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Short Communication / **Kısa Bilimsel Çalışma**

Intestinal cryptosporidiosis associated with distemper in a dog

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Summary: This article reports the first case of intestinal cryptosporidiosis associated with distemper in a minature pincher from Turkey with the supportive laboratory, histologic, immunohistochemistry and electron microscopical findings.

Key words: Distemper, intestinal cryptosporidiosis

Bir köpekte gençlik hastalığına eşlik eden bağırsak kriptosporidiozisi

Özet: Bu çalışmada, laboratuvar, histolojik, immunohistokimyasal ve elektron mikroskopik bulgularıyla, bir köpekte saptanan ve gençlik hastalığı ile birlikte bulunan bağırsak kriptosporidiozisi bulguları bildirilmektedir.

Anahtar sözcükler: Bağırsak kriptosporidiozisi, köpek gençlik hastalığı

Intestinal cryptosporidiosis has been reported in a wide range of animal species and also humans (10, 12). The apparent lack of host-specifity of the agent could lead to potential source of human infection. Companion or pet animals may be one such source because of this close interactions with owners. There are various reports of possible transmission of *Cryptosporidium* spp. from an animal to a human or vice versa (1, 2, 4, 7, 8).

Intestinal cryptosporidiosis has been rarely reported in dogs and cats and little data about the disease is available in these species. Usually evidence of concurrent disease or known immunodeficiency is reported (3, 6, 15), but, the precise role of *Cryptosporidium* spp. is not clear.

Most reports involved a *Cryptosporidium* spp. morphologically indistinguishable from *C. parvum* (2, 10, 12). However, a distinct "dog" genotype and the name *Cryptosporidium canis* has recently been designated for isolates from dogs that share the same genetic and biologic characteristics as a separate species (5, 9). Also, this genotype has been identified in the stool of a person with HIV infection (11).

The purpose of this study is to report the first case of intestinal cryptosporidiosis associated with distemper in a puppy in Turkey.

A 10-month-old male minature pincher was presented to the Internal Clinic of Veterinary Faculty of Ankara University with clinical signs of persistent vomiting, diarrhea and depression. According to the owner, the dog was not vaccinated and had been bought from a pet shop. It had a yellowish-green colored watery diarrhea. There was blood and mucus in feces that were passed 4-5 times a day. Frequency of vomiting was 2-3 times a day.

On physical examination, the dog was lethargic, severely dehydrated and pyrexic (39.1 °C). There was a sero-mucous discharge from both eyes and nose. The lung sounds were audible but reduced on both sides. The dog had tremors and was unable to stand. Abdominal palpation was unremarkable.

Commercially available a dot-ELISA system (Immunocomb, Israel) for canine distemper antibody was applied and the result of this test was positive (4+, titer was >1:80 according to instructions of manufacturer). The dog died 4 hours after attending the clinic.

At necropsy, the main gross finding was severe gastroenteritis.

Microscopical lesions were bronchointerstitial pneumonia associated with marked interlobular and subpleural edema and emphysema, lymphocytic depletion in various lymphoid tissues and catarrhal gastroenteritis.

Severe crypt damage with hyperplasia, dilatation and loss of glands were present in the sections of the ileum. Numerous oval to spherical, dense bodies 1 to 4 μm in diameter were present on the luminal surfaces of the crypt epithelial cells (Fig. 1). They stained basophilic with the Giemsa method. The lamina propria and the

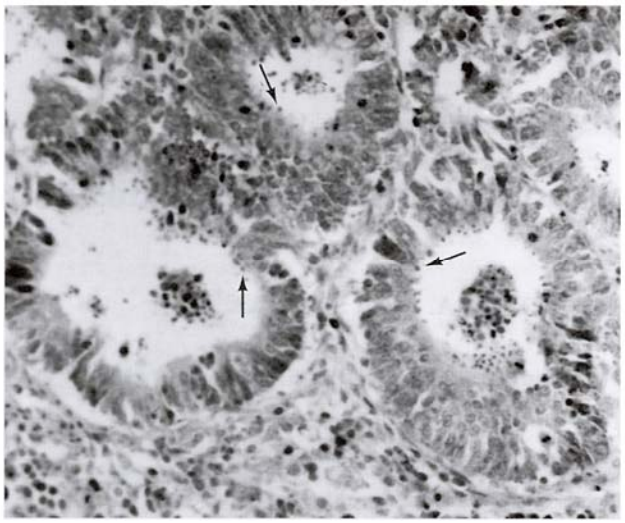

Figure 1. Photomicrograph of hyperplastic and enlarged crypts of Lieberkuhn in the section of ileum. Note numerous oval to spherical, dense bodies with 1 to 4 μm in diameter in the luminal surfaces of the epithelial cells of the crypts of Lieberkuhn (arrows). There are inflammatory cells in the lamina propria mucosa. HxE, x 400.
Şekil 1. Genişlemiş ve hiperplastik ileum liberkühn kriptlerinin mikroskobik görünümü. Kript epitellerinin lumene bakan yüzeylerinde çok sayıda, 1-4 μm çapında, yuvarlak-oval bazofilik cisimcikler ve lamina propria'da yangı hücreleri. HxE, x400.

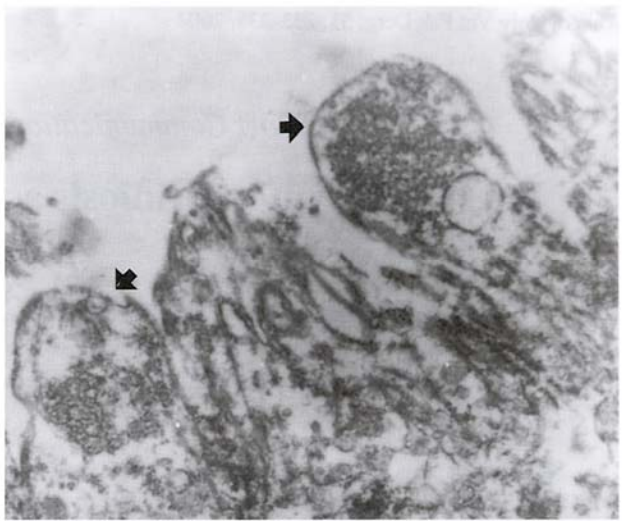

Figure 2. Two trophozoites (arrows) in ultrathin section prepared from formalin-fixed specimens of ileum. Uranyl acetate and lead citrate, x19.000.
Şekil 2. Formalinde tespit edilmiş ileum örneğinde iki trophozoitin elektron-mikroskobik görünümü. Uranil asetat ve kurşun sitrat, x 19.000.

submucosa were infiltrated predominantly with lymphocytes, plasma cells, macrophages, and neutrophils. Transmission electron microscopic examination of ultrathin sections prepared from formalin-fixed specimens of ileum demonstrated the organism to have morphologic characteristics consistent with the genus *Cryptosporidium*, but the state of preservation of organisms was not good and only trophozoites were identified to be consistent with the asexual cycle (Fig. 2).

Additionally, the sections examined immunohistochemically for canine distemper virus antigens demonstrated immun reactivity in the crypt epithelial cells, although eosinophilic inclusion bodies were not observed under light microscopy.

A definitive diagnoses of canine distemper and intestinal cryptosporidiosis were made on the basis of the clinical signs, serology, histology, immunohistochemistry, and electron microscopy.

Following the first report referring to cryptosporidial infection in dogs indicated that antibody to *Cryptosporidium* was found in sera of dogs (14), the first clinical canine intestinal cryptosporidiosis was reported by Wilson and Holscher, 1983 (16). This and subsequent reports on intestinal cryptosporidiosis in the domestic dog have usually involved the young or immunosuppressed animal and, ages of affected animals have been less than 6 months-of-age and have had clinical signs attributable to concurrent diseases (6, 13, 15, 16). Due to concurrent infections, the role of *Cryptosporidium* infection in the diarrhea or enteritis could not be usually determined.

Host immunity status appears to be important in determining extent and severity of enteritis caused by *Cryptosporidium* spp. The virulence of *C. parvum* isolates may vary, possibly reflecting the difference in genotypes (3). In the case reported here, the enteritis was severe and may have been exacerbated by concurrent *Cryptosporidium* infection, but it was difficult to ascertain the respective role of each organisms in the pathogenesis of diarrhea because both distemper and intestinal cryptosporidiosis may have been the primary cause of diarrhea in this dog. It may be considered that the presence of *Cryptosporidium* spp was not an incidental finding and was associated with morphological evidence of disease. However, it was clear that immunsupression by canine distemper virus resulted increasing susceptibility to cryptosporidial infection. Otherwise, it could be expected that infection is subclinical as well as most pet animals.

The agent involved is morphologically indistinguishable from *C. parvum*, but other species infecting the intestine may exist. It must be considered that the possible role of pet animals as reserviors of *Cryptosporidium* infection and that additional studies are needed to clarify its role as a primary pathogen in dogs.

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