

Prevalence of Canine Parvovirus Infection in Street Dogs in Mymensingh Municipality area, Bangladesh

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ABSTRACT

Canine parvovirus (CPV) is a highly contagious infectious disease of dog characterized by severe gastroenteritis but so far there is no first-hand data on CPV reported in Bangladesh. Therefore, this cross-sectional survey was carried out for the antigenic detection of CPV in thirty randomly selected street dogs captured throughout Mymensingh municipality of Bangladesh over the period from January to July 2010. Rectal swab samples were collected from all dogs and tested by CPV rapid Ag test. Overall prevalence of canine parvovirus disease was recorded as 30%. Prevalence of CPV was higher in young age group than that of older age groups. Male dogs were found to be higher susceptible to canine parvovirus infection in comparison with female. Significantly higher prevalence of CPV was recorded in diarrheic dogs compared with those having no diarrhea. Dogs with poor health condition were more vulnerable to canine parvovirus infection compared to those with normal health status. This is the first published report on CPV in street dogs in Bangladesh.

Key Words: Canine parvovirus, Street dog, Prevalence, Mymensingh, BangladeshReceived: 27th January, 2014. Accepted: 20th July, 2014.

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Introduction

A dog that has no owner, and roams around irrespective of urban and rural localities is termed as street dog. Canine parvovirus (CPV) disease is one of the highly contagious infectious diseases of dogs caused by canine parvovirus type-2 (CPV-2) (Shackelton *et al.*, 2005). CPV belongs to the genus Parvovirus, along with the feline panleukopenia virus under the family Parvoviridae and it possesses a negative sense single-stranded DNA genome (Truyen *et al.*, 1994). CPV disease is characterized clinically by enteritis, leukopenia, nausea, vomiting, depression and myocarditis in puppies over the age of 2 months (Decaro *et al.*, 2007; Kang *et al.*, 2008). CPV was first isolated in USA in 1978 and was later determined to be the essential cause of severe haemorrhagic enteritis in puppies all over the world along with other three viruses such as canine coronavirus; canine rotavirus and canine distemper virus (Pollock and Carmichael, 1983). CPV commonly spreads through feces and is stable in the environment and resistant to the effect of heat, detergent and alcohol and therefore can be recovered from dog feces even after three months at room temperature (Radostits *et al.*, 2008).

Except pet dogs, vaccination against any infectious diseases in street dogs has not been practiced in Bangladesh. Street dogs impose burden on the community in a number of ways: transmission of infectious disease to human like rabies, parvovirus and other zoonoses are of paramount importance (Bronson *et al.*, 2008). Along with increasing number of pet dogs in Bangladesh in recent years, CPV disease has emerged as a public health concern. Serosurveillance of canine diseases would provide information about the existence and immune status; and it is also considered important for the development of new vaccines and establishment of vaccination programs to prevent CPV infection among canine population.

The outbreak of CPV disease in dogs has been reported in Thailand (Sakulwira *et al.*, 2003), in USA (Lamm and Rezabek, 2008) and in Portugal (Santos *et al.*, 2009). Though diarrhea is one of common clinical features encountered by the pet practitioners, but to date, there is no published literature on canine parvovirus disease of dogs in Bangladesh. Therefore this study was conducted to investigate whether if CPV disease currently exists in street dogs in the study areas.

Materials and Methods

A cross-sectional study was conducted on a total of thirty street dogs of different age and sex in Mymensingh municipality town in Bangladesh over the period from January to July 2010. The street

dogs (Fig. 1) used to roam around waste-bin, bush, road-side, rail way station and other cruddy place for searching their food. Irrespective of sex, the body weight of the dogs ranged between 14 kg and 26 kg.

Street dogs were caught for euthanasia as a part of rabies control campaign operated by the municipality corporation. Before euthanized, rectal swabs were collected by using sterile cotton swab provided with kit (RapiGEN Inc., Korea, 2004) and kept in top-off extraction bottles containing assay buffer and mixed properly. The extraction bottles were then transferred to the laboratory using ice-box and kept at 2-4°C until tested. Clinical evidence of presence of diarrhea; age, sex and health status of dog were noted carefully. Age of the dog was determined by examination of teeth (De Lahunta and Habel, 1984). Health status of the dog categorized into poor health status and normal healthy dogs based on body condition.

**Fig 1. Street dogs used for sampling****Fig 2. Result window of test kit showing two purple colour bands (C and T) indicating Canine parvovirus (CPV) positive result (sample no. 04) and showing only one purple colour band (C) indicating CPV negative result (sample no. 24)**

Rectal swab samples were examined using a commercial rapid CPV Ag test kit (RapiGEN Inc., Korea, 2004) following the manufacturer's instruction. This chromatographic immunoassay can qualitatively detect the canine parvovirus antigen in intestinal content with a limit about 104.5 TCID₅₀/0.1 ml (Esfandiari and Klingeborn, 2000). Before testing, the extraction bottle were kept at room temperature for a short time and about four drops of supernatant were poured into the sample well (S) by squeezing the buffer bottle. As the test began to work, a purple colour band was observed moving across the result window in the center of the test device.

Interpretations of test results were also performed within 4-5 minutes. The appearance of only one band (control band, C) within the result window indicated a negative result while appearance of two bands (test band, T and control band, C) within the result window, no matter which band appeared first, indicated a positive result (Fig 2). If the control band (C) was not visible within the result window after performing the test, the result was considered invalid (Esfandiari and Klingeborn, 2000).

The exact binomial confidence interval of the proportions were estimated to evaluate the association of the test results with age, sex, health status and presence of diarrhea by using STATA 12 (StataCorp, 2011) for windows.

Results and Discussion

Of thirty dogs tested, nine were positive for CPV Ag accounting the prevalence of canine parvovirus disease as 30%. Canine parvovirus

is one of the most common and highly contagious viral enteritis of dog especially for puppy. Though diarrhea is one most commonly observed clinical illness of dogs, but to our knowledge, this is the first time report on prevalence of canine parvovirus in dogs in Bangladesh. The prevalence of canine parvovirus infection was reported as 77-80.4% in Thailand (Decaro *et al.*, 2009), 82.9% in Korea (Corrium *et al.*, 2007) and 6% in Lithuania (Grigonis *et al.*, 2002). In this study, rectal swab samples of dogs were used instead of expelled fecal sample that has positive influence on the sensitivity of test. However, still it is not clear if apparently health dogs with positive test result caused by carrier state. Dogs for this study were divided into three age groups such as 1-6 months, 7-12 months and more than 12 months. Prevalence of canine parvovirus was significantly higher in 1-6 months and 7-12 months age groups as compared to more than 12 months age groups (Table 1).

Table1. Prevalence and associated risk factors of canine parvovirus in street dogs in Mymensingh municipality, Bangladesh.

Variables	Category levels	No. of sample tested	Positive cases	Prevalence and 95% Confidence interval
Age	1-6 months	15	5	33.33 (15.18 - 58.29)
	6-12 months	6	2	33.33 (9.68 - 70)
	> 12 months	9	2	22.22 (6.32 - 54.74)
Sex	Male	16	6	37.5 (18.48 - 61.36)
	Female	14	3	21.4 (7.57 - 47.59)
Diarrhea	Presence	14	8	57.14 (32.59 - 78.62)
	Absent	16	1	6.25 (1.11 - 28.33)
Health status	Apparently normal health	10	2	20 (5.67 - 50.98)
	Poor health	20	7	35 (18.12 - 56.71)

Sex related prevalence revealed that CPV infection was more prevalent in male dogs than female dogs. Male dogs are more susceptible than female to CPV infection which was in agreed with report of Parthiban *et al.* (2010). Dogs having signs of diarrhea are more vulnerable to canine parvovirus infection compared to that with no diarrheic signs. Dogs with poor health condition are more susceptible to canine parvovirus infection compared to those with apparently normal health status.

Conclusions

In conclusion, as street dogs can play an important role as a reservoir of infectious agent including CPV for pet dogs, the management of street dogs is therefore rationale to prevent the spreading of the diseases. Even though the sample size of current study is very small but the result carry first-hand information about the existence of canine parvovirus disease among street dogs in Bangladesh and further in depth epidemiological and microbiological study is required for better understanding the nature of infection, transmission patterns and its management of this infection.

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