Cytauxzoon felis Infection in Domestic Cats, Yunnan Province, China, 2016

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We performed a molecular survey for Cytauxzoon felis infection in 311 domestic cats in Yunnan Province, China, in 2016 and found a prevalence of 21.5%. C. felis infection in domestic and wild cats in other provinces should be investigated to determine parasite prevalence and genetic diversity among cats throughout China.

Cytauxzoonosis is a tickborne hemoprotozoal disease of both domestic cats and wild felids caused mainly by Cytauxzoon felis protozoa (1,2). In the late 1900s, C. felis protozoa were reported exclusively in North America, particularly in the mid-Atlantic states of the United States (3), but in the early 2000s, this pathogen was reported in some countries of South America, and in Europe, several other Cytauxzoon species were identified (4). Cytauxzoonosis of domestic cats has long been considered contagious and deadly (2). However, as research progressed, the virulence of different C. felis isolates was found to be inconsistent; some cats were able to survive the infection and potentially serve as natural reservoirs (5).

The number of pet cats around the world is increasing, but the information about the prevalence of C. felis infection in domestic cats is limited worldwide. Because of the seriousness of feline cytauxzoonosis and its geographic expansion to more and more regions, informing veterinarians, pet owners, and the general public about this disease has become imperative. The objective of this study was to examine whether C. felis infection is present in domestic cats in China.

The Study

During November–December 2016, we collected whole blood from the femoral vein of 311 domestic cats (74 stray cats and 237 pet cats) in Yunnan Province in southwestern China using EDTA tubes. We stored these EDTA whole blood samples at −20°C and then performed genomic DNA extraction with the TIANamp Genomic DNA Kit (TianGen, http://www.tiangen.com) following the manufacturer’s protocol. To detect C. felis infection, we performed a PCR targeting the second internal transcribed spacer (ITS-2) of ribosomal DNA (6). We sequenced amplicons in both directions and compared these sequences with those of other relevant C. felis isolates available in GenBank. We analyzed differences in C. felis prevalence in domestic cats according to lifestyle, region, sex, and age using the χ² test in SPSS 22.0 standard version for Windows (IBM Corporation, https://www.ibm.com). We considered differences statistically significant when the p value obtained was <0.05.

In total, 67 (21.5%) of 311 examined domestic cats were positive for the C. felis protozoan. We sequenced these C. felis–positive PCR products and obtained 67 ITS-2 sequences; 4 representative sequences were deposited in GenBank (accession nos. MF966369–72). The 67 C. felis ITS-2 sequences shared 98.4%–100% similarity. These sequences had 95.6%–100% similarity with corresponding C. felis ITS-2 sequences available in GenBank.

The prevalence of C. felis protozoa in domestic cats in Yunnan Province was 21.5% (Table), lower than the prevalence in domestic cats in the United States (30.3%, 27/89) (7) but higher than that in Brazil (0.66%, 1/151) (8). The C. felis prevalence in stray cats (51.4%, 38/74) was significantly higher (p<0.001) than that in pet cats (12.2%, 29/237) (Table), probably because stray cats often live outdoors with poor sanitation, thus having high probability of contact with ticks. However, no significant difference in C. felis prevalence was found among domestic cats of different sexes or age groups.

Distinct C. felis genotypes of different virulences in domestic cats have been identified, and genetic diversity among C. felis populations has been studied by comparisons of 18S rRNA, ITS-1, and ITS-2 sequences (1). ITS-1 and ITS-2 rDNA are better genetic markers for assessing C. felis genotypic variability (9) because these sequences evolve faster than the 18S rRNA gene. A combination of ITS-1 and ITS-2 sequences has been used to identify the C. felis genotypes present in various domestic cats and wild felids (1). C. felis protozoa are transmitted to domestic cats by ticks, such as Amblyomma americanum and Dermacentor

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variabilis (I). Raising pet cats indoors and preventing and treating ectoparasites of outdoor stray cats would help reduce risk for infection in C. felis protozoa–endemic areas. Some effective antitick insecticides can be used for preventing transmission of this parasite (10).

Conclusions

Our study revealed a high (21.5%) C. felis prevalence in domestic cats in Yunnan Province, China. Further studies are warranted to assess the prevalence of the C. felis protozoan in wild felids and domestic cats in other regions of China to estimate its geographic distribution and genetic diversity and to investigate its potential tick vectors.

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References


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