Epidemiology of Parvovirus and Corona Virus Infections in Dogs in Assam*

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Abstract
The canine parvovirus (CPV) and canine corona virus (CCV) infections were detected in faecal samples of 178 diarrhoeic dogs from Kamrup district of Assam by using sandwich ELISA. The prevalence rate of CPV and CCV infections were recorded as 25.25 and 19.28 percent, respectively with a mixed infection of 4.49 percent. Higher incidence of CPV and CCV infections were recorded in the age group of 4-6 months (41.86%) (significant, P<0.05) and 0-3 months (26.67%), respectively. Occurrence of CPV was recorded highest (significant, P<0.05) in pre monsoon (43.18%) followed by winter (34.62%). Breed wise variation of CPV was found significantly higher (P<0.05) in German spitz (45.95%) than other breeds. The season and breed wise variation of CCV infection was statistically non-significant. Similarly, sex wise variations of CPV and CCV were statistically non-significant. The CPV infection was recorded as 9.52 percent in vaccinated and 30.15 percent in unvaccinated dogs with case fatality rate of 17.78 percent.

Introduction
Canine parvovirus (CPV) and canine coronavirus (CCV) infections have been recognized as most common causes of vomition and haemorrhagic diarrhea in young puppies and adolescent dogs. High fatality (50-100%) in acute CPV infection is probably the result of complications due to vomition, haemorrhagic diarrhea, dehydration, electrolyte imbalance, endo-toxaemia and bacteraemia (Puscasu, 2002). Although CCV infection is widespread, it is mild and often less effusive than parvo viral diarrhea. Following the initial reports of CPV (Balu and Thangaraj, 1981) and CCV (Ganesan et al. 1990) infections, sporadic outbreaks of parvoviral enteritis and few corona viral enteritis have been reported from different parts of India (Banja et al., 2002). In Assam, the knowledge of canine viral gastroenteritis is scant. The present paper describes the epidemiology of CPV and CCV infections from Kamrup district of Assam based on sandwich ELISA.

Materials and Methods
The epidemiology of CPV and CCV infections was studied in 178 numbers of diarrhoeic dogs for one calendar year divided into four different seasons, viz. pre-monsoon (March, April and May), monsoon (June, July, August and September), post-monsoon (October, November and December) and winter (January and February). The diarrhoeic dogs were categorized into five age groups viz. 0-3, 4-6, 7-9, 10-12 and above 12 months.

The CPV and CCV antigens in faecal samples were detected by sandwhich ELISA (Rhimmelzwaan, et al. 1991). Faeces from rectum of dogs was collected by introducing a sterile cotton swab soaked in 0.05 M phosphate buffer saline (PBS, pH 7.4) and immediately transferred to the laboratory in an ice box. The sample was centrifuged at 5000 rpm for 20 min and the supernatant was collected and preserved at -20°C till further use as test virus antigen. For ELISA, CPV and CCV specific antibodies were raised in rabbit and dog (Ramadass and Khader, 1982). Rabbit anti CPV and anti CCV serum (showing >500 and 300) and dog anti CPV and CCV serum (showing >200 and 100), respectively were aliquoted in one ml vials and stored at -20°C until further use. The statistical analysis of the data was carried out as per standard procedures.

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Results and Discussion

The prevalence rates of CPV and CCV infections were found to be 25.28 and 12.92 per cent, respectively. The case fatality rate of CPV infection was 17.78 percent. The prevalence of CPV and CCV infections were found to vary from 19.73 to 72.90 per cent and 6.4 to 18.70 percent, respectively in different parts of India (Joshi et al., 2000 and Sekar et al., 2001).

Age group susceptibility showed the highest prevalence of CPV in 4-6 months (41.86%) with a decreasing trend along with the advancement of age and was significantly higher (P<0.05) than above 12 months (10.53%). The higher susceptibility of pups below six months to CPV infection might be due to the fact that the virus has tremendous affinity for rapidly multiplying intestinal crypt cells in weaning pups with higher mitotic index due to changes in bacterial flora as well as in the diet. However, the lower incidence of CPV in 0-3 months than 4-6 months might be due to protection conferred by maternal antibodies due to wide practice of vaccination in bitches. The maximum prevalence of CCV infection (26.67%) were found in the age group of 0-3 months which decreased along with advancement of age and it might be due to weaning stress co-incident with the waning of maternal antibodies in absence of immunization against CCV.

A significantly higher (P<0.05) seasonal prevalence of CPV infection was observed in pre-monsoon (43.18%) followed by winter (34.62%) and post-monsoon (26.09%) season than monsoon (8.06%). Mason et al. (1987) observed highest prevalence of CPV infection during March and April. The highest prevalence of CCV was ofund in winter season (26.92%) followed by pre-monsoon (15.91%) and lowest in monsoon season (6.45%). The higher prevalence of CPV and CCV infections in premonsoon and winter might be due to the increased susceptible age groups of animals during these seasons following whelping and subsequent weaning pups along with weaning of maternal antibodies (Deepa et al., 2000). Further low moisture, low rainfall and windy weather in Assam might help in the rapid spread of the both viruses within susceptible dog during the period. However, the high rainfall during monsoon might wash away the infected faecal material and the restricted movement of pet dogs probably interfered with the rapid spread of the viruses.

The breed wise prevalence of CPV infection was more in German spitz breed (45.95%) followed by other breeds and was significantly higher (P<0.05) than Labrador (14.29%) and Alsatian (13.33%). Similarly, German spitz (21.62%) was also highly susceptible to CCV followed by Non-descript (14.81%) and others. The highest susceptibility to CPV and CCV in German spitz breed might be due to the rearing of this small breed of dog usually in groups by the owners and due to poor hygiene because of the long hairy body of the dogs.

Higher prevalence rates of CPV (28.04%) and CCV (15.89%) infections were recorded in male dogs than female (21.12% and 8.45%, respectively) which might be attributed to more chances of exposure of males to infection due to their wandering behavior and selective preference of keeping males as pets by the pet owners.

A total of 9.52 per cent vaccinated and 30.15 per cent unvaccinated dogs were CPV positive in faecal samples (significant, P<0.01). The occurrence of CPV in vaccinated dogs was in agreement with Deepa and Saseendranath (2002) who reported that 13.64 per cent vaccinated dogs suffered from CPV. A poor vaccination antibody response might be due to improper age or timing of vaccination, non boostering of the animals, interference produced by maternal antibodies and improper maintenance of cold chain. However, the diarrhoeic dogs had no vaccination history against CCV. In order to prevent infection, intro-luminal antibodies (mucosal immunity) are essential although the immune mechanism is still unclear in CCV infection.

Mixed infection of 4.49 percent was recorded showing age wise distribution of 10.00 and 11.63 percent in 0-3 months and 4-6 months, respectively. The occurrence of mixed infection was found maximum in pre-monsoon season (13.64%), German spitz breed (10.81%) and male dogs (4.67%). However, none of the vaccinated dogs against CPV was found positive for mixed infection. Ganesan et al. (loc.cit) and
Amo et al. (1999) reported dual infection in five per cent of faecal samples of dogs Banja et al. (loc.cit) and Sakulwira et al. (loc.cit) reported comparatively higher prevalence of mixed infection with CPV and CCV.

Summary
Viral gastroenteritis caused by CPV and CCV seems to be an important seasonal problem in young dogs in Assam. The occurrence of CPV in vaccinated dogs also appeared as serious concern which might be attributed to the factors of improper vaccination.

References


