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Seroprevalence of Canine Adenovirus (CAV) Infection in Kars Dogs in Turkey

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SUMMARY

Aim of this study was to serologically investigate the CAV infection in Kars Dogs from Kars region of Turkey. In the present study, 57 adult male and 37 female (above 1 year old) Kars Dogs were used. For this purpose, samples were collected from Kars Dogs (94) in Kars region of Turkey. None of these dogs are vaccinated against CAV types before. Definite health records of the sampled dogs are not obtained, so any clinical symptoms is not known. In this study, the seropositivity of CAV was found as 65.95 % (62/94). The proportions of seropositive male and female Kars Dogs were 63.15% (36/57) and 70.27% (26/37), respectively. The infection was studied for the first time in Kars Dogs of Turkey.

Key Words

Canine adenovirus, Kars Dog, Seroprevalence

Kars Çoban Köpeklerinde Canine Adenovirus (CAV) Enfeksiyonunun Seroprevalansı

ÖZET

Bu çalışmada, Kars yöresinde sahipli Kars Çoban Köpeklerinde canine adenovirus enfeksiyonunun seroprevalansı araştırıldı. Bu amaçla daha önce CAV'un herhangi bir serotipine karşı aşılanmamış 57 adet erkek ve 37 adet dişi olmak üzere toplam 94 adet (1 yaşından büyük) Kars Çoban Köpeği örneklendi. Araştırmada örneklenen populasyonda CAV enfeksiyonunun seroprevalansı %65.95 (62/94) olarak tespit edildi. Seropozitiflik oranlarının cinsiyete göre dağılımı ise erkekler ve dişilerde sırası ile %63.15(36/57), %70.27 (26/37) bulundu. Bu çalışma Kars Çoban Köpeklerinde CAV enfeksiyonu ile ilgili yapılan ilk araştırmadır.

Anahtar Kelimeler

Canine adenovirus, Kars Çoban Köpeği, Seroprevalans

INTRODUCTION

The two diseases caused by canine adenoviruses (CAV) are the most important adenovirus infections of animals worldwide. Infections canine hepatitis, caused by CAV type 1, dogs younger than one year of age are the most often affected (Carter et al. 2005) also an important pathogen of foxes, wolves (Stephenson et al. 1982), coyotes (Cypher et al. 1998), skunks and bears (Dunbar et al. 1998). Other carnivores may be latent carrier of the virus. The disease occurs world widely, but is uncommon where vaccination is practiced (Carter et al. 2005). In fact, CAV type 1 was recognized as a specific viral disease of dogs by Rubarth in 1947. In dogs, the virus may also cause respiratory or ocular disease, encephalopathy, chronic hepatitis and interstitial nephritis. CAV type 2 causes respiratory disease with tonsillitis, pharyngitis, tracheitis, bronchitis and bronchopneumonia (Murphy et al. 1999). Although there was antigenic relatedness and cross-protective immunity between two types (Emery et al. 1978), restriction endonuclease analysis shown that they are genetically different viruses (Assaf et al. 1983). The main transmission routes of the diseases are oro-nasal exposure to contaminated saliva, urine and feces (Cabasso 1981). Recovered dogs may shed virus in their urine for up to 6 months (Murphy et al. 1999).

Clinical period of CAV type 1 lasts up to one week in

normal conditions, rarely some dogs can develop chronic hepatitis, this situation is generally seen in the presence of concurrent infections. The incubation period is 4 to 7 days (Green 1990). Clinical signs include depression, fever, vomiting, diarrhea, and nasal and ocular discharges, rhinitis, ataxia, anorexia, tonsillitis, abdominal pain, blood in feces, acute/chronic hepatitis and interstitial nephritis. Encephalitis is not an often event but deaths can occur in very short time with lethargy, ataxia, blindness and vomiting findings. Because of a tendency to bleed, hematomas may be seen in the mouth (Carter et al. 2005; Caudell et al. 2005). Recovered dogs may develop a transient corneal opacity ("blue eye") as a result of local immune complex deposition. Recovery from infectious canine hepatitis (ICH) results in lifelong immunity (Carter et al. 2005; Carmichael 1965; Wright 1976).

CAV type 2 causes an infection of the respiratory tract that is usually unapparent or mild. It has been implicated as one of the causes, not the most important, of the common widespread disease kennel cough or infectious canine laryngotracheitis, which is associated with kennels and animal hospitals. The etiology of kennel cough is complex. Canine parainfluenza 2 and *Bordetella bronchiseptica* seem to also play major roles (Carter et al. 2005).

CAV resembles several other viral infections of dogs, so that a definitive diagnosis requires laboratory confirmation. Several methods such as enzyme linked

immunosorbent assay (ELISA) (Robinson et al. 2005), polymerase chain reaction (PCR), virus isolation (Kerstin et al. 2004), electron microscopy (Castleman 1985), haemagglutination inhibition (HAI), serum neutralization (SN) (Mouzin et al. 2004) and complement-fixation (Ditchfield et al. 1962) can be used to diagnose the CAV infection. Indirect ELISA is also one of the most sensitive, reliable and fast method (Noon et al. 1979).

Aim of the present study is to investigate the CAV infection serologically in Kars Dogs in Kars region of Turkey.

MATERIAL and METHODS

Serum Samples

In the present study, a total of 94 unvaccinated Kars Dogs above 1 year old (57 adult male and 37 female) were examined from several different villages Kars region of Turkey were owned by farmers. None of the dogs were vaccinated against these viruses, so secondary immunisation is not concerned in this study. Definite health records of the sampled dogs were not obtained so animals history of diseases was not available showed clinical symptoms or not.

Blood samples were centrifuged in the laboratory at 3000 rpm for 15 min and separating serum samples were collected and kept in freezer (-20°C) until to use.

Enzyme Linked Immunosorbent Assay (ELISA)

For detection of CAV antibodies, a commercial indirect ELISA (European Veterinary Laboratory-Netherlands) was used. Test was performed according to the manufacturer's directions. The results were evaluated by reading of plates at 450 nm on a spectrophotometer at the final step.

Statistical Analysis

Chi-square (χ^2) method was used to compare the proportion of positivity to CAV infection between male and female (SPSS 1999). Significant level was set at $P < 0.05$.

RESULTS and DISCUSSION

The proportion of dogs having antibodies to CAV was 65.95% (62/94). The proportions of seropositive male and female Kars Dogs were 63.15% (36/57) and 70.27% (26/37) respectively. This difference was not statistically significant ($\chi^2=0.24$, $P=0.6$).

This study investigated the presence of CAV serologically in Kars Dog breed in Kars region, where the main income is animal husbandry and rearing, therefore majority farmer has a shepherd dog.

Kars Dogs are bred in the Northeast part of Turkey, especially in the Kars region. This region of Turkey neighbors other Caucasian countries. Kars Dogs are characteristically similar to the Caucasian Ovcharka, present in Georgia, Armenia, Azerbaijan and Iran (Kırmızıbayrak 2004). Kars Dogs are specific Turkish livestock-guarding breed gathered under the general rubric of Turkish shepherd dogs (Kırmızıbayrak 2004; Nelson 1996).

These animals have mostly been used for shepherd dogs in small-medium scale private goat and sheep breeding enterprises, so number of the dogs per farm was among 1 to 6.

The Kars regions of Turkey has a large Kars Dog population and this dogs are used for livestock-guarding and property protection so, these dogs are very important

in the live of human in the region and investigation and control such diseases are important.

Canine Adenoviruses infection is widespread infections in whole world, seropositivity proportion ranged from 30% to 82% in the dogs (Bohm et al. 2004; Sasaki et al. 1956; Rubarth 1947). Okuyan (1975) was the first reported ICH in dogs in 1975 in Turkey.

In this study, total of 62 out of 94 (65.95 %) Kars Dogs by ELISA were found to be positive for CAV infections. The proportions of seropositive male and female Kars Dogs were 63.15% (36/57) and 70.27% (26/37) respectively. This was not significantly different.

The ELISA was known as efficient test to detect the immune response of dogs to canine adenoviruses. However, the kit used for antibody detection in this study can not discriminate the CAV type 1 and 2. The obtained values include the both type, so it is not possible to indicate type differences. The determined proportions are very high in this study. The figure obtained here is comparable to previously reported proportion in dogs in Turkey. We know that both infections, especially CAV type 2 can be silent in adult dogs. Therefore, vaccination including both types should be practiced in order to control and the disease.

In conclusion, CAV infections were found to be very prevalent in Kars Dogs (65.95 %) and the infection was studied for the first time from Kars region of Turkey in Kars Dogs.

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