

Lagoquilascariasis in domestic cat (*Felis catus domesticus*) – case report

[*Lagoquilascariase em felino doméstico (Felis catus domesticus) – relato de caso*]

L.R. Flecke¹, S. Dalegrave², A.S. Mattei¹, K.A. Guterres¹, C. Giordani¹,
B.G. Silva¹, C. Nesello¹, L.L. Dias de Castro¹.

¹Universidade de Caxias do Sul, UCS, Caxias do Sul, RS, Brasil

²Pontifícia Universidade Católica do Paraná, PUC-PR, Toledo, PR, Brasil

ABSTRACT

Lagoquilascariasis is a zoonotic disease caused by a nematode parasite of the genus *Lagochilascaris* (Family *Ascarididae*), with the ingestion of contaminated rodents being the main source of infection. The main clinical signs are dysphagia and the presence of ulcerated nodules in the cervical region. The objective was to describe a case of lagoquilascariasis in a domestic cat, in the city of Caxias do Sul / RS. A young adult male feline, without defined breed presented lethargy, dehydration, bilateral fistulas in the oropharynx cavity, right eyeball with exophthalmos, corneal opacity, third eyelid prolapse and periocular ulcerated skin lesion in the upper medial region. The diagnosis was made through the visualization and microscopic identification of the parasite *Lagochilascaris minor* and coproparasitological examination with the presence of eggs. Treatment was based on the use of doramectin and sanitary measures. According to the current literature, there are few reports of lagoquilascariasis in felines with clinical presentation similar to this case, since the most common is the formation of an abscess in the neck region. Moreover, it is the first case described in the municipality, thus contributing to the epidemiology of the disease.

Keywords: domestic cat, *Lagochilascaris minor*, parasitic zoonosis

RESUMO

A lagoquilascariase é uma doença zoonótica causada por um parasita nematoide do gênero *Lagochilascaris* (família *Ascarididae*), sendo a ingestão de roedores contaminados a principal fonte de infecção. Os principais sinais clínicos são disfagia e presença de nódulos ulcerados em região cervical. O objetivo deste trabalho foi descrever um caso de lagoquilascariase em um felino doméstico, na cidade de Caxias do Sul/RS. Um felino, macho, sem raça definida, adulto jovem, apresentou letargia, desidratação, fístulas bilaterais em cavidade orofaringe, globo ocular direito com exoftalmia, opacidade de córnea, prolapso de terceira pálpebra e lesão cutânea ulcerada periocular em região superior medial. O diagnóstico foi realizado por meio da visualização e identificação microscópica do parasita *Lagochilascaris minor* e de exame coproparasitológico com presença de ovos. O tratamento baseou-se no uso de doramectina e de medidas sanitárias. De acordo com a literatura atual, existem poucos relatos de lagoquilascariase em felinos com apresentação clínica semelhante a este caso, visto que o mais comum consiste na formação de abscesso na região de pescoço. Além disso, é o primeiro caso descrito no município, contribuindo, assim, para a epidemiologia da doença.

Palavras-chave: gato doméstico, *Lagochilascaris minor*, zoonose parasitária

INTRODUCTION

Lagoquilascariasis is a zoonotic disease caused by a nematode of the genus *Lagochilascaris* belonging to the *Ascaridae* family, with five

different species that affect domestic and wild animals: *Lagochilascaris minor*, *Lagochilascaris major*, *Lagochilascaris sprengi*, *Lagochilascaris turgida* and *Lagochilascaris buckleyi*. *L. minor* is solely responsible for human parasitism (Monteiro, 2017). The occurrence of this

parasitosis expands in the countries of Latin America, where Brazil is responsible for 80.7% of the cases, according to a survey by Palheta-Neto *et al.* (2002), mainly affecting the Amazon region, due to the consumption of meat from wild animals by the population. The increase in the occurrence of infections in domestic cats has been described in the literature, with reports in Rio Grande do Sul, in the cities of Farroupilha, Santa Maria and Pelotas (Reis *et al.*, 2011; Faccio *et al.*, 2013; Fehlberg *et al.*, 2014).

The parasite's life cycle is heterogeneous, with carnivores and humans as the definitive host, and wild animals, mainly the rat, as an intermediate host. The intermediate host ingests embryonic eggs in the environment and when it reaches the intestine, it hatches in stage 3, enters the intestinal mucosa and forms cysts in the muscles and organs. The definitive host is infected by ingesting the contaminated animal, where cysts hatch in its stomach and ascend to the oropharynx, larynx, and trachea (Paço *et al.*, 1999; Barbosa *et al.*, 2005).

The symptomatology is similar between the affected species, with anorexia, dysphagia, weight loss, profuse salivation and the presence of abscesses or cutaneous nodules, which drain content that can contain all phases of the parasite. Depending on the region affected, it can progress to otitis, vestibular syndrome, and neurological signs (Aquino *et al.*, 2008; Furtado *et al.*, 2015).

The diagnosis is made through the morphological analysis of the parasites and eggs, present in the lesions or in the host's feces (Monteiro, 2017). Specific serology serves as an option if the parasite or its eggs are not directly observed (Prudente *et al.*, 2008). Treatment is based on the removal of parasites, cleaning of fistulas and parasitocidal therapy (Monteiro, 2017).

This work aims to describe a case of lagoquilascariasis in a domestic cat, contributing to its epidemiology in addition to the atypical clinical presentation.

CASUISTRY

A young adult, non-castrated male feline of mixed breed came from rescue in Caxias do

Sul/RS, with unknown history. Upon general clinical examination, the animal had a lethargic state of consciousness, body score 2 (scale 1 to 9), walking with difficulty, dehydration degree estimated at 8%, rectal temperature at 34.8°C, pale mucous membranes and other vital parameters within physiological values. In the neurophthalmic evaluation, he presented a reduced left eyelid reflex, and a right eyeball with corneal opacity, third eyelid prolapse, exophthalmos and periocular ulcerated skin lesion in the medial upper region.

Laboratory tests showed hematological changes such as leukopenia due to neutropenia, with deviation to the left (rods and metamielocytes) and lymphopenia, and in the biochemical profile, hypoalbuminemia, uremia and hyperglycemia, in addition to jaundiced serum. In the serological exams for Feline Immunodeficiency Virus (FIV) and Feline Leukemia Virus (FeLV), the result was positive only for FeLV.

Supportive therapy was performed with physiological solution, adding vitamin complex (thiamine hydrochloride, pyridoxine hydrochloride, nicotinamide, calcium pantothenate, fructose, L-arginine hydrochloride, acetyl methionine, potassium aspartate, magnesium aspartate, sodium selenite, cyanocobalamin), 0.2mL/kg, intravenously (IV); tramadol hydrochloride 3mg/kg, subcutaneously (SC) and dexamethasone 1mg/kg, via IV. As topical therapy in the right eyeball, eye drops with sodium diclofenac (1 drop) and ophthalmic ointment (retinol acetate, amino acids, methionine, and chloramphenicol) were chosen.

The patient showed a brief improvement in the degree of dehydration to an estimated 6%, the state of consciousness remained lethargic, and the mucous membranes became pale. The therapeutic approach was added with the administration of maropitant citrate 1mg/kg, via SC, once a day (SID), for two days; ranitidine hydrochloride 2mg/kg, via SC, twice daily (BID) and sodium ceftriaxone 30mg/kg, via IV, BID, for three days. After a more thorough evaluation of the oral cavity, the presence of parasites in the oropharynx region was seen. Thus, the patient was sedated to remove the parasites (Fig. 1A and B).

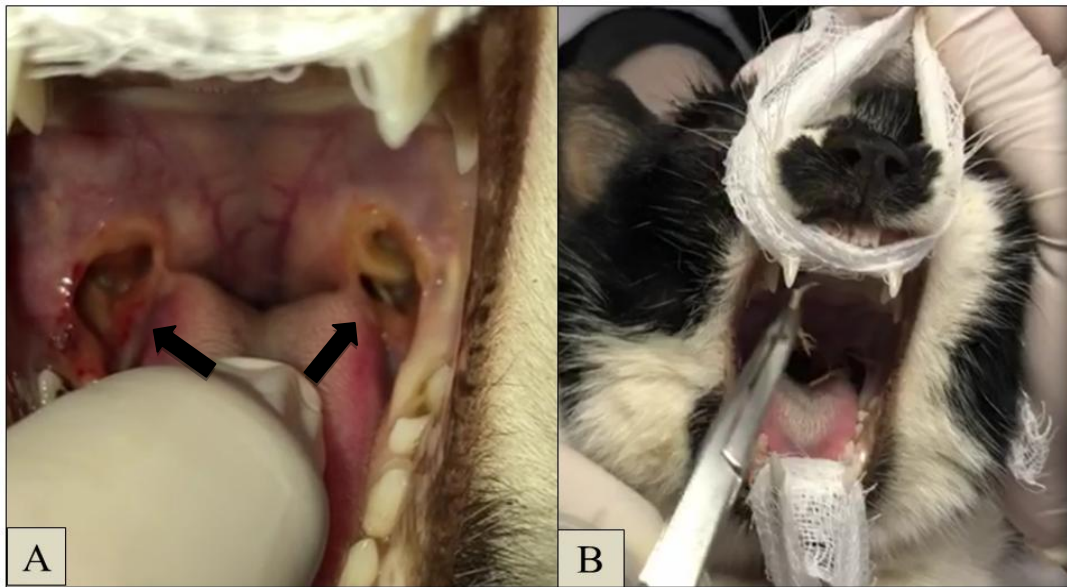


Figure 1. *Lagoquilascariasis* in domestic cat: (A) Visualization of parasites in ulceration in the oropharyngeal cavity (arrows); (B) Removal of parasites from the oral cavity.

Parasitological classification, morphological analysis of parasites removed from the oral cavity and coproparasitological examination were carried out at the UCS Veterinary Parasitology Laboratory. The nematodes were fixed in 70°GL alcohol and clarified in Aman's lactophenol for identification. Adult male parasites measuring between 15 and 17mm and females measuring around 22mm were observed under direct microscopy, both with three lips wider than the other long with well-developed

cuticular lining, presence of a deep post-labial groove, posterior margin of the groove forming three triangular interlabial projections, undeveloped lateral wing present along almost the entire length (Fig. 2 A and B). The coproparasitological examination performed by the Faust technique, modified according to Monteiro (2017), resulted in the observation of characteristic eggs of the species, approximately 15 eggs/field (Fig. 3), confirming the diagnosis of *Lagochilascaris minor*.

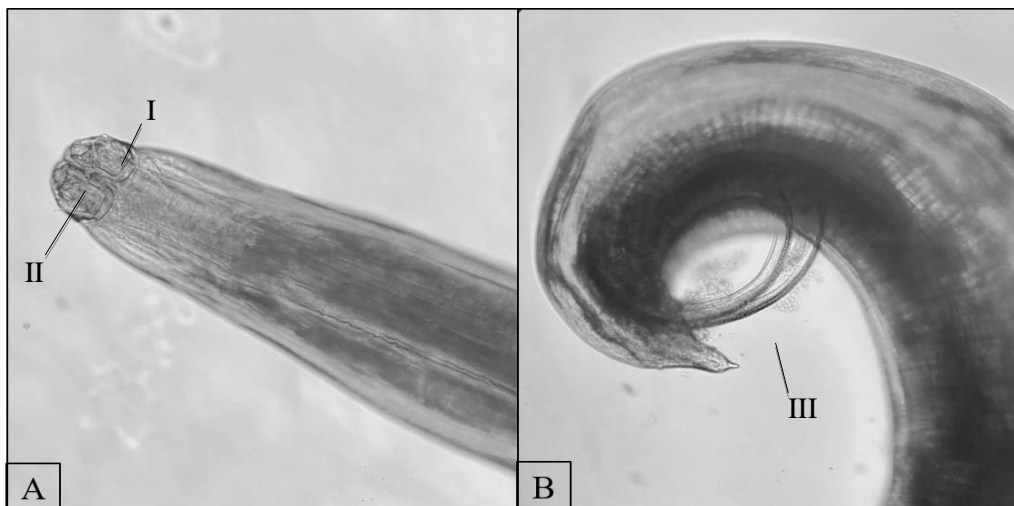


Figure 2. *Lagochilascaris minor* collected from the lesion in a domestic cat. (A) Anterior extremity of *Lagochilascaris minor* (lateral view): postlabial (I) and interlabial (II) sulcus. (B) Posterior extremity (lateral view) of the male showing the spike (III).

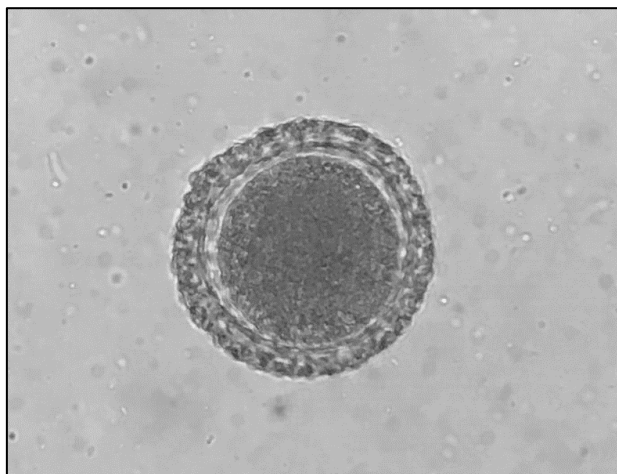


Figure 3. *Lagochilascaris minor* egg present in feline feces, using the Faust method, at 10X magnification under a compound microscope. Thick, irregular shell egg with 15 to 26 excavations on the outer surface of the shell and size ranging from 40 to 83 x 58 to 98 μ m.

After the definitive diagnosis, a decision was made to change the therapeutic approach to amoxicillin with potassium clavulanate, 12.5mg/kg, via SC, BID, for fourteen days; meloxicam 0.1mg/kg, via SC, SID, for five days and the antiparasitic protocol with three doses of doramectin 1%, 0.4mg/kg, via SC, with an interval of seven days between doses. After 6 days, a new hematological evaluation was performed, showing leukocytosis, due to neutrophilia with deviation to the left (rods) and thrombocytosis, in the biochemical profile had hypoalbumin and uremia.

The animal underwent a surgical procedure for enucleation of the right eyeball and elective orchiectomy, without intraoperative complications. The removed eyeball was sent for histopathological examination, resulting in degenerated structures, without the presence of parasites.

After 9 days of the initial treatment, a new coproparasitological evaluation was performed, with a negative result, and the second dose of doramectin was administered. After 13 days, a new hematological analysis was performed, showing leukocytosis, due to neutrophilia, with deviation to the left (rods), monocytosis, and icteric plasma. In view of hematological deviations and failure to search for the underlying cause, it was decided to undergo treatment with doxycycline, 10mg/kg, orally (VO), SID, for ten days; ranitidine

hydrochloride, 2mg/kg, VO, BID, for ten days; meloxicam, 0.05mg/kg, VO, SID, for seven days and sodium dipyron, 25mg/kg, VO, SID, for three days. In 16 days, the last coproparasitological exam (negative for the sample analyzed), application of doramectin and prescription of supplementation with oral paste (vitamins A and E, thiamine, taurine, fish oil, soy lecithin and malt extract) were performed, 2cm of paste, VO, SID, until further recommendations.

The animal returned for reassessment 44 days after the first consultation, showing clinical improvement and weight gain. After two months, the patient returned to the clinic, showing good general condition, clinical examination without changes, laboratory tests within the normal range and negative coproparasitological examination, getting medical discharge.

DISCUSSION

The life cycle of *Lagochilascaris sp.* has not been fully clarified, but experimentally and as reported by Barbosa *et al.* (2005) it would be characterized as heteroxene. This cycle needs an intermediate host, usually rodents, which ingest the eggs with third stage larvae and after hatching the larvae would spread in the bloodstream and form cysts in various organs, serving as a source of infection for other animals, carnivores, and man. Still as a possibility, autoinfection may occur in definitive hosts,

where the larvae migrated from the oropharyngeal region, and when developing the adult stage, would release eggs into the digestive tract (Paço *et al.*, 1999). The patient reported was a wandering animal, and for food probably had a hunting habit, which could be the origin of the infection.

The larvae after hatching in the digestive tract of the definitive hosts migrate upwards, affecting the oropharynx, oral cavity, subcutaneous tissue of the head and cervical region, middle ear, respiratory tract, and central nervous system (Barbosa *et al.*, 2005; Palheta-Neto *et al.*, 2002). Besides these sites, Aquino *et al.* (2008) also described a case of human lagoquilascariasis, where the patient's eyeball was involved by the parasite. In the present case, larvae were observed in the lumen of the oropharyngeal cavity, besides the right eye lesion, and parasite migration was suspected. However, the histopathological examination did not show the presence of any phase of the nematode; however, the surgical procedure was performed after the beginning of the treatment.

The domestic feline presented bilateral fistulas in the oropharyngeal cavity, corroborating the same findings of Rubio *et al.* (2015) and different from the most common clinical presentation consisting of abscess formation in the neck region reported by other authors (Faccio *et al.*, 2013; Furtado *et al.*, 2015; Reis *et al.*, 2011). Other clinical signs were compatible with those described in the literature such as apathy, weight loss, coughing episodes and depression of consciousness. In cases of abscess in the cervical region, intense pruritus may occur, and in cases of involvement of the central nervous system and/or peripheral vestibular system, it can also be observed difficulty in locomotion, head tilting to the left/right side, imbalance, motor incoordination, walking in circles, lateral decubitus, pedaling movements, vocalization, evolving to death (Monteiro, 2017).

The diagnosis of this parasitosis is based on the morphological analysis of the nematodes and their eggs. The parasites would be cream colored, having three lips on the anterior part of the body, the females measuring 1.8 to 2.1cm long, having the vulva in the ventral medial portion of the body, and the males measuring 1.7 to 2cm (Monteiro, 2017). The eggs are

characterized by being rounded measuring approximately 60 µm, surrounded by a thick shell and the presence of structures on the surface called excavations, where *L. minor* has between 15 and 26 excavations (Monteiro, 2017). These characteristics were compatible with the analyzes made on the nematodes sent to the laboratory and with the eggs identified in the parasitological examination of feces, by the Faust method, the same used by Faccio *et al.* (2013).

In a statistical study by Prudente *et al.* (2008) it was observed that parasitized domestic cats would have increased leukocyte levels, liver enzymes and creatinine, thrombocytopenia, and red blood cells, hemoglobin and hematocrit would be increased when compared to the control group. In the first examination, the animal described demonstrated leukopenia due to neutropenia with a left shift, followed by lymphopenia, it is supposed that these alterations occurred due to the chronicity of the disease and the debilitated state of the patient. In the second laboratory examination performed, it was possible to notice leukocytosis with neutrophilia, deviation to the left, as seen in the study, suggesting an inflammatory reaction by the parasite infection and ulcerations in the oral cavity.

Therapeutic protocols cover the removal of the parasite, cleaning the region and the use of parasiticide (Faccio *et al.*, 2013). According to Barbosa and Campos (2001), ivermectin demonstrated 100% efficacy in 4th stage larvae, and doramectin, which also belongs to avermectins, was used as an alternative option by Rubio *et al.* (2015), which obtained a satisfactory answer in a single application. The therapy chosen for the reported patient was doramectin in three subcutaneous applications, with an interval of seven days. The frequency of administration was intended to prevent recurrence due to the scarcity of studies on the action of the drug in other stages of the parasite. Reis *et al.* (2011) pointed out the use of the association with antibiotics, in which case an effective potentiated aminopenicillin is used to control secondary infection. Complete remission of internal lesions in four days, absence of recurrence and negative coparasitological control confirmed the success of the therapy prescribed in the present case.

Prophylactic measures were pointed out by Monteiro (2017), among them, it is not recommended to supply raw or undercooked meat from wild animals, both for domestic animals and for human consumption. In addition to individual hygiene habits and the environment should be strengthened. Oliveira *et al.* (1995) tested different forms of disinfection against parasite eggs, where the most effective were thermal changes, 99% ethyl alcohol and lugol. Because it is a zoonotic disease, where stray animals can serve as reservoirs and vehicles of transmission, through their feeding habits, it shows to be an important differential diagnosis in the care of cats that present the relevant symptoms.

CONCLUSION

Lagochilascariasis is a zoonotic disease with few reports in the literature. The case reported was the first in the city of Caxias do Sul - RS, where the patient presented symptoms that were not characteristic of the disease. The treatment with removal of the parasites from the oropharyngeal region and application of three doses of doramectin were effective in obtaining clinical cure. Thus, this case highlights the presence of the parasite in the city and the importance of adopting control and prevention measures for this disease.

AUTHORS' CONTRIBUTIONS:

All authors contributed equally for the conception and writing of the manuscript. All authors critically revised the manuscript and approved of the final version.

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