

Canine Sinonasal Aspergillosis

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ABSTRACT

Background: Sinonasal aspergillosis (SNA) is the second most common cause of nasal discharge in dogs. The diagnosis is confirmed through anamnesis, physical and complementary exams. *Aspergillus fumigatus* is the species most frequently isolated from dogs with fungal involvement of the upper respiratory tract. Canine SNA is a disease with worldwide distribution but, surprisingly, the disease has never been described in Brazil. The prognosis of SNA is usually good. The objective of this report is to describe the first case of canine sinonasal aspergillosis in Brazil.

Case: A 18-months old, male, Rottweiler breed dog was referred to the Hospital de Clínicas Veterinárias at the Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Southern Brazil, for purulent nasal discharge, variably bloody, and sneezing of approximately 6 months duration. During this period, the dog was treated with various antibiotics with no success and lost 10 kg of corporal mass. The alterations found in the physical exam were bilateral sanguinopurulent nasal discharge, depigmentation of nose and paranasal region, as well as subnutrition. The dog was anesthetized and sinus and chest x-rays were performed (latero-lateral and ventrodorsal positions). In the radiographic analysis, it was verified the lessening of radiolucency on the left nostril, indicating the destruction of the nasal concha. The chest radiographies did not show alterations. A rhinoscopy was carried out showing destruction in the endoturbinates, purulent discharge and presence of a dark color mass in the frontal sinus, which was collected for histopathological and microbiological culture exams. Histopathologic examination revealed the presence of hyaline, branching septate hyphae, consistent with *Aspergillus* spp. and inflammatory cells. Culture identified *Aspergillus fumigatus*. Bacteriological culture was negative. Antibodies to *Aspergillus fumigatus* were detected by counter electrosyneresis. The haemogram showed lymphocytosis and monocytosis. The dog was treated with itraconazole (5 mg/kg of body weight, orally, twice a day for 30 days). After this period, nasal discharge decreased and a good repigmentation was observed with the dog showing improvement of his appetite and energy level.

Discussion: The presence of antibodies to *Aspergillus* spp. does not always confirm canine nasal aspergillosis. Serological tests can yield 5% to 15% false positive results in dogs. Therefore, it is necessary to perform complementary exams such as radiography, rhinoscopy, histopathology and fungal culture in order to confirm the diagnosis. For many years, aspergillosis was considered as an incurable chronic rhinitis characterized by the turbinate destruction, nasal discharge and intermittent epistaxis. The reported prevalence of canine SNA in animals affected by disorders in the upper respiratory may range from 7 to 34%. Consequently, predisposed animals (like dolichocephalic dogs) are serious candidates to develop nasal aspergillosis that, in many cases, may be not diagnosed. This first report of canine sinonasal aspergillosis in Brazil reinforces the importance of consider this disease as a differential diagnosis in cases of nasal disease in dogs with clinical rhinosinusitis mainly in tropical countries.

Keywords: sinonasal aspergillosis, rhinosinusitis, *Aspergillus fumigatus*, dog, serology.

INTRODUCTION

Sinonasal aspergillosis (SNA) is the second most common cause of nasal discharge in dogs after nasal neoplasia [21]. Canine SNA is a mycotic disease with worldwide distribution and it is characterized by the formation of lesions within the nasal cavity and/or frontal sinus [4]. Aspergillosis is the most common fungal disease in dogs with clinical rhinosinus alterations [1,12,22]. Involvement of the upper respiratory tract, lungs and disseminated infection are less commonly described. Dolichocephalic and middle-aged large-sized dogs are more likely to be affected by SNA [7,17-19,22]. *Aspergillus fumigatus* is the most common species found in dogs with fungal involvement of the respiratory system [19,20].

Clinical signs of aspergillosis usually include mucopurulent or bloody discharge, sneezing, pain on palpation and depigmentation or uni or bilateral ulcerations [3,22].

The diagnosis is achieved through anamnesis, physical exam and, mainly through the combination of complementary exams (histopathology, serology, fungal culture and alterations revealed in the radiographic exam, rhinoscopy or computed tomography) [6]. Various exams are required because *Aspergillus fumigatus* is an opportunistic agent frequently found in the endogenous biota of the nasal cavity in many animals [19]. The treatment is performed through the administration of antifungal drugs directly in the nasal cavities and sinuses and/or by oral route [1,9-12,19]. The prognosis of SNA is usually good [1,10,11,22].

The objective of this report is to describe the first well-documented case of canine sinonasal aspergillosis in Brazil.

CASE REPORT

A 18-months old, male, Rottweiler dog was referred to the Hospital de Clínicas Veterinárias (HCV) of the Universidade Federal do Rio Grande do Sul (UFRGS) for purulent nasal discharge, variably bloody, and sneezing of approximately 6 months duration. During this period, the dog was treated with various antibiotics without success, and lost 10 kg of corporal mass. The alterations found in the physical exam were bilateral sanguinopurulent nasal discharge, depigmentation of nose and skin (paranasal region) (Figure 1) and subnutrition.

The dog was anesthetized and sinus and chest x-rays were performed (latero-lateral and ventrodorsal positions). In the radiographic analysis, the lessening of radiolucency on the left nostril indicated the destruction of the nasal concha (Figure 2). The chest radiographies did not show alteration. A rhinoscopy was carried out and demonstrated destruction in the endoturbinates, purulent discharge and presence of a dark color mass in the frontal sinus (Figure 3), which was collected for histopathological, bacteriological and fungal culture. Histopathological examination revealed the presence of hyaline, branching septate hyphae, consistent with *Aspergillus* spp. and inflammatory cells (Figure 4) and culture on Sabouraud dextrose agar at 37°C identified only *Aspergillus fumigatus* (Figure 5). Bacteriological culture in blood agar was negative. Blood was collected



Figure 1. A 18-months old, male, Rottweiler breed dog was referred to the Hospital of Veterinary Clinic at the Federal University of Rio Grande do Sul for purulent nasal discharge, depigmentation of nose and skin (paranasal region).

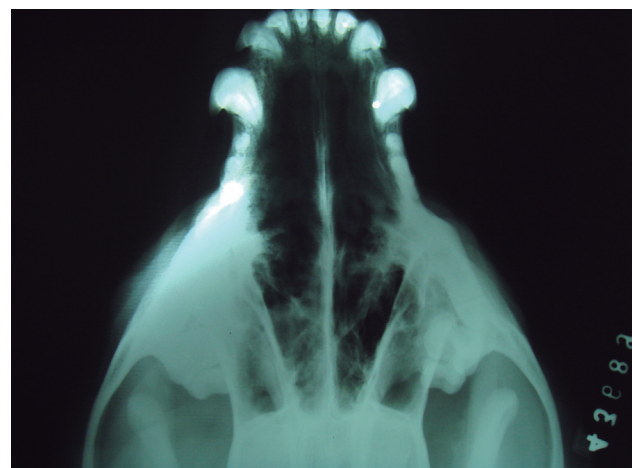


Figure 2. Sinus x-ray of a 18-months old, male, Rottweiler breed dog referred to the Hospital of Veterinary Clinic at the Federal University of Rio Grande do Sul showing areas of diminution of radiolucency in the left nostril, indicating destruction of nasal concha.

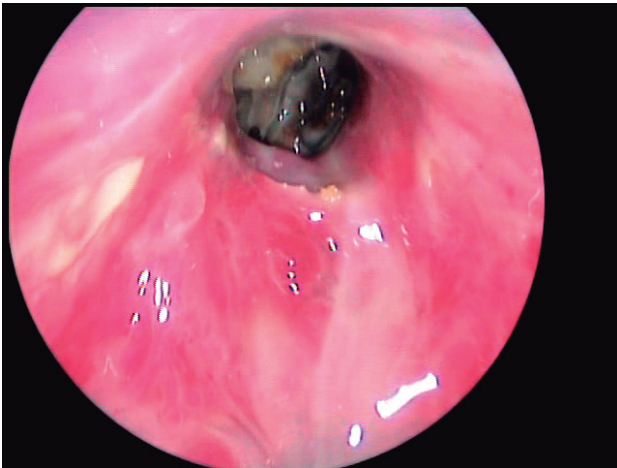


Figure 3. Rhinoscopy in a 18-months old, male, Rottweiler breed dog referred to the Hospital of Veterinary Clinic at Federal University of Rio Grande do Sul demonstrating purulent discharge and presence of a dark color mass in the frontal sinus.

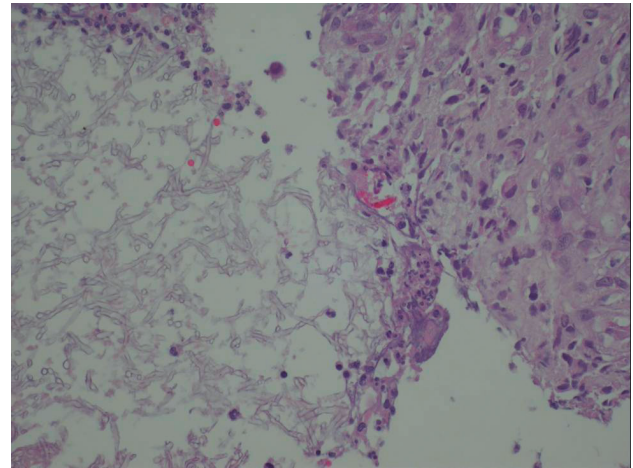


Figure 4. Microscope image (total enlargement 400x) of histopathological exam carried out after biopsy guided by rhinoscopy of a dark color mass in the frontal sinus of a 18-months old, male, Rottweiler breed dog referred to the Hospital of Veterinary Clinic at the Federal University of Rio Grande do Sul revealing the presence of *Aspergillus* hyphae and inflammatory cells.

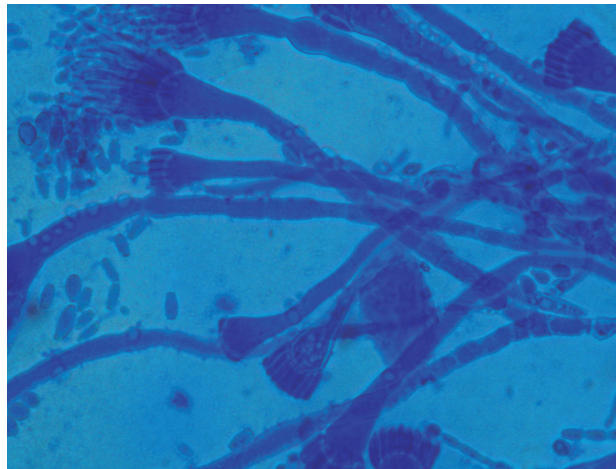


Figure 5. Microscopic aspect (total enlargement 1.000x) of *Aspergillus fumigatus*, isolate after sample culture of nasal frontal sinus of a 18-months old, male, Rottweiler breed dog referred to the Hospital of Veterinary Clinic at the Federal University of Rio Grande do Sul.

for the serological test (electro-syneresis) which was positive for anti-*Aspergillus fumigatus* antibodies (Figure 6). The haemogram showed lymphocytosis and monocytosis.

Through the anamnesis and the physical and complementary exams, the diagnosis of canine SNA was confirmed. The dog was treated with itraconazole (5 mg/kg of body weight, orally, twice a day for 30 days). After this period, nasal discharge decreased and a good repigmentation (Figure 7) was observed with the dog showing improvement of his appetite and energy level. The dog is still under treatment.

DISCUSSION

Sinonasal aspergillosis may occur as an opportunistic primary infection or secondary to the presence of a foreign body, previous nasal trauma or neoplasia [1]. For many years the disease was considered as an incurable chronic rhinitis characterized by the turbinate destruction, nasal discharge and intermittent epistaxis [3,10,22].

Although it has been reported in many countries, especially those with temperate climate, canine SNA has never been registered in the veterinary Brazilian literature. Due to climate conditions (high tem-

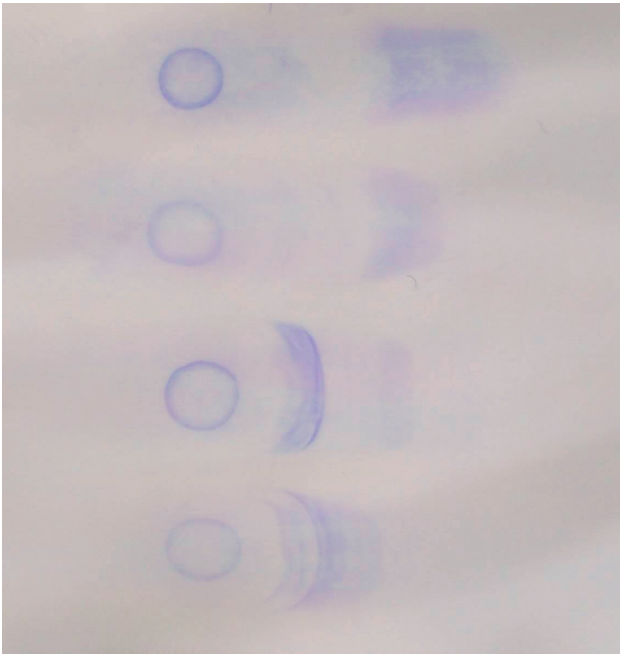


Figure 6. Electrosyneresis on a Cellulose Acetate Plate of electrosyneresis of a 18-months old, male, Rottweiler breed dog referred to the Hospital of Veterinary Clinic at the Federal University of Rio Grande do Sul. On the third strip (top to bottom) the formation of many arches of precipitation indicating a positive result, especially when compared to the fourth strip (metabolic control antigen).

perature and humidity), which enhance fungal growth and multiplication, the probability of the occurrence of fungal diseases in tropical countries is higher than in those with temperate climate [22].

In veterinary medicine, infection of the upper respiratory tract by *Aspergillus* spp. is of greatest clinical significance in the dog [4]. The reported prevalence of SNA in dogs affected by disorders in the upper respiratory may range from 7 to 34% [6,9,15,17,20]. The several ways in which *Aspergillus* spp. can cause sinonasal infection in dogs, depend not only on the pathogenicity of the fungal species, but also on the individual susceptibility of animals, the age and general conditions [15]. Localized tissue damage of the nasal mucosa probably constitute the most common predisposing factor for infection [15].

The fact that it is the first well-documented case of canine sinonasal aspergillosis in Brazil is surprising because *Aspergillus fumigatus* is often detected in high percentage of the fungal conidia populations in the indoor and outdoor atmosphere in many Brazilian cities [13,14]. One reason for this lack of diagnosis in Brazil might be the difficulty of the veterinarians to confirm the diagnosis through positive results provided by various complementary tests. The combination of diagnostic methods is essential since *Aspergillus fu-*



Figure 7. A 18-months old, male, Rottweiler breed dog after 30 days treatment with itraconazole as a dose of 5 mg/kg every 12 h, showing improvement of his conditions and no evidence of nasal pigmentation.

migatus is an ubiquitous fungus isolated from many different substrates and, also found in the nasal cavity of many healthy animals [19].

According to Saunders & Van Bree [18], only the result of the culture is inconclusive because 30-40% of the results obtained from the nasal discharge samples of healthy dogs are positive for *Aspergillus* spp.

On the other hand, detecting antibodies to *Aspergillus* spp. does not always confirm canine SNA. A positive serology is supportive of a fungal rhinitis but should be interpreted in light of other diagnostic tests [1]. Sharp [19] mentioned that serological electrosyneresis and immunodiffusion tests may yield 5% to 15% false-positive results in dogs.

Therefore, it is necessary to perform various complementary exams, such as radiography, rhinoscopy, histopathology, fungal culture, and serology among others, in order to confirm the diagnosis of SNA [5,6,8,18,19]. Currently, no single test can be used to make the diagnosis, because false-positive and false-negative results can occur [5]. To date, the “gold standard” for diagnosing this disease is the direct visualization of fungal plaques by endoscopy or the observation of fungal elements on cytology or histopathologic examination of a nasal or sinus mucosal biopsy [5,8,16].

This first report of canine sinonasal aspergillosis indicates that the disease should be included in the differential diagnosis of nasal disease in dogs with clinical rhinosinusitis mainly in tropical countries like Brazil.

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