminated biological materials. Items such as gauze, syringes, and other waste generated during the care of infected animals must be discarded in appropriate containers for infectious waste, in accordance with current sanitary regulations. This practice is fundamental to reducing the risk of pathogen spread to other animals and humans, as well as preventing environmental contamination (Gremião *et al*., 2017).

Diagnostic

The diagnosis of feline sporotrichosis can be established using different laboratory methods, each with its own advantages and limitations. The main diagnostic approaches include cytopathology, mycological culture, and molecular biology techniques (Almeida *et al*., 2018).

Cytopathology provides an effective, minimally invasive approach for sample collection, allowing for the rapid preparation of cytological slides for microscopic analysis. This method enables detailed evaluation of lesion morphology at the cellular level, yielding important clues regarding lesion patterns and intralesional agents (Macedo-Sales *et al*., 2018). Specifically, the cytological presentation of sporotrichosis is characterized by a pyogranulomatous inflammatory pattern associated with the presence of yeast-like structures measuring approximately 3 to 5 µm, located both intra- and extrahistiocytically (Figure 1). In addition, cytopathological diagnosis can be performed quickly, enabling prompt clinical decision-making and early therapeutic intervention, which are essential for reducing disease dissemination (Raskin *et al*., 2011).

Figure 1 – Intra-histiocytic oval structures, approximately 3 µm in diameter, surrounded by a clear halo in negative image and an eccentrically located basophilic nucleus, morphologically suggestive of yeasts of the genus *Sporothrix*



Source: Pereira *et al*. (2025).

Although mycological culture and molecular biology techniques are considered the gold standard methods for definitive diagnosis of sporotrichosis, these approaches are labor-intensive, costly, and require prolonged processing times. The waiting period for results, often extending over several weeks, represents a critical limitation, as during this interval the animal may remain untreated, acting as a reservoir and source of pathogen dissemination (Almeida *et al*., 2018). Delayed diagnosis not only compromises clinical management of the affected animal but also increases the risk of transmission to other animals and humans, underscoring the need for faster and more effective diagnostic alternatives (Larsson, 2011).

Epidemiological Surveillance

Sporotrichosis, an emerging fungal zoonosis, has become a significant public health concern in several regions of Brazil. The management of this disease extends beyond clinical treatment and encompasses professional, ethical, and social responsibilities that require critical reflection and effective action by veterinarians. Notification of sporotrichosis cases to epidemiological surveillance systems constitutes a fundamental pillar for disease control (Silva *et al*., 2019). However, underreporting remains a persistent issue, compromising an accurate understanding of the true magnitude of the problem. In this context, continuing education plays a crucial role, as well-informed professionals are better equipped to recognize the importance of case notification as a strategic public health tool (Barros *et al*., 2010).

Case notification enables accurate mapping of disease incidence, allowing efforts to be directed toward the most affected areas and facilitating the development of more effective control policies. Furthermore, the systematic collection of epidemiological data is essential to support research that contributes to the sustainable prevention and long-term control of sporotrichosis. Therefore, strengthening professional training and integrating surveillance actions are essential steps to mitigate the impacts of this emerging zoonosis (Silva *et al*., 2019; Barros *et al*., 2010).

Conclusion

Sporotrichosis is an emerging mycosis of major relevance to public and animal health. Effective control of the disease requires integrated strategies involving accurate diagnosis, appropriate clinical management, and robust epidemiological surveillance. In this context, cytopathology stands out as an accessible diagnostic tool with rapid execution and high sensitivity, enabling early detection of infection and significantly contributing to the timely implementation of therapeutic measures. Although mycological culture and molecular biology techniques are considered gold-standard methods, their limitations regarding turnaround time reinforce the importance of cytopathology as a screening and initial diagnostic method, allowing for a prompt clinical response.

Strengthening case notification, together with the training of healthcare professionals and veterinarians, is essential to improve epidemiological surveillance. Measures such as raising awareness of early diagnosis and standardizing reporting practices are fundamental to a more effective response to sporotrichosis outbreaks, contributing to the protection of public health and the control of disease dissemination. &

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