



## **REPORT ON A CASE OF SPOROTRICHOSIS IN CAT IN ROSTOV-ON-DON: DIAGNOSTICS AND THERAPY**

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### **Abstract**

At present there are no recommendations on carrying out the differential diagnostics of sporotrichosis in cats. The article covers a medical case of sporotrichosis in the regions of head in cat. While conducting cytologic screening of the contents of fistulous tract, the representative granulomatous inflammation with occurrences of epithelioid, giant cells and macrophages was revealed; the ovoid microorganisms were explored intra- and outercellularly. An investigation of general blood analysis and immune- chromatographic analysis of lethal viral infections were conducted, where a positive result on FIV was derived. In order to exclude a foreign body, an X-ray examination in 2 projections was held. To obtain the final diagnosis (sporotrichosis), a histogenesis of invaded tissue was held. Following diagnosis confirmation, the treatment included azoles at 10 mg/kg, and antibiotics at 25-30 mg/kg daily for several months. The results may form the basis of common recommendations for diagnosing and curing sporotrichosis in small pets.

**Keywords:** sporotrichosis in the cat, diagnosis and treatment

Sporotrichosis is a chronic sporadic disease caused by the infection of the fungus *Sporothrix schenckii* species complex, naturally found in soil, plants, and timber, occurring more frequently in coastal areas and river valleys (1). The disease is usually contracted when *Sporothrix schenckii*

enters the skin with soil or plant through cuts or scrapes. There are reports of zoonotic transmission of *Sporothrix schenckii* from animals to humans (2, 6). As an infectious disease, sporotrichosis was first described in Brazil in 2009, when 220 cases were reported in humans, 120 cases in dogs, and 3,244 cases in cats (4).

Cats contract sporotrichosis more frequently than other domestic animals due to a higher zoonotic potential: their skin normally houses a range of pathogenic fungi, including *Sporothrix schenckii*.

This paper presents a clinical case of sporotrichosis in a domestic cat in the Rostov Oblast, Russia. The study provides cytological and histological characteristics of skin lesions in the cat infected with sporotrichosis, and describes therapeutic strategy applied.

## Diagnostic Technique

A cross-breed cat 6 years old was admitted to the “Centr” Veterinary Clinic (Rostov-on-Don). The keeper complained recurring abscesses on the cat's head and face during the last 6 months (Fig. 1). The keeper reported that the cat lived freely in a rural house, was fed with Friskies dry cat food, and had not been vaccinated or treated against either ecto- or endoparasites.

Previously, on the basis of provisional diagnosis made in another clinic, the cat was treated against soft tissue abscesses by cleaning the cavities in the lesions and administering oral antibiotics, first Convenia (3rd generation cephalosporin antibiotic) at 0.1 mg/kg, and later Sinulox at 12 mg/kg twice a day. The treatment had no positive response.

At admission to the “Centr” Veterinary Clinic, the cat had body temperature of 38.0°C. Capillary refill time - 1. Skin turgor normal, heart auscultation normal. Nutritional status normal. Swelling around the right eye, hyperemic conjunctiva, reactive to light, eye bulb unaffected.



Fig. 1. Cat's Head at Admission to the Clinic

Biplane X-ray examination (using Veterinray-20 CR Scanner) was conducted to specify diagnosis and exclude possible foreign body in the head tissues; no pathology in the head bones was detected (Fig. 2)



**Fig. 2. Radiography of the Cat's Head**

On the assumption of differential diagnoses (cryptococcosis, sporotrichosis), the following examinations were proscribed: general clinical blood test, FeLV/FIV tests (feline leukemia virus / feline immunodeficiency virus), cytological examination of the fistulous tract liquid (fine-needle biopsy sampling with Diff-Quick sample staining).

## Examination Results

Express-test for fatal viral infections using VetExpert (immunochemical chromatography of blood serum samples) returned negative FeLV and positive FIV results.

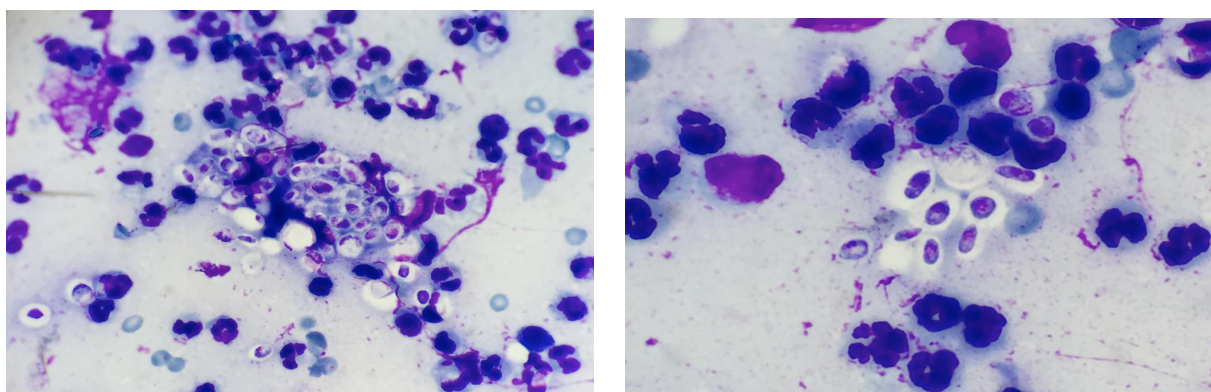
Complete blood count (using Mindray BC-2800 Vet hematology analyzer) returned low leukocyte count, increased erythrocyte sedimentation rate, and high segmented neutrophil count in the differential WBC. The results implied chronic inflammatory process in the animal (Table 1).

Item	Reference Values, units	Test Values
Leukocytes (WBC)	10 – 1*10 <sup>9</sup> /l	<b>6.50</b>
Erythrocytes (RBC)	5.8 - 10.7*10 <sup>12</sup> /l	<b>9.14</b>
Hemoglobin (HGB)	90 – 150 g/l	<b>128.0</b>
Hematocrit (HCT)	30 – 47%	<b>40.00</b>
ESR	1 – 6 mm/h	<b>68.0</b>

Platelet Level (PLT)	300 - 800*10 <sup>9</sup> /l	<b>253</b>
<b>Differential WBC</b>		
Banded Neutrophils	1-10	<b>6</b>
Segmented Neutrophils	40-45	<b>62</b>
Lymphocytes	36-60	<b>30</b>
Monocytes	1-3	<b>2</b>
<b>Parasites</b>		
Haemobartonella felis:	No	

**Table 1 – Results of General Clinical Blood Test for the Cat with Sporotrichosis**

Cytological examination of the fistulous tract liquid smears showed abundant infiltrate of neutrophils, including degenerate ones, and macrophages with occasional epithelioid cells. Numerous oval-shaped microorganisms 7 - 8 µm long and 3 - 5 µm wide with central eosinophilic nuclei and basophilic cytoplasm were found phagocytosed by neutrophils both extracellularly and intracellularly. Each of them was surrounded by an unstained bright area (up to 10 µm in diameter). The examination led to the conclusion that the area was affected with pyogenic granuloma and mycosis, caused by *Sporothrix schenckii*, according to morphological data (Fig. 3).



**Fig. 3. Cytological Examination of Fistulous Tract Liquid from the Cat**

Following cytological examination, the fistulous tract liquid was cultured and tested for antibiotic sensitivity (Fig. 4).

<b>Sensitivity Test</b>	<b>1</b>
<b>AMPICILLIN</b>	<b>S</b>
<b>AMOXICILLIN</b>	<b>S</b>
<b>AMOXICILLIN CLAVULANAT</b>	<b>S</b>
<b>CEFIXIME</b>	<b>R</b>
<b>CEFTRIAXON</b>	<b>R</b>
<b>GENTAMICIN, 120</b>	<b>S</b>
<b>CIPROFLOXACIN</b>	<b>R</b>
<b>ERYTHROMYCIN</b>	<b>S</b>
<b>AZITHROMYCIN</b>	<b>S</b>
<b>TETRACYCLINE</b>	<b>R</b>
<b>DOXYCYCLINE</b>	<b>R</b>
<b>VANCOMYCIN</b>	<b>S</b>
<b>CO-TRIMOXAZOL</b>	<b>R</b>
<b>NITROFURANTOIN</b>	<b>S</b>
<b>RIFAMPICIN</b>	<b>S</b>
<b>FOSFOMYCIN</b>	<b>S</b>
<b>CHORAMPHENICOL</b>	<b>S</b>
<b>ENROFLOXACIN</b>	<b>R</b>

**Fig. 4. Fistulous Tract Liquid Culture and Antibiotic Sensitivity Test Results.**

**Cultured from enrichment media for *Enterococcus faecalis* (S — sensitive to antibiotic; R - resistant to antibiotic)**

On the basis of examination results and taking into consideration inability to administer antibiotic to the cat orally twice a day, Azitromycin at 10 mg/kg for 10 days was prescribed. In addition, fistulous tracts were cleaned with trypsin and physiological solution and filled with Baneocin ointment (neomycin + bacitracin).

Examination 14 days into the prescribed treatment showed reduction of the affected skin area (Fig. 5).

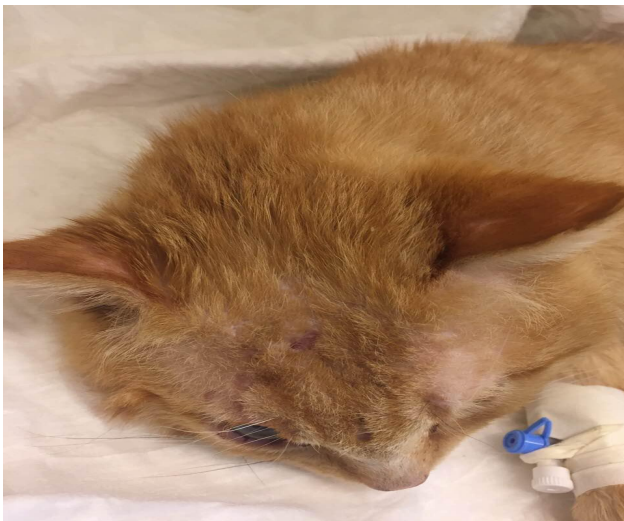




**Fig. 5. Cat's Head 14 Days into Treatment**

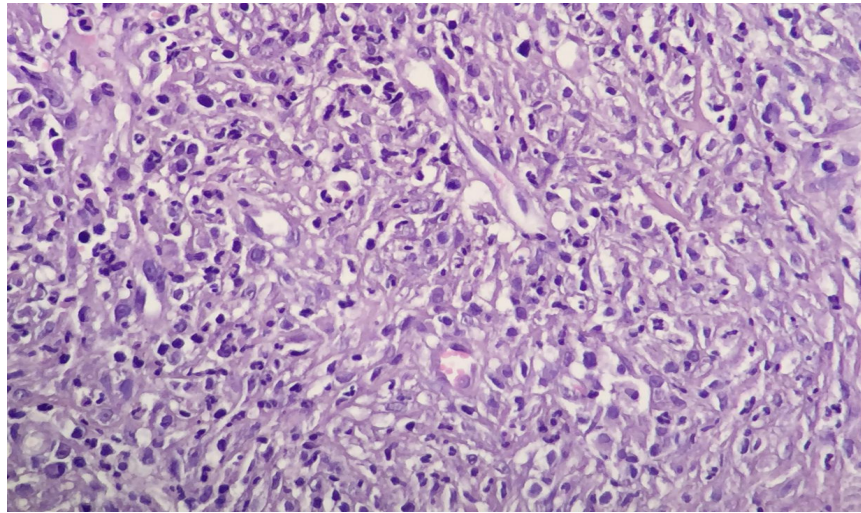
Histologic examination was carried out to confirm the final diagnosis. A tissue sample for histologic examination was taken with a punch sampler (dia. 3 mm) and the following treatment was prescribed: Itraconazole 10 mg/kg once a day orally with food for several months. Cleaning of the fistulous tracts with trypsin and physiological solution 0.9% followed by filling with Baneocyn was continued.

Figure 6 shows the skin of the cat's head 14 days into treatment.



**Fig. 6. Cat's Head 1 Month after Admission to the Clinic**

Histologic examination shows loose granulomatous lesions in the dermis with marked infiltration with neutrophils. The lesions were demonstrated to contain large quantities of macrophages and moderate quantities of epithelioid cells. Small ovoidal microorganisms (less than 100 at x400) were found both intracellularly and extracellularly. Based upon the results of histologic reexamination it was confirmed that the cat's skin lesions contained mycotic pyogenic granuloma (Fig. 7).



**Fig. 7. Histologic Reexamination, 1 Month after Admission to the Clinic**

Therefore, based on the examination findings the following diagnoses were made: immunodeficiency, sporotrichosis.

## **Conclusion**

*Sporotrichosis* (Shenk's disease, Beurmann's disease, rose gardeners' disease, rhinocladiosis) is a chronic infectious disease affecting skin and superficial lymph glands caused by a variety of filamentous mycoses species (*Sporothrix schenckii*). The disease is of significance because humans are susceptible to sporotrichosis as well as animals.

Cats, being the most susceptible to infection with *S. schenckii* [3,10] animals, usually develop severe skin lesions without granulomas but rich in mycotic agents. This makes it necessary to screen animal patients' immune response to *S. schenckii* infection and its link to mycotic burden and overall condition of the animals.

In-vivo studies on mice show that histopathological effects of sporotrichosis change with the disease stage, first manifesting themselves as abscesses containing macrophages and lymphocytes due to heavy mycotic burden. Granulomas form on later stages, when macrophages differentiate and increase activity. As a result, the mycotic burden reduces resulting in smaller abscesses and increased plasma cells count [11-13].

Sporotrichosis manifests itself with numerous abscesses and ulcers, affecting primarily skin and subcutaneous tissues, lymph nodes; less frequently the disease localizes in muscles, lungs, bones, and other internal organs. The disease may either develop at the point of entry (sporotrichosis chancre), or spread via lymph vessels (lymph sporotrichosis). Most often the disease develops on

animal's face or paws. There are no conclusive data on possibility of hematogenic spreading of the fungi from a skin lesion. Port of infection in case of the disease development in bones, joints, lungs, and other tissues is not determined yet. Most probably, it is lungs.

Cytological examination of the fistulous tract liquid may provide valuable insight for correct diagnosis. The final diagnosis requires histological examination of a punch biopsy sample. It is recommended to gather 3 - 4 biopsy samples of affected tissues under topical anesthesia. Usually, cytological examination reveals specific granulomatous inflammation with inclusions of epithelioid cells, giant cells, and macrophages. Inflammatory infiltrate contains aggregates of neutrophils and fragmented nuclei.

Following diagnosis confirmation, the treatment included azoles at 10 mg/kg, and antibiotics at 25 - 30 mg/kg daily for several months.

Untreated sporotrichosis becomes chronic, with a few reported cases of spontaneous healing. The results above may contribute to the development of new medications, therapeutic strategies, and measures of control of sporotrichosis infections in cats, thus reducing the risk of transmitting the infection to other animals and people.

The authors state that there is no conflict of interest with regard to the publication of this document.

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