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Lymphocutaneous and nasal sporotrichosis in a dog from Southern Italy: Case Report

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Abstract

Sporotrichosis is a chronic, granulomatous and usually lymphocutaneous infection of humans and animals caused by the dimorphic fungus, *Sporothrix schenckii*. This study reports a case of lymphocutaneous and nasal sporotrichosis in a hunting dog with a three month history of non-healing skin lesions. Cytological examination of nasal discharge and of the material collected from ulcerated skin surfaces showed a few cigar-shaped organisms within macrophages. Fungal cultures of nasal and ulcerated skin swabs yielded colonies of *S. schenckii*. The dog received oral itraconazole but died of unrelated causes. Necropsic examination was not performed.

Key words: dog, lymphocutaneous infection, sporotrichosis, *Sporothrix schenckii*

Introduction

Sporotrichosis is a chronic, granulomatous and usually lymphocutaneous infection affecting humans and animals. It is characterized by the development in subcutaneous tissues, skin and lymph nodes of nodular lesions which soften and break down to form indolent ulcers [1–3]. The etiologic agent, *Sporothrix schenckii*, is a dimorphic fungus which is usually found as mould in the environment from plant debris, soil and water, and as yeast in infected tissues [2, 4]. Sporotrichosis is present worldwide, mainly in areas characterized by high humidity and mild temperatures, where it grows in decaying organic substrates [2, 4]. Since the first report of human sporotrichosis [5], the disease has been described in horses, dogs, cats, cattle, camels, fowls, swine, rats, mice, hamsters, chimpanzees, and humans [6–11]. Human sporotrichosis occurs mainly in Central and South America where it is usually endemic but only rarely epidemic [2, 8]. Similarly, most of the published case reports regarding dogs and cats are from the United States, and Central and South America [8–15]. The most common presentation of sporotrichosis in animals and humans is chronic granulomatous lymphocutaneous infection [2, 3, 11] which can spread because of immunodepression [2, 3]. The main route of infection both in animals and humans is through wounded skin and sporadically through the inhalation of conidia [2, 11]. Canine sporotrichosis may also be transmitted through scratches by infected cats [11] and the infection may spread subcutaneously via the lymphatic vessels leading to lymphangitis [2, 3, 11]. Definitive diagnosis of infection is based on cytological examination of exudates, histological examination of a biopsy specimen, or isolation of *S. schenckii* by fungal culture [2, 3]. Serological methods (i.e. Immunofluorescence Test) can be used mainly in humans and dogs although a positive result indicates exposure but not neces-

sarily an active infection [2, 3]. Since 1963, only 113 cases of human sporotrichosis have been reported in Europe and 42 of them came from the Italian region of Apulia [16]. Although *S. schenckii* is very common in Apulia no data of animal sporotrichosis have been reported in this area. This study describes the first case of sporotrichosis in a dog from Apulia.

Case Report

A five year-old male Italian Bracco (hunting dog) was referred to the Department of Animal Health and Welfare of the Faculty of Veterinary Medicine (DEAHW), University of Bari (Italy) with a history of pruritic dermatitis and weight loss. No other animals (dogs or cats) lived with the dog.

Three months prior to the referral, a nodule was noticed on the right fore limb of the animal. Oral antibiotic therapy (dose and active ingredient not documented) was instituted leading to a transient improvement. Three weeks later, when the dog was checked again, the nodule had reappeared and had become ulcerated. At that date, the dog was pruritic. *Sarcoptes scabiei* was detected in skin scrapings and the dog was treated for mange with two injections of ivermectin 1% (injectable solution at 0.2 mg kg^{-1} of bodyweight administered 15 days apart). No other infections were diagnosed.

Upon referral to the DEAHW, the dog presented with depression and weight loss, but its temperature (38 °C), pulse (100/min) and breathing rate (18/min) were within the normal physiological range. Dermatological examination revealed multiple, circular, alopecic lesions and large nodules (ranging from 0.5 to 3.5 cm in diameter) exuding serous brown matter. The nodules were confined to the epidermis and dermis of the extremities (Figure 1), sternal area and head. Non-ulcerated nodules were also observed on the ears (Figure 2) and side of the trunk. The scrotum was erythematous and ulcerated. The dog presented bilateral mucopurulent nasal discharge, ulcerated nares and erosion of the ventral area of the nose (Figure 3). Generalized lymphadenopathy was also found. Based on the animal's history and physical examination, the differential diagnosis included sporotrichosis, leishmaniosis, neoplasia, mycobacteriosis, nodular panniculitis and

Figure 1. Multiple, circular, alopecic lesions and ulcerated nodules exuding brown matter on the extremities.

Figure 2. Non-ulcerated nodule on the pinna.

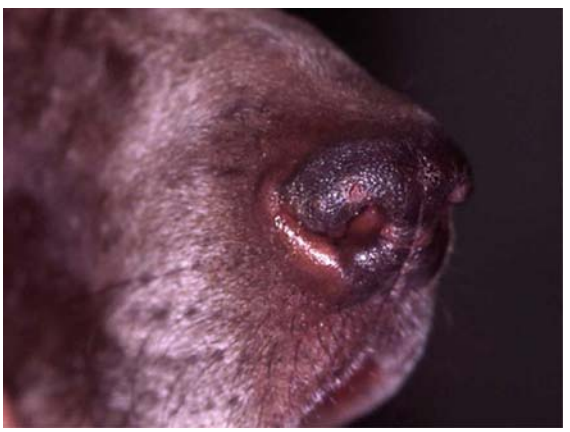

Figure 3. Erosive lesions on the nares.

combined anaerobic and aerobic infections. Skin scrapings were negative for parasitic and fungal pathogens. Anti-*Leishmania* antibodies were not detected by immune fluorescent immunosorbant assay. Neutrophilic leucocytosis was recorded on the hemogram while the serum chemistry panel showed no abnormal findings.

Cytological examination of nasal discharge and of the material collected from ulcerated skin surfaces (i. e. nodules on the body, scrotum and nares) showed a few cigar-shaped organisms (1–3 μm) within macrophages (Figure 4). Sterile swabs of ulcerative skin from the nares and scrotum were cultured on Sabouraud agar with cloramphenicol (0.5%) and cycloheximide (0.4%) (Liofilchem Diagnostici ®) at 25 °C. A pure filamentous fungus was isolated from all the Petri dishes after 7 days incubation. The colonies were initially white, then changed to grey and finally black with white margins. Microscopic examination of the cultures revealed branched and septate hyphae with fine conidiophores producing pear-shaped conidia. The mycelial phase was converted to an elongated yeast form when sub-cultured at 37 °C in Brain Heart Infusion Agar and budding yeasts were visible at microscopic examination. These elements identified the organism as the dimorphic fungus, *Sporothrix schenckii*.

The dog received oral itraconazole (7.5 mg/kg, PO, q. 12 h with food for 5 days, q.24 h). Seven days after therapy was instituted the dog died of unrelated causes. Necropsic examination was not performed.

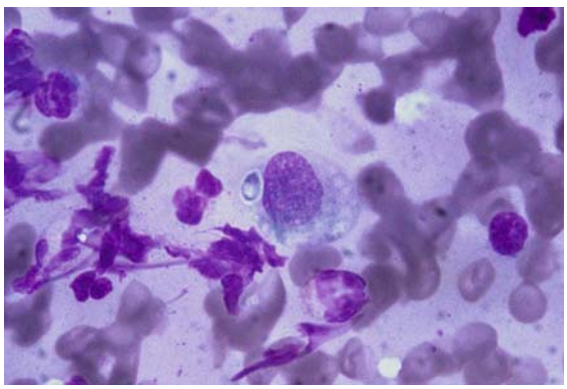

Figure 4. May–Grunwald Giemsa staining of nasal discharge: cigar-shaped organism within a macrophage (100×).

Discussion

Sporotrichosis has been only sporadically reported in dogs and most of the cases published in the literature come from Brazil, Ontario, and USA [11–15, 17]. In these cases sporotrichosis was acquired as a result of the fungus entering the dermis through a cut in the skin, although cases caused by inhalation of spores and penetration through the external auditory meatus have also been described [11–15, 17]. *Sporothrix schenckii* may also be transmitted by infected cat or armadillo scratches [11, 13]. The dog of the case we are reporting had no visible wounds before the nodular lesions appeared but it is likely that it became infected through a cut or puncture on its paws since it was a hunting dog allowed to roam free in the countryside. After inoculation, canine sporotrichosis develops in the cutaneous form or, rarely, in the lymphocutaneous or disseminated forms [3, 11]. Unlike dogs where sporotrichosis generally has a good prognosis and is amenable to treatment, cats usually present severe, often systemic disease from which they rarely recover [10]. In particular *S. schenckii* causes lesions (i.e. draining puncture wounds) in sites that are commonly exposed or inoculated during cat fights. Subsequently the affected area becomes ulcerated and drains purulent exudates. The disease process is complicated by autoinoculation occurring when cats scratch the lesions. Dissemination usually takes place, resulting in internal organ involvement (i.e. lymphnodes, lungs, and liver) [10].

No data on canine sporotrichosis has been reported so far in Apulia, a region where *S. schenckii* is considered to be endemic [16]. A likely explanation for this lack of information is that sporotrichosis lesions are often mistaken for leishmaniosis, neoplasia or granuloma in dogs [18]. Histological examination of skin biopsies and cytological examination of nasal and ulcerated skin swabs can be challenging because of the few *S. schenckii* elements generally found in infected dogs [11, 13, 15]. This case report indicates that cigar-shaped, round or oval, intracellular structures, suggestive of *S. schenckii* can be detected by cytological examination of exudates about three months post infection and provides further evidence that the number of organisms in tissues is small. Lesions in this dog started in the legs and

spread throughout its body in three months in correspondence of lymphatic vessels. Definitive diagnosis of sporotrichosis is usually based on detection of the organism by cytological examination of exudates and/or histological examination of a biopsy specimen while fungal culture is used only to confirm the presence of the organism [2, 3]. A recent investigation suggested that direct microscopic examination of wet mounts of secretions and tissue fragments taken from lesions prepared with 4% sodium hydroxide is useful to detect *S. schenckii* only in 13% of the samples while histopathological examination of skin biopsies specimens is useful in 16.7% [11]. More interestingly, fungal culture of exudate specimens and tissue fragments detect the organism in 75.8% and 97% of samples, respectively [11]. These results clearly demonstrate that negative histological examination of skin biopsy specimens and cytological examination of exudates do not rule out the presence of the fungus. For this reason the definitive diagnosis of canine sporotrichosis should be carried out by isolation and identification of the organism both in the mycelial and yeast forms using fungal culture. Specific fluorescent antibody (FA) detection of *S. schenckii* (i.e *Sporothrix* - antigen specific direct FA test) is used to diagnose canine sporotrichosis mainly when fungal culture is negative [3]. Some immunohistochemical and molecular tools have also been recently investigated to diagnose infections by *S. schenckii*, mainly in humans [19–23]. Serological testing for antibody detection of canine sporotrichosis is available but positive results indicate exposure, not active infection [3]. Furthermore the antigenic identification of *S. schenckii* and the purification of these epitopes are still being investigated [24–26]. Finding *S. schenckii* also in material collected from nasal discharge may result from the infection of the yeast to the upper respiratory tract. The presence of the yeast to the upper airways is an unusual finding since the infection is mainly characterized by single or multiple cutaneous and subcutaneous lesions [11, 13]. Osteo-articular and disseminate forms have been occasionally reported [14, 15, 27–30].

Treatment of sporotrichosis in cats and dogs is mainly systemic and consists of oral administration of potassium and sodium iodide even if ketoconazole and itraconazole have been used successfully [3, 11, 15, 29, 30]. In the case we are reporting, treatment was prescribed but unfortunately no follow-up was possible as the dog died of unrelated causes.

Although the dog's owners and attending veterinarians came into contact with the exudates of the animal they did not develop any lesions probably because of the small number of organisms the dog shed. This suggests that the risk of transmission from an infected dog to humans is unlikely. By contrast, with cats (unlike other animals) the presence of a large number of intra- and extra-cellular fungal elements represents a risk for owners and veterinary practitioners [10, 11]. Nonetheless, since sporotrichosis is potentially hazardous to humans, protective clothing, especially gloves, should be worn to avoid infection through open wounds of carnivores.

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