

# Studies on Main Zoonoses and Infections in Stray Cats

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In Korea, stray cats across the country have been rapidly increasing the number of population. Also, the number of pet cats have been gradually expanding. In America and Eastern Europe, cat population has been shown considerable growth compared to dog's one. Also, cat clients in Germany have been going ahead the dog's one. In these reasons, the potential to the transmission of main infections in stray cats has been focusing the one of the interesting topics in veterinary pathology and epidemiology.

With considerable increase of stray cat population in Korea in recent years, the possibility of disease outbreaks among stray cats has also been increased, while no reports are available on the serological prevalence of major feline viral, rickettsial and parasitic diseases. This study was therefore performed to obtain informations firstly on sero-prevalence against the seven viral pathogens including feline panleukopenia (FPL) virus, feline leukemia virus (FeLV), feline infectious peritonitis (FIP) virus type 1 and 2, feline herpesvirus (FHV), feline calicivirus (FCV), and feline immunodeficiency virus (FIV); secondly, on the nationwide status of sero-prevalence against zoonotic diseases transmitted by cats which include toxoplasmosis, Hantavirus, *scrub typhus*, *murine typhus*, and *spotted fever* group; thirdly on the endoparasitic infection among stray cats in Korea. Serum samples of cats were collected from five regions in Korea from November 1995 to October 1997. Geographic regions included in the survey were Seoul · Kyounggi, Kangwon, Chungchong, Cholla and Kyungsang Provinces. Basic anatomic and pathophysiologic conditions of all cats collected were recorded as well as information on sex, breed, and age of cats. Sera were screened by indirect immunofluorescent antibody assay (IFA) for the presence of specific antibodies against *Rickettsia tsutsugamushi*, *R. typhi* and *R. sibirica*, and seven viruses including Hantavirus, FCV, FPL virus, FIP virus type-1 and 2, FeLV and FHV. Also, serology was used by latex agglutination test for *Toxoplasma gondii*, rapid immunomigration test for FIV, and by modified Knot's test for *Dirofilaria immitis*. In addition, fecal samples of stray cats were examined for the presence of helminth ova or protozoan oocysts. Presence of adult helminth worms in the internal organs including stomach, intestine, liver and heart was also recorded. Results were summarized as following. Seropositives against *T. gondii* in 212 stray cats from Seoul · Kyounggi (47), Kangwon (45), Choungchong (40), Cholla (40), and Kyoungsang (40) were 20.7% (44 cases). Seropositive antibody titers tested were classified as 38.6% in 1:32~256, 31.8% in 1:512~2,048, and 29.5% in 1:4,096~32,768. By sex, male(22.3%) showed higher in seropositives than female (19.3%). By areas collected them, seropositives to *Toxoplasma gondii* were more frequently detected in Seoul · Kyounggi and Kangwon area than the others. By IFA test to hantavirus, *Rickettsia tsutsugamushi*, *R. typhi* and *R. sibirica* in 165 stray cats, no seropositive cases were detected. For endoparasitic examination, there was sacrificed to 215 stray cats collected from Seoul · Kyounggi (54), Kangwon (38), Chungchong (34), Cholla (38), and Kyoungsang (51) areas, respectively. Also, fecal test was applied by sugar flotation and formalin-ether sedimentation technique. Infection of internal parasites was found in 184 cats (85.6%). Among the cases with endoparasites, 52.1% was infected with nematode, 19.1% with protozoa, 27.9% with cestode, 5.5% with trematoda and 0.5% with *D. immitis*. In intestinal parasites in the stray cats, nematode was frequently classified *Toxocara cati* (102) and *Ancylostoma tubaeformae* (9). Most frequent cestode (27.9%) was *Spirometra erinaeaei* (34) and *Taenia taeniaformis* (26). *Opisthorchis tenuicollis* was found in bile duct of 9 cats and *Isospora* spp. was also identified in 41 cats (19.1%). In mixed infection, 3.3% was infested with nematode, trematode and protozoa, 8.8% with nematode and cestode, 4.2% with nematode

and protozoa, 1.9% with cestode and protozoa. By age, the infestation rate was the highest as 92.3% in 2 to 4-year old, and then was followed as 87.6% in 1~2-year old and 80% in older than 4-year old. By areas of the sample collection, the infection rates were the highest in Seoul·Kyeonggi area (79.6%) and the following orders were 76.5% in Kyoungsang, 65.8% in Kangwon, 63.2% in Cholla and 61.8% in Chungchong, respectively. the detection rate of eggs in feces was 78.1%. Severe infection of *D. immitis* was confirmed by necropsy in one cat collected from Kangwon area where showed high prevalence of canine dirofilariasis, while no positive case was found in blood test. It suggest that the blood test to *D. immitis* in cats must be accompanied with other tools for definite diagnosis. By age, the endoparasitic infection was most prevalent in 2 to 4 years old cats. However, there was no significant difference between sex. In seroepidemiological survey of 240 cats from 5 different regions, 171 cats (71.2%) showed seropositives against FCV, 158 (65.8%) against FPL virus, 83 (34.6%) against FIP virus type-1 and 271 (21.6%) against FIP virus type-2. Seropositives to FCV were detected in 86% of Seoul·Kyeonggi, 78% of Kangwon, 64% of Chungchong, 74% of Cholla, and 50% of Kyoungsang, respectively. Seropositives to FPL virus was found in 82% of Seoul·Kyeonggi, 70 of Kangwon, 56% of Chungchong, 70% of Cholla, and 47.5% of Kyoungsang, respectively. Seropositives to FIP-1 virus were detected in 42% of Seoul·Kyeonggi, 38% of Kangwon, 34% of Chungchong, 36% of Cholla, and 20% of Kyoungsang, respectively. Seropositives to FIP-2 virus was found in 34% of Seoul·Kyeonggi, 40% of Kangwon, 24% of Chungchong, 26% of Cholla, and 22.5% of Kyoungsang, respectively. For FIV, 100 stray cats was tested but only one male stray cat in Kangwon area was positive. However, there were not detected the seropositives to FHV and FeLV. From these results, stray cats in Korea were confirmed the frequent prevalence of *T. gondii* infection as well as various kinds of endoparasites. Also they were consistently exposing the various viral pathogens including FCV, FPL virus, FIP virus type-1 and 2. But, stray cats in our country were fortunately not invaded by zoonotic causative agents including Hantavirus and main rickettsia and also no evidence of the infection of FHV and FeLV which are clinically playing with the role of major pathogens in feline medicine around the world.

Other trial was carried out to understand the infection rate of FCV to stray cat lived in the area of Bug-ku, Kwangju. Eighty-five feline sera were collected from Feb to May 2000. Most of them were externally shown the normal physical condition except pregnancy, accidental trauma or abscessation in a few cases at necropsy. For measuring the antibody to FCV and *Toxoplasma gondii*, all sera were tested by the indirect immunofluorescent antibody test kits which produced by VMRD(USA). Seropositives to CAV and *T gondii* were 14.1%(12 cases) and 8.2%(7 cases), respectively. Seropositives to CAV and *T gondii* were 71.2% and 20.7%, respectively. This result is very much differentiation. Because this differentiation is that survey is different the whole country environments from city and urban areas environments. CRFK cell line was used for the isolation to FCV from the swab materials of nasal cavity, trachea and lung in 150 cats. Among them, we can get 8 isolates to be identified as feline calicivirus. Consequently, the results strongly suggested that there was necessary to make and ecological and epizootiological monitoring to stray cats in the Republic by the points of zoonotic views.

Consequently, these results strongly suggested that there was necessary to make the ecological and epizootiological monitoring to stray cats in the Republic by the points of zoonotic views. In addition, it is certain to carried out the further trials on various pathogens in stray and pet cats in the fields of microbiology and pathology soon.