A Retrospective Study of Parvovirus Infection in Dogs in Kathmandu

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ABSTRACT

Canine parvo virus infection (CPVI) is highly infectious disease of dogs causing acute gastrointestinal illness in dog with high morbidity. In Kathmandu valley, knowledge on the epidemiology of diseases of dogs is limited. To determine the prevalence of disease in owned dogs in the Kathmandu valley and its associated risk factors, a retrospective study of data from clinical records of the Mount Everest kennel club (old Baneshwor height) during a one-year period was conducted. Using an Excel line graph and pie chart, the prevalence of canine parvovirus infection was examined according to season, age, and vaccination status. A total of 504 cases were seen in the 735 clinical records reviewed, of which 145 cases—or 11.01 % of all cases—had CPVI-like symptoms. The prevalence of CPVI in dogs sold by Mount Everest Kennel club in the valley was estimated to be 11.01% where high cases were observed during the dry season (peaks at April and December) though it could also reach peak during the rainy season (July-August). High number (55.6%; 45/81) of outbreaks were noted among the age group below 3 months followed by age group 4 to 7 months (33.3%; 27/81) and least number of outbreaks were noted in the age group older than 7 months (11.1%;9/81). High number (55.6%; 45/81) of outbreaks were noted among the age group below 3 months followed by age group 4 to 7 months (33.3%; 27/81) and least number of outbreaks were noted in the age group older than 7 months (11.1%;9/81). Disease incidence was highest in German shepherd (21%; 17/81), Japanese spitz (18.51%; 15/81), Labrador (18.51%; 15/81) and mixed/cross (42%; 34/81). Few Vaccinated dogs (7.4%; 6/81) were also found to be tested positive with CPVI. Our finding showed that temperature, breed susceptibility and vaccination status can be the possible risk factors associated with CPVI infection among dog population in Kathmandu valley suggesting pet owners to regularly follow the vaccination schedule, vaccinate their dogs in a timely manner, and routinely check on the health of their canines. Additionally, owners should be aware of the risks and should keep their dogs away from stray dogs.

Keywords: *Clinical, Epidemiology, Dogs, Kathmandu valley*

INTRODUCTION

Canine parvovirus (CPV) is a global infection and highly contagious viral disease that affects both stray and owned dog population with high morbidity and mortality rate. Within three to seven days of infection, canines with CPV appear with acute gastroenteritis, lethargy, vomiting, fever, and diarrhea (usually bloody) (Nelson et al., 1979; Qi et al., 2020).The disease most often strikes in pups six and twenty weeks old, but older animals may sometimes also affect. A rare variant of the disease is well known to cause myocarditis in young puppies (Ford et al., 2017). Effective vaccination and disinfection are crucial for disease dissemination and prevention in dog household and animal shelters. Although the disease is vaccinated against, still there is chance of vaccine failure among pups. CPV can affect all the dogs, but unvaccinated dogs and puppies younger than four months old are at most risk.

The season has an impact on the prevalence of the Parvo virus, with cases peaking in the dry season months compared to wet (Sayed-Ahmed et al., 2020; Shima et al., 2015). In Dry season, more number of cases were found to occur in the month of May and June whereas in the wet season, the highest incidence of parvoviruses occurred in September. On the Other hand, breed also acts as a predisposition factor for the occurrence of Parvovirus infection in the dog. The breed-wise incidence rate over positive cases was found to be higher in local or non-descriptive breeds, followed by German shepherd and other exotic breeds (Sayed-Ahmed et al., 2020). Males were more likely to contract the virus than females were, with the largest frequency of the parvo virus occurring in dog under the age of six months (Behera et al., 2015). Young, unvaccinated pups and exotic breeds were particularly vulnerable to CPV infection among other risk factors. But puppies that have received a vaccination might also get recurrent parvovirus infections(Gamage et al., 2020).

Numerous studies have documented the prevalence of canine CPV infection and its high association with various risk factors. However, the epidemiological study in the study area is still scarce. Large Nepalese regions like Kathmandu have a significant large stray dog population (Díaz-Regañón et al., 2020). Due to the fact that most owned dogs are not kept inside of their owners' homes and that contact with stray dogs is unavoidable, owned dogs are thus more likely to get an infection through stay dogs. Therefore, this study aimed to collect data from clinical case records of dogs admitted in Everest kennel club to determine the prevalence and risk factors associated with Parvo outbreak in Kathmandu Valley.

MATERIALS AND METHODS

Study location

The capital of Nepal, Kathmandu, is located in the heart of the Kathmandu Valley, a popular tourist destination. Both in terms of human and canine populations, it is one of the most populous areas of the valley. The earliest and largest kennel club in the valley, Mount Everest Kennel Club (MEKC), with branches throughout the valley, has been providing veterinary services in the old Baneshwor area since 2055. The clinic of MEKC was chosen due to its establishment year and competent clinical record keeping. At MEKC, both native and exotic dog breeds—whether they were used as pets or security dogs—were brought for vaccination or medical care.

Data collection

An analysis of clinical data base records from the previous year was done retrospectively using information from the MEKC veterinary clinic in the old Baneshwor. With the exception of instances including routine castration, deworming, immunization, general checkups, tail and ear trimming, and ear notching, all clinical cases from January 2018 to December 2018 were taken into account. The selection of canine parvo viral infection (CPVI) cases was based on the patient's history, clinical condition, results of a test using a kit for canine parvo and canine corona viruses, and necropsy findings. Dogs showing signs of at least one of the following conditions were chosen: fever, hemorrhagic diarrhea, diarrhea and vomiting, and foul-smelling diarrhea. At the Mount Everest Kennel Club, every instance of CPVI was meticulously examined taking into account the dog's history from the initial day of registration at the MEKC clinic until the day of recovery from or death from CPVI. Additionally, the day of the presentation as well as the breed, sex, quantity, and timing of the Distemper, Hepatitis, parvo, para influenza, and leptospirosis (DHPPiL) immunization doses were noted.

Statistical analysis

For descriptive analysis of variables including breed, dog's household number of CPVI incidence, cases result for positive, cases died of parvo, treatment success, vaccination status, and age, data were input into an MS Excel sheet. Following that, the data were examined using statistical techniques such as line graphs, bar graphs, pie charts, and pivot table fields with a 95 percent confidence level. Analysis of the prevalence is done to identify any relevant risk factors for CPVI.

RESULTS AND DISCUSSION

A total of 504 cases were seen in the 735 clinical records reviewed, of which 145 cases—or 11.01 % of all cases—had CPVI-like symptoms. The highest occurrence of CPVI positive cases was recorded in April and August (14.81 %) while the lowest occurrence was

recorded in June (7.40%) which is shown in Fig (1). This result was consistent with that of a retrospective research by (Khan et al., 2017), which revealed an 11.81 % prevalence in the months of April and August demonstrating a considerable increase in the occurrence of CPVI cases as the temperature rises.

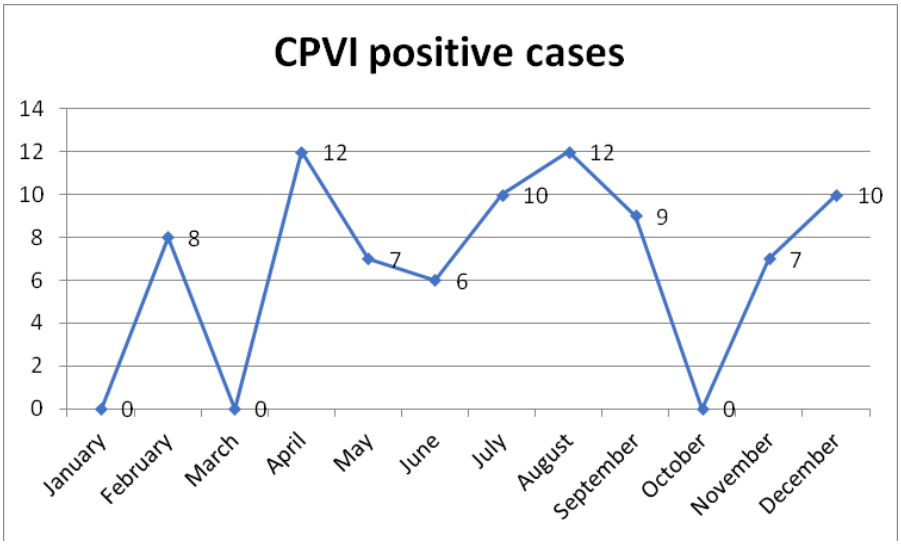

Figure 1: Graph showing month wise distribution of CPVI positive cases

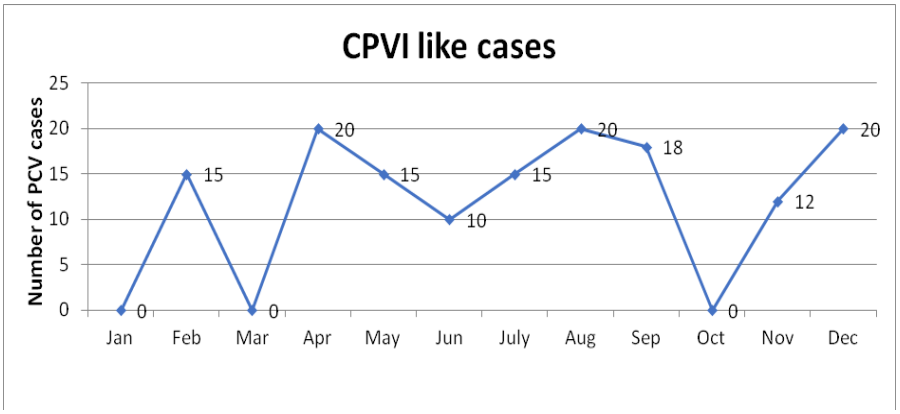

Figure 2: Line graph showing month-wise distribution of CPVI like cases

Based on age category, highest prevalence (55.6 %) was reported in puppies (below the age 3 months) and lower prevalence (11.1 %) was observed in adult dog (above 7 months). Similar age wise prevalence was also shown in a study conducted in India which showed highest prevalence of CPVI in the age group of 1-3 month (27.59%) and lowest prevalence in the adult dog (3.45%)(Behera et al., 2015). Similar data were also reported

by (Khare et al., 2019), who found that dogs aged 0 to 3 months had a prevalence of 11.9 %, followed by those aged 3-6 months by 7.09 %, and those aged 6 to 12 months by 5.31 %. The virus' attraction for quickly proliferating intestinal crypt cells in weaning pups with higher mitotic index due to changes in bacterial ecology as well as in the food related to weaning may account for the highest prevalence of CPVI in puppies under 3 months (Stepita et al., 2013).

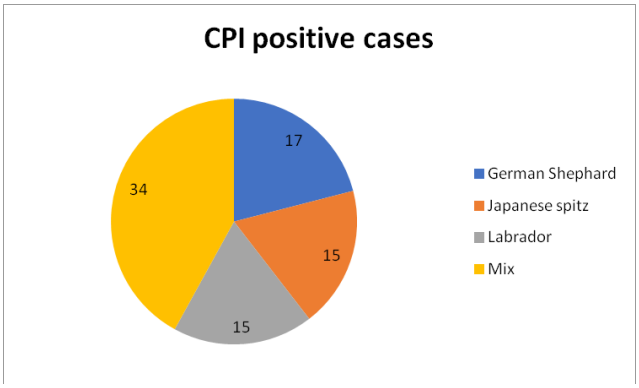

Figure 3: Pie chart showing breed-wise prevalence of CPVI

According to Breed, mix breed showed highest prevalence (42 %) followed by German shepherd (21%), and equal incidence was observed in Japanese spitz and Labrador (18.5%) which is shown fig (3). This result was in contrast to an epidemiological research of canine parvovirus infection carried out in India, which showed that the local breed had the highest frequency followed by the German shepherd and an equal incidence in mixed breed and Labrador retrievers. However, both results showed that the German shepherd came in second, suggesting that breed of the dog might be predisposing factor for occurring of the disease. Our findings are reasonably similar to the research of (Glickman et al., 1985), which revealed the greatest incidence of CPVI in mix breed, followed by German shepherd and other exotic breed. This suggests that there may be breed-related susceptibility to CPVI.

Based on vaccination status, a lower incidence (7.4%) was recorded among dogs that had received vaccinations as compared to dogs that had not received (92.59%). This shows that dogs that have not had vaccines have a higher chance of developing CPVI than those who have, and this is corroborated by a number of studies (Francis et al., 2020; Khan et al., 2017; Sayed-Ahmed et al., 2020). Due to vaccine failure, dogs continue to get CPVI after receiving extensive vaccinations, and it remains a significant source of infection among dogs (Decaro et al., 2020).

CONCLUSION

Our findings indicated that CPVI was more prevalent in the warmer months of the year

and in pups (below 3 months) respectively. Additionally, vaccinated dogs are less likely to get the infection. We recommend pet owners to regularly vaccinate their dogs in a timely manner, and routinely check the health of their canines. Also, we suggest owners to take precautions to keep their dogs away from stray dogs.

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