

# Equine Rhinosporidiosis: a case report in Brazilian midwestern

## *Rinosporidiose equina: relato de caso no centro-oeste brasileiro*

Ísis Assis Braga<sup>1,2\*</sup> , Raiany Borges Duarte<sup>2</sup> , Letícia Souza Prates<sup>1</sup> ,  
Hugo Henrique Ferreira<sup>3</sup> , Lara Adriana Fernandes da Fonseca<sup>2</sup> , Gilmar Arantes Ataíde Júnior<sup>2</sup> ,  
Dirceu Guilherme de Souza Ramos<sup>2</sup> , Vantuil Moreira de Freitas<sup>1</sup> 

**ABSTRACT:** This is the first report of equine nasal rhinosporidiosis in Mineiros, Goiás, diagnosed through the histopathological analysis of granulomatous masses removed from a horse's nostril of a 12-year-old male horse, through a surgical procedure. Microscopy revealed a papillomatous tissue lesion covered by moderately hyperplastic squamous epithelium, rich, loose fibrocollagenous tissues, well vascularized, accompanied by an accentuated inflammatory reaction constituted by a mixture of macrophages, lymphocytes, plasmocytes, and smaller number of neutrophils, and numerous round to oval structures with a unilamellar wall and a central nucleus surrounded by basophilic granular material, which were morphologically compatible with *Rhinosporidium* spp. sporangia.

**KEYWORDS:** Horses; Nasal polyps; *Rhinosporidium seeberi*

**RESUMO:** Este é o primeiro relato de rinosporidiose nasal equina em Mineiros, Goiás, diagnosticada através da análise histopatológica de massas granulomatosas retiradas da narina de um equino macho, de 12 anos de idade, através de procedimento cirúrgico. A microscopia revelou uma lesão de tecido papilomatoso recoberta por epitélio escamoso moderadamente hiperplásico, bem como, ricos tecidos fibrocolagenosos frouxos, bem vascularizados, acompanhados de acentuada reação inflamatória constituída por uma mistura de macrófagos, linfócitos, plasmócitos e menor número de neutrófilos, e numerosas estruturas arredondadas a ovais com uma parede unilamelar e um núcleo central circundado por material granular basofílico, que eram morfológicamente compatíveis com esporângios de *Rhinosporidium* spp.

**PALAVRAS-CHAVE:** Cavalos; Pólipos nasais; *Rhinosporidium seeberi*

## INTRODUCTION

Characterized as a chronic infective inflammatory disease with slow evolution but not contagious, rhinosporidiosis is a protozoonosis caused by the *Rhinosporidium seeberi* that belongs to the Chitridiales order, Mesomycetozoa class, and the Rhinosporideaceae family (Ahluwalia, 2001; Tiwari *et al.*, 2015) and has human as its primary host, though it has already been reported in some species of mammals such as horses, dogs, cats, cattle.

This microorganism is known to be saprophytic, hydrophilic, and adapted to tropical and subtropical regions; considering that, the hypothesis is that transmission occurs through direct contact of the injured nasal epithelium with *R. seeberi*,

which is dispersed in reservoirs with stagnant water or flooded areas. Furthermore, until this moment, there's no scientific evidence that direct transmission between hosts can occur (Pal, 2019; Pal; Rao, 1989).

About 90% of rhinosporidiosis cases were reported in the southern India and Sri Lanka, considered endemic regions, mainly for humans. Although sporadically, another 70 countries have been described as having this disease (Bernardo *et al.*, 2016; Hussein; Rashad, 2005; Jain, 1967; Leeming *et al.*, 2007a; McClatchie; Bremner, 1969; Tizzano *et al.*, 2021).

Although there were reports of rhinosporidiosis in humans and animals in Brazil in the 30's and 40's, respectively (Ferreira; Neves, 1954), relates are still scarce, being verified in humans

<sup>1</sup> Centro Universitário de Mineiros, Mineiros/GO, Brasil

<sup>2</sup> Universidade Federal de Jataí, Jataí/GO, Brasil

<sup>3</sup> Médico Veterinário Autônomo

\*Corresponding author: isis@unifimes.edu.br

Received: 06/13/2023 Accepted: 10/16/2023

in its vast majority in the estate of Maranhão (Almeida *et al.*, 2016), in cattle (Riet-Correa *et al.*, 1983) and in equines, being frequently described in the southern region (Argenta *et al.*, 2018; Bernardo *et al.*, 2016; Londero; Santos; Freitas, 1977; Sampaio; Bracarense; Maria, 2018; Santos *et al.*, 2014), in the northeast (Matias *et al.*, 2022) and cases in the southwest, where it was also been reported in dogs (Neves *et al.*, 2014; Zibordi *et al.*, 2020).

Even with low mortality and sporadic in majority of Brazil, rhinosporidiosis is of public health interest because it is a zoonosis; however, more research on this approach is required in order to address the region's lack of epidemiological data. Thus, the objective of this is to report the first case of equine rhinosporidiosis in Mineiros, Goiás.

### CASUISTRY

In September 2022, in the municipality of Mineiros, Goiás, a male equine, 12 years old, of creole mixed race, about 280 kilograms of weight, was treated for a clinical complaint of progressive enlargement of a nodule in the anatomical region of the left nostril within a period of 5 months, however, without reduction in its performance. The animal was purchased 5 years ago from a producer in Balneário Cambori, Santa Catarina, according to the anamnesis.

The presence of a principal mass of nearly 4 cm diameter, located in the nasal vestibule, with granulomatous aspect and irregular surface, but not hemorrhagic, without ulceration and exudate, was related by inspection and palpation during the physical exam (Fig. 1A). Other small nodules are added to the nasal septum of the left nostril while the right nostril remains unchanged. Physiological parameters were within normal limits.

The excision of nodular masses were recommended in that occasion, and the preoperative period consisted of the following steps: water and food fasting for 12 hours; sedation with 1% detomidine hydrochloride at dosage of 1 mg/23 Kg of body weight or dosage of 0.4 ml of Detto Vet<sup>®</sup>/100 Kg of



Subtitle: A) granulomatous nodules of irregular aspect, located on the nasal vestibule; B) The completely healed lesion 50 days after surgery.

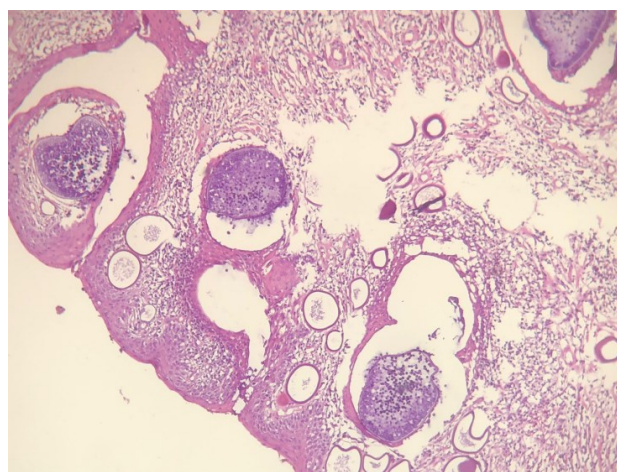
**Figure 1.** Left nostril of an equine that lives on XXXXXX.

body weight; containment in station position; hygiene of the nostril with soap and water followed by antiseptics with 2% chlorhexidine (Clorexidine<sup>®</sup>), infiltrative local anesthesia with 2% lidocaine hydrochloride without vasoconstrictor at dosage of 2 mg/kg or dosage of 25 ml of Bloc<sup>®</sup> subcutaneously in the perinodular region.

The transoperative period began with the resection of the larger mass, and then a scalpel was used to excise the smaller nodules that were internally in the nasal cavity, followed by hemostasis and cauterization of the nasal vestibule mucosa. The removed fragments were stored in a 10% formalin solution for histopathological analysis.

In the postoperative period, a penicillin-based antibiotic was used at a dosage of 20,000 IU/Kg, which is equivalent to an intramuscularly dosage of 20 ml per day for 7 consecutive days. It was also suggested to use the anti-inflammatory and analgesic flunixin meglumine in dosage 1.1 mg/kg, which corresponds to an intravenously dosage of 10 ml, once a day, for 5 consecutive days. The wound was cleaned with gauze moistened in saline solution until it healed. Furthermore, preventively, 5,000 IU of anti-tetanus serum was administered intramuscularly in a single dose. There were no complications or surgical interurrences, and the wound healed within a period of 14 days, with no recurrence until this moment (Fig. 1B).

The microscopic evaluation revealed a papillomatous tissue lesion reconstituted by squamous epithelium that was moderately hyperplastic. Underlying it were rich, loose fibrocollagenous tissues, well vascularized, accompanied by an accentuated inflammatory reaction constituted by a mixture of macrophages, lymphocytes, plasmocytes, and smaller number of neutrophils. There were numerous round to oval structures of varying sizes, with a unilamellar wall and a central nucleus surrounded by basophilic granular material morphologically compatible with sporangia of *Rhinosporidium* spp. (Fig. 2).



**Figure 2.** Histological section of the granulomatous nodule removed from the equine's left nostril, revealing round structures, a unilamellar wall, a central nucleus surrounded by granular basophilic material that was compatible with *Rhinosporidium* spp. sporangia (H.E; obj. 10X).

## DISCUSSION

According to the literature, this is the first report of equine rhinosporidiosis in the Mineiros, Goiás, which, because it's not an endemic area and the animal was purchased in the southern region of Brazil, we assume the possibility of this being an allochthonous case, considering that most cases in equines in the country occur in the southern region, according to previous searches (Londero; Santos; Freitas, 1977) and more recent reports in Pelotas, RS (Bernardo *et al.*, 2016; Santos *et al.*, 2014), in Londrina, PR (Sampaio; Bracarense; Maria, 2018), Porto Alegre and the northeast region of Rio Grande do Sul (Argenta *et al.*, 2018).

The disease's spread to non-endemic areas is frequently reported. Matias *et al.* (2022) reported rhinosporidiosis on a horse from the semi-arid region of Paraíba, in the northeast area of Brazil, which is considered an endemic region for rhinosporidiosis in humans, although in animals, it was the first report. Similar to what was observed by Leeming *et al.* (2007a, 2007b) in the United Kingdom and Burgess *et al.* (2012) in Canada, they related parasitism by *R. seeberi* on equines bought from Argentina, which is known for its huge activity on horse exportation for competition purposes; nonetheless, it's an endemic area for this disease on equines (Niño; Freire, 1964; Tizzano *et al.*, 2021).

Thus, we believe that Rhinosporidiosis was introduced in those non-endemic areas, such as in the region of this study, as a result of subclinical course of Rhinosporidiosis, which can hang around for long periods until the onset of the clinical symptoms, which manifest as seropurulent nasal discharge, sneezing, epistaxis, wheezing, visualization of single or multiple polyps in the nostrils and nasolarynx, varying in size, in color pink, red or pale gray and covered with numerous sharp yellowish-white granules. Polyps may be sessile or pedunculated, and the surface is irregular, shiny, and may be ulcerated (Pal, 1989; Caniatti; Roccabianca; Scanziani, 1998).

The clinical manifestation observed on the related horse were consistent with the description in the literature, corroborating the diagnosis of Rhinosporidiosis; however, when analyzing the findings in the microscope, some differential diagnosis must be considered, as the infection caused by

*Coccidioides immitis*, *Cryptococcus neoformans*, *Histoplasma spp.*, *Aspergillus spp.*, *Pseudoallescheria boydii*, *Conidibolus coronatus* and *Pythium insidiosum* (Trotte *et al.*, 2008), despite the nasal granuloma caused by hypersensitivity (Pereira; Meireles, 2007), the histopathological analysis is essential once *R. seeberi* can't be isolated on artificial places (Rath; Baig; Debata., 2015).

Therefore, the definitive diagnosis was based on microscopic observation of morphologically compatible structures with the *R. seeberi* sporangia, discarding *Coccidioides immitis*, *Emmonsia parva*, and *E. crescens* by analyzing the size and shape of the sporangia (Caswell; Williams, 2016). Furthermore, the presence of inflammatory infiltrates composed of lymphocytes, plasma cells, neutrophils, and macrophages is a common finding (Bernardo *et al.*, 2016; Bugess *et al.*, 2012; Matias *et al.*, 2022).

Regarding the clinical management instituted in this case, surgical excision of the nodules combined with cauterization is a procedure supported by the literature with excellent results, although the occurrence of recurrences isn't uncommon (Burgess *et al.*, 2012; Neves *et al.*, 2014; Santos *et al.*, 2014; Zibordi *et al.*, 2020). Burgess *et al.* (2012) believe that recurrences are related to the release of endospores that were in nodular formations during their surgical resection.

## CONCLUSIONS

Lastly, it's recognized that sporadic cases of rhinosporidiosis can occur in non-endemic areas, either thought the importation of animals from endemic areas or even because they are high-risk areas for humans. The data in this report support the need of furthermore investigation on this disease in animals, as there is a theory that it is not as rare as thought, but rather underdiagnosed.

Finally, we emphasize that this is the first record of equine rhinosporidiosis in the midwestern region of Brazil.

## ACKNOWLEDGEMENTS

The Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Fundação de Amparo à Pesquisa do Estado de Goiás (FAPEG) by fellowship.

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