

## Pathological findings on natural infection with *Physaloptera praeputialis* in cats

Soraya Naem\*, Amir Abbass Farshid, and Vahid Tanhai Marand

Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran

---

NAEM, S., A. A. FARSHID, V. T. MARAND: Pathological findings on natural infection with *Physaloptera praeputialis* in cats. Vet. arhiv 76, 315-321, 2006.

### ABSTRACT

To study the pathological changes in the stomach of cat caused by *Physaloptera praeputialis*, 22 stray cats were euthanized. At necropsies, seven cats were found to be infected with this nematode. Thickening of the stomach wall, congestion and oedema, along with tiny erosions, were observed in gross pathology. Histopathology observations indicated congestion, oedema, leukocytic infiltration, necrosis, hyperplasia and cystic changes of glands and hyperplasia of muscular coat. These changes were indicative of inflammatory and degenerative reaction brought about by parasitic infection with *P. praeputialis* and its consequent irritating effects on the stomach. This is the second report of pathological observations of *P. praeputialis* infection in domestic cats.

**Key words:** pathology, *Physaloptera praeputialis*, stomach, cat

---

### Introduction

*Physaloptera praeputialis* Von Linstow (1889), was described from a domestic cat in Brazil. The adult worms are white or pinkish in colour and tend to live in the stomach with the anterior end embedded in the mucosa. In dog, the adult worms often are present also in the anterior-most portion of the duodenum at the level of the gastric valve (SOULSBY, 1986; BOWMAN and LYNN, 1999). Despite the importance of *P. praeputialis* in causing catarrhal gastritis, multiple pseudogranulomas, ulceration, oedematous wounds, bleeding, anorexia, mass loss, vomiting, and gastro-intestinal upsets with tarry faeces (CLARK, 1990; JERGENS and GREVE, 1992; THEISEN et al., 1998; BOWMAN and LYNN, 1999; BOWMAN et al., 2002), there are only a few studies on the pathogenicity caused by some other nematodes of the genera and species of Spirurida (NICOLAIDES et al., 1977; BARTLETT et al., 1987; ZARATE-RAMOS et al., 1991; KAGEI et al., 1992; OKAZAKI et al., 1993; JONES, 1995; MEGUID and

---

\* Contact address:

Dr. Soraya Naem, DVM, PhD, Head, Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, P.O. Box 1177, Urmia University, Urmia, Iran, Fax: +98 441 3443 442, E-mail: sorayanaem@yahoo.com

EURE, 1996). However, there is no detailed report on pathological changes of the stomach of cats infected with *P. praeputialis*. Therefore, the present study was designed.

### Materials and methods

During a two-year period (April 2002 to April 2004), twenty-two stray cats from different parts of Urmia, Iran, were euthanized with over dose injection of ketamine, and necropsies were carried out with special reference to the stomach of these animals. The gross changes were recorded and some free worms were collected, washed in phosphate buffered saline (PBS, pH 7.2) and transferred in A.F.A. solution. This nematode was different in size and morphology from other stomach nematodes of cat and identification of the nematode species was confirmed on the basis of light microscopic examination with reference to keys (YAMAGUTI, 1961; SKRJABIN, 1969; CHABAUD, 1975; DUNN, 1978). Tissue samples were collected from stomach of infected cats, fixed in 10% neutral buffered formalin and processed routinely, sectioned at 4-5  $\mu\text{m}$ , stained with hematoxylin and eosin. Slides were examined under light microscope, observations were recorded and compared.

### Results

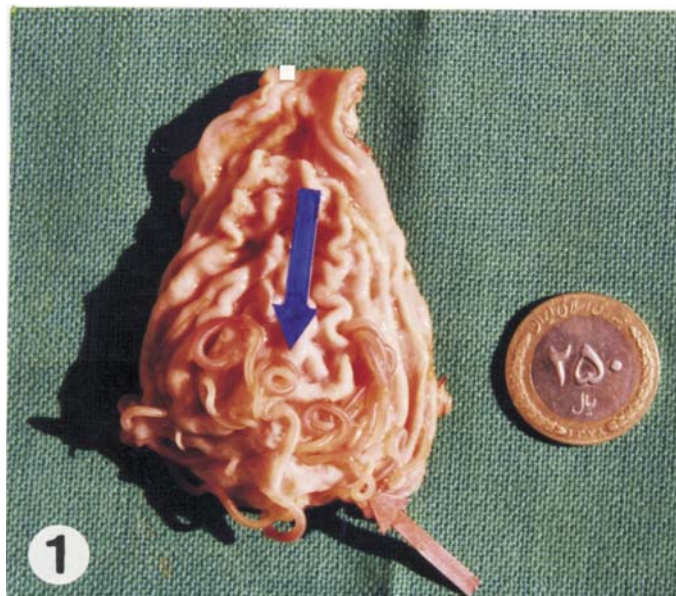


Fig. 1. Stomach of a cat infected with *Physaloptera praeputialis*, showing mass of adult worms (brown arrow) and thickening of the mucosa (blue arrow)

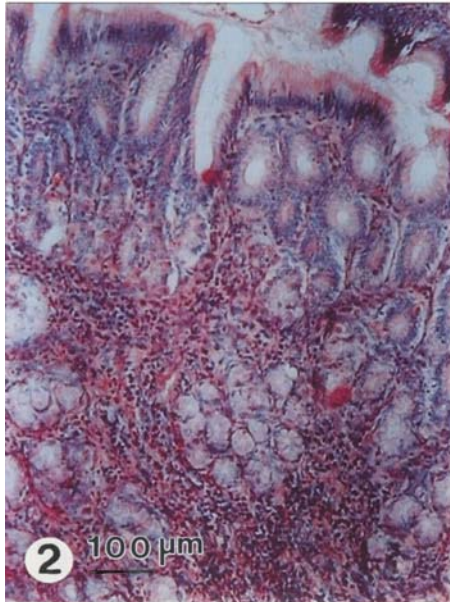


Fig. 2. Stomach of a cat infected with *Physaloptera praeputialis*, showing diffuse infiltration of leukocytes in the mucosa. H&E; scale bar = 100 µm.

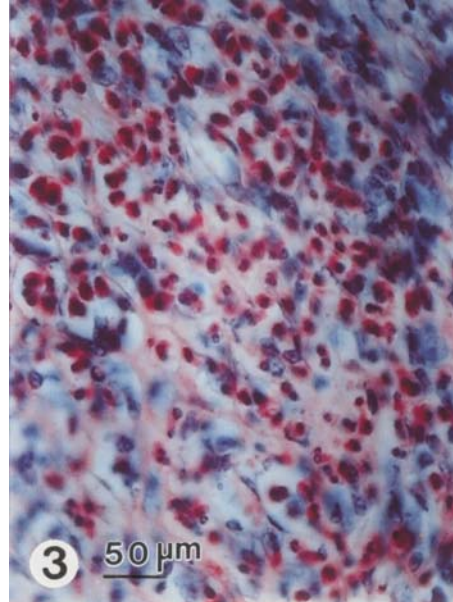


Fig. 3. Stomach of a cat infected with *Physaloptera praeputialis*, showing infiltration of eosinophilia. H&E; scale bar = 50 µm.

Seven of 22 cats were found to be infected with *P. praeputialis*. In one case, a total number of 30 adult worms (19 females and 11 males) were removed. In the other infected cats the number of adult worms was 25-28. The females were 1.3 to 5.5 cm long and the males were 0.8 to 4.2 cm in length. There were large triangular lips which bear small teeth. The cuticle is reflected forward at the anterior end to form a prepuce-like collar. The male tail had broad asymmetrical alae which often meet anteriorly. At necropsy, a mass of worms on the mucosa (Fig. 1) and thickening of the stomach wall were seen. The mucosa was congested and oedematous. Also, there were tiny erosions on the mucosa. Congestion of the mucosa, diffuse leukocytic infiltration, which were mainly comprised of lymphocytes, macrophages (Fig. 2) and eosinophils (Fig. 3), were observed. Necrotic changes were also evident in some areas. Hyperplasia of the mucosal glands, along with accumulation of mucus and cystic changes in some of the glands, were seen (Fig. 4). Meanwhile, formation of papillary projections in some areas was observed. Also, infiltration of leukocytes into the glands, proliferation of fibrous tissues in between the glands and forming lobulation were noticed. Infiltration of leukocytes in the submucosal layer was noticed along with congestion and oedema. Hyperplasia of the muscular coat was a further finding (Fig. 5).

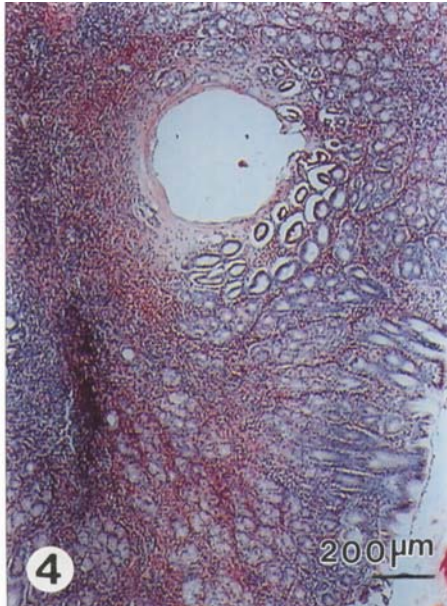


Fig. 4. Stomach of a cat infected with *Physaloptera praeputialis*, showing gastric glands with hyperplastic changes and cystic space. H&E; scale bar = 200 μm.

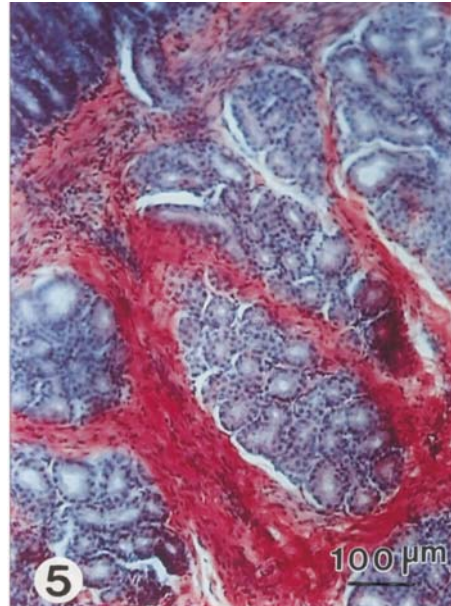


Fig. 5. Stomach of a cat infected with *Physaloptera praeputialis*, showing proliferation of fibrous tissues in between the glands and forming lobulations. H&E; scale bar = 100 μm.

No histopathological differences were seen among infected cats.

#### Discussion

In this study, histopathological changes of the gastric mucosa associated with *P. praeputialis* infection were observed. The heaviest burden of the parasite was observed in one of seven stomachs where 30 worms were collected. A mass of worms was observed on the mucosa, which was congested and oedematous. The mucosal erosions and injuries are due to the attachment of the parasite initiating inflammatory reactions. Diffuse leukocytic infiltration comprised mainly of lymphocytes, macrophages and eosinophils was also noticed. The irritation of the gastric glands and their inflammatory reaction resulted in increasing mucous secretions and catarrhal changes. Formation of papillary projections was also observed in some areas. In this study, the proliferation of fibrous connective tissues seems to be indicative of chronic inflammation. In the submucosa, infiltration of leukocytes was seen, together with congestion and oedema. Hyperplasia of the muscular layer was another finding of our study. Moderate catarrhal gastritis and multiple pseudogranulomas

have already been reported in cats infected with *P. praeputialis* (ZARATE-RAMOS et al., 1991). In our study, necrotic changes were evident in some areas. Also, cystic changes in some of the glands, infiltration of leukocytes into the glands, and forming lobulation were shown in histopathological sections. VELIKANOV and SHARPILLO (2002) found seven species of reptile naturally infected with the larvae of *P. praeputialis*. Thus, it would appear that the paratenic hosts probably play an essential role in the infection of cats. In another investigation, JONES (1995) studied pathological changes associated with physalopterid larvae in the gastric tissues of Australian reptiles.

Upper gastrointestinal endoscopy in a 6-year-old Schnauzer crossbred dog with a 2-month history of vomiting which had not responded to treatment, revealed numerous gastric nematodes on the gastric mucosal surface and within rugal folds. The gastric mucosa showed erythema and irregularity. Biopsy of mucosal samples showed moderate lymphocytic-plasmacytic gastroenteritis. Histological lesions were more severe in the duodenum than in the stomach. The nematodes were identified as *Physaloptera* spp. (JERGENS and GREVE, 1992).

Humans have on rare occasions been infected with *Physaloptera*. The infection is obtained by the ingestion of the intermediate or paratenic hosts. An infected cat in a household would thus present only a very minimal risk to its owners. A case was reported of an 11-month-old baby suffering from gangrene of the distal portion of the small bowel due to infestation by larval worms belonging probably to the genus *Physaloptera* spp. Microscopically, the resected bowel showed ischaemic necrosis, eosinophilic granuloma and larval worms in the lumen and wall of blood vessels. The inflammatory process extended into the mesentery, where the vessels showed focal necroses, thrombosis and endarteritis (NICOLAIDES et al., 1977).

The results of the present study have completed the pathological findings of the previous study carried out by ZARATE-RAMOS et al. (1991).

#### Acknowledgments

The authors wish to thank Dr. H. Seifi and Dr. H.A. Seifi for their critical reading of the manuscript.

#### References

- BARTLETT, C. M., A. O. BUSH, R. C. ANDERSON (1987): Unusual finding of encapsulated nematode larvae (Spiruroidea) in *Bartramia longicauda* and *Numenius americanus* (Charadriiformes) in western Canada. *J. Wildl. Dis.* 23, 591-595.
- BOWMAN, D. D., R. C. LYNN (1999): *Georgis' Parasitology for Veterinarians*. W. B. Saunders Company, Philadelphia, Pennsylvania, USA.
- BOWMAN, D. D., C. M. HENDRIX, D. S. LINDSAY, S. C. BARR (2002): *Feline Clinical Parasitology*. Iowa State University Press, A Blackwell Sciences Company, pp. 299-302.



- CHABAUD, A. G. (1975): Keys to the Genera of the Order Spirurida. Part II, In: CIH Keys to the Nematode Parasites of Vertebrates (Anderson, R. C., A. G. Chabaud, S. Willmott, Eds.), 3. Commonwealth Agricultural Bureaux, England.
- CLARK, J. A. (1990): *Physaloptera* stomach worms associated with chronic vomiting in a dog in western Canada. *Can. Vet. J.* 31, 840.
- DUNN, A. M. (1978): *Veterinary Helminthology*, 2<sup>nd</sup> ed. Butler and Tanner, London, UK.
- JERGENS, A. E., J. H. GREVE (1992): Endoscopy case of the mouth: chronic vomiting in a dog. *Vet. Med.* 87, 872-876.
- JONES, H. I. (1995): Pathology associated with physalopterid larvae (Nematoda: Spirurida) in the gastric tissues of Australian reptiles. *J. Wildl. Dis.* 31, 299-306.
- KAGEI, N., H. KUMAZAWA, K. MIYOSHI, I. KOSUGI, A. ISHIIH (1992): A case of ileus caused by a spiruroid nematode. *Int. J. Parasitol.* 22, 839-841.
- MEGUID, M. A., H. E. EURE (1996): Pathobiology associated with the spiruroid nematodes *Camallanus oxycephalus* and *Spinitectus carolini* in the intestine of green sunfish, *Lepomis cyanellus*. *J. Parasitol.* 82, 118-123.
- NICOLAIDES, N. J., J. MUSGRAVE, D. MCGUCKIN, D. E. MOORHOUSE (1977): Nematode larvae (Spirurida: Physalopteridae) causing infection of the bowel in an infant. *Pathol.* 9, 129-135.
- OKAZAKI, A., T. IDA, T. MURAMATSU, T. SHIRARI, T. NISHIYAMA, T. ARAKI (1993): Creeping disease due to larva of spiruroid nematoda. *Int. J. Dermatol.* 32, 813-814.
- SKRJABIN, K. I. (1969): *Key to Parasitic Nematodes*. Vol. 1., Spirurata and Filariata, Academy of Sciences USSR, Moscow.
- SOULSBY, E. J. L. (1986): *Helminths, Arthropods and Protozoa of Domesticated Animals*, 7<sup>th</sup> edn, Baillier Tindall, London, UK.
- THEISEN, S. K., S. N., LEGRANGE, S. E., JOHNSON, R. G., SHERDING, M. D., WILLARD (1998): *Physaloptera* infection in 18 dogs with intermittent. *J. Am. Anim. Hosp. Assoc.* 34, 74-78.
- VELIKANOV, V. P., V. P. SHARPILLO (2002): Experimental identification of *Physaloptera praeputialis* and *Pterygodermatites cahirensis* larvae (Nematoda, Spirurata) from paratenic hosts (in Russian). *Vestnik Zoologii* 6, 25-29.
- YAMAGUTI, S. (1961): *Systema Helminthum*. Vol. 3. The Nematodes of Vertebrates. Part 1 and 2, Interscience Publishers, New York, USA.
- ZARATE-RAMOS, J. J., T. M. CRAIG, R. AVALOS-RAMIREZ, M. A. GUZMAN-GARCIA, G. DAVALOS-ARANDA, R. RAMIREZ-ROMERO (1991): *Physaloptera praeputialis* gastritis in cats. *Vet. Mexico* 22, 185-190.

Received: 8 March 2005

Accepted: 27 June 2006

---

**NAEM, S., A. A. FARSHID, V. T. MARAND: Patološki nalazi pri invaziji mačke obličem *Physaloptera praeputialis*. Vet. arhiv 76, 315-321, 2006.**

**SAŽETAK**

Patološke promjene uzrokovane obličem *Physaloptera praeputialis* istražene su u 22 eutanazirane mačke lualice. Razudbom je potvrđen oblič u čak sedam jedinki. Ustanovljeno je zadebljanje i edem želučane stijenke prožete sitnim erozijama. Patohistološkom pretragom zabilježena je kongestija, edem, leukocitna infiltracija, nekroza, hiperplazija, cistično promijenjene žlijezde te hiperplazija mišićnice. Patohistološke promjene mogle su se dovesti u vezu s upalnom i degenerativnom reakcijom uzrokovanom obličima. Autori ističu da je ovo drugi objavljeni prikaz patoloških promjena uzrokovanih obličem *P. praeputialis* u mačaka.

**Ključne riječi:** patologija, *Physaloptera praeputialis*, želudac, mačka

---

