

Haw's Syndrome Associated with Giardiasis in a Cat

Agnes Prieto Mendonça¹, Thaíz Furtado Silva¹, Reiner Silveira de Moraes²,
Andréia Vitor Couto Amaral¹ & Dirceu Guilherme de Souza Ramos¹

ABSTRACT

Background: Haw's syndrome results in bilateral projection of the third eyelid, which is caused by a dysfunction of the sympathetic innervation in the region, not accompanied by other ocular changes. It has been mostly seen in cats, under 2-year-old and, it usually shows an acute presentation. It is believed that the disorder may be self-limiting, but several infectious etiologies have been proposed, together with diarrhea. The aim of the study was to report a case of a 2-year-old mixed breed male feline, castrated and diagnosed with Haw's syndrome, associated with an infectious condition given the presence of *Giardia* sp.

Case: A 2-year-old male, mixed-breed cat and orchiectomized, was admitted and treated at the Veterinary Hospital of the Federal University of Jataí. In the anamnesis, the owner complained that the cat had had pasty brown diarrhea for 4 days and a projection of the third eyelid. He emphasized that the animal used to have some episodes of diarrhea sporadically and the last deworming was carried out 3 months ago from that day. He reported contact with other random street and outdoor cats. On the physical examination, bilateral projection of the third eyelid was observed without any other visible alteration. The third eyelid projection was responsive to the mydriatic and adrenergic [phenylephrine 10%] eye drops instillation test. Complete blood count and serum biochemical evaluation of creatinine, alkaline phosphatase (ALP) and alanine aminotransferase (ALT) concentrations were performed. In addition, abdominal ultrasound and parasitological examination of feces were requested. Complete blood count showed eosinophilia and serum biochemical evaluations were within reference values. The coproparasitological examination detected *Giardia* sp. On the ultrasound, no significant changes were observed. The recommended treatment was anthelmintic [fenbendazole 50 mg/kg, SID, for 5 days]. However, one week later, the coproparasitological examination still showed *Giardia* sp. Given this scenario, the chosen treatment was the use of nitazoxanide [25 mg/kg, BID, for 7 days]. Therefore, the patient presented emesis and the treatment with nitazoxanide had to be suspended. Thus, metronidazole [25 mg/kg, BID, for 7 days] was prescribed, in addition to the environmental disinfection and daily litter box cleaning, all performed with quaternary ammonia. After 1 week of treatment with metronidazole, the patient's clinical improvement and reversal of the third eyelid projection were observed.

Discussion: This case proved to be consistent with the data found in the literature, in which cats younger than 2-year-old are affected by Haw's syndrome and may present concomitant diarrhea. On the physical examination, the parameters evaluated were within normal reference for the cat species and the bilateral projection of the third eyelid was the only alteration found in the patient. The prognosis for the patient with Haw's syndrome and concomitant giardiasis is favorable, as long as the intestinal infection is treated briefly, in order to prevent the chronicity of the enteroparasitosis. The need of more studies is evident in order to explain the Haw's syndrome pathology and so, clarify the real cause of this disease. Since the syndrome is mostly, a self-limiting disease, interventions with topical ocular drugs are not necessary. However, in the event of a concomitant disease, infection or underlying cause, it must be treated correctly. Attention is drawn to the need of feces examination through coproparasitological evaluation in cases of diarrhea.

Keywords: cat, diarrhea, intestinal parasitosis, nict membrane.

DOI: 10.22456/1679-9216.118829

Received: 4 December 2021

Accepted: 16 April 2022

Published: 10 May 2022

¹Veterinary Medicine Department, Federal University of Jataí (UFJ), Jataí, GO, Brazil. ²São Paulo State University (UNESP), Botucatu, SP, Brazil. CORRESPONDENCE: A.V.C. Amaral [andreiavcvet@ufj.edu.br]. Medicina Veterinária, CIAGRA-UFJ. Campus Jatobá. BR 364, km 195, nº 3800. CEP 75801-615 Jataí, GO, Brazil.

INTRODUCTION

In domestic animals, there are 3 eyelids which consist of: upper, lower and third eyelid. Among the main functions of the third eyelid, the production of 25-40% of the total tears produced can be highlighted, additionally to the protective effect over the cornea [1,4].

Haw's syndrome results in bilateral projection of the third eyelid which is caused by a dysfunction of the sympathetic innervation in the region, not accompanied by other ocular changes. The syndrome has been mostly seen in cats, under 2-year-old and, it usually shows an acute presentation. It is believed that the disorder may be self-limiting, but several infectious etiologies have been proposed, together with diarrhea [3,8,10,14].

Diarrhea can be caused by giardiasis which is a common cause of chronic diarrhea in humans and in domestic and wild animals [13]. Giardiasis is a zoonosis [2], however, it is also a zoonosis [11]. The infection occurs through the ingestion of feces contaminated by cysts and there may be reinfection through self-cleaning [6,15].

This case report aims to present a case of a 2-year-old, castrated, mixed-breed male cat admitted and treated at the Veterinary Hospital of the Federal University of Jataí. The feline patient was diagnosed with Haw's syndrome associated with an infectious condition as the presence of *Giardia* sp. was observed in the coproparasitological examination.

CASE

A 2-year-old male cat, non-defined breed, orchiectomized, was admitted and treated at the Veterinary Hospital of the Federal University of Jataí. The owner reported that the cat had pasty brown diarrhea for 4 days and presented bilateral projection of the third eyelid. He emphasized that the animal used to have some episodes of diarrhea sporadically and the last deworming was carried out 3 months ago from that day. He reported contact with other random street and outdoor cats.

On the physical examination, rectal temperature (RT) of 38.6°C, heart rate (HR) of 192 beats per min (bpm), capillary perfusion time (CPT) of 2", respiratory rate (RR) of 24 breaths per min, normally hydrated in the skin turgescence test and mucous membranes observation. Also, lymph nodes were observed

with normal volume on palpation, normal colored mucosa, good general condition, alert and with normal body score. However, the feline presented bilateral projection of the third eyelid (Figure 1A).

Immediately afterwards, a drop of mydriatic and adrenergic [phenylephrine 10%] eye drops¹ were instilled in the right eye. Ten min later, the repositioning of the third eyelid was observed (Figure 1B).

Complete blood count, serum biochemical evaluation of creatinine, alkaline phosphatase (ALP) and alanine aminotransferase (ALT) concentrations were performed. In addition, abdominal ultrasound and

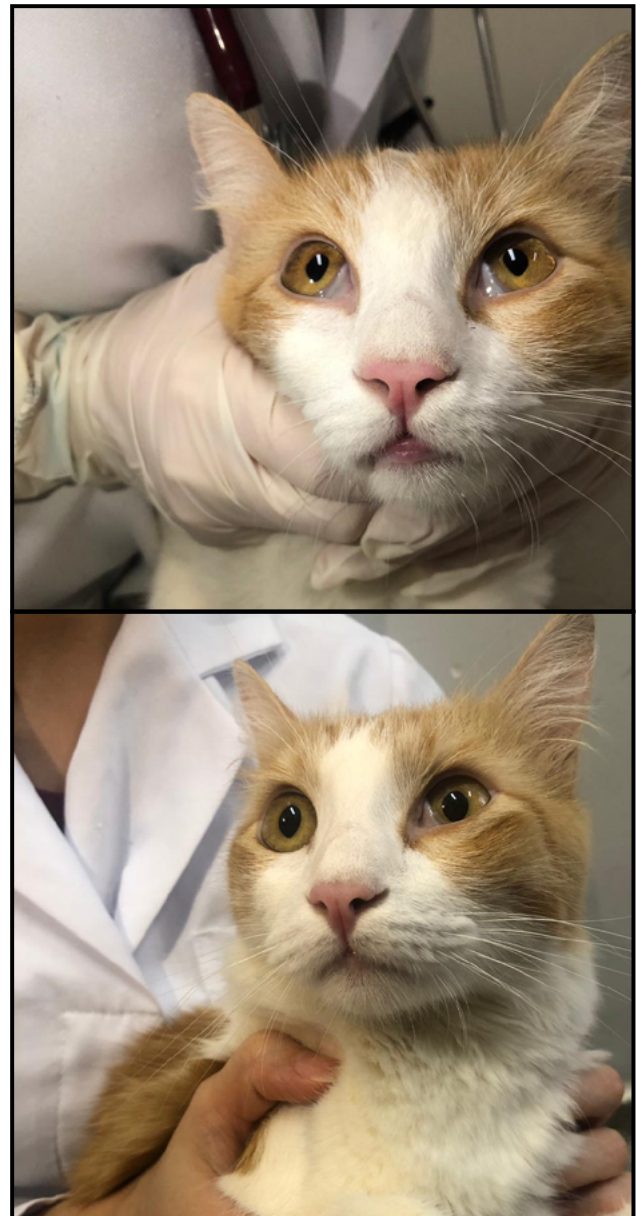


Figure 1. A- A 2-year-old male cat, presenting bilateral projection of the third eyelid, before eye drops instillation. B- Cat 10 min after mydriatic and adrenergic [phenylephrine 10%] eye drops instillation with visualization of third eyelid reposition in the right eye (intillated).

parasitological examination of feces were requested. The hemogram showed an increase in eosinophils (1194/ μ L - reference interval 80 to 800/ μ L). The other results were within the reference values for the species.

On ultrasound, significant changes were not observed. In the coproparasitological examination, which was performed by using the Hoffman and Willis methods, the presence of *Giardia* sp. was detected.

Based on the results of the required exams, the chosen treatment consisted of an amino acid-mineral vitamin supplement for cats, containing probiotics and prebiotics² [Lactobac cat Organnact[®] - 3 g, SID, for 14 days], nutrient-rich supplement with antioxidant action³ [Nutralogic[®] - 1/2 tablet, BID, for 30 days], and anthelmintic⁴ [Fenbendazole - 50 mg/kg, Fenzol[®] SID, for 5 days]. All the aforementioned medication was orally administered.

After 1 week of treatment and with fenbendazole administration concluded, another parasitological examination of feces was performed, and *Giardia* sp. was still detected. Thus, the administration of a synthetic antiparasitic⁵ [Nitazoxanide - 25 mg/kg, Annita Suspensão[®] orally, BID, for 7 days] was prescribed, but the animal vomited the pill. Therefore, nitazoxanide was replaced by metronidazole⁶ [Metronidazole - 25mg/kg, Flagyl Pediátrico[®] orally, BID, for 7 days]. At the time, the third eyelid was still projected.

Moreover, the owner performed daily cleaning and sand replacement of the litter box. The litter box cleaning was carried out by diluting a quaternary ammonia-based disinfectant⁷ [Herbalvet[®]]. The environment was also cleaned with the same product, 3 times a week. The entire process lasted 2 weeks, the period necessary to carry out the patient's treatment considering that fenbendazole showed to be ineffective.

Later on, 1 week after the start of metronidazole administration, a third coproparasitological examination was indicated, but the owner refused to pay for an additional feces examination as the cat was clinically recovered. At that moment, the third eyelid settled to its anatomical position, with no seen projection.

DISCUSSION

The reported patient meets the description found in the literature. For this syndrome, the main affected animal is cat under 2-year-old, which may present with a concomitant clinical sign of diarrhea [8,10]. On the physical examination, all parameters were in agreement with normal reference values for

the species and the only alteration was the bilateral projection of the third eyelid, corroborating with findings in the literature [2].

The explanation for the patient's infection by *Giardia* sp. is probably the fact that several stray and outdoor animals have access to the house and so, contact with the animal of this report. Even if the patient did not have any direct contact with other animals, the cat could be infected by ingesting cysts from the environment [12].

The instillation of topical mydriatic and adrenergic [phenylephrine 10%] eye drops worked to abolish the third eyelid projection during the test, as an adrenergic agonist [5,10]. The requested complementary exams served to eliminate other alterations which could culminate with third eyelid projection and interfere with the definitive diagnosis to be reached by the veterinarian [8,10].

Eosinophils are regulated by 2 situations. The first is related to eosinophils regulatory role in allergic response due to antihistamine and anti-inflammatory properties. The second is seen in parasites infection, in which there is a stimulus of the humoral and cellular response. In this case, lymphokines produced by T lymphocytes are activated by the parasite antigens that can stimulate the production and release of eosinophils, reflecting in the blood as eosinophilia [9]. Therefore, eosinophilia may have great relevance for the diagnosis of this patient as it suggests that, in this case, the diarrhea could have a parasitic origin.

In the differential diagnosis, feline dysautonomia, Horner's syndrome and tetanus were considered for this patient. In feline dysautonomia, the bilateral projection is observed as the condition is a toxic neuropathy. In Horner's syndrome, there is partial projection due to the loss of sympathetic innervation of the orbital smooth muscle, responsible for keeping the third eyelid retracted. Similarly, tetanus represents an infectious disease in which the effect of the tetanus toxin on neurons that innervate the extraocular muscle, allows the visualization of protrusion of the third eyelid [7,10].

The recommended treatment is in accordance with the literature where fenbendazole at a dose of 50 mg/kg, SID, for 5 days, is considered for anthelmintic function. On the other hand, the nutrient-rich supplement with antioxidant action helps to select the most beneficial enteric flora, supports the gastrointestinal flora and prevents the proliferation of pathogenic

bacteria. In addition, the presence of zinc helps in revitalizing the gastrointestinal epithelium. The amino acid-mineral vitamin supplement containing probiotics and prebiotics helps in modulating the gastrointestinal flora, minimizing colonization by pathogenic bacteria and decreasing the probability of bacterial translocation. These were prescribed as a support treatment which is also in accordance with what is found in the literature [6,12,15].

The control measures of the environment followed by the owner under the instruction of the veterinarian, are in accordance with what is recommended by the literature. The environmental cleaning, which includes the cat's litter box, is done with quaternary ammonia which works eliminating the cysts present in the environment, also preventing the occurrence of reinfection [6,15].

Ideally, the owner should have allowed a third coproparasitological examination in order to conduct and halt the treatment for *Giardia* spp. infection. As this condition was not possible, the treatment was interrupted considering the clinical recovering of the patient. Environmental care and risk of contact with stray and outdoor cats were emphasized, given the risk of reinfection [12].

In conclusion, the need of more studies is evident in order to explain the Haw's syndrome pathology and so, clarify its real cause. As the syndrome is mostly, a self-limiting disease, interventions with topical ocular drugs are not necessary. However, in the event of a concomitant disease, infection or underlying cause, it must be treated correctly. Attention is drawn to the need of feces examination through coproparasitological evaluation in cases of diarrhea.

The prognosis for the patient with Haw's syndrome together with giardiasis is given as favorable. This is possible, as long as, the parasitic infection is treated shortly after identified, given the possibility of intestinal alteration chronicity and further complications.

MANUFACTURERS

¹Allergan Produtos Farmacêuticos Ltda. Garulhos, SP, Brazil.

²Organnact - Indústria e Comércio e Produtos Agropecuários Ltda. Curitiba, PR, Brazil.

³Vetnil-Indústria e Comércio de Produtos Veterinários Ltda. Louveira, SP, Brazil.

⁴Agener União Química Ltda. São Paulo, SP, Brazil.

⁵Farmoquímica S.A. Rio de Janeiro, RJ, Brazil.

⁶Sanofi-Aventis Farmacêutica Ltda. Suzano, SP, Brazil.

⁷Ouro Fino Saúde Animal Ltda. Cravinhos, SP Brazil.

Declaration of interest. The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

REFERENCES

- 1 **Andrade A.L. 2008.** Semiologia do Sistema Visual dos Animais Domésticos. In: Feitosa L.F. (Ed). *Semiologia Veterinária: A Arte do Diagnóstico*. 2.ed. São Paulo: Roca, pp.689-722.
- 2 **Bowman D.D. 2019.** Introduction. In: *Georgis' Parasitology for Veterinarians*. 11th edn. Philadelphia: W.B. Saunders Co., pp.1-9.
- 3 **Corrêa L.F.D., Santalucia S., Oliveira M.T., Souza F.W., Pohl V.H., Feranti J.P.S. & Brun M.V. 2014.** Síndrome de Haw em Gatos. *Acta Scientiae Veterinariae*. 42(Suppl 1): 45. 5p.
- 4 **Gellat K.N. & Brooks D.E. 2011.** Surgical procedures for the conjunctiva and the nictitating membrane. In: Gelatt K.N. & Gelatt J.P. (Eds). *Veterinary Ophthalmic Surgery*. New York: Elsevier, pp.157-190.
- 5 **Herrera D. 2008.** Oftalmologia do Gato. In: *Oftalmologia Clínica em Animais de Companhia*. São Paulo: MedVet Livros, pp.237-239.
- 6 **Javinsky E. 2015.** Sistema Digestivo, Fígado e Cavidade Abdominal: Parasitos Gastrintestinais. In: Little S.E. (Ed). *O Gato: Medicina Interna*. São Paulo: Roca, pp.727-731.
- 7 **Lahunta A. & Glass E. 2009.** Lower Motor Neuron: General Visceral Efferent System. In: Lahunta A. & Glass E. (Eds). *Veterinary Neuroanatomy and Clinical Neurology*. 3rd edn. Philadelphia: W.B. Saunders Co., pp.134-166.
- 8 **Lim C.C. & Maggs D.J. 2015.** Oftalmologia. In: Little S.E. (Ed). *O Gato: Medicina Interna*. São Paulo: Roca, pp.1150-1189.
- 9 **Lopes S.T.A., Biondo A.W. & Santos A.P. 2007.** Módulo 2: Bioquímica Clínica. In: *Manual de Patologia Clínica Veterinária*. Biblioteca Setorial do Centro de Ciências Rurais, pp.77-78.
- 10 **Penderis J. 2015.** Disorders of eyes and vision. In: Platt S.R. & Olby N.J. (Eds). *BSAVA Manual of Canine and Feline Neurology*. 3rd edn. Quedgeley: British Small Animal Veterinary Association, p.153.

- 11 Schmidt G.D. & Roberts L.S. 2013.** Other Flagellated Protozoa. In: *Foundations of Parasitology*. Nova York: McGraw-Hill, pp.88-92.
- 12 Souza S.L.P. 2014.** Giardíase. In: Jericó M.M., Andrade Neto J.P. & Kogika M.M. (Eds). *Tratado de Medicina Interna de Cães e Gatos*. Barueri: Guanabara Koogan Ltda., pp.2121-2133.
- 13 Taylor M.A., Coop R.L. & Wall R.L. 2017.** Protozoologia Veterinária. In: *Parasitologia Veterinária*. Barueri: Guanabara Koogan Ltda., pp.546-548.
- 14 Taylor S.M. 2015.** Distúrbios neuromusculares: Perda de Visão e Anormalidades Pupilares. In: Nelson R.W. & Couto C.G. (Eds). *Medicina Interna de Pequenos Animais*. 5.ed. Rio de Janeiro: Elsevier, pp.1013-1015.
- 15 Willard M.D. 2015.** Desordens do Trato Intestinal. In: Nelson R.W. & Couto C.G. (Eds). *Medicina Interna de Pequenos Animais*. 5.ed. Rio de Janeiro: Elsevier, pp.472-474.