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Occurrence of cystoisosporosis among domestic cats in Thrissur district, Kerala

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Abstract

This study was aimed to evaluate the prevalence of cystoisosporosis among domestic cats in Thrissur district, Kerala. A total of 155 cats were included in this study. Faecal samples collected from all the cats were subjected examination by direct smear method and floatation by Sheather's sugar solution. Of 155 faecal samples examined, oocysts were found in 28 cats (18.06 per cent). Among these, 12 were collected from cats with signs of gastrointestinal diseases and 16 from cats which are apparently healthy with firm faeces. Mixed infection with Cystoisospora spp and Toxocara, Ancylostoma and Cystoisospora were also detected in three (1.94 per cent) and one (0.65 per cent) cat respectively. Various risk factors associated with the infection were also studied. Prevalence was found to be higher in cats less than six months old. Gender and breed were not affected the prevalence. This study demonstrates that cystoisosporosis is common in cats.

Keywords: *Cystoisospora spp., cats, enteric protozoans, risk factors*

Two species of Cystoisospora have been identified in cats which include *Cystoisospora felis* and *Cystoisospora rivolta* (Dubey, 2018). Morphological identification of the species affecting cats is possible due to variation in the size of oocyst of two species (Soulsby, 1982). It is the most commonly identified coccidians infecting cats (Dubey and Greene, 2012). They are strictly host specific with worldwide distribution. The prevalence of infections varies with several factors such as climate, age and housing system. Diarrhoea can be noticed in some infected kittens however they can excrete oocyst without showing any clinical signs.

Faecal samples collected from 155 domestic cats presented to the Teaching Veterinary Clinical Complex, Mannuthy and University Veterinary Hospital, Kokkalai during the period from January 2021 to March, 2022. Anamnesis and details of management protocols followed were

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collected from the owner of each cat by a structured questionnaire. The faecal samples were examined immediately after collection by direct smear method and by floatation using Sheather's sugar solution (Zajac and Conboy, 2012). All positive samples were subjected to micrometry (Soulsby, 1982) for species level identification of Cystoisospora. The results obtained were statistically analysed using SPSS version 24.0 software. Chi-square test was used to study the statistical difference in the occurrence of *Cystoisospora* spp. and various risk factors under this study.

Out of 155 samples examined *Cystoisospora* spp. oocysts was detected in 16 samples by direct smear/wet mount method. Floatation using Sheather's sugar solution detected oocysts of *Cystoisospora* spp. (Fig. 1) in 18.06 per cent (28 out of 155) samples. Swathi (2016) detected *Cystoisospora* spp. oocyst in 7.67 per cent of samples examined by floatation using Sheather's sugar solution in Thrissur district. Previous studies conducted in India reported a higher prevalence of 80 per cent by Borkataki *et al*. (2013) in stray cats in whereas lower prevalence of 3.47 per cent was reported among cats sampled from various sources such as stray, owned and shelter cats in Bangalore (Gautham *et al*., 2018). Co-infection with helminths and *Cystoisospora* spp. was detected in 2.58 per cent (4/155) of animals under this study. Shaheena (2020) reported that gastrointestinal parasites including *Ancylostome* spp. and *Toxocara* spp. infection can leads to severe anaemia in cats. In the present study mixed infection with *Cystoisospora* spp. and *Toxocara* spp. was noticed 1.94 per cent (three out of 155) and *Cystoisospora* spp. and *Ancylostoma* spp. was detected in 0.64 per cent (one out of 155) of samples examined. This was in accordance with Morandi *et al.* (2020) who reported that multiple infections were more common among cats when compared to dogs and mixed infections with *Cystoisospora* spp. and *Toxocara cati* were found to be more.

Morphological identification of *Cystoisospora* spp. was done by combining the morphological features of oocyst and morphometry. The oocyst was ovoid in shape with a smooth pale brown wall without a micropyle. The largest oocyst measured was 52.5 x 42 µm whereas the smallest oocyst measured 42 x 31.5 µm with a mean of 43.34 x 34.07 µm. The oocysts from cats in the present study were found to be of *C. felis* by micrometry. None of the samples examined revealed *C. rivolta* infection, which was in concordance with findings of Dubey (2018) who reported that among cystoisospora infection in cat, infection with *C. felis* were more prevalent than *C. rivolta.*

Association of various risk factors such as age, breed, gender, housing, number of cats in the household, ingestion of prey species and source of cats with prevalence were studied by statistical analysis of data using Chi-square test. A significant association was noticed between age of cats, number of cats in the household and source of cats. Cystoisosporosis was found to be higher among cats less than six months of age (36.76 per cent). None of the cats above one year of age was found to excrete the oocyst. House hold having more than two cats was found to be a risk factor in which 23.8 per cent of cats were infected compared to six per cent in household with two cats. Source of cat also influenced the

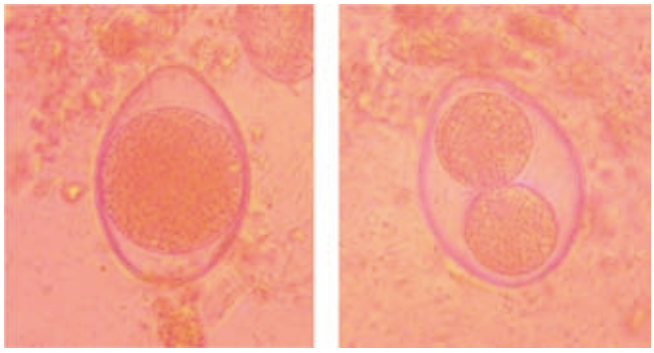

Fig.1. *Cystoisospora* spp. oocyst detected on microscopic examination after floatation

occurrence, only one stray cat was involved in the study was found to be excreting oocysts of *Cystoisospora* spp. 40.9 per cent of cattery cats and 13.6 per cent of client owned cat were found to be cystoisospora positive.

Age can be considered as a possible risk factor especially in case of gastrointestinal parasitism. Lappin (2010) opined that infection was common in young animal than adults. Multiple cat households are always prone to infection with various infectious agents. Faeco-oral route of transmission of these enteric protozoa can cause more number of cases especially in crowded and unsanitary environments. Sauda *et al*. (2019) observed that high housing density and increased contact with other cats can be a risk factor in feline enteric parasites including protozoa such as *Cystoisospora* spp. and *Trichomonas* spp. Interaction between different age groups and immunosuppression resulting from stress due to overcrowding can be the reason for this association. Source of cats were found to affect the prevalence in the present study. The prevalence was found to be high in cats from catteries (40.9 per cent) compared to client owned cats (13.6 per cent). Mode of transmission of the parasite play an important role in this, in catteries and shelter homes were with more number of cats were housed and there will be interaction between the cats of different age groups. Crowded condition of the facility together with poor hygiene and sanitation can be regarded as a reason for the increased prevalence in this study. Breed, gender, housing and ingestion of prey species were not identified as potential risk factors for cystoisosporosis in the present study which was in accordance with findings of Symeonidou *et al.* (2018). Consistency of faeces does not affect the probability of detecting Cystoisosporan oocyst in cat.

Summary

The present study investigates the occurrence of cystoisosporosis in cats and identified various risk factors associated with infection. The findings revealed that the prevalence was higher than helminthic infection in cats, the species of Cystoisospora identified in the present study was *C. felis*. Risk factors identified can be utilized for establishment of proper management and intervention strategies for disease control and prevention.

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