Research Note

Rev. Bras. Parasitol. Vet., Jaboticabal, v. 20, n. 3, p. 259-261, jul.-set. 2011
ISSN 0103-846X (impresso) / ISSN 1984-2961 (eletrônico)

Parasite meningomyelitis in cats in Uruguay

Meningomielites parasitária em gatos no Uruguai

Rodolfo Rivero[1]*; Carolina Matto[1]; María de Lourdes Adrien[2]; Fernando Nan[2]; Todd Bell[3]; Christopher Gardiner[3]

[1]Laboratorio Regional Noroeste "Dr. Miguel C. Rubino", Dirección de Laboratorios Veterinarios del Ministerio de Ganaderia, Agricultura y Pesca, Paysandú, Uruguay

[2]Departamento de Salud en los Sistemas Pecuarios, Facultad de Veterinaria, Universidad de la República, Paysandú, Uruguay

[3]Registry of Veterinary Pathology, Armed Forces Institute of Pathology, Washington, USA. D.C. 20306

Received January 25, 2011
Accepted February 24, 2011

Abstract

Two outbreaks of progressive hind limb paresis in cats (*Felis catus*) caused by parasitic meningomyelitis in Uruguay are reported. The case studies occurred in 2008 and 2009 respectively, in the rural areas of Fray Bentos (33° 07' 40.39" S) and were characterized by hindquarter paralysis. This paralysis was progressive and had a chronic progression of approximately 12 months until the death or euthanasia of the animals. Clinical symptoms started with ataxia of the hindquarters with lateral side-to-side swaying and culminated in total paralysis. Two animals were sent for necropsy in 2009. The main histopathological findings were severe myelitis in the lumbar spinal cord with perivascular cuffing and white matter necrosis, severe nonsuppurative meningitis with thrombi in subarachnoid blood vessels, and intravascular presence of multiple adult parasites. From the morphological characteristics of the parasites and location in the leptomeninges, the parasite was identified as the nematode *Gurltia paralysans*.

Keywords: Parasite myelitis, migratory parasites, diseases of spinal cord, *Gurltia paralysans*.

Resumo

São relatados dois surtos de paralisia progressiva dos membros posteriores em gatos (*Felis catus*), causada por meningomielite parasitária no Uruguai. Os estudos de casos ocorreram entre os anos 2008 e 2009, respectivamente, nas zonas rurais de Fray Bentos (33° 07' 40,39" S) e foram caracterizados por paralisia dos membros posteriores. Esta paralisia era progressiva e tinha evolução crônica de aproximadamente 12 meses, até que os animais vinham a óbito ou eram eutanasiados. Os sintomas clínicos começaram com ataxia dos membros posteriores, com movimentos laterais, terminado em paralisia total. Em 2009, dois animais foram encaminhados para necropsia. Os achados histopatológicos foram caracterizados por severa mielite na medula espinhal lombar com manguitos perivasculares linfocitarios e necrose da substância branca, severa meningite não supurativa com trombos nos vasos sanguíneos subaracnóideos, e presença intravascular de múltiplos parasitos adultos. De acordo com as características morfológicas dos parasitos e localização nas leptomeninges, este foi identificado como um nematóide da espécie *Gurltia paralysans*.

Palavras-chave: Mielite parasitária, parasitas migratórios, enfermidades da medula espinal, *Gurltia paralysans*.

Introduction

Neurological diseases are common in small animals (DA COSTA; MOORE, 2010). However, pure meningomyelitis and myelitis are rare (TIPOLD; STEIN, 2010). In a recent review of spinal cord diseases in 205 cats, the causes found were: inflammatory/infectious diseases in 32% of the animals, followed by neoplasms (27%), trauma (14%), hereditary or congenital diseases (11%), vascular diseases (9%), degenerative (6%) and metabolic diseases (1%) (MARIONI-HENRY, 2010).

*Corresponding author: Rodolfo Rivero
Laboratorio Regional Noroeste de Diagnóstico, DILAVE,
Ruta 3, Km 363, CP 57037, Paysandú, Uruguay
e-mail: rrivero@mgap.gub.uy

There are several reports in the literature of neurological processes caused by migration of nematode larvae. Denk et al. (2009) described in dogs a case of severe hemorrhage and malacia of the white matter of the brain involving the leptomeninges. The authors observed granulomatous pneumonia caused by eggs in morula stage, and adult forms of the nematode *Angiostrongylus vasorum*. There are other reports of migration of larvae of this parasite to the eyeball, cerebellum and spinal cord, with the presence of adult worms in lungs of dogs (PERRY et al., 1991). Another parasite has been identified as a causative agent of granulomatous myelitis in dogs, *Strongyloides* spp., probably *Strongyloides stercoralis* (SNOOK et al., 2009). Additionally, this host has been reported

to harbor the larval nematode *Spirocerca lupi* causing inflammatory lesions in the spinal cord (DVIR et al., 2007). In 2010, cases of meningomyelitis in cats in Chile were caused by migration of a metastrongyle (GÓMEZ et al., 2010). Furthermore, there have been reports of lesions caused by migrating insect larvae such as *Cuterebra* in cats, which histopathological examination revealed superficial laminar cerebrocortical necrosis, larval paths and astrogliosis (GLASS et al., 1998). In cats protozoans such as *Toxoplasma gondii* are the causative agent of encephalitis (PFOHL; DEWEY, 2005; DUBEY et al., 1996) and *Sarcocystis neurona* of encephalitis and myelitis (DUBEY et al., 2003).

This report is a collection of cases of progressive hindquarter paresis in cats (*Felis catus*) due to meningomyelitis caused by the metastrongyle nematode *Gurltia paralysans.*

Materials and Methods

In a rural area of Fray Bentos, Uruguay (33° 07' 40.39" S), with natural forests close to a river, two clinical cases of hindquarter paralysis in cats (*Felis catus*) have occurred in 2008 and 2009 respectively. All were domestic cats that had an indoor/outdoor lifestyle, living around the farms. There were other local reports of hind limb paralysis in cats without a clear diagnosis. This paralysis was progressive and had a chronic course of approximately 12 months until the death or euthanasia of the animals. The clinical symptoms started with ataxia with hindquarter side-to-side swaying and culminated in total paralysis of the hindquarters. Both animals (three and four year old, intact males) were sent to the Northwest Regional Laboratory of DILAVE (Veterinary Laboratories Division of the Ministry of Livestock, Agriculture and Fisheries of Uruguay) for necropsy in 2009. Organ samples were fixed in 10% buffered formalin, embedded in paraffin and cut into 5-µm sections and stained with hematoxylin and eosin (H.E.).

Results

Only one animal had significant gross lesions at necropsy. There was congestion of blood vessels of the spinal meninges and hemorrhages in the spinal cord along the lumbar area. The main histopathological findings were in the lumbar spinal cord including severe myelitis with perivascular cuffing and some polymorphonuclear cells, necrosis of the white matter and severe nonsuppurative meningitis (Figure 1). It was also observed the presence of numerous adult parasites in subarachnoid blood vessels, with thrombus formation (Figure 2). In other areas of the spinal cord and brain there were gliosis and moderate meningitis. The most affected area was the lumbar spinal cord. The lungs were distended. Alveolar septa were infiltrated by mononuclear cells, characterizing interstitial pneumonia, associated with presence of uninucleate and embryonated eggs in the alveoli lumen (Figure 3). The parasites showed a smooth cuticle, coelomyarian musculature, a pseudocoelom, an intestine composed of few multinucleated cells, and reproductive organs (Figure 2). They were identified as adult parasites due to the presence of mature reproductive organs, and were consistent with the characteristics of the superfamily Metastrongylidae. Females showed the characteristic two genital

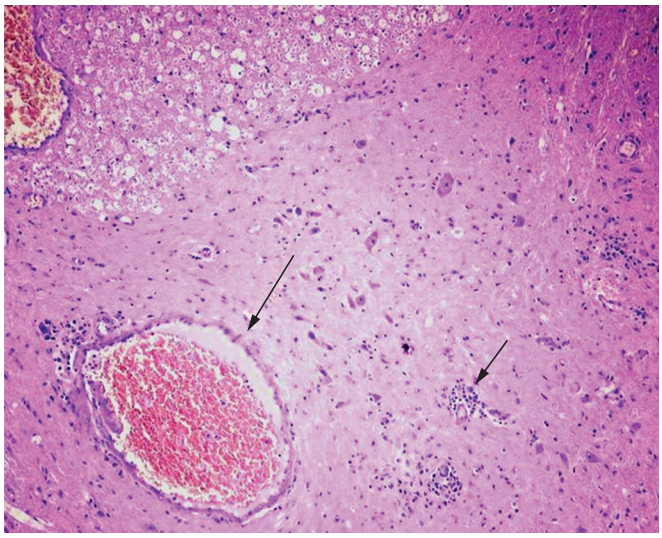

Figure 1. Spinal cord of a cat with parasitic meningomyelitis. Vacuolation of white matter. The short arrow indicates lymphocytes infiltration and the long arrow indicates congestion of the grey matter. H.E. 10× magnification.

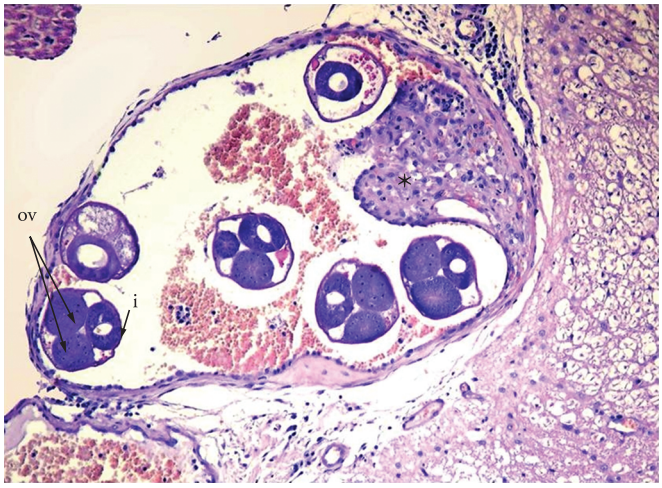

Figure 2. Spinal cord of a cat with parasitic meningomyelitis. Subarachnoid blood vessel with *Gurltia paralysans* females. Note the intestine (i), and paired ovaries (ov). A thrombus (*) can be seen on the right side of the vessel. H.E. 40× magnification.

tracts (Figure 2). Larval stages were not observed in any section. Taking into account the size, morphological characteristics, and location of parasites in the leptomeninges, the parasite was identified as *Gurltia paralysans*.

Discussion

According to Marioni-Henry review (2010), diseases affecting the spinal cord that arise from an inflammatory response are 32% of reported outbreaks. They reported a case of nonsuppurative meningomyelitis. Parasites were found in blood vessels associated with thrombi and ischemia, thus causing necrosis of the underlying tissue of the spinal cord. The affected animals showed neither clinical signs nor gross or microscopic lesions suggestive of damage

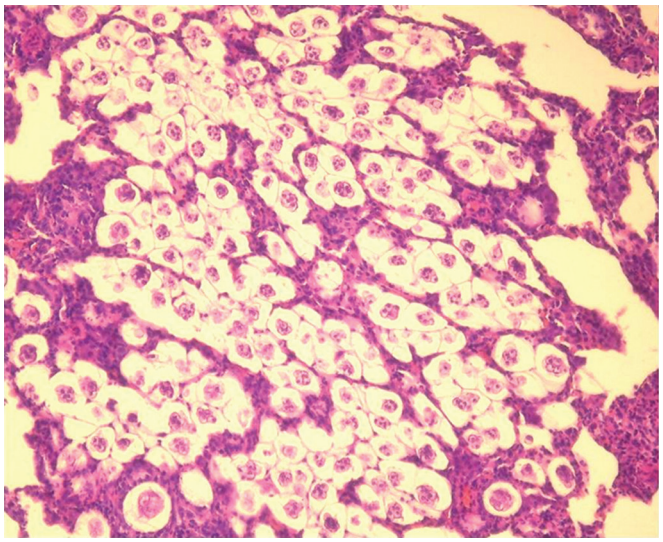

Figure 3. Lung of a cat with parasitic meningomyelitis. Interstitial pneumonia with embryonated, uninucleate parasite eggs in the interstitial and alveolar spaces. H.E. 20× magnification.

of other areas of the central nervous system. Other reports of parasitic myelitis in dogs showed granulomatous (SNOOK et al., 2009) or pyogranulomatous (DVIR et al., 2007) inflammatory infiltrate; however, in the cases here studied, the infiltrate was mainly composed of lymphocytes and some polymorphonuclear cells, which indicate a different disease progression. The most common parasitic meningomyelitis reported in dogs are caused by *Angiostrongylus vasorum* (PERRY et al., 1991), *Strongyloides* (SNOOK et al., 2009) or *Spirocerca lupi* (DVIR et al., 2007). In cats parasitic encephalitis by *Toxoplasma gondii* (PFOHL; DEWEY, 2005) and encephalitis and myelitis by *Sarcocystis neurona* (DUBEY et al., 2003) have been reported. An outbreak of feline parasitic meningomyelitis similar to the case described here has recently been reported in Chile. The causative agent was also identified as *Gurltia paralysans* (GÓMEZ et al., 2010). *G. paralysans* belongs to the superfamily Metastrongyloidea, family Angiostrongylidae and was first described by Wolffhügel in 1933 (BOWMAN et al., 2002; BOWMAN; GEORGI, 2008).

Although the specific life cycle of *G. paralysans* has not been elucidated, metastrongyles generally have a mollusk intermediate host and cats become infected when they eat this intermediate host. Furthermore, due to low prevalence of *G. paralysans* in domestic cats, it is postulated that other wild cats (e.g., *Leopardus guigna*) are the most commonly infected hosts, as reported by Wolffhügel in 1933 (BOWMAN et al., 2002). There are few reports of this parasite indicating that domestic cats would not be a usual host. In 1993, a group at Cornell University, USA, reported similar cases in cats showing hindquarter weakness, urinary and fecal incontinence and hemorrhagic lesions in the spinal cord at L3 and L6 (BOWMAN et al., 2002). But a nematode parasite was not found. This is the third report of the presence of *Gurltia paralysans* in South America (BOWMAN et al., 2002; GÓMEZ et al., 2010).

References

BOWMAN, D. D. et al. Metastrongyloidea. In: BOWMAN, D. D. **Feline clinical parasitology**. Iowa: Iowa State University Press. 2002. 475 p. http://dx.doi.org/10.1002/9780470376805

BOWMAN, D. D.; GEORGI, J. R. **Georgis' parasitology for veterinarians**. Missouri: Elsevier Health Sciences, 2008. 451 p.

DA COSTA, R. C.; MOORE, A. S. Differential diagnosis of spinal diseases. **Veterinary Clinical Small Animal**, v. 40, n. 5, p. 755-763, 2010. PMid:20732590. http://dx.doi.org/10.1016/j.cvsm.2010.06.002

DENK, D. et al. Disseminated angiostrongylosis with fatal cerebral haemorrhages in two dogs in Germany: A clinical case study. **Veterinary Parasitology**, v. 160, n. 1-2, p. 100-108, 2009. PMid:19062192. http://dx.doi.org/10.1016/j.vetpar.2008.10.077

DUBEY, J. P.; BENSON, J.; LARSON, M. A. Clinical *Sarcocystis neurona* encephalomyelitis in a domestic cat following routine surgery. **Veterinary Parasitology**, v. 112, n. 4, p. 261-267, 2003. http://dx.doi.org/10.1016/S0304-4017(03)00019-0

DUBEY, J. P.; MATTIX, M. E.; LIPSCOMB, T. P. Lesions of neonatally induced toxoplasmosis in cats. **Veterinary Pathology**, v. 33, n. 3, p. 290- 295, 1996. PMid:8740702. http://dx.doi.org/10.1177/030098589603300305

DVIR, E. et al. Spinal intramedullary aberrant *Spirocerca lupi* migration in 3 dogs. **Journal of Veterinary Internal Medicine**, v. 21, n. 4, p. 860-864, 2007.

GLASS, E. N. et al. Clinical and clinicopathologic features in 11 cats with *Cuterebra* larvae myiasis of the central nervous system. **Journal of Veterinary Internal Medicine**, v. 12, n. 5, p. 365-368, 1998. PMid:9773413. http://dx.doi.org/10.1111/j.1939-1676.1998.tb02136.x

GÓMEZ, M. et al. Meningomyelitis due to nematode infection in four cats. **Veterinary Parasitology**, v. 170, n. 3-4, p. 327-330, 2010. PMid:20307937. http://dx.doi.org/10.1016/j.vetpar.2010.02.039

MARIONI-HENRY, K. Feline spinal cord diseases. **Veterinary Clinical Small Animal**, v. 40, n. 5, p. 1011-1028, 2010. PMid:20732602. http://dx.doi.org/10.1016/j.cvsm.2010.05.005

PERRY, A. W.; HERTLING, R.; KENNEDY, M. J. Angiostrongylosis with disseminated larval infection associated with signs of ocular and nervous disease in an imported dog. **The Canadian Veterinary Journal**, v. 32, n. 7, p. 430-431, 1991.

PFOHL, J. C.; DEWEY, C. W. Intracranial *Toxoplasma gondii* granuloma in a cat. **Journal of Feline Medicine and Surgery**, v. 7, n. 6, p. 369-374, 2005. http://dx.doi.org/10.1016/j.jfms.2005.03.004

SNOOK, E. R.; BAKER, D. G.; BAUER, R. W. Verminous myelitis in a pit bull puppy. **Journal of Veterinary Diagnostic Investigation**, v. 21, n. 3, p. 400-402, 2009. PMid:19407100. http://dx.doi.org/10.1177/104063870902100320

TIPOLD, A.; STEIN, V. M. Inflammatory diseases of the spine in small animals. **Veterinary Clinical Small Animal**, v. 40, n. 5, p. 871-879, 2010. PMid:20732596. http://dx.doi.org/10.1016/j.cvsm.2010.05.008