AgriCos e-Newsletter
ISSN: 2582-7049
AgriCos e-Newsletter
Open Access Multidisciplinary Monthly Online Magazine
Volume: 05 Issue: 04 April 2024 Article No: 06

Review on Parvo viral infection in Dogs and its Therapeutic Management

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SUMMARY

Canine parvovirus causes haemorrhagic gastroenteritis in dogs. it is a devastating disease of canine patients mostly affecting the young ones, due to its transmission cycle and nature of virus its very common in the places where unvaccinated dogs are held as a group. Though this disease is not zoonotic, the infection and its management in household level is stressful economically and emotionally. In order to control the prevalence of parvo viral infection in canine population, vaccination is the best approach.

INTRODUCTION

Canine parvoviral enteritis/gastroenteritis (CPVE/CPVGE) is one of the most common viral disease of dogs caused by Canine Parvovirus – 2, a DNA virus (CPV – 2 virus). It is highly infectious & contagious, spreads through faeces of infected dogs (has high virus load). The prevalence of this disease is common among unvaccinated puppies, dog shelters and pet stores, litter from unvaccinated bitches where there are no maternal antibodies to protect from virus in neonatal stage. When Veterinary hospitals are not following isolation protocols & not disinfecting enough, nosocomial infection can occur.

Epidemiology

Under natural conditions, only canidae family is infected, but parenteral inoculation of CPV -2 virus can also infect cats, minks & ferrets. Faeces is the primary mode of spread, during severe illness virus may also spread in saliva & vomitus. Peak shedding period (in faeces) occurs during 4-7day post infection [5].
Maternal antibody interference during immunization is the most cause of vaccine failure in weanling pups later [3].

Transmission

Canine parvovirus has been proven to be contagious and spreads by contact with canine infected faeces or contaminated surfaces whereby the virus enters the body through oral route. Dogs kept together in large numbers are at a higher risk of disease than the ones who are kept indoors and not allowed to be in contact with other dogs. The virus is quite resistant to ambient temperature and desiccation thereby allowing it to survive in ground tainted with faeces for about 5 months [1].
Rottweilers and Doberman are most susceptible dog breeds compared for CPV infection to others.

Clinical features

3 syndromes – distinct and age related.

a. Generalized neonatal syndrome – rare
b. Myocarditis syndrome – recognized in pups by sudden death without preceding clinical signs. Pups which survives will have lifelong cardiac issues due to extensive myocardial damage (Age: 4-8 weeks)
c. Leukopenia/Enteritis syndrome – (Age: 8 – 12 weeks), vomiting is often initial sign and can be severe and protracted; there is anorexia, lethargy and diarrhoea leading to rapid dehydration. The faeces is often streaked with blood/ frankly haemorrhagic & remain fluid until recovery or death [3].

In enteritis form there is slight to high rise of temperature in initial stages but turn to subnormal level with the advance of vomiting and diarrhoea [4].

Diagnosis

Despite the typical presentation seen with CPV infection of acute-onset vomiting and diarrhoea, depression, dehydration, fever, and leukopenia in an unvaccinated puppy, these findings are nonspecific although this cluster of findings is frequently the legitimate basis of a presumptive diagnosis. Definitive diagnostic tests include demonstration of CPV in the faeces of affected dogs, serology, and necropsy with histopathology.

Diagnosis of active CPV infection via serology requires detection of anti-CPV antibody that is of recent origin (ie, IgM class antibodies) in the face of typical clinical signs. A near-patient enzyme-linked immunosorbent assay test is available to practitioners to demonstrate CPV in the faeces of infected puppies. Viral particles are readily detectable at the peak of shedding (4–7 days after infection). False-positive results may occur 3 to 10day post vaccination with a modified live CPV vaccine, and false-negative results may occur secondary to binding of serumneutralizing antibodies with antigen in diarrhoea or cessation of faecal viral shed. Other methods available to detect CPV antigen in faeces include electron microscopy, viral isolation, faecal hemagglutination, latex agglutination, counter immunoelectrophoresis, immunochromatography, and polymerase chain reaction (PCR). PCR based methods, specifically real-time PCR, have been shown to be more sensitive than traditional techniques [2].

Differential Diagnosis – Gastroenteritis is also caused by ancylostomiasis, canine distemper, adeno and corona viruses, toxins, inflammatory bowel disease, salmonellosis, pancreatitis etc.

Treatment

No specific antiviral therapy for the parvo viral infection but use of oseltamivir (@2mg/kg) was postulated across the world, but the use of this antiviral drug is limited.

Symptomatic therapy is the common approach in treating this infection,

1) Fluid therapy

As the effected dogs were presented to clinics with the vomiting and diarrhoea, there is continuous fluid, electrolytes loss from the body leads to deteriorating the health of patient. Correction of intravascular fluid deficits can be done by using crystalloids (Ringer lactate, normal saline, also dextrose normal saline, dextrose 5%, normosol-R etc). In severe hypovolemic cases use of colloids (hydroxyethyl starch - 10-20ml/kg/B.W/day I.V, etc) is very useful.

Volume deficit is corrected by using formula –

Volume deficit (in ml) = (% dehydration/100) x body weight x 100

(administrated in 24 hours I.V)

In selecting the correct fluid to administer, one should consider both fluid and electrolyte loss from the patient body. To maintain the circulating blood volume in hypovolemic cases – whole blood, fresh plasma, frozen plasma can be used to prevent shock.

2) Anti-emetics

The foremost sign noticed in parvo infected dogs is vomiting, the common anti-emetics used to counter gastritis induced emesis are odansetron (0.1 to 0.5mg/kg, IV, up to 4 times a day [6]), metoclopramide (0.1 to 0.3mg/kg, SC, IM, IV, up to 3 times a day [6]). Other anti-emetics like maropitant (2mg/kg PO, once a day for up to 5 consecutive days [6]).

3) Antibiotics

Controlling the secondary bacterial infections is very crucial for successful recovery in PVGE. Antibiotics of class Penicillins like amoxicillin (10 to 20mg/kg, SC, IV, 2 times a day [6]), ampicillin (5 to 10mg/kg, SC, IM, 2 to 3 times a day [6]), cloxacillin (10 to 15mg/kg, IM, IV, 4 times a day [6]) / other potentiated penicillins etc; cephalosporins like Cefotaxime (25 to 50mg/kg, SC, IV, 2 to 3 times a day [6]), ceftriaxone (15 to 50mg/kg, IM, IV, 2 times a day [6]), cefazoline (10 to 30mg/kg, SC, IV, IM, 3 times a day [6]) with or without combination of beta lactamase inhibitors etc; Fluoroquinolones like enrofloxacin (2.5 to 5mg/kg, IM, IV, 2 times a day [6]), ciprofloxacin (5 to 10mg/kg, IV, once a day [6]) and nitroimidazoles like metronidazole (15 to 25mg/kg, IV, 2 times a day [6]) etc can be used. Choice of antibiotics should be done based on spectrum of bacterial sensitivity, previous successful therapies and recovery rate.

4) Gastric acid secretion inhibitors

The common drugs are Rantidine (0.5 to 2mg/kg, IM, SC, 2 to 3 times a day [6].), cimetidine (5 to 10mg/kg, IM, slow IV (over a period of 10-20 min), 3 to 4 times a day [6]), pantoprazole (0.7 to 1mg/kg, IIV, once a day) etc. they will decrease the acid secretion in stomach and aids in its healing.

Other -

5) Anti-motility drugs like loperamide can be used to decrease the G.I motility and then diarrhoea.
6) Use of activated charcoal/ bismuth subsalicylate to bind to the enterotoxins formed in G.I tract, only after vomiting subsided.
7) Faecal microbiota transplantation.
8) Styptics like achrome and botropase can be used to G.I bleeding, when there is heavy bleeding.
9) Heterologous intravenous anti parvo virus immunoglobulins (0.4 ml/kg B.W IV once a day for 5 days) which stimulates passive immunity.
10) There are so many syrups and herbal preparations are available, but the efficiency is questionable
11) Canine monoclonal antibody therapy is the new approach which helps in shorten the course of the disease.

Nil-per-os/NPO, the technique followed in many parts of the world where no oral food or water is given orally till recovery and only given intravenously. NPO protocol is followed in order to decrease the G.I stimulation and decrease the enzyme secretions, chances of osmotic diarrhoea and also give time for epithelium regeneration and villi regrowth. Common disinfectants used are Hypochlorite and formaline.

CONCLUSION

Although most dogs will recover with supportive therapy, some dogs may show life-long secondary complications like cardiac issues, poor gut health etc. Prevention is better than cure so general public education and young puppy vaccination – immunization is the best option controlling this disease – multi antigen vaccines are available commercially which can be given in one primary dose (about 45th day) and 2 booster doses IM, SC 21days apart.

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