

Komunikaty

Toxoplasma gondii antibodies in domestic cats in Olsztyn urban area, Poland

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ABSTRACT. The aim of the investigation was to determine the prevalence of *T. gondii* among a domestic cat population in an urban area in Olsztyn. In total, 135 serum samples of cats collected in several veterinary outpatient clinics in Olsztyn were examined by direct agglutination assay. The Toxo-Screen DA BioMerieux commercial test detected anti-*Toxoplasma gondii* IgG antibodies. The results of studies indicated that cats bred under different conditions in the city of Olsztyn have contact with various forms of invasive *T. gondii*. The high percentage of seropositive results at a 1:40 dilution (65.9%) suggests a past infection, and the high percentage of seropositive cases at a 1:4000 dilution (68.1%) indicates a current or recent toxoplasmosis process. This could indicate that there is a permanent source of *T. gondii* infection in the habitable environment of the cats. The high percentage of *T. gondii* seropositive results among domestic cats in Olsztyn proves the presence of circulation of the parasite in the environment.

Key words: *Toxoplasma gondii*, IgG, cats, prevalence, Poland

Introduction

The invasion by the protozoan parasite, *Toxoplasma gondii*, is widely prevalent in humans and animals throughout the world. Dubey and Carpenter [1] have shown 60% of seropositivity in 100 cats examined in the USA, Sumner and Ackland [2] have shown 39% in Melbourne, Meireles et al. [3] have stated 40% in Brasil, and Uggla et al. [4] have reported 42% in Sweden. Rommel and Simon (as cited in 7) have found that about 51% of the cat population in Germany have antibodies against *T. gondii*. Humans become infected by eating raw or undercooked meat that contains parasite cysts, or by drinking water and eating raw vegetables contaminated by cat faeces [3]. In continental Europe, it is estimated that 50 to 80% of the population had contact with parasite [5].

Infected meat, organs and tissues of different animal species, rodents and synanthropic birds are basic sources of infection of cats [6]. Investigations

conducted by Wąsiatycz [7] on seropositive cat faeces have shown that the occurrence of *Toxoplasma gondii* oocysts is rare (0.8%). According to this author, permanent contact of the owners with their *T. gondii* seropositive cats has no influence on the frequency increase in protozoan infection. The analysis of the results has revealed that tin-fed cats kept at home are free from *T. gondii* [7].

The aim of the investigation was to determine the prevalence of *Toxoplasma gondii* in a population of domestic cats in an urban area of Olsztyn.

Material and methods

Serum samples of cats collected in several veterinary outpatient clinics in Olsztyn were used. The cats examined in the study were 1.5 to 3 years old, and about 75% of serum samples were obtained from females. The blood samples taken during

surgical operations were centrifuged and the serum obtained was refrigerated until the day of examination. A total of 135 serum samples were examined.

Because direct agglutination assay is the main screening test in both humans and animals, examinations of anti-*Toxoplasma gondii* IgG antibodies were performed by an indirect agglutination test using the Toxo-Screen DA BioMerieux commercial test. This test detects anti-*T. gondii* IgG antibodies in the serum above 4 IU/ml. Each titration plate was supplied with a negative control serum and a standard antigen enclosed to the set. Serum samples were examined at two dilutions: 1:40 and 1:4000, and reading was performed twice, after 5 and 18 hours. Agglutination in at least half of the microtube bottom (like in a positive control) was accepted as a positive reaction. In the case of pattern of full antibody sedimentation on the microtube bottom (negative control, model of antigen) the score was interpreted as negative, i.e. excluding the presence of *T. gondii* antibodies in the serum.

Results

The results of studies are included in Table 1. Among cat serum samples collected during first year of study, 70.6% of seropositive results and almost 24% of negative results were recorded at a 1:40 dilution. At a dilution of 1:4000 the proportions of seropositive and doubtful samples were 58.8% and 5.9% respectively. Among the cats examined in second year of study percentage of seropositive results was slightly lower at a 1:40 dilution (65.2%) and higher (69.5%) at a 1:4000 dilution, compared with the previous year. In both years the percentage of doubtful results in relative dilutions varied from 3.4% and 5.9% respectively. High positive, i.e. positive in both titres samples amounted 23.5%.

Discussion

The results of two-year studies show that cats bred under different conditions (nourishment and care differentiation) in the city of Olsztyn had contact with different forms of invasive *T. gondii*. The high percentage of seropositive results at a 1:40 dilution (65.9%) suggests a past invasion, and the high percentage of seropositive cases at a 1:4000 dilution (68.1%) indicates a current or recent toxoplasmosis process. This indicates that there is a permanent contact with parasite in the living environment of the cats. Due to the lack of accurate data about the living conditions and nourishment of the cats examined in the study, it would be difficult to state that the only pathway of parasite transmission was infected meat. Perhaps it was also transmitted by rodents and synanthropic birds.

A high percentage (70.6%) of seropositive results was also reported by Wąsiatycz [7] who examined cats living in the city of Poznań and the suburban zone. Similar results were obtained by Svobodova et al. [8] in the Czech Republic, where they revealed 61.3% IgG antibodies in serum samples of cats at 1:10 to 1:2560 dilutions. Tenter et al. [9], who tested 306 suburban cats in Germany, showed *T. gondii* serological evidence in about 45% of animals. Infection rates varied from about 32% for cats kept indoors to about 55% for stray cats.

According to the literature data, toxoplasmosis does not occur only in Europe, but it is also widely prevalent on other continents. In Japan the overall prevalence confirmed with a latex agglutination test to direct anti-*Toxoplasma gondii* antibodies in serum samples collected from domestic cats at animal hospitals amounted to 6% [10]. In the USA, in the state of Washington, the overall prevalence of serum antibodies to *T. gondii* in 87 stray cats was 31% [11], and in Baltimore it was 14.5% [12]. Dubey et al. [13], who tested the serum of 275 cats from the state of Ohio, revealed *T. gondii* antibodies in 48% of them.

Table 1. Results of examinations of cat serum for the detection of *Toxoplasma gondii* antibodies with a direct haemagglutination assay

Examination	Number of samples	Titres 1:40		Titres 1:4000		High positive (+ in both titres)	Negative
		+	±	+	±		
The first year	17	12 (70.6%)	1 (5.9%)	10 (58.8%)	1 (5.9%)	10 (58.8%)	4 (23.5%)
The second year	118	77 (65.2%)	6 (5.1%)	82 (69.5%)	4 (3.4%)	77 (65.2%)	32 (27.1%)
Total	135	89 (65.9%)	7 (5.2%)	92 (68.1%)	5 (3.7%)	87 (64.4%)	36 (26.7%)

It may be concluded that the high percentage of *T. gondii* seropositive results among domestic cats in Olsztyn proves the presence of this parasite in the environment. It follows that further investigations into *T. gondii* seroprevalence in cats are needed to limit the transmission of this parasite to people.

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