

NEUROLOGICAL AND OCULAR FORM OF TOXOPLASMOSIS IN CATS

Cătălina Anca CUCOȘ, Iuliana IONAȘCU, Jacqueline MOCANU, Manuella MILITARU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd,
District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67,
Email: ancacucos@gmail.com; driulianaionascu@yahoo.com;
jacqueline_mocanu@yahoo.com; militmanuella@yahoo.com

Corresponding author email: ancacucos@gmail.com

Abstract

Toxoplasmosis is a zoonotic disease caused by the protozoan Toxoplasma gondii, an intracellular coccidian parasite. The cat occupies a central role in the life cycle of this parasite, as a definitive host. Toxoplasmosis is transmitted by consumption of infected raw or undercooked meat, consumption of oocysts from the cat feces or by transplacental transfer of tachyzoites from mother to fetus.

The study was conducted in the Ophthalmology Department of the Faculty of Veterinary Medicine, Bucharest, over a one year period, from September 2013 to September 2014. We examined and diagnosed with toxoplasmosis a number of 22 cats. The cases were subjected to clinical, neurological, ocular examinations and paraclinical tests. Clinical examination revealed various multifocal neurological signs such as behavioural changes, altered mentation, seizures, ataxia, blindness, anisocoria, torticollis and vestibular signs. In some cases the ophthalmological examination revealed chorioretinitis and uveitis. These results along with the history led us to the suspicion of toxoplasmosis. We performed routine haematology and serum biochemistry tests, but these tests are not specific and the results depend on the extent of systemic involvement.

We established the definitive diagnosis of toxoplasmosis by performing the serological specific test in order to determine the IgM and IgG levels of Toxoplasma antibodies. In the cases where the IgM titre was elevated, the acute phase of the infection was diagnosed, whereas the elevated IgG titre revealed a chronic infection.

The aim of this paper is to highlight the multiple and various neurological signs of toxoplasmosis, which is often misdiagnosed and incompletely investigated, and therefore improperly treated. The importance of this study stems from the fact that in recent years toxoplasmosis experienced an increase incidence in our country.

Key words: cat, central nervous system, serological tests, toxoplasmosis.

INTRODUCTION

Toxoplasmosis represents a worldwide spread important zoonosis, in which the cats occupies a central part, are the only definitive host.

Most cats infected with *Toxoplasma gondii* will not show any symptoms, but in immunosuppressed young and adult cats the signs of disease are present, especially in cats infected with feline immunodeficiency virus (FIV), feline leukemia virus (FeLV) or other concurrent infections (Platt et al., 2013; Jaggy et al., 2010).

The clinical manifestations of feline toxoplasmosis are variable and it can cause gastrointestinal, respiratory, ophthalmological and neurological disorders. Nonspecific signs of anorexia, lethargy, depression, fever, and

weight loss can be seen (Lorenz et al., 2012; Gunn-Moore et al., 2011; Platt et al., 2013).

The neurological signs may be observed alone or along with the digestive, pulmonary or ophthalmological signs (Gunn-Moore et al., 2011; Lorenz et al., 2012).

Toxoplasmosis in cats represents a common neurological problem, but only 10% from all diagnosed cases presents neurological signs, the rest of the cases representing latent infection (Gunn-Moore et al., 2011).

When toxoplasmosis affects the eyes and central nervous system, signs such as retinitis, chorioretinitis, uveitis, anisocoria, blindness, personality and behavioural changes, circling, ataxia, or seizures can be observed (Platt et al., 2013; Gunn-Moore et al., 2011; Elmore et al., 2010; Gelatt et al., 2013).

In immunocompromised patients there is a high risk in reactivation of latent infection.

Toxoplasmosis is diagnosed based on the history, clinical signs and the results of laboratory tests. Diagnostic tests for toxoplasmosis are represented by determining the antibody titers or performing the PCR technique from blood or cerebral spinal fluid. IgM antibodies reflect an acute infection, while IgG antibodies reflect chronic infection (Platt et al., 2012; Maggs et al., 2012).

The oocysts can be found in feces only for a short period of time, thus the coproparasitological test is not recommended to establish the diagnosis. The cats usually excrete the *Toxoplasma gondii* oocysts 3 days after infection, and may continue shedding up to 20 days (The Merck Veterinary Manual, 2011; Jaggy et al., 2010).

MATERIALS AND METHODS

The study was conducted in the Ophthalmology Department of the Faculty of Veterinary Medicine, Bucharest, over a one year period, from September 2013 to September 2014. We examined and diagnosed with toxoplasmosis a number of 22 cats.

All cases were subjected to physical, neurological, ophthalmological examinations and paraclinical tests – hematology, serum biochemistry screening and serum antibody titres.

The blood samples from these cases were tested for Toxoplasma antibodies (IgM and IgG) in the Faculty of Veterinary Medicine Laboratory, performing also routine hematology and serum biochemistry screening. In some cases, the cats were also tested for FIV and FeLV, but the antibodies were not detected.

RESULTS AND DISCUSSIONS

We diagnosed clinical toxoplasmosis in 22 cats, male and female, with ages ranged from 4 months to 17 years old, four cats were younger than one year. One of the most represented breeds was Domestic Short Haired (DSH), 19

from 22 cases; the other breeds were represented by British Short Haired, Russian Blue and Siamese.

The common clinical signs are represented by ophthalmic manifestations, unilateral or bilateral uveitis (Figure 1), presence of keratic precipitates on the corneal endothelium (Figure 2).

Among these manifestations, systemic signs such as loss of appetite, weight loss, personality and behavioral changes are also common findings of toxoplasmosis (Table 1).

Table 1. Signalment, clinical signs associated with clinical Toxoplasmosis in 22 cats.

Nr. Crt	Age	Sex	Breed	Clinical signs
1.	9 yr ¹	F ⁴	DSH ⁵	Behavioural and personality changes, seizures, uveitis
2.	7 mo ²	M ³	DSH ⁵	Unilateral uveitis
3.	10 yr ¹	F ⁴	DSH ⁵	Unilateral uveitis
4.	1.7 yr ¹	F ⁴	British Short Haired	Behavioural and personality changes, anisocoria
5.	2 yr ¹	M ³	DSH ⁵	Keratic precipitates
6.	8 yr ¹	M ³	DSH ⁵	Bilateral uveitis
7.	1.2 yr ¹	F ⁴	DSH ⁵	Unilateral uveitis
8.	3 yr ¹	F ⁴	DSH ⁵	Unilateral uveitis
9.	2 yr ¹	M ³	DSH ⁵	Unilateral uveitis
10	10 mo ²	F ⁴	DSH ⁵	Unilateral uveitis, keratic precipitates
11	8 yr ¹	M ³	DSH ⁵	Unilateral uveitis
12	1 yr ¹		DSH ⁵	Unilateral uveitis
13	7 yr ¹	M ³	Russian Blue	Anterior uveitis, keratic precipitates
14	2 yr ¹	F ⁴	DSH ⁵	Bilateral uveitis
15	6 yr ¹	M ³	DSH ⁵	Vestibular syndrome, without ocular signs
16	1,3 yr ¹	M ³	DSH ⁵	Unilateral uveitis
17	9 yr ¹	F ⁴	DSH ⁵	Unilateral uveitis
18	4 mo ²	F ⁴	DSH ⁵	Latero-lateral nystagmus, ataxia, absent PLR, amaurosis
19	2 yr ¹	F ⁴	DSH ⁵	Behavioural changes,

.				unilateral uveitis, keratic precipitates
20	6 mo ²	M ³	DSH ⁵	Unilateral uveitis
21	4 yr ¹	M ³	DSH ⁵	Unilateral uveitis
22	17 yr ¹	F ⁴	Siamese	Latero-lateral nystagmus, mydriasis, bilateral chorioretinitis amaurosis

¹yr = years

²mo = months

³M = male

⁴F = female

⁵DSH = Domestic Short Haired

Ophthalmological signs were observed in 19 of the 22 cases examined (86 %), representing the most frequent clinical manifestation. In cases 1, 19 and 22, the ocular signs were associated with neurological signs, such as seizures, behavioural and personality changes, respectively nystagmus in case 22.



Figure 1. Ocular toxoplasmosis. Unilateral toxoplasmic uveitis, iridocyclitis in a 3 year old cat.

Anterior and posterior uveitis represents the most common ophthalmological signs. Lens luxation, absent pupillary light reflex (PLR) and chorioretinitis were also encountered.



Figure 2. Ocular toxoplasmosis. Note the keratic precipitates on the corneal endothelium.

The neurological signs include a wide variety of clinical manifestations, present along or without ophthalmological signs. Six of the 22 cases presented neurological signs (27%), such as anisocoria, nystagmus, amaurosis, ataxia, vestibular signs, behavioural changes, altered mentation and seizures.

The changes of the routine hematology and serum biochemistry screening are not specific, depend on each individual case. The common changes in routine hematology include anemia, typically increased neutrophils, lymphocytes and eosinophils; while the changes in serum biochemistry screening in some cases showed liver dysfunctions, hyperglobulinemia.

Radiological examination, when performed, showed no changes.

We diagnosed toxoplasmosis by correlating the history and the clinical signs with the measured serum titre of IgM and IgG toxoplasma antibodies in all cases.

We didn't performed the coproparasitological test because doesn't represent a reliable test; the *Toxoplasma* oocysts are similar to some other parasites, and the period of excreting the oocysts is short (The Merck Veterinary Manual, 2011; Jaggy et al., 2010).

The treatment consisted in systemic administration of an antibiotic and supportive clinical treatment in all cases, for 28 days. Local treatment was performed with antibiotic and anti-inflammatory collyrium.

The antibiotic election was different, in case 4 we used Doxycycline, 10 mg/kg, once a day, during 28 days, and Azithromycin eye drops. In case 18, because of the poor general condition we used intravenous administration of Ceftriaxone, 25mg/kg, during 10 days. After this period we used Clindamycin, 25 mg/kg daily.

In rest of the cases we used oral therapy with Clindamycin, 25 mg/kg daily, for 28 days.

The therapeutic response was favorable in 20 of all 22 cases, except cases 1 and 18, which died. The cat that presented seizures, case 1, died during the treatment, due to trauma after having a seizure.

In case 18, immunosuppression associated with secondary infection contributed to the clinical worsening, and after two months of treatment the owners chose euthanasia.



Figure 3. Bilateral chorioretinitis in a 17 years old cat – case 22, which presented latero-lateral nystagmus.

In case 22, who presented bilateral chorioretinitis, fixed mydriasis, latero-lateral nystagmus and vision loss, in addition to the antibiotic, methylprednisolone was administered. The clinical signs improved slightly during one month of treatment, so the drug therapy was lengthened with 28 days.

CONCLUSIONS

This paper highlights the multiple and various neurological and ocular signs of toxoplasmosis, one of the most important zoonotic parasites, which is often misdiagnosed and therefore improperly treated.

Due to the predominant subclinical evolution of nervous form of toxoplasmosis, all diagnosed cases must be treated for at least 28 days, even though the clinical signs, often ophthalmologic manifestations, were resolved previously.

Diagnosis of toxoplasmosis is established by determining the serum levels of IgM and IgG antibodies, correlated with clinical signs and full history of the case.

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