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Prevalence of canine parvovirus infection in Bidar district of Karnataka

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Abstract

The present study was undertaken to know the prevalence of Canine parvoviral gastro-enteritis (CPVGE) in and around Bidar. Retrospective study was undertaken to know the prevalence of CPVGE. It was observed that the prevalence of CPVGE was highest in less than 3 months of age dogs with greater frequency of occurrence during Post South West monsoon season. (October to December). The prevalence was highest in Labrador breed with higher frequency of occurrence in males. Varying degree of temperature, elevated heart rate and respiratory rate, bloody diarrhoea, inappetence and dehydration was observed in the CPVGE affected dogs which showed improvement after treatment.

Keywords: Canine parvovirus infection, dogs, Bidar, DNA virus

Introduction

In canines, gastroenteritis is a common problem. Canine Parvovirus (CPV-1 and 2), Canine Corona Virus (CCV) and Canine Rotavirus (CRVs) have been incremented as primary pathogen in viral diarrhoea. Canine parvovirus gastroenteritis is a highly contagious and often fatal disease. It has a worldwide distribution and is widely prevalent in India (Khadiolkar *et al.*, 1994^[9], Sagar *et al.*, 2008^[14]). It is estimated that millions of dogs are affected each year in spite of the availability of an effective vaccine. Canine Parvovirus (CPV), a single stranded DNA virus, was first discovered in 1978 and belongs to Family – Parvoviridae. The virulent strain CPV-2a was discovered in 1979 followed by CPV-2b (1984) and CPV-2c in 2000. (Nivy *et al.*, 2011)^[10].

CPV infects and replicates in rapidly dividing cells, mostly in the intestinal crypts and lymphoid organs, myocardial cells and later affecting myeloid progenitor cells in the bone marrow, thus presenting two distinct clinical forms, gastro-enteritis and myocarditis. Myocardial form is more common in puppies between 3-8 weeks of age, whereas, gastroenteritis is more prevalent in older puppies (Prittie, 2004^[12]; Haque, Arfa, 2012^[5]). Acute Parvo-enteritis can be seen in dogs of any breed, age or sex, but puppies between 6 weeks and 6 months of age appear to be more susceptible (Prittie, 2004)^[12].

Clinical manifestations of Canine parvoviral gastro-enteritis are severe emesis, inappetence, diarrhoea with presence of frank blood and foul smell, progressive dehydration and the diseases is almost universally fatal without treatment, with treatment survival rates of only 9 per cent in an experimental model (Kariuki *et al.*, 1990)^[8]. Parvovirus infects the germinal epithelium of intestinal crypts resulting in its destruction and shortening of villi which is responsible for bloody diarrhoea. Severe neutropenia and lymphopenia favors the secondary bacterial infection resulting in endotoxaemia and disseminated intravascular coagulation causing heavy mortalities.

Material and Methods

Present research was undertaken to study the prevalence of Canine parvovirus gastroenteritis and around Bidar District was studied by retrospective data. For retrospective study the official records of naturally affected cases which were presented to out Patient ward of Veterinary Medicine, Veterinary College, Bidar and Veterinary Hospital, Disease diagnostics and Information Centre, Bidar were utilized. The relevant information of each animal with regard to age, breed, sex and season-wise prevalence of CPVGE in and around Bidar were collected and analyzed.

Prevalence of CPVGE in and around Bidar was studied in the present investigation. The records of Out Patient Ward of Veterinary Medicine, Veterinary College, Bidar and Veterinary Hospital, Disease diagnostics and Information Centre, Bidar were utilized to gather data on gastroenteritis and CPVGE cases in dogs. In the present study the overall prevalence of CPVGE in and around Bidar was found to be 4.44 per cent. However, prevalence of CPVGE among total gastroenteritis cases was found to be 13.92 per cent. (Table-1) (Fig.1a and 1b). However, earlier reports on the prevalence of CPVGE in this area are lacking. In this study, low prevalence was recorded when compared to the earlier reports from different areas (Archana *et al.*, 2009^[1], Roy *et al.*, 2010^[13] and Haque and Arfa, 2012^[5]). Bidar is the northern most Districts of Karnataka and is considering as developing district. Low density of canine population prevailing in and around Bidar has reflected in the low prevalence. Since most infections of CPVGE occur as a result of contact with contaminated faeces in the environment and spreads rapidly from dog to dog via feco-oral or oro-nasal exposure, high density of canine population linked with faster spread of disease and intern leading to high prevalence (Scott, 1980)^[16].

Age wise distribution

Age wise distribution of prevalence of CPVGE cases in and around Bidar was recorded and depicted in the Table-1 (Fig.1c). When the age wise prevalence was studied in the available data, it was found that overall prevalence of CPVGE was highest up to 3 months of age group (2.35%), followed by 3-6 months of age group (1.36%), 6-12 months of age group (0.54%) and lowest in more than 1 year age group (0.18%). Similarly, when age-wise prevalence of CPVGE among gastroenteritis cases was studied highest prevalence was noticed up to 3 months of age group (17.10%), followed by 3-6 months of age group (15.95%), 6-12 months of age group (9.83%) and lowest in more than 1 year age group (4.44%). As age advances susceptibility to infection get reduced and also prevalence rate among the different age groups. The result indicated that the prevalence of canine parvovirus infection was high in young ones, it could be attributable to the close affinity of virus to rapidly dividing cell of the myocardium and intestine (Banja *et al.*, 2002^[2] and Haque and Arfa, 2012^[5]). The present findings are in agreement with the findings of Jacob *et al.* 1980^[7], Udupa 1991^[21], Ramadass and Khaeder 1992^[11], Deepa *et al.* 2000^[3], Gunaseelan and Ramkrishna 2003^[4], Tajpara *et al.* 2009^[20], Roy *et al.* 2010^[13] and Haque and Arfa 2012^[5]. On the contrary high prevalence of CPV-2 infections was reported in 3-6 months old dogs by Sakulwira *et al.* 2003^[15].

Sex wise distribution

Sex wise distribution of prevalence of CPVGE cases in and around Bidar was recorded and depicted in the Table-2 (Fig.2). When the sex wise prevalence was studied in the available data it was found that prevalence of CPVGE is highest in males (57.14%) compared to females (42.85%). Although, sex has an influence of occurrence of CPVGE, high prevalence in male could be probably due to tendency of male

dogs to roam more and have higher risk of exposure to infectious agent (Houston *et al.*, 1996). The present finding is similar to the findings of Deepa *et al.* 2000^[3], Sharma *et al.* 2005^[17], Archana *et al.* (2009)^[1], Tajpara *et al.* 2009^[20] and Haque and Arfa 2012^[5] as these reports also found that males had more tendency for CPVGE. However, the present finding is contrary to reports of Udupa 1991^[21], Gunaseelan and Ramkrishna 2003^[4], Sharma *et al.* 2007^[18] and Roy *et al.* 2010^[13] which stated that the females had a higher incidence compared to males.

Breed wise distribution

Breed wise distribution of prevalence of CPVGE cases in and around Bidar was recorded and depicted in the Table-3 (Fig.3). When the breed wise prevalence was studied in the available data it was found that overall prevalence of CPVGE is highest in Non-descript (1.99%) followed by Labradors (0.81%), German shepherds (0.63%), Pomeranian(0.45%), Doberman (0.18%), Mudhol Hound (0.18%) and Golden Retriever (0.18%). When prevalence of CPVGE among total gastroenteritis cases during the study period was studied, prevalence was in Labradors (16.66%), Non-descript (15.82%), Pomeranian (14.28%), German shepherd (11.47%), Mudhol Hound (11.11%) and least in Doberman (6.89%). The highest prevalence among the Labrador dogs could be attributed to the fact that Bidar is a developing district of the state and pet awareness is lacking among the people. This is reflected by less number of pedigree dogs of specific breed in and around Bidar. German shepherds and Labradors are more commonly preferred breed in Bidar which clearly represented by more number of these dogs (115/352) which were presented with gastroenteritis. Similarly Prittie 2004^[12] observed that besides a genetic component, other factors may also account for increased risk of disease, such as breed popularity and lack of appropriate vaccination protocols. Smith-Carr *et al.* 1997^[19] found that certain breeds have been shown to be at increased risk for severe CPVGE, including the Rottweiler, Doberman pinscher, American Pit Bull Terrier, Labrador retriever and German shepherd dog.

Season wise Prevalence

Season wise distribution of prevalence of CPVGE cases in and around Bidar was recorded and depicted in the Table-4 (Fig.4a and 4b). When the season wise prevalence was studied, highest prevalence of CPVGE seen in South west monsoon season (1.54%) followed by Post south west monsoon season (1.08%) and Pre monsoon (1.08%). However, least prevalence was recorded during winter season (0.72%). When prevalence of CPVGE among gastroenteritis cases was studied, highest prevalence recorded in Post south west monsoon season (18.46%) followed by, Pre monsoon (17.39%), South west monsoon season (13.49%) and lowest in winter season (8.69%). The present finding is almost similar to the findings of Houston *et al.* (1996) and Deepa *et al.* 2000^[3]. The highest incidence of CPVGE observed in the Post South West monsoon season because of the humid and cold weather and the extreme variations in climatic conditions. In humid and cold conditions the CPV may persist in cold environment for long period.

Table 1: Age wise prevalence of CPVGE in dogs in retrospective study

Age	Total no of GE Cases	CPVGE Cases	Overall prevalence of CPVGE (%), (n = 1102)	Prevalence of CPVGE among gastroenteritis cases (%)
Up to 3 months	152	26	2.35	17.10
3 months – 6 months	94	15	1.36	15.95
6 months – 12 months	61	6	0.54	9.83
>1 years	45	2	0.18	4.44
Total	352	49	4.44	13.92

Table 2: Sex wise prevalence of CPVGE in dogs in retrospective study

Sex	CPVGE cases	Prevalence of CPVGE (%)
Males	28	57.14
Females	21	42.85

Table 3: Breed wise prevalence of CPVGE in dogs in retrospective study

Breed	Total Gastroenteritis Cases	CPVGE Cases	Prevalence of CPVGE among overall cases (%), (n = 1102)	Prevalence of CPVGE among gastroenteritis cases (%)
Non – descript	139	22	1.99	15.82
German shepherds	61	7	0.63	11.47
Labradors	54	9	0.81	16.66
Pomeranian	35	5	0.45	14.28
Doberman	29	2	0.18	6.89
Mudhol Hound	18	2	0.18	11.11
Golden Retriever	16	2	0.18	12.50
Total	352	49	4.44	13.92

Note: n = Total No. of Cases

Table 4: Season wise prevalence of CPVGE in dogs in the retrospective study

Season	Gastroenteritis Cases	No. of cases of CPVGE	Prevalence of CPVGE (%), (n = 1102)	Prevalence of CPVGE among gastroenteritis Cases (%)
Winter Season				
January	54	5	0.45	9.25
February	38	3	0.27	7.89
Season's Total	92	8	0.72	8.69
Pre Monsoon Season				
March	26	4	0.36	15.38
April	19	5	0.45	26.31
May	24	3	0.27	12.50
Season's Total	69	12	1.08	17.39
South West Monsoon Season				
June	22	4	0.36	18.18
July	47	5	0.45	10.63
August	41	4	0.36	9.75
September	16	4	0.36	25.00
Season's Total	126	17	1.54	13.49
Post South West Monsoon Season				
October	21	5	0.45	23.80
November	22	4	0.36	18.18
December	22	3	0.27	13.63
Season's Total	65	12	1.08	18.46
Grand Total	352	49	4.44	13.92

Note: n = Total No. of Cases

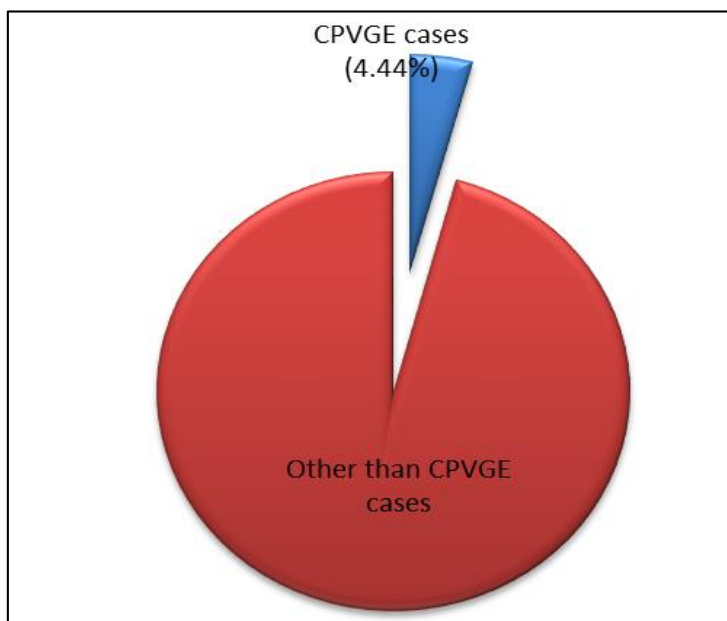


Fig 1a: Prevalence of CPVGE among the overall cases

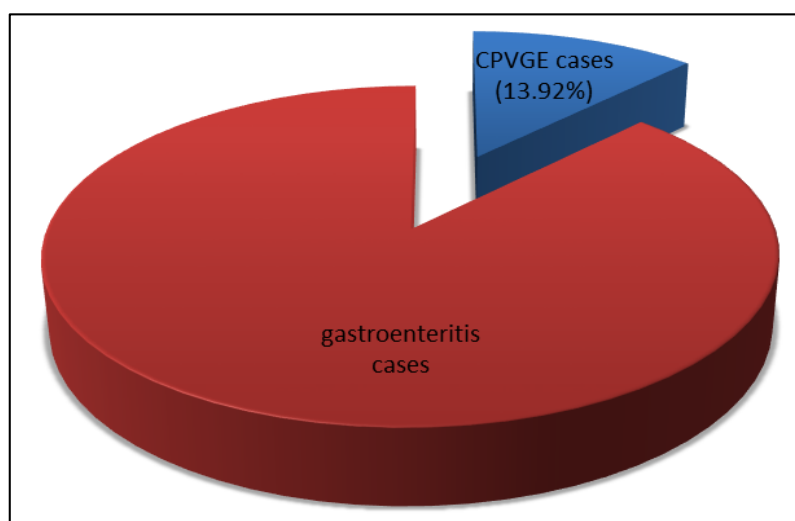


Fig 1b: Prevalence of CPVGE among the Gastroenteritis cases

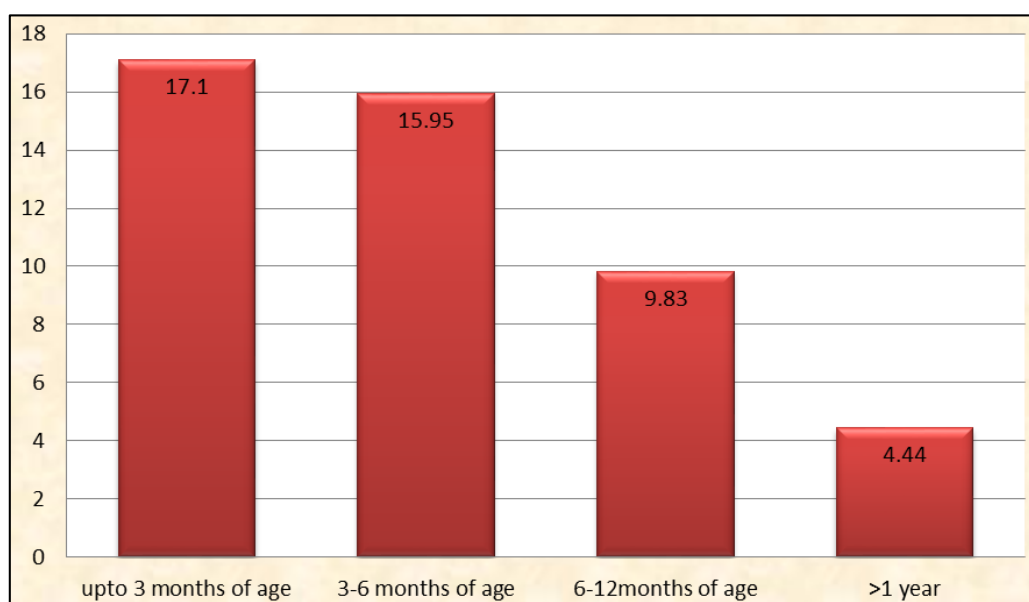


Fig 1c: Age-wise prevalence of CPVGE among the dogs with gastroenteritis in Retrospective study

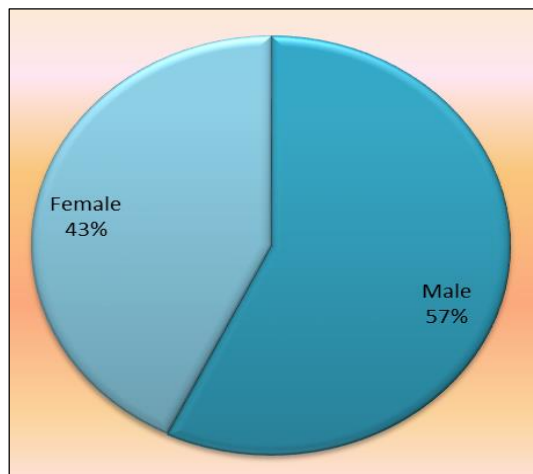


Fig 2: Sex-wise prevalence of CPVGE among the dogs with gastroenteritis in Retrospective study

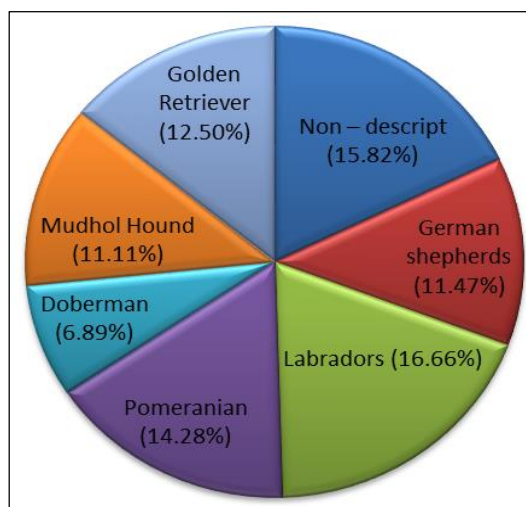


Fig 3: Breed-wise prevalence of CPVGE among the dogs with gastroenteritis in Retrospective study

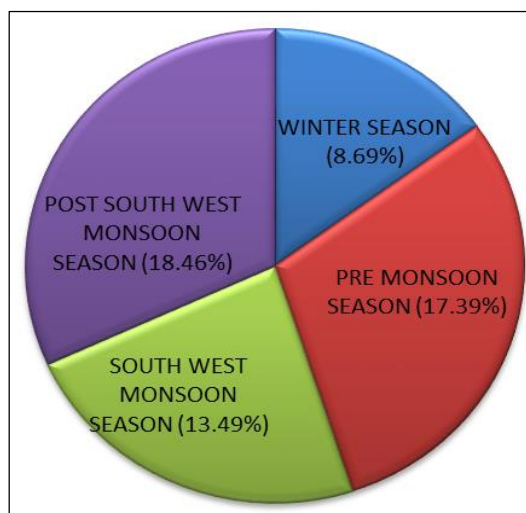


Fig 4a: Season-wise prevalence of CPVGE among the dogs with gastroenteritis in Retrospective study

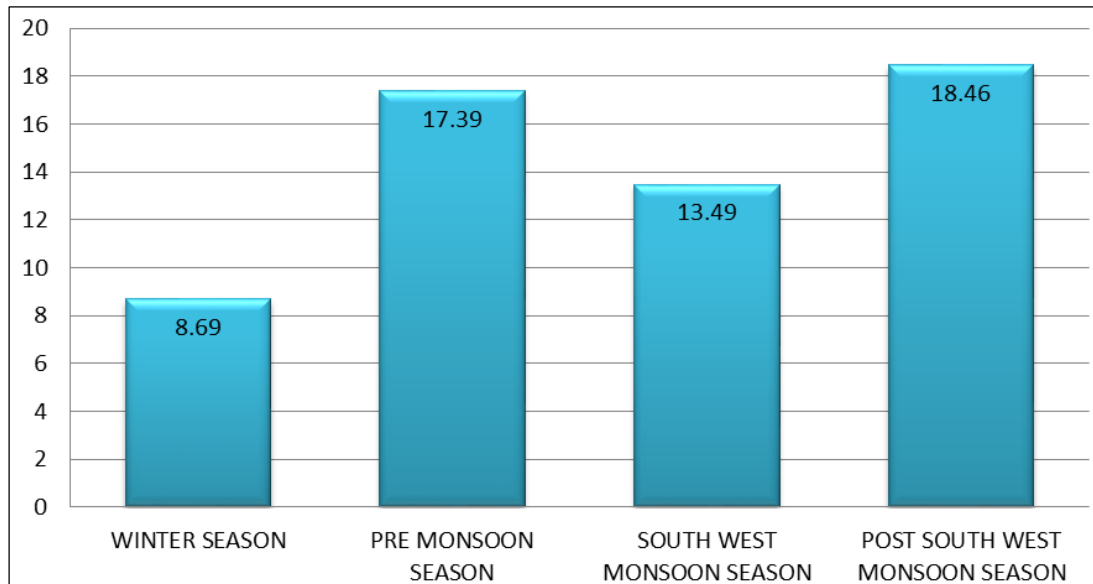


Fig 4b: Season wise prevalence of CPVGE among the dogs with gastroenteritis in Retrospective study.

Conclusion

Present study conclude that prevalence of CPVGE in and around Bidar was 4.44 per cent among the overall cases. However, prevalence of CPVGE among total gastroenteritis cases was found to be 13.92 per cent. The prevalence of CPVGE was highest in less than 3 months of age group. Its occurrence was highest in males as compared to females. Breed wise prevalence was highest in Labradors followed by Non-descript, Pomeranian and German shepherd. Season wise prevalence was highest in Post South West monsoon (October to December).

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