SEVEN publicações acadêmicas
EM PARCERIA COM: IEMS UNIASSELVI

Feline sporotrichosis: Clinical, diagnosis and treatment

Romeu Luiz de Podestá Junior[1], Maria Christina Sanches Muratori[2].

ABSTRACT

Feline sporotrichosis is a zoonosis transmitted by *Sporothrix brasiliensis* that causes skin and disseminated lesions. The objective of this study was to evaluate the efficiency of routine clinical diagnosis, and treatment of feline sporotrichosis. A total of 96 cases suggestive of sporotrichosis were analyzed, which were analyzed through clinical and laboratory tests. A protocol defined by the Sporotrichosis Service of the Zoonoses Control Area of the Municipality of Vitória – ES was recommended. The material was collected by *Swabs* or by the *imprint* method, in exudative lesions, identified, packaged and examined in the laboratory. Of the 95 (100%) animals were diagnosed with sporotrichosis, 69 (73%) submitted to the proposed treatment (itraconazole or itraconazole + potassium iodide) were cured and 26 (27%) were unsuccessful in the treatment. Therefore, it is concluded that felines between 23 months and 35 weeks, classified in stages I and II of treatment, obtained satisfactory cure rates and demonstrated that the therapeutic protocol used was effective.

Keywords: Zoonosis, Itraconazole, Potassium iodide, *Sporothrix* sp, Cats.

INTRODUCTION

Sporothrix brasiliensis is an anamorphic and dimorphic fungus, commonly found in the form of filamentous micelles, in the environment and in the form of yeasts in the lesions of contaminated felines. These are important epidemiological agents that transmit and propagate sporotrichosis, especially by non-castrated felines, with free access to the street, without a defined breed, with an average age of 24 months (Pires, 2017).

Domestic felines are nocturnal, peridomiciliary, have habits of licking each other, fighting for territories and females, have scratches and bites in the act of copulation and these, containing the fungus in the nails and saliva, enable the transmission of *Sporothrix brasiliensis*. The fungus penetrates the skin in the form of conidia and hyphae, which implanted in the host's tissue, in the form of yeasts, will cause primary skin infections, reaching the lymphatic pathways. However, the infected animal, in direct contact with humans, by scratches, bites or in direct contact with the ulcerative lesion makes it possible to transmit the disease (Almeida *et al.* 2018).

The diagnosis of sporotrichosis should be made based on clinical knowledge of the disease, by an

[1] ORCID: https://orcid.org/0000-0002-4761-2288
Veterinarian at the Center for the Control of Zoonoses of the Department of Health of the Municipality of Anchieta-ES, Brazil
[2] ORCID: https://orcid.org/0000-0002-4569-0995
Full Professor at the University of Piauí, Department of Veterinary Morphophysiology at UFPI-PI, Brazil

experienced professional, by a cautious anamnesis, which combines epidemiological data and laboratory analyses, and these factors are categorical for the conclusion of the diagnosis (Nuñez *et al*. 2019). Sporotrichosis lesions are difficult to differentiate from other skin diseases, as they have characteristics similar to topical, atypical dermatitis and scratches (Larsson *et al*. 2011).

Therefore, the relevance of this study lies in identifying, diagnosing and providing free of charge the drugs and evaluating the efficiency of the treatment recommended by the Department of Sporotrichosis Service, of the Zoonoses Control Area, of the municipal government of Vitória, ES.

METHODOLOGY

LOCAL SAMPLING

270 clinical cases of felines suggestive of sporotrichosis were analyzed, from November 2019 to December 2020, and 95 were diagnosed, treated and medicated free of charge by the Sporotrichosis Service, of the Zoonoses Control Area, of the city of Vitória, ES; located at 20°19'10" south latitude and 40°20'16" west longitude, with an altitude of 4.0 meters, 98.5 km² in length, an average temperature of 24.8 °C and an average annual rainfall of 1,103 mm ( ) and with 362,097 inhabitants (BRASIL, 2022).

ETHICAL CONSIDERATIONS

The procedures were performed with the consent of the tutors during the consultations carried out at the Sporotrichosis Service, of the Zoonoses Control Area (CVSA), of the Municipality of Vitória, ES. There were no invasive GI procedures, such as definitions according to CONCEA (2019) and on Process No. 4324050/2020, of the Opinion of the Technical Research Committee of SEMUS/PMV, which approved the study, and a declaration of consent was constituted, in accordance with Ordinance No. 023/2018.

COLLECTION OF THE MATERIAL

The suspicious animals taken by the owners to the CVSA of Vitória were referred for clinical consultation. At the time, *imprints of* lesions were performed and, when necessary, material was collected for cytological culture. After completion of the diagnosis, the clinical stage was classified as stage I, II, or III, depending on the lesions presented and respiratory impairment (Table 1 and Figure 1).

Table 1 – Classification of sporotrichosis according to clinical stage and skin lesions.

Clinical stage	Characteristics of the lesions
I	Felines that have 1 to 2 lesions on the body, located on the paws and back. They are lesions with a small extension, usually confused with scratches or bites from other felines or injuries. Therapy is rapid and treatment is usually effective.

II	Lesions spread throughout the body, located on the paws and face; characteristic of sporotrichosis, ulcerated, moist and difficult to heal. At this stage, the animal is not weakened and does not have respiratory tract impairment. However, in relation to stage I, the treatment is longer; around two, three or more therapeutic phases. With the possibility of cure.
III	Weakened animal in a state of cachexia, which may present impairment of the respiratory system, with lesions spread throughout the body, accumulated in the nose and head region. At this stage, the treatment is difficult, intensive, since the animal is weakened and with low immunity, therefore, in this phase hospitalization is recommended, in order to obtain adequate therapeutic support; since the percentage of death at this stage is high. In addition, most tutors opt for euthanasia, due to the inefficiency in the therapeutic response. Usually the patient passes phase III of treatment.

Source: Authors

Figure 1 - Felines with lesions characteristic of sporotrichosis, attended and treated by the Zoonosis Center of Vitória, ES. A) Lesion characteristic of stage I; B) lesions typical of stage II; C) Extensive stage III lesion.

Source: Authors.

The procedures described by Podestá et al. were followed for data collection. (2022). A sterile *swab* was used to collect exudate from lesions that were packed in test tubes containing *Stuart medium.* Samples could also be performed by the cytological *imprint* method, performed by gentle pressure on the suspicious lesion with a glass slide previously cleaned with saline solution, sterilized and dried. For each slide used, three *imprints* were performed, with a total of six *imprints* per lesion. After drying them for approximately 15 to 30 minutes at room temperature. Then, the slides were placed in a tube with positioning for three slides for transport and later to be stained at the Unit's Microbiology Laboratory (Macêdo-Sales *et al*., 2018).

MICROBIOLOGICAL ANALYSES

The procedure was performed by direct contact of the sterile *swab* with the lesions, containing exudate. Subsequently, the *swab* was packed in the middle of the test tube, to be transported. After the consultation, the material used in the clothing was packed in a plastic bag, sealed and sent to the Unit to be discarded. The materials collected from the injuries were immediately sent to the Unit's Laboratory to be examined.

At the CVSA Microbiology Laboratory, the slides were stained using the rapid panoptic method. The rapid panoptic staining method is based on the principle of hematological staining established by Santos *et al.* (2018).

The exudate contained in S*wab* was seeded in test tubes containing *sabouraud* dextrose agar and remained at room temperature for five to seven days. After five days, colonies that were membranous, flattened, pleated, and rarely presented a gray aerial mycelium at the edges were considered suggestive of sporotrichosis. To confirm the result, a sample of the colony was removed by means of a platinum loop, which was then fixed on a slide, stained with cotton blue and analyzed under direct microscopy.

TREATMENT EMPLOYED

The treatment prescribed for monotherapy was Itraconazole (ITL 50® and ITL100®) and for drug association, Itraconazole plus potassium iodide (manipulated using odorless ingredients and based on the animal's weight, following the treatment protocol for sporotrichosis in cats in table 2 (Gremião *et al*. 2021; Podestá *et al*. 2022).

Table - 2. Therapeutic protocol for sporotrichosis used during the treatment period.

Protocol	**Drug**	**Weight of the animal (kg)**	**Dosage (mg/kg)**	**Administration**
Monotherapy	Itraconazol cápsula	<1.0	25,0	1 x a day
		≥ 1.0 to < 3.0	50,0	
		≥ 3,0	100,0	
Drug association	Itraconazol (*) + Iodeto de potássio (KI)	≥ 1.0 to < 3.0	ITZ* + 12.5 (KI)	1 x a day
		≥ 3,0	ITZ* + 25.0 (KI)	It's 1 x 1 + x in it.

ITZ= Itraconazole; IK= Potassium iodide. (*) Adapted dosage based on the study by Gremião *et al*. (2021) and de Podestá *et al*. (2022).

However, the tutors were guided and clarified of the responsibility and duties regarding the treatment of the animals and the medicines were provided free of charge by the city of Vitória, for continuous use for 30 days or more, according to the clinical dosage. The tutors were instructed to return to the unit for veterinary clinical evaluation every 30 days, until the end of the treatment (Table 3). During the treatment phases, the felines were monitored by the veterinary medical service and the team. After clinical observation, tables were prepared to classify the clinical stages of sporotrichosis and the treatment phases.

Table 3. Classification of phases for the treatment of sporotrichosis.

Phases (days)	Treatment
I (0 to 30)	The first phase of 30 days of treatment. After 30 days and the lesions are healed, they will be prescribed another 30 days of drug to complete the treatment. Then the animal returns to normal life without restrictions.
II (30 to 60)	After 60 days from the start of treatment, this animal is consulted and the clinical status and closure of the lesions will be analyzed. If considered cured, this animal will be medicated for another 30 days and the case will be closed and the animal returns to normal life without restrictions.
III (After 60 days)	The feline that did not present closure of the lesions until phase two goes through successive consultations again and will be medicated until the complete closure of the lesions and cured. Then this animal will be medicated for another 30 days and will return to normal life without restrictions.

Source: adapted from the study by Gremião *et al*. (2021) and de Podestá *et al*. (2022)

STATISTICAL ANALYSIS

The results were analyzed by the non-parametric *Kruskal-Wallis* test of the *Kruskal* package. The quantitative results (rates of sick animals and other epidemiological parameters) were analyzed by the chi-square test (χ^2). The level of significance used in all tests was $P<0.05$.

RESULTS AND DISCUSSION

The protocol based on the study by Gremião et al. (2021) described in table 3 was used in the routine of the clinic of the Sporotrichosis Service of the Zoonoses Control Area. The clinical stage of sporotrichosis was classified as phase I, II, and III of treatment, according to respiratory impairment, number of skin lesions, cases of recurrence, or ineffective response with treatment with itraconazole alone.

Thus, when the animals were evaluated and classified in phases I and II, the use of itraconazole was recommended for 30 to 90 days, depending on the severity. However, when they were classified as phase III or in animals that had already been treated with itraconazole without therapeutic efficacy, the use of itraconazole associated with potassium iodide was recommended.

Larsson *et al*. (2010) renamed itraconazole (10mg/kg) orally daily for the treatment of feline sporotrichosis without achieving a short-term clinical response. Pereira *et al*., (2010) recommended that after the clinical cure of cats, the drug should be administered for one month after the lesions disappear. However, it was observed that stage I cats weighing up to 1.0 kg that received itraconazole 25 mg/kg orally once a day (Table 3) did not present more lesions after one to two months of treatment. These animals remained receiving the drug for another month until clinical discharge. The animals classified as stage II also received dosages higher than those recommended by Larsson *et al*. (2010) and achieved therapeutic success in the same period observed in stage I cats. However, stage III cats were only successful in treatment, with continuous use of itraconazole associated with potassium iodide. After the closure of the lesions, the protocol was extended for another two months.

Table 4

Age by Months	Cured	Euthanized due to inefficient treatment	Total
Up to 11	9	3	12
Up to 23	**23**	**8**	**31**
Up to 35	**19**	**6**	**25**
Up to 47	7	6	13
Up to 59	5	2	7
Over 59	6	1	7
TOTAL	**69 (73%)**	**26 (27%)**	**95 (100%)**

Source: authors

Pereira et al. 2010 reported that most animals in an advanced stage of the disease do not present a therapeutic response and evolve to death. However, it is very common in domestic cats to occur cases of therapeutic inefficiency in cases of refractory sporotrichosis or also in therapeutic failure. However, Chaves et al (2012) addressed relevant issues in the therapeutic execution during treatment, among these factors, prolonged therapies, acquisition of the disease by a family member, negligence in stopping treatment, when animals show improvement of skin lesions and/or clinical signs, non-return for therapeutic follow-up are the most common and determining causes for the abandonment of the animal from the success of the treatment.

The table above shows that the animals that were most likely to be cured were animals up to 23 months of age and animals up to 35 months of age, these animals in the reproduction and peridomiciliary phase. Therefore, considering 95 (100%) treated animals and 69 (73%) animals that were cured and twenty-six (27%) animals that were not successful in the treatment, these due to inefficiency of medications and/or because they presented advanced stages of the disease associated with autoimmune diseases, with FELV and FIV, the protocol used was satisfactory and efficient. Among the main difficulties observed during the treatments were poor information about the disease, lack of knowledge about the feline's habits, difficulty in providing the medication correctly, the animal's stress, the fear of tutors and family members of being contaminated by the disease, the precarious living conditions of most tutors and the lack of financial resources to acquire the medications.

CONCLUSIONS

It was concluded that felines between 23 months and 35 weeks, classified in phase I and II, obtained satisfactory cure rates, in relation to phase III animals.

The therapeutic protocol proposed by the Sporotrichosis Service, Department of Zoonosis, Environmental Health Center, was effective.

REFERENCES

Almeida, A. R., Ferreira, J. S., Silva, R. J., & Vasconcelos, J. M. (2018). Esporotricose em felinos domésticos (Felis catus domesticus) em Campos dos Goytacazes. Revista Pesquisa Veterinária Brasileira, 38(7). https://doi.org/10.1590/1678-5150-PVB-5559

Brasil. (2022). Instituto Brasileiro de Geografia e Estatística (IBGE), último censo de 2022. Available at: https://agenciadenoticias.ibge.gov.br/ (Accessed August 22, 2024, 7:23 AM).

Chaves, E. L., Almeida, A. C., Silva, J. L., & Lima, M. S. (2012). Treatment abandonment in feline sporotrichosis - Study of 147 cases. Zoonoses and Public Health, 60(2), 149–153. https://doi.org/10.1111/j.1863-2378.2012.01506.x

Gremião, I. D., Almeida, S. R., & Costa, C. A. (2021). Guideline for the management of feline sporotrichosis caused by Sporothrix brasiliensis and literature revision. Brazilian Journal of Microbiology, 52(1), 107–124. https://doi.org/10.1007/s42770-020-00365-3

Larsson, R. P. (2011). Sporotrichosis. Brazilian Journal of Veterinary Research and Animal Science, 54(4), 439–444. https://www.revistas.usp.br/bjvras/article/view/133772/0

Macêdo-Sales, M. D., Silva, M. J., & Santos, R. C. (2018). Diagnóstico laboratorial da esporotricose felina em amostras coletadas no estado do Rio de Janeiro, Brasil: Limitações da citopatologia por imprint. Rev Pan-Amaz Saude, 9(2), 13–19. http://revista.iec.gov.br/submit/index.php/rpas/article/view/337

Mafra, L. R. (2016). Protocolo de manejo clínico e vigilância em saúde para esporotricose no estado do Paraná. Curitiba. Available at: https://www.saude.pr.gov.br/sites/default/arquivos_restritos/files/documento/2020-04/protocolobrucelose2018.pdf

Moura, S. G., Silva, F. F., & Oliveira, M. M. (2018). Esporotricose, protocolo de entendimento da doença em Belo Horizonte. Revista Online, 1(1), 12–13. Available at: file:///C:/Users/betha/Downloads/diagnastico_epidemiolagico_da_esporotricose_em_belo_horizonte_minas_g.pdf

Nuñez, J. F., Santos, R. C., & Almeida, A. R. (2019). Nota Técnica S/SUBVISA nº 03/19 Protocolo de Tratamento da Esporotricose Animal S/Subvisa. Available at: https://doi.org/10.13140/RG.2.2.24502.93768

Pereira, J. C., Freire, R. M., & Carvalho, M. G. (2010). Response to azolic antifungal agents for treating feline sporotrichosis. Veterinary Record, 166(10), 290. https://doi.org/10.1136/vr.b4752

Pires, J. T. (2017). Revisão de literatura: Esporotricose felina. Revista de Educação Continuada em Medicina Veterinária e Zootecnia do CRMV-SP, 15(1), 16–23. https://doi.org/10.36440/recmvz.v15i1.36758

Podestá, R. D., Ferreira, P. P., & Lima, R. A. (2022). Esporotricose felina: Conduta clínica, diagnóstico e tratamento preconizado no município de Vitória – ES. Research, Society and Development, 11(10), e589111031028. https://doi.org/10.33448/rds-v11i10.31028

Reis, J. L., Monteiro, J. B., & Silva, F. C. (2012). Potassium iodine capsule treatment of feline sporotrichosis. Journal of Feline Medicine and Surgery, 14(6), 399–404. https://doi.org/10.1177/1098612x12441317

Santos, A. C., Silva, A. P., & Oliveira, L. R. (2018). Guia prático para enfrentamento da esporotricose felina em Minas Gerais. Revista V&Z Em Minas, 38(137), 25–27. Available at: http://www.crmvmg.gov.br/arquivos/ascom/esporo.pdf