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Research paper

Prevalence of canine parvoviral enteritis in pet dogs at Dhaka city of Bangladesh

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Abstract

Background: Canine parvoviral enteritis is a highly contagious viral disease of dog that can lead to life-threating illness.
Objectives: The present study was conducted to determine the prevalence of canine parvoviral enteritis in dogs of Dhaka City Corporation, Bangladesh.
Methods: A total of 545 dogs were examined at Dr. Sagir's Pet Clinics and Research Centre, Dhaka during September 2016 to August 2017. The disease was diagnosed on the basis of clinical history, clinical signs and by CPV rapid Ag kit test.
Results: Overall prevalence of canine parvoviral enteritis was recorded as 13.94%. The prevalence of canine parvoviral enteritis varied significantly ($p<0.05$) among different aged groups (23.63%, 10.63%, 8.27% in 0-6 months, 7-12 months and above 12 months respectively). Considering seasonal influences, highest prevalence was found in summer season (17.5%) followed by winter (12.12%) and rainy season (11.66%) which was statistically insignificant ($p>0.05$). Male dogs (18.74%) were found to be significantly ($p<0.05$) higher susceptible in comparison with female (11.00%).
Non-vaccinated dogs (80.0%) were at greater risk than vaccinated (2.58%), ($p<0.05$). There was significant ($p<0.05$) difference among various breeds where German Shepherd (40.78%) had highest prevalence of canine parvoviral enteritis followed by Labrador (22.36%), Rottweiler (21.05%), Doberman (13.15%) and cross breeds (4.4%). Dogs with poor health condition (20.75%) were more vulnerable than apparently healthy dogs (7.5%), ($p<0.05$).
Conclusion: This result provides an empirical scenario of canine parvoviral enteritis in Dhaka city. Effective routine vaccination and control measures may reduce the disease burden in dog population.

Keywords: *Bangladesh; Canine Parvoviral Enteritis; Dhaka; Dog; Prevalence.*

1. Introduction

Companion animals like dog and cat, play an important role in societies throughout the world. People keep pet animals for their physical, social and emotional satisfaction (Robertson et al. 2000). In Dhaka city of Bangladesh, pet dogs are suffered from many diseases but pet owners are not much aware of health condition of their pets. Pet dogs have been imported from abroad and are sold at Katabon Market at Dhaka city of Bangladesh. Therefore rearing of pet animals has become very common in Dhaka city of Bangladesh (Runa et al. 2016). However, there had very few studies on canine parvoviral enteritis like contagious disease of pet dogs.
Canine parvovirus (CPV) infection is a highly infectious and contagious viral disease of canine especially of dogs. This viral agent is a single stranded DNA genome, non-enveloped virus belonging to the family Parvoviridae (Aappel et al. 1979). This virus was first isolated in 1978 in the USA (Pereira et al. 2000). Canine parvovirus (CPV) infection is one of the causal agents for neonatal death in dogs (Tattersall et al. 2005). This virus may infect all age groups of dogs but high affinity among puppies of 3 month of age and unvaccinated puppies (Godsall et al. 2010 and Behera et al. 2015). Male dogs are more prone to canine parvoviral enteritis than females. Dogs get access to outside environment and contact to virus which may contribute to occurrence of the disease (Houston et al. 1996). Seasonal influence may observed in different geographical areas but in some regions, that has differed or been non-existent (Kalli et al. 2010). Canine parvovirus gain access through the faecal-oral route when virus shed through the feces, vomit or fomites to the environment. Before few days onset of clinical signs, shedding of virus is initiated and persists for 7 days (Macartney et al. 1984). Canine parvoviral enteritis is mainly manifested by vomition, brownish or bloody foul smelling diar-

rhoea and dehydration (Pollock & Coyne 1993). In some affected dogs mucosal pallor, prolonged capillary refill time, or rarely hypothermia may be found. Tubular mass as a result from intestinal intussusception may be perceived by abdominal palpation (Kalli et al. 2010). Clinical manifestations of canine parvoviral enteritis depends on different factors like stressful environment; age and immunity of dogs; pre-existing parasitic, bacterial or viral infection and virulence properties of virus (McAdaragh et al. 1982 and Hoskins 1997). Breeds status is also a major issue of consideration as the occurrences is mostly observed in Doberman, Rottweiler and German shepherd (GS) dogs (Ling et al. 2012). Considering the mentioned facts, present research work was undertaken to assess the prevalence and the risks factors associated with canine parvoviral enteritis in the pet animals of Dhaka City Corporation.

2. Methods

2.1. Study area and study duration

The study was carried out at Dr. Sagir's Pet Clinics and Research Centre to determine prevalence of canine parvoviral enteritis in dog in Dhaka City Corporation, Bangladesh during September 2016 to August 2017. A total of 545 dogs were examined in the clinics during the study period of which 76 dogs of different breeds were affected with canine parvoviral enteritis.

2.2. Diagnosis of disease

Diseases were diagnosed based on clinical history, clinical examination and CPV antigen kit test. Clinical history was collect from owner using a preformed questionnaire. Health status of the dog categorized into poor health status and normal healthy dogs based on body condition.

Fig. 1: A German Shepherd Affected with Canine Parvoviral Enteritis Manifests Bloody Diarrhoea at Dr. Sagir's Pet Clinics and Research Centre.

CPV antigen kit test: For antigen kit test (using a commercial CPV test kit), rectal swab were collected from the infected dogs and inserted into the specimen tube containing 1ml of assay diluent and mixed properly. After few minutes, about four drops of supernatant fluids were collected from disposable dropper and poured into the sample well. If control band (C) and test band (T) appeared at a time within 4-5 minutes that indicate the test is positive. If only control band (C) appears that indicate test is negative. No appearance of any of the band indicates the error in performing test.

2.3. Data analysis

All the data were input into Microsoft office excel-2010. Then the obtained data were stored, coded and exported to STATA version-13/C for analysis. The results were expressed in prevalence percentage according to age, seasons, sex, breed, immune status and health status. To assess the association between different variables p-value with chi-square test was performed with 95% level of confidence and 5% level of significance.

3. Results

In Dr. Sagir's Pet clinics and Research Centre, 76 positive cases for canine parvoviral enteritis were identified out of 545 clinically sick dogs. Prevalence of canine parvoviral enteritis with different risk factors (age, season, sex, immune status, breed status, health status) are summarized in Table 1.

During the study period, the overall prevalence of canine parvoviral enteritis at Dr Sagir's pet clinics and Research centre in Dhaka city of Bangladesh was recorded as 13.94%. Among three categories of age group (0-6 months, 7-12 months and above 12 months) at the age of 0-6 months, 39 pet dogs out of 165 were found as diseased; at 7-12 months aged group, 25 pet dogs out of 235 and above 12 months aged group, 12 pet dogs out of 145 were found diseased. The prevalence of canine parvoviral enteritis in different age group differed significantly ($P<0.05$) and these were 23.63% for 0-6months, 10.63% for 6-12 months and 8.27% for above 12 months of ages. As contribution of seasonal risk factor, 35 positive cases were found as canine parvoviral enteritis out of 200 at summer season, 20 positive cases were found out of 165 at winter season and 21 positive cases were found out of 180 hospitalized dogs. The prevalence of canine parvoviral enteritis in different season were differed insignificantly ($P>0.05$) and these were 17.5% at summer season, 12.12% at winter and 11.66% at rainy season. While considering gender, 40 canine parvoviral enteritis positive cases were found out of 218 hospitalized male dogs and 36 out of 327 female hospitalized dogs. In sex category the prevalence was significantly ($P<0.05$) higher in male (18.74%) than female (11.0%). Although vaccination was performed in 465 numbers of hospitalized dog but still 12 cases were found as canine parvoviral enteritis-positive and out of 80 non-vaccinated dogs, disease was developed in 64 dogs. The prevalence was significantly ($P<0.05$) higher in non-vaccinated (80.0%) than vaccinated (2.58%) group. Among different breeds, 74 positive cases were found as positive out of 500 pure dogs. Among them, German Shepherd was 40.78%, Labrador was 22.36%, Rottweiler was

21.05% and Doberman was 13.15%. Among 45 number of cross breeds, 2 positive cases were detected as canine parvoviral enteritis. The prevalence of canine parvoviral enteritis in different breeds were substantially significant (P<0.05). While considering health status, out of 280 apparently healthy dogs, 21 were found to be positive and 55 positive cases were found out of 265 poor health condition of hospitalized dogs. This depicts that, the prevalence of canine parvoviral enteritis were differed significantly (P<0.05) and higher at poor health status (20.75%) than apparently normal health status (7.5%).

Table 1: Prevalence of Canine Parvoviral Enteritis According to Different Risk Factor at Dhaka City

Variables	Categories	No of observation (N=545)	Positive case	Prevalence (%)	P-value
Age	0-6 month	165	39	23.63	0.000077
	7-12 month	235	25	10.63	
	>12 month	145	12	8.27	
Season	Summer(March to June)	200	35	17.5	0.188039
	Rainy(July to October)	180	21	11.66	
	Winter (November to February)	165	20	12.12	
Sex	Male	218	40	18.74	0.0153
	Female	327	36	11.00	
Immune Status	Vaccinated	465	12	2.58	0.000001
	Non-vaccinated	80	64	80	
Breed	German Shepherd	113	31	40.78	0.0000446
	Labrador	130	17	22.36	
	Rottweiler	125	16	21.05	
	Doberman	132	10	13.15	
	Cross	45	2	4.44	
Health status	Apparently Good health	280	21	7.5	0.000008
	Poor health	265	55	20.75	

4. Discussion

In the present study, overall prevalence of canine parvoviral enteritis was observed as 13.94%. This result conforms to the report of Runa et al. (2016) who recorded the prevalence of canine parvoviral enteritis in Dhaka city of Bangladesh as 15.95%. However, the prevalence of canine parvoviral enteritis was higher in Korea (82.9%) (Kang et al. 2008) and Lahore (22.7%) (Umar et al. 2015) but lower in Lithuanina (6%) (Grigonis et al. 2002).

This study revealed that prevalence of canine parvoviral enteritis was 23.63% for 0-6months, 10.63% for 6-12 months and 8.27% for above 12 months of ages. This study strongly supports to the report of Runa et al. (2016) and Islam et al. (2014). Young puppies are very susceptible to infection, particularly because, maternal antibody to parvovirus has a biological half-life of approximately 10 days, and as this natural immunity derives from mother decline puppies become susceptible to infection (Pollock & Coyne 1993 and O'Brien 1994). This study depict that prevalence of canine parvoviral enteritis was higher in summer season (17.5%) followed by winter (12.12%) and then rainy season (11.66%). This report agrees with the observation of Umar et al. (2015) and Islam et al. (2014). However, Houston et al. (1996) found in Canada that dogs were more likely to be admitted with canine parvoviral enteritis in July to September than in other months of the year, which indicates the times when dogs allows the outdoors and associate with virus in the environment.

It was observed in the present study that the prevalence of canine parvoviral enteritis is higher in male (18.74%) than female (11.0%). This result is in agreement with the observation of Islam et al. (2014) and Hasan et al. (2017) who reported that the prevalence of canine parvoviral enteritis was higher in male than female. Effective immunization has been admitted to be essential in the prevention of canine parvoviral enteritis to susceptible puppies. This study showed that non-vaccinated (80.0%) dogs have higher susceptible than vaccinated animal (2.58%). This result agreed with Hasan et al. (2017) who found that non-vaccinated (64.0%) dogs are more likely affected with canine parvoviral enteritis than vaccinated (8.8%) dogs. Godsall et al. (2010) described that unvaccinated puppies aged between six weeks and six months are at greatest risk of developing canine parvoviral enteritis. The higher prevalence of canine parvoviral enteritis in non-vaccinated dogs may due to lack of protective immunity. Some of the vaccinated dogs were also found as diseased which may be occurred due to incomplete or ineffective primary vaccination course, or vaccination failure (Hasan et al. 2016).

This study revealed that pure breed like German shepherd (27.43%), Labrador (13.07%), Rottweiler (12.8%), Doberman (7.57%) are more prone to canine parvoviral enteritis than cross breed (4.4%). It has been reported that pure breed like Doberman pinscher, Rottweiler and German shepherd are at greater risk of canine parvoviral enteritis which may be due to inherited immunodeficiency as well as the fact that have relatively higher prevalence of Von Willebrand's disease (Uzuegbu 2015). Health status also plays a major rule in the occurrence of disease as the prevalence of canine parvoviral enteritis is higher in those dogs having poor health condition (20.75%) than dogs having apparently normal health status (7.5%). This result agrees with the report of Islam et al. (2014) who observed that dogs with poor health condition (35.0%) are more prone to canine parvoviral enteritis compared to apparently healthy dogs (20.0%)

5. Conclusion

This study represents the status of canine parvoviral enteritis in Dhaka city of Bangladesh which is a major threat for pet dogs. Dogs of all ages and breeds are susceptible but puppies and pure breeds are more likely to be infected. However, the hygienic measures and proper vaccination strategies are fundamental principles to reduce the occurrence of this disease. Further study should be conducted for better understanding the spread of disease and its management.

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