

## Lagoquilascariasis in Domestic Feline in Southern Brazil, Case Report

### Lagoquilascariase em Felino Doméstico no Sul do Brasil, Relato de Caso

Alexsander Ferraz<sup>\*a</sup>; Renata Fontes Ongaratto<sup>a</sup>; Gabriela de Almeida Capella<sup>a</sup>; Paola Renata Joanol Dallmann<sup>a</sup>; Camila Moura de Lima<sup>b</sup>; Mariana Reis Gomes<sup>a</sup>; Tiago Felipe Barbosa Moreira<sup>a</sup>; Cleber Martins Ribeiro<sup>a</sup>; Rodrigo Casquero Cunha<sup>a</sup>; Luiz Filipe Damé Schuch<sup>a</sup>; Leandro Quintana Nizoli<sup>a</sup>; Naama de Oliveira Miranda<sup>c</sup>

<sup>a</sup>Universidade Federal de Pelotas, Faculdade de Veterinária, Departamento de Veterinária Preventiva. RS, Brasil.

<sup>b</sup>Universidade Federal de Pelotas, Faculdade de Veterinária, Departamento de Clínicas Veterinária. RS, Brasil.

<sup>c</sup>Médica Veterinária autônoma. Pelotas, RS, Brasil

\*E-mail: xanderferraz@yahoo.com.br

---

#### Abstract

Lagoquilascariasis is a parasitic disease caused by a nematode *Lagochilascaris* spp. This parasite has a heteroxene cycle, requiring an intermediate host, generally rodents, and a definitive host, such as felines and humans. The infection occurs through the ingestion of raw or undercooked meat of the intermediate host with larvae encysted. The aim of this work was to relate one case of Lagoquilascariasis in a domestic cat in the city of Pelotas, Rio Grande do Sul. In the clinical examination, the feline, female, adult and without defined race, presented a fistula in the cervical region with the presence of larvae and an increase in the size of the submandibular lymph nodes. It was also observed an oropharyngeal fistula with drainage of purulent contents into the oral cavity. In the anamnesis, the tutors reported that the feline had run away from home, reappearing a few months later with the aforementioned injuries. The diagnosis was made by the identification of the parasite and eggs using optical microscopy. The treatment consisted of the use of ivermectin to eliminate the parasite, in addition to supportive care. Therefore, the importance of researching and reporting cases involving the parasite *Lagochilascaris* spp. is highlighted, since it represents not only a health problem in felines, but also a public health problem due to its zoonotic potential.

**Keywords:** *Lagochilascaris*. Domestic Cat. Zoonosis.

#### Resumo

Lagoquilascariase é uma zoonose parasitária, causada pelo nematódeo *Lagochilascaris* spp. Este parasito apresenta ciclo hetero xeno, necessitando de um hospedeiro intermediário, geralmente roedores, e um definitivo, como felinos e humanos. A infecção ocorre através da ingestão de carne crua ou mal cozida do hospedeiro intermediário, contendo larvas encistadas. O objetivo deste trabalho foi relatar um caso de Lagoquilascariase em felino doméstico no município de Pelotas, no Rio Grande do Sul. Na avaliação clínica o felino, fêmea, adulto e sem raça definida, apresentava uma fístula em região cervical com presença de larvas e aumento de tamanho dos linfonodos submandibulares. Foi observado também uma fístula orofaríngea com drenagem de conteúdo purulento na cavidade oral. Na anamnese, os tutores relataram que o felino havia fugido de casa, reaparecendo alguns meses depois com as referidas lesões. O diagnóstico foi realizado a partir da identificação do parasito e dos ovos usando microscopia ótica. O tratamento consistiu no uso de ivermectina para eliminação do parasito, além de terapia de suporte. Portanto, fica em evidência a importância de pesquisar e de relatar casos envolvendo o parasito *Lagochilascaris* spp., uma vez que representa não só um problema de saúde em felinos, como também de saúde pública devido ao potencial zoonótico.

**Palavras chave:** *Lagochilascaris*. Gato Doméstico. Zoonose.

---

#### 1 Introduction

Lagoquilascariasis is a parasitic disease caused by a nematode *Lagochilascaris* spp. This genus belongs to the phylum Nematoda, Order Ascaroidea and Family Ascarididae (REY, 2011). Nowadays there are five different species of this parasite that infect domestic and wild animals (*Lagochilascaris minor*, *Lagochilascaris major*, *Lagochilascaris sprenti*, *Lagochilascaris turgida* e *Lagochilascaris fiveyi*), being *L. minor* the only one associated with humans infection (GUIMARÃES, 2010). It is considered an emerging zoonosis, with a neotropical distribution and growing number of humans infections. Usually, affects people in social vulnerability, who lives in precarious housing and with the eating habits of consuming raw or partially cooked wild animal meat (CAMPOS; BARBOSA, 2016; FEHLBERG *et al.* 2014;

LEÃO *et al.*, 2015; SUDRÉ *et al.*, 2012).

The life cycle of this parasite involves definitive hosts, as domestic and wild felines, beyond canids and humans. The intermediated hosts are the rodents that ingest the eggs containing third-stage larvae (L3) of the parasite, presents in the environment (SEMERENE *et al.*, 2004; PRUDENTE *et al.*, 2008). The larvae form cysts in the muscles and also in different organs of the intermediate host and consequently, play an important role in the epidemiology of the disease (CAMPOS *et al.*, 1992).

The felines, the mainly definitive host, are infected by ingesting the third-stage larvae (L3) of *Lagochilascaris* spp., encysted in the intermediate host (PAÇÔ and CAMPOS, 1999; FLECKE, *et al.*, 2022). The larvae migrate and can damage the esophagus, pharynx, trachea, cervical lymph nodes and

central nervous system (BARBOSA; BARBOSA; CAMPOS, 2005). Thus, they lead to progressive granulomatous inflammation, with the development of nodules or abscesses interconnected by fistulous pathways, in which there is intermittent elimination of different stages of the parasite, such as eggs, larvae and adult helminths (SEMERENE *et al.*, 2004). Therefore these characteristics contribute to the occurrence of the autoinfection, resulting in a chronic illness (CAMPOS *et al.*, 2017; FLECKE, *et al.*, 2022). The clinical manifestations and the magnitude of *Lagochilascariasis* depending on factors as: affected organ, degree of tissue invasion, parasite load, in addition to host immune response (CAMPOS; BARBOSA, 2016).

Diagnosis are made through the adult parasite identification or by the larva identification present in the secretions of abscesses and fistulas, as well as by the coproparasitological exam through the morphological analysis of the eggs (PALHETA-NETO *et al.*, 2002; CAMPOS; BARBOSA, 2016; LUCIO; FLORES, 2021).

In this way, the presence of *Lagochilascaris* spp in Brazil is a reality, being possible the infection in felines, as well in humans, by the zoonotic potential of this nematode. In this context, the aim of this work was to relate a case of *Lagochilascariasis* in a domestic feline in the city of Pelotas, in the state of Rio Grande do Sul, Brazil.

## 2 Material and Method

At a particular clinic in the municipality of Pelotas, in the state of Rio Grande do Sul, a feline, female, adult and undefined race was attended. In anamnesis, the feline's tutor related that the feline was scape from home, coming back after some months with a lesion in the neck region, which one were observed some larvae. In the clinical exam was observed a fistula in the cervical region (Figure 1) and also that the submandibular lymph nodes were very reactive and enlarged, and also a purulent material was drained from the puncture. As a result of the enlargement of the lymph nodes, the animal could not feed itself, showing a very evident weight loss. In addition, an oropharyngeal fistula with suppuration in the oral cavity was visualized.

**Figure 1** - Feline with a fistula in the cervical region



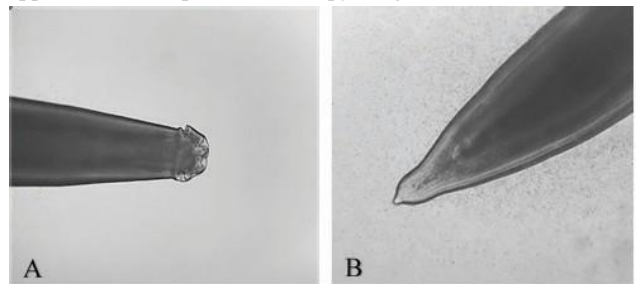
Source: Authors

As complementary exams, blood samples were collected to perform the hemogram and the found larvae were sent to the identification at Laboratory of parasite diseases (LADOPAR) at Federal University of Pelotas (UFPeL).

It was observed in the hemogram, thrombocytopenia (185 mil/uL) and leukocytosis (21.900/uL) due to neutrophilia (13.550/uL) and eosinophilia (1.835/uL). In the parasitological analysis, firstly the larvae were clarified in lactophenol, afterwards the identification as *Lagochilascaris* spp., was made using an optical microscopy, by the morphologically characterized by having a post-labial and interlabial groove in the anterior portion (Figure 2 A) and in the posterior one a rounded terminal protuberance (Figure 2 B).

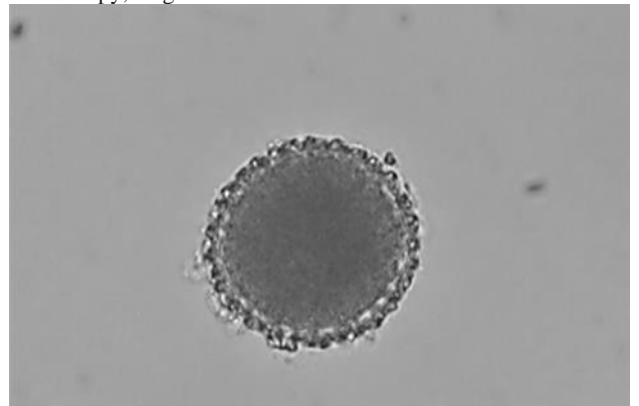
One of the females was macerated to obtain the eggs contained in the uterus, and these are characterized by having a rounded or oval contour, with a thick and irregular shell, containing from 15 to 26 excavations (Figure 3).

**Figure2** - Sideview of frontend(A)andrear end of *Lagochilascaris* spp. observed in optical microscopy, magnification of 400x



Source: Authors

**Figure 3:** Egg of *Lagochilascaris* spp. observed in optical microscopy, magnification of 400x.



Source: Authors.

After definitive diagnosis, it was performed the treatment using parasiticide associated with ivermectin (0.3 mg/kg), being two doses with interval of 15 days between doses. Due the presence of fistulas, the use of amoxicillin + Potassium clavulanate was advocated (20mg/kg, orally, BID, for 10 days). As the patient had difficulty eating, due to the inflammatory process and enlargement of the submandibular lymph nodes, prednisolone (1 mg/kg, orally, SID, for 7 days) and dipyrone (25 mg/kg, orally, BID, for 3 days). The larvae were mechanically removed and the lesion was treated by

local cleaning with disinfectant solution and application of healing ointment.

### 3 Results and Discussion

Lagochilascariasis is a zoonosis, being Brazil, the responsible for 81.2% of the global cases notifications. Guimarães *et al.* (2010) described a case of Otomastoiditis caused by *L. minor* in a child that lived in a rural zone of the municipality of Canarana, in the state of Mato Grosso. Vieira *et al.* (2000) reported a case of Lagochilascariasis in a 8 years old child, from a rural zone in the municipality of Xinguara, in the state of Pará. The human cases can be attributed to the behavior of the residents from this region to eat silver rodents meat as agouti (*Dasyprocta agouti*) and cavy (*Cavia porcellus*), intermediated hosts of this parasite (PALHETA-NETO *et al.*, 2002).

There are rare cases reports of Lagochilascariasis in felines. The first one related in Brazil was described by Artigas *et al.* (1968) in the state of São Paulo. Besides that there are other cases described in Rio Grande do Sul (FACCIO *et al.*, 2013; FERRAZ *et al.*, 2021; FLECKE *et al.*, 2022; LUCIO; FLORES, 2021; REIS *et al.*, 2011) and Rio de Janeiro (AMATO; GRISI; PIMENTEL NETO, 1990; SUDRÉ *et al.*, 2012).

Although the life cycle of *L. minor* is still unknown, some experimental studies suggest that it is a heteroxenous cycle, involving intermediate and definitive hosts (CAMPOS *et al.*, 1992). As the animal in this report spent a period living on the street, its food source was certainly based on hunting, acquiring the parasite by eating an infected rodent.

The human and animal symptoms are similar, in which the mild cases are characterized by cutaneous and subcutaneous abscess, localized mainly in the cervical and oropharyngeal region. In the severe cases, the abscesses can invade the lungs and central nervous system (BARBOSA BARBOSA; CAMPOS, 2005). In 75% of the cases, the infection involves formation of abscess in the subcutaneous tissues restrict to the cervical region and oropharyngeal region (BARBOSA; CAMPOS, 2001), being this the mainly clinical sign, as in the patient of this case.

The diagnoses is based on the identification of the adult parasite, as well the other phases of the parasite (eggs and larvae), in the secretions from the lesions (PALHETA-NETO *et al.*, 2002; VIEIRA *et al.*, 2000), besides the identification of eggs in the coproparasitological exams (FERRAZ *et al.*, 2021).

In the hematological exam was observed leukocytosis due to neutrophilia and eosinophilia, in addition to thrombocytopenia. Prudente *et al.* (2008), analyzing the hematological profile of domestic cats experimentally infected with *lagochilascaris minor*, also observed increased levels of these cells.

The treatment consists in the elimination of the parasite thru the use of parasiticides such as ivermectin, which

presents satisfactory results when two doses are used with an interval of 15 days (SPAMPINATO *et al.*, 2003). Barbosa and Campos (2001) found 100% efficacy in the treatment with ivermectin in cats experimentally infected with *L. minor*. This protocol was the same used in the patient of this report. In addition, amoxicillin + potassium clavulanate was also used to control secondary infection, as indicated by Reis *et al.* (2011). Also as a therapeutic protocol, the removal of parasites and cleaning of the region is indicated (FACCIO *et al.*, 2013). After parasitocidal treatment, complete remission of the lesions was observed, indicating the success of the therapy prescribed for the patient in this case.

Therefore, the importance of researching and reporting cases involving the *Lagochilascaris* spp. parasite is evident, since it represents not only a health problem in cats, but also a public health problem due to its zoonotic potential.

### 4 Conclusion

In summary, it was possible to conclude that this parasite has an important role in the feline medical clinic, being necessary more clinical and epidemiological studies about the abundance of this parasite.

### References

- AMATO, J.F.R.; GRISI, L.; PIMENTEL NETO, M. Two cases of fistulated abscesses caused by *Lagochilascaris major* in the domestic cat. *Mem. Inst. Oswaldo Cruz*, v.85, n.4, p.471-473, 1990. doi: 10.1590/s0074-02761990000400013
- ARTIGAS, P.T. *et al.* Sobre um caso de parasitismo humano por *Lagochilascaris minor* Leiper, 1909, no estado de São Paulo, Brasil. *Rev. Inst. Med. Trop. São Paulo*, v.10, n.2, p.78-83, 1968.
- BARBOSA, C.A.L.; BARBOSA, A.P.; CAMPOS, D.M.B. Gato doméstico (*Felis catus domesticus*) como possível reservatório de *Lagochilascaris minor* Leiper (1909). *Rev. Patol. Trop.*, v.34, n.3, p.205-211, 2005. doi: 10.5216/rpt.v34i3.1927
- BARBOSA, C.A.L.; CAMPOS, D.M.B. Avaliação da eficácia terapêutica da ivermectina sobre larvas de quarto estágio de *Lagochilascaris minor* em gatos infectados experimentalmente. *Rev. Soc. Bras. Med. Trop.*, v.34, n.4, p.373-376, 2001. doi: 10.1590/S0037-86822001000400011
- CAMPOS, D.M.B. *et al.* Human lagochilascariasis A rare helminthic disease. *PLoS. Negl. Trop. Dis.*, v.11, n.6, p.1-16, 2017. doi: 10.1371/journal.pntd.0005510
- CAMPOS, D.M.B.; BARBOSA, A.P. *Lagochilascaris*. In: NEVES, D.P. *et al.* Parasitologia humana. São Paulo: Atheneu; 2016. p.514-523.
- CAMPOS, D.M.B. *et al.* Experimentallifecycle of *Lagochilascaris minor* Leiper, 1909. *Rev. Inst. Med. Trop. São Paulo*, v.34, n.4, p.277-87, 1992. doi: 10.1590/S0036-46651992000400003
- FACCIO, L. *et al.* Case report: Feline infection by *Lagochilascaris* sp. in the State of Rio Grande do Sul, Brazil. *Vet. Parasitol.*, v.196, n.3-4, p.541-3, 2013. doi: 10.1016/j.vetpar.2013.03.006
- FEHLBERG, M.F. *et al.* *Lagochilascariasis* in cats (*Felis catus domesticus*) in southern Brazil. *J. Feline Med. Surg.*, v.16, n.12, p.1007-9, 2014. doi: 10.1177/1098612X14525386
- FERRAZ, A. *et al.* Diagnóstico coproparasitológico de *Lagochilascaris* sp. em gato doméstico (*Felis catus*).

- Rev. Acad. Ciênc. Anim., v.19, e19203, 2021. doi: 10.7213/acad.2021.19203
- FLECKE, L.R. *et al.* Lagoquilascariasis in domestic cat (*Felis catus domesticus*) - case report. *Arq. bras. med. vet. zootec.*, v.74, n.2, p.345-350, 2022. doi: 10.1590/1678-4162-12418
- GUIMARÃES, V.C. *et al.* Otomastoidite por *Lagochilascaris Minor* em Criança: Relato de Caso. *Arquivos Int. Otorrinolaringol.*, v.14, n.3, p.373-376, 2010. doi: 10.1590/S1809-48722010000300017
- LEÃO, R.N.Q.; FRAIHA-NETO, H.; DIAS, L.B. *Lagochilascariase*. In: VERONESI, R.; FOCACCIA, R. Tratado de Infectologia. São Paulo: Atheneu, 2015. p.2107-11.
- LUCIO, B.M.; FLORES, M.M. Subcutaneous and muscular lagochilascariasis in a cat from Rio Grande do Sul, Brazil. *Ciênc. Rural*, v.51, n.7, e20200853, 2021. doi: 10.1590/0103-8478cr20200853
- MOURA, M.Q. *et al.* First report of *Lagochilascaris* (Nematoda: Ascarididae) eggs in a public park in Southern Brazil. *Vet. Parasitol.*, v.184, n.2/4, p.359-361, 2012. doi: 10.1016/j.vetpar.2011.09.019
- PAÇÓ, J.M., CAMPOS, D.M.B. Wild rodents as intermediate host of *Lagochilascaris minor* Leiper, 1909. *Mem. Inst. Oswaldo Cruz*, v.94, n.4, p.441-449, 1999. doi: 10.1590/S0074-02761999000400003
- PALHETA-NETO, F.X. *et al.* Contribuição ao estudo da lagochilascariase humana. *Rev. Bras. Otorrinolaringol.*, v.68, n.1, p.101-105, 2002. doi: 10.1590/S0034-72992002000100018
- PRUDENTE, M.F.S.; CRESPO, A.M.C.; CARVALHAES, M.S. *Lagochilascaris minor*: antibody production in experimentally infected mice. *Rev. Soc. Bras. Med. Trop.*, v.42, n.3, p.325-332, 2008. doi: 10.1590/S0037-86822009000300016
- REIS, R.A. *et al.* *Lagochilascaris minor* (Nematoda, Ascarididae) em gato doméstico: relato de caso. *Vet.Foco*, v.9, n.1, p.43-48, 2011.
- REY, L. *Bases da parasitologia médica*. São Paulo: Guanabara Koogan, 2011.
- SEMERENE, A.R. *et al.* Experimental lagochilascariosis: histopathological study of inflammatory response to larval migration in the murine model. *Mem. Inst. Oswaldo Cruz*, v.99, n.4, p.393-398, 2004. doi: 10.1590/S0074-02762004000400009
- SUDRÉ, A.P.; UCHÔA, F.; BRENER, B. Lagochilascariasis in a housecat and the potential risk for human disease. *Braz. J. Infect. Dis.*, v.16, n.1, p.111-112, 2012. doi: 10.1590/S1413-86702012000100024
- VIEIRA, M.A. *et al.* Relato de caso de lagochilascariase humana procedente do Estado do Pará, Brasil. *Rev. Soc. Bras. Med. Trop.*, v.33, n.1, p.87-90, 2000. doi: 10.1590/S0037-86822000000100014