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Epidemiological and haemato-biochemical studies in parvo viral infected dogs

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Abstract

The present study was carried out at Department of Veterinary Clinical Complex, Veterinary College, Gadag, for the period of 1 year (January-2021 to April 2022). Total of 101 dogs were presented with history of vomition, diarrhea, depression & dehydration to the Department of Veterinary Clinical Complex, Veterinary College, Gadag during the study period. Out of 101 cases 57 cases were screened positive for Parvoviral infection by using "Anigen Rapid" CPV Ag test kits. Out of these 57 cases 14 cases were selected for the hemato-biochemical study. The pups below the age of 6 months were highly susceptible compare to the adult ones and the more number of cases reported were of Labrador breed. The case susceptibility was comparatively more in male dogs than female ones and the highest incidence was recorded in post monsoon season (October-December). Reduced HB, PCV, Leukocytopenia, lymphocytopenia, thrombocytopenia, neutrophilia and elevated levels of ALP and ALT enzymes were observed in the CPV infected cases.

Keywords: Parvoviral infection, epidemiology, hematobiochemical, dog

Introduction

Canine parvovirus infection (CPV) is a highly contagious and often fatal disease of dogs in many parts of the world. Clinical manifestation of CPV gastroenteritis are severe emesis, inappetance, diarrhea, with or without presence of blood and foul smell (Castro *et al.*, 2007 and Sagar *et al.*, 2008) [4, 16]. Parvoviral enteritis can be seen in dogs of any breed, age or sex but puppies between 6 weeks and 6 months of age are more prone to the disease (Quinn *et al.*, 2002 and Gaddard *et al.*, 2008) [14, 6]. Factors that predispose to parvoviral infection in puppies are lack of protective immunity, intestinal parasites and overcrowded, unsanitary and stressful environmental conditions (Greene, 2006) [5]. The present study was an attempt to study the Epidemiological and hemato-biochemical alterations in canine parvovirus infection.

Materials and Methods

Total of 101 dogs were presented with history of vomition, diarrhea, depression & dehydration to the Department of Veterinary Clinical Complex, Veterinary College, Gadag during the study period. Out of 101 cases 57 cases were screened positive for Parvoviral infection by using "Anigen Rapid" CPV Ag test kits. Out of these 57 cases 14 cases were selected for the hemato-biochemical study. 4 ml Blood sample was collected from all the infected dogs (n=14) and also from the healthy control group dogs (n=6) using new syringes and then transferred 2ml each to EDTA vials and serum clot activator vials. The serum was separated through centrifugation for further analysis. The Hematological Parameters (Hb, RBC, TLC, PCV and Platelets) were determined using automated blood cell counter (Beckman Coulter, Coulter diff Ac.T, USA) and biochemical parameters (ALT and ALP) were determined using automated clinical chemistry analyzer (Adiduoplus Biochemistry Analyzer). The differential leucocyte count was performed manually on blood smear stained by Wright-Giemsa staining method. Statistical analysis is done by unpaired "t" test.



Fig 1: Arrow indicating Positive test bands. Negative- Only control band visible

Results and Discussion

Total of 101 dogs were presented with history of vomition, diarrhea, depression & dehydration to the Department of Veterinary Clinical Complex, Veterinary College, Gadag during the study period. Out of 101 cases 57 cases were screened positive for Parvoviral infection by using “Anigen Rapid” CPV Ag test kits. The pups below the age of 6 months (54.39%) were found to be more susceptible for parvoviral infection followed by 6-12 months (31.58%) age groups and the adult ones (14.03%). similar observations are recorded by Quinn *et al.* (2002) [14], Mohammed *et al.* (2005) [13], Goddard *et al.* (2008) [6]. This could be due to due to lack of immunity (Greene, 2006) [5].

The breed susceptibility was seen more in Labrador breed (36.84%) of dogs followed by German Shepherd (19.29%), Pomeranian (14.03%), Non-descript (12.28%), Doberman (10.52%) and Golden Retriever (7.01%). These changes could be due to the more number of Labrador population in the Gadag district of Karnataka. The sex wise incidence study revealed, male dogs were more prone to the parvoviral infection compare to female. The similar observations are recorded by Haque and Arfa (2012) [7]. This variation in sex wise incidence could be due to more population of male dogs compare to female ones in the district. Seasonal incidence of parvoviral infection was seen more in Post monsoon during October-December (42.10%) season followed by monsoon during the month of June-September (28.07%), Winter during the months of January-February (21.05%) and Pre monsoon during the months of March-May (8.77%). Similar findings were reported by Al-Bayati *et al.* (2010) [1] who reported high prevalence during September- December months. This could be due to the survivability and growth of virus in cold climate as opined by Mehta *et al.* (2017) [12]. However contradictory to these findings reported by Mohammed *et al.* (2005) [13] who reported highest prevalence in May to June months.

Hematological examination showed marked anemia with significantly reduced hemoglobin levels of (9.75±0.2) and reduced hematocrit (28.9±0.82). Similar observations were also recorded by Sagar (2005) [17] and Sujata *et al.* (2012) [19]. The reduced hemoglobin, hematocrit could be due to damages to the capillaries of the intestinal villi (Hoskins and McCaw 1998) [8], decreased erythropoiesis as CPV directly effects the

bone marrow (Boosinger *et al.*, 1982) [3] and loss of blood due to emesis and diarrhea as it’s the most common sing of CPV infection (Yadav *et al.*, 2011) [21].

Leukocytopenia (3.76±0.17) was observed in 11 cases (78.57%) and lymphocytopenia (18.86±0.73) was seen in 8 cases (57.14%). Similar observations were also recorded by Goddard *et al.* (2008) [6], Sagar *et al.* (2008) [16] and Sujata *et al.* (2012) [19]. This could be due to the virus replication in the lymphoid organs resulting in lymphocytolysis (Biswas *et al.* 2005) [2] and which indicates the presence of more severe form of disease (Mason *et al.*, 1987) [11].

Thrombocytopenia (98.57±3.26 ×10³/µl) was observed in 12 cases (85.71%). This was in resemblance to Sujata *et al.* (2012) [19]. The Virus-induced thrombocytopenia can occur because of decreased platelet production or as a result of direct action of viruses and/or immuno-logic components on platelets or endothelium (Wilson *et al.*, 1982) [20]. Neutrophilia (61.36±1.21) was recorded in all 14 cases. These observations were similar to reports of Shah *et al.* (2013) [18]. This could be due to concurrent bacterial infections with parvoviral enteritis as opined by Ramprabhu *et al.* (2002) [15]. Biochemical evaluation revealed significant rise in the values of ALP and ALT in all 14 cases. These observations were similar to reports of Jacobs *et al.* (1980) [9], Macintire and Smith, (1997) [10] and Shah *et al.* (2013) [18]. Significant rise in alkaline phosphatase and alanine transaminase could be a result of hepatic hypoxia secondary to severe hypovolemia or the absorption of toxic substances due to loss of the gut barrier as opined by Shah *et al.* (2013) [18].

Table 1: Age wise incidence of the Parvovirus in Canines

Age wise	No. of animals found positive for Parvoviral infection (2021-2022)	%
<6 monts	31	54.39
6 months – 12 months	18	31.58
>1 year	8	14.03
Total	57	

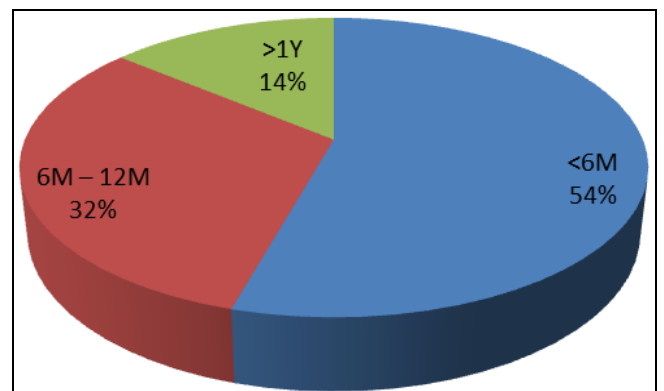


Fig 1: Age wise incidence of the Parvovirus in Canines

Table 2: Breed wise incidence of the Parvovirus in Canines

Breed of Animal of mal	No. of animals found positive for Parvoviral infection (2021-2022)	%
Non descript	7	12.28
German shepherd	11	19.29
Labrador	21	36.84
Pomeranian	8	14.03
Doberman	6	10.52
Golden retriever	4	7.01
Total	57	

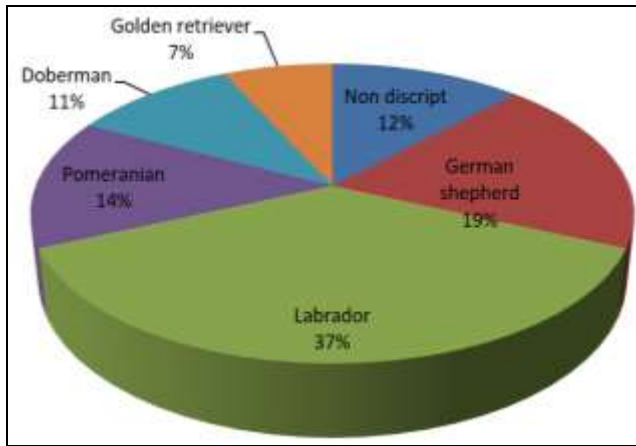


Fig 2: Breed wise incidence of the Parvovirus in Canines

Table 3: Sex wise incidence of the Parvovirus in Canines

Sex of the animal	No. of animals found positive for Parvoviral infection (2021-2022)	%
Male	31	54.38
Female	26	45.61
Total	57	

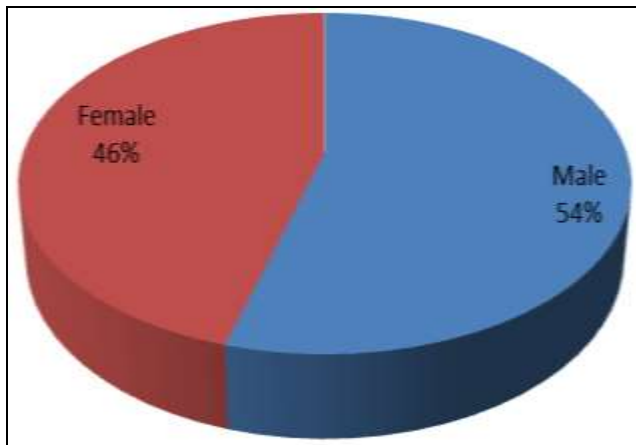


Fig 3: Sex wise incidence of the Parvovirus in Canines

Table 4: Seasonal incidence of the Parvovirus in Canines

Season	No. of animals found positive for Parvoviral infection (2021-2022)	%
Winter (Jan-Feb)	12	21.05
Pre monsoon (March-May)	5	8.77
Monsoon (June-Sept)	16	28.07
Post monsoon (Oct-Dec)	24	42.10
Total	57	

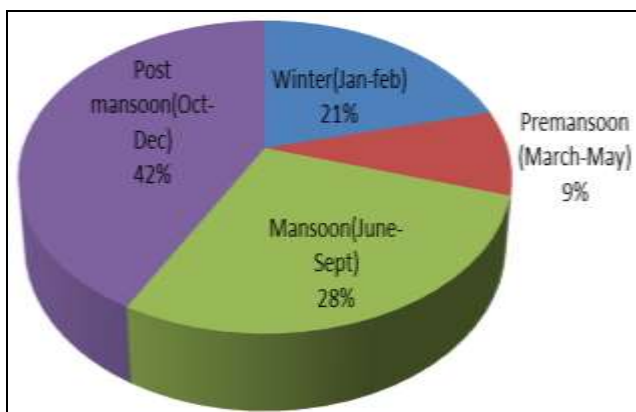


Fig 4: Seasonal wise incidence of the Parvovirus in Canines

Table 5: Haematological and Biochemical values in parvovirus infected dogs (n=14) & control (n=6)

Parameter	Unit	Study Group (n=14)	Control Group (n=6)
Hb	g/dl	9.75±0.2 ^a	13.75±0.26 ^b
RBC	×10 ⁶ /μl	4.10±0.17 ^a	6.12±0.14 ^b
PCV	%	28.9±0.82 ^a	40.12±1.05 ^b
WBC	×10 ³ /μl	3.76±0.17 ^a	6.35±0.56 ^b
Neutrophils	%	61.36±1.21 ^b	56.33±1.22 ^a
Lymphocytes	%	18.86±0.73 ^a	25.83±1.25 ^b
Platelets	×10 ³ /μl	98.57±3.26 ^a	190.0±6.82 ^b
ALT	IU/L	163.70±7.03 ^b	68.18±1.63 ^a
ALP	IU/L	166.10±6.46 ^b	61.70±11.32 ^a

Value bearing different superscripts (a,b) within a row differ significantly ($p < 0.05$)

Conclusion

From the above study it is concluded that, the epidemiological data reveals the outbreak of CPV infection in dogs is very common in young dogs and in monsoon season and the hemato- biochemical study plays a vital role in diagnosis of the CPV infected dogs and helps in assessing the possible prognosis of the disease.

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