Objective: To report 4 cases of sporotrichosis with zoonotic transmission by Felis catus.

Method: Qualitative, descriptive, retrospective, cross-sectional data obtained from medical records and laboratory results filed in the computerized system. Approved by CEP/EMESCAM under number 4.239.032.

Result: The first case refers to a 29-year-old woman, with an ulcerated lesion in the lower third of the face affected by scratches from a domestic cat. In the second case, it is a 21-year-old female who was scratched by a cat diagnosed with sporotrichosis and after collection of material from the lesion on the 3rd right finger. In the third case, a 51-year-old woman took care of a stray cat with sporotrichosis and developed an ulcerated lesion on her leg. The fourth case occurred in a 60-year-old woman who, when living with a stray cat, presented ascending lymphangitis characteristic of the disease and a culture of the secretions from the lesions was performed. In all four cases, from laboratory diagnosis, macroscopic and microscopic examination of colonies on Sabouraud-glucose Agar confirmed Sporothrix schenckii complex. Three patients were treated with potassium iodide and one with fluconazole and all were cured.

Final considerations: Health professionals should be aware of the presence of classic lesions, and especially the form of transmission by felines associated with early laboratory diagnosis with adequate treatment to prevent its dissemination.

Keywords: Sporotricosis; Sporothrix schenckii; Felis catus; Transmission
**INTRODUCTION**

Sporotrichosis is a neglected subcutaneous fungal disease of humans and animals. Caused by a dimorphic⁶, geophilic and saprobic fungus⁷, called Sporothrix schenckii, whose complex is composed of: *S. albicans*, *S. brasiliensis*, *S. globosa*, *S. luriei*, *S. mexicana*, *S. pallida*, *S. gossypina* and *S. inflata*. The species are widely distributed in nature, mainly in soils rich in decomposing organic matter, dry leaves, plant thorns, wood and moss. It occurs all over the world, considered cosmopolitan, mainly in tropical and subtropical zones, being in Latin America, the most common subcutaneous mycosis⁸. It is considered endemic in Brazil, in the state of Rio de Janeiro, where there has been an exponential increase in cases since the 2000s⁹.

Classically, its transmission occurs by traumatic inoculation with plants or soils contaminated with the fungus in the filamentous form. Dogs, cats, rats and armadillos can also transmit by scratching or biting, with the cat being the species most associated with zoonotic transmission, due to the large amount of filamentous fungi in the nails and oral cavity, due to feline habits¹. The occurrence of this disease is predominantly associated with people who deal with soils and plants, mainly in rural areas. The infection has also been reported in professionals who deal with cats, such as veterinarians and assistants, and the animal can also present the disease by inoculation and there can also be family outbreaks in more than one of the components of the residence. There are no predisposing individual factors for sporotrichosis, and it can affect both sexes and any age group².

The classic clinical presentation is an erythematous lesion, close to the site of inoculation, with progression to erythematous nodules, ulcers and the appearance of new similar lesions ascending in the lymphatic vessels. Skin lesions need to be differentiated from other diagnoses, such as cutaneous tuberculosis, blastomycosis, cutaneous leishmaniasis, nocardiosis, chromoblastomycosis, and atypical, rapidly growing mycobacterioses (Mycobacterium spp. infections). Osteoarticular sporotrichosis, which may involve one or more joints and cause granulomatous tenosynovitis and bursitis, and pulmonary sporotrichosis, caused by the inhalation of conidia, are rare forms of disease manifestations³. Systemic and pulmonary infection, Parinaud’s oculoglandular syndrome and meningitis by Sporothrix spp. they are also rare presentations and may occur more frequently in immunosuppressed patients⁴.

In order to diagnose it correctly, clinical, epidemiological and laboratory correlation is necessary⁵. The gold standard for diagnosis is the culture and isolation of the fungus in Agar Sabouraud - glucose and Mycosel media, proving the dimorphism⁶. The biological materials are obtained from biopsy, gummy pus or secretion from skin lesions and, in the case of systemic sporotrichosis, from other bodily secretions such as cerebrospinal fluid (CSF) and sputum³.

The first line of treatment for years was the saturated solution of potassium iodide, however, it is only effective for the cutaneous and lymphocutaneous forms⁴. Azole derivatives (itraconazole, ketoconazole, fluconazole), as they act in the various forms of sporotrichosis, are the most commonly used drugs, with itraconazole being the antifungal of choice⁸ and amphotericin B used in severely affected patients⁸. Terbinafine can be used in cases of intolerance or lack of response to itraconazole. The objective is to report 4 cases of sporotrichosis involving zoonotic transmission by cats.

**METHOD**

The analysis was qualitative, retrospective, cross-sectional of archived documents on the 4 Case Reports, at the Dermatology Service of the Holy House of Mercy of Vitória Hospital (HSCMV), located at Rua Doutor João dos Santos das Neves, 143 – Vila Rubim, Vitória – ES, 29025-023, and at the Tommasi Clinical Analysis Laboratory, located at Avenida Luciano das Neves, 1807 - Vila Velha Center, Vila Velha - ES, 29100-060. The project was approved by the Research Ethics Committee (CEP) of Emescam with Opinion No. 4,239,032.

**REPORTS OF THE 4 CASES**

**Case 1** - MSP, 29 years old, female, without comorbidities, attended the dermatology outpatient clinic of Hospital da Santa Casa de Misericórdia de Vitória (HSCMV) on August 31, 2020 with an injury due to a cat scratch in the left mandibular region 40 days ago. She reports the cat was diagnosed with sporotrichosis. She sought care from a dermatologist using, under medical prescription, ketoconazole for 14 days and prednisone for 4 days. Evolved with worsening of hyperemia and intense pruritus after starting the medication. On physical examination, he presented an ulcerated lesion in the lower third of the face, infiltrated, with well-defined borders, measuring approximately 3 cm and with a clean bottom. In addition, there was a hyperemic, scaly plaque that extended to the face, neck and left shoulder (Figure 1).

**Figure 1:** Ulcerated lesion in the lower third of the face, infiltrated, with well-defined borders, measuring approximately 3 cm and with a clean bottom. Hyperemic, scaly plaque extending to the face, cervical region and left shoulder. Source: Archive of the Dermatology Service of Holy House of Mercy of Vitória Hospital. Dr. Karina Demuner Sarmenghi
She was instructed to discontinue the use of ketoconazole and prednisone, start hizidine and topical corticosteroids in the hyperemic area, in addition to returning in 14 days. Laboratory examination of the gummy pus by culture on Sabouraud-glucose agar revealed macroscopic and microscopic characteristics of S. schenckii complex, confirming the diagnosis of sporotrichosis.

Thus, the patient returned after 14 days and started treatment with potassium iodide, five drops, three times a day for 15 days and, after that, 10 drops three times a day. Thirty days later, she returned to the outpatient clinic for follow-up and it can be seen that both the lesion and the scaly, hyperemic plaque have improved greatly. On physical examination: healing lesion of approximately 1.5 cm in the lower third of the left face, convalescent punctiform erythema on the face, neck and left shoulder, absence of palpable lymph node enlargement. Advised to maintain treatment and to return again in 30 days for follow-up.

Case 2- MOS, 21 years old, female, without comorbidities, resident in Vila Velha, works as a self-employed person, was admitted to the HSCMV Dermatology outpatient clinic on September 5, 2019, referring to an injury on her right hand after being scratched by a stray cat, on August 11, 2019.

Initially, the lesion had a papular aspect and evolved with ulceration. In addition, she had ascending reddish nodules on the right upper limb and pain in the ipsilateral axillary region. Her father, who lives with the patient, presented similar lesions after being bitten by a cat. She reports that the Zoonoses Center confirmed the diagnosis of Sporotrichosis in the cat, which died. The physical examination at the first contact with the patient revealed an ulcer with a clean background and erythematous borders on the root of the third right finger and no lymph node enlargement.

The incisional biopsy of the lesion on the right hand, on September 5, 2019, showed ulcerated granulomatous dermopanniculitis. Grocott and PAS special stains were negative for fungi in the sample. Although no fungal elements were detected, the histopathological findings allow for a real correlation with the clinical hypothesis of sporotrichosis. The biological material of the lesion was seeded on Sabouraud-glucose agar, confirming the presence of S. schenckii complex.

The patient used 20g potassium iodide diluted in 20 ml distilled water, 10 drops once a day for 15 days, followed by 20 drops, once a day, for a period of 3 weeks. He returned on November 4, 2019 for reassessment, referring to correctly following the proposed treatment and significant improvement of the injury in his right hand. On physical examination, a small, slightly erythematous violaceous spot with a central scar (previous biopsy site) was seen on the root of the third right finger, with no signs of infiltration. Absence of lymph node enlargement on palpation. Therefore, he was instructed to return in case of changes in the lesion and potassium iodide was suspended.

Case 3- INE, 51 years old, female, without comorbidities or allergies, had her first consultation on April 30, 2020, at the HSCMV Dermatology outpatient clinic, referring to the appearance of a vesicular lesion in the region of the right leg about 1 month ago. She also reported that, after manual removal of the lesion, there was the onset of local itching with yellowish secretion, in addition to an increase in ulceration.

The patient reported not remembering biting insects and other similar injuries, but she took care of stray cats that live close to her house. She also mentions having used some medications such as cephalaxin, ceftriaxone, benzetacil, itraconazole and mupirocin ointment at the site. Upon physical examination upon admission, she presented a 4 cm ulcerated lesion with hyperchromic borders, well delimited and infiltrated, with granulation tissue and yellowish secretion output in the posterior region of the right leg. She was instructed to perform local care with sunflower oil and treatment with amoxicillin and clavulanate, returning in 15 days for evaluation.

On May 21, 2020, she returned for an incisional biopsy of the lesion on the right leg and the material was sent to the anatomopathological department. In addition, the laboratory was contacted to collect research material for sporotrichosis. After 2 months, the patient returned to present the histopathological result and, also, referring the permanence of the output of the yellowish secretion at the edges of the lesion. The result revealed suppurative mixed granulomatous dermatitis, with focal signs of exulceration. Grocott and PAS special stains were negative. The findings favor the clinical hypothesis of the disease. Culture of the biological material on Sabouraud-glucose agar confirmed S. schenckii.

Upon physical examination, the follow-up showed a verrucous lesion measuring approximately 4cm with hyperchromic, well-defined and infiltrated borders, in addition to papules with central signs of sclerosis in the posterior region of the right leg. On that same day, treatment with potassium iodide was prescribed, as instructed for Case 2, and guidance on the diagnosis was given, in addition to continuation of the monthly follow-up of the condition.

Case 4- ML, 60 years old, female, sought the Basic Health Unit (BHS) on September 6, 2019, presenting numerous nodules and ascending lymphangitis in the right upper limb (Figure 2), some nodules with spontaneous drainage of purulent secretion, starting two months ago, after being bitten by a stray cat. She was using a third antimicrobial regimen of sulfamethoxazole-trimethoprim, due to the maintenance of the condition, after using cephalaxin followed by amoxicillin-clavulanate.

In the admission physical examination, lymph node enlargement and fever were not identified. On the right upper limb, he had 4 vegetating ulcerative lesions across the entire circumference of the forearm. Larger diameter lesion, located on the right hand, measuring 3cm. The edges of the lesions are raised and the bottom is granular, dirty, with a gummy purulent appearance. Numerous nodules on the forearm, one with spontaneous drainage, another with a floating point and the others hard, without phlogistic aspects.

Mycological laboratory examination of culture to investigate the presence of S. schenckii confirmed the diagnosis. Due to the lack of the antifungal agent of choice (itraconazole) at the UBS, treatment with fluconazole was
started, showing visible improvement of the skin lesions one month after starting the medication. Despite the good response of the lesions to the medication, the patient presented an increase in creatinine from 1.2 to 1.7 and a decrease in the glomerular filtration rate in approximately two months, requiring the calculation of the dosage of fluconazole, decreasing from 3 pills to 2 pills a day and the patient was referred to an outpatient clinic specializing in infectious diseases.

**Laboratory diagnosis of the 4 cases of sporotrichosis**

It is recommended to collect the material in a disinfected and comfortable environment for the patient, with sterile instruments for collection, culture media for sowing the fungus with a proven sterility test, a qualified professional mycologist with experience in collecting material for sporotrichosis and procedures for asepsis that can guarantee the development of colonies of Sporothrix spp. with the absence of environmental contaminating fungi.

The purulent secretion of the floating ganglion or the chancreoid lesion, after harvesting, can be stained and visualized in optical microscopy 1000x and discrete yeast cell associated with an asteroid corpuscle can be observed (Splendore and hoeppli phenomenon), with elongated shapes that are confused with leukocytes (navete or cigar bodies) surrounded by eosinophilic material. However, the direct microscopy test has low sensitivity and the diagnosis is only conclusive with a positive culture for the genus Sporothrix.

The parasitic form is yeast-like and the infective form is filamentous. The filamentous form is distinguished by petal-shaped conidiophores, resembling a daisy-like flower with thin, septate hyphae. While the yeast form presents a typical colony with a buttery and cream appearance. Mycosel Culture Medium (shows the yeast-like colony) at a temperature of 37°C. The time for this development can extend from four to 30 days. Thus, both culture media after sowing the purulent secretion of the respective patients were incubated for four days to four weeks, in periodic observations. Species research shows that the colonies can have a membranous appearance, white to beige with a blackish halo, or completely black from the beginning. Sporothrix spp. presents thermal dimorphism between 25 and 30°C and develops a macroscopic aspect of filamentous form at AT with colonies of variable color from light gray to dark gray to black. The pigment may be intensified in older cultures as shown in Figure 3. These differences contribute to species determination. However, so far it does not influence the treatment.

**Figure 3:** Colony on the left on Mycosel agar with a filamentous appearance between 1 and 2 weeks of Sporothrix spp. Colony on the right on Sabouraud agar - yeast-like glucose showing dimorphism at a temperature of 36.5°C. Source: Micoteca do Tommasi Clinical Analysis Laboratory. Old village. ES. Brazil- Biomedical Andrielly Zanque Denadai and Dr. Maria das Graças Silva Mattede.

After the macroscopic analysis of the suggestive colonies, the microscopic examination of the fungal structure is carried out in two ways: the direct examination of the culture and the direct examination using the RIDDEL technique. Both should confirm the presence of fine hyphae and daisy-shaped conidiophores, which become more evident with fresh staining with Poirier Blue, as shown in figure 4.

**Figure 4:** 400x optical microscopy of the classic filamentous form of Sporothrix schenckii grown at RT on Mycosel Agar. Source: 400x microscopy of the Sporothrix schenckii complex from result carried out at Tommasi Clinical Analysis Laboratory. Vila Velha. ES. Brazil. Images courtesy of Pharmacist Rodrigo de Oliveira Neves.
The genus Sporothrix, has the specific species S. schenckii complex with its species and subspecies that are usually identified by molecular biology technique or automation devices. In all cases of feline transmission, research on the patient’s biological material with a specific culture for sporotrichosis revealed a dimorphous fungus with microscopic and macroscopic characteristics of Sporothrix schenckii.

**DISCUSSION**

The disease is a mycosis of cutaneous, subcutaneous or systemic presentation, which can evolve from subacute to chronic, and the most frequent clinical manifestations are localized cutaneous and cutaneous-lymphatic. It can be classified as an occupational disease, in which florists, farmers and gardeners assume the risk of contagion of the disease. However, professionals who deal with contaminated animals, such as veterinarians and technicians, are more likely. Regarding transmission in non-occupational conditions, both trauma after contact with plants and sand and direct contact with the lesions of the sick feline, which provides contamination, become relevant in epidemiology.

The patients in this study were infected by biting or scratching contaminated cats. Such animals play an important role in the transmission of the disease, especially those that are not castrated and have free access to the street, since their skin lesions have a large amount of infective fungal cells, characterizing them as a notable source of infection.

As reported in case 4, the patient was affected by the cutaneous/lymphatic form of sporotrichosis, the most common presentation, corresponding to 70% to 80% of cases. The clinic is characterized by a primary ulcerated lesion that gives rise to other gumy lesions, following the lymphatic path; the ganglia proximal to the secondary lesions become ulcerated as the infection progresses to chronicity, giving the appearance of ascending or descending nodular lymphangitis in 80% of untreated cases. Initially, the absence of lymphangitis may occur and after a week to 15 days it may appear in another location, due to hematogenous dissemination.

Treatment regimens should be evaluated in parallel with issues such as cost, ease of administration, safety profile, and whether the infection is local or disseminated. Despite its high cost, itraconazole has become the drug of choice for cutaneous varieties (fixed and lymphocutaneous) and osteoarticular disease, with success rates ranging from 90 to 100%.

According to the study “Hospitalizations and deaths related to sporotrichosis in Brazil (1992-2005)”, the states with the highest number of hospitalizations due to sporotrichosis were Rio de Janeiro, São Paulo and Goiás, with 250, 128 and 69 cases, respectively, despite of the few reports on the disease currently in the state of Espirito Santo, 171 cases were reported from 1982 to 2012.

**FINAL CONSIDERATIONS**

Currently, there are no such specific measures for the control of this mycosis, the number of trained health professionals is insufficient and the unavailability of tests in the public health network results in diagnostic delay and the culture of the fungus is the definitive diagnosis standard of sporotrichosis. The cat can be considered an animal of potential trait for zoonotic studies. Occupational factors generate social harm, seclusion and withdrawal from activities at work, in addition to predisposing to extracutaneous sporotrichosis. In this way, multidisciplinary work is necessary with the objective of allocating knowledge and investment to relate socio-environmental conditions in the transmission of the fungus S. schenckii.

**REFERENCES**


Resumo

Objetivo: Relatar 4 casos de esporotricose de transmissão zoonótica por Felis catus.

Método: Qualitativo, descritivo, retrospectivo, transversal de dados obtidos em prontuário médico e resultados laboratoriais arquivados no sistema computadorizado. Aprovado pelo CEP/EMESCAM sob número 4.239.032.

Resultado: O primeiro caso refere-se a mulher de 29 anos, com lesão ulcerada em terço inferior da face acometida por arranhaduras de gato domiciliar. No segundo caso trata-se também de pessoa do sexo feminino de 21 anos que sofreu arranhadura por gato diagnosticado com esporotricose e após coleta do material da lesão do 3º quirodáctilo direito. No caso número três, uma mulher de 51 anos, cuidou de gato de rua com esporotricose e desenvolveu uma lesão ulcerada na perna. O quarto caso, ocorreu em mulher de 60 anos que ao conviver com gato de rua apresentou linfangite ascendente característica da doença e realizada cultura das secreções das lesões. Em todos os quatro casos, do diagnóstico laboratorial, o exame macroscópico e microscópico das colônias em Ágar Sabouraud-glicose confirmou Sporothrix schenckii complex. Três pacientes foram tratadas com iodeto de potássio e uma com fluconazol e todas obtiveram cura.

Considerações finais: Os profissionais de saúde devem estar atentos quanto a presença de lesões clássicas, e principalmente a forma de transmissão por felinos associada ao diagnóstico laboratorial precoce com tratamento adequado para evitar sua disseminação.

Palavras-chave: Esporotricose, Sporothrix schenckii, Felis catus, Transmissão.