



## Popular Article

### Canine Parvovirus in Jalukie, Nagaland

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#### Abstract

Canine Parvovirus [CPV] infection is a global infectious and highly contagious viral disease of canine, resulting in severe GIT disease and occasionally cardiac disease with high morbidity rate (up to 100%) and frequent mortality (up to 10%) (Anum, 1979). The pathogenicity and transmission of this virus is amazingly quick due to its unusual high contagiousness. The virus responsible for Canine Parvovirus is a non-enveloped DNA virus. Canine Parvovirus is a stable virus that can survive for up to 5-7 months in the environment, this means, susceptible dogs can contract the virus simply by coming in contact with the environment that had been contaminated months back. In the Teaching Veterinary clinical complex of CoVSc, Jalukie, Nagaland, it has been observed that dogs between 2-6 months of age which were not vaccinated indicated the highest prevalence. The condition is found to be more severe when the puppies are neither vaccinated nor dewormed. Dogs of any breed, be it non-descriptive (local) dogs or exotic breeds like German Shepherd, Golden Retriever, Doberman, and Labrador etc. are susceptible to this infection. Among different risk factors, young unvaccinated puppies and exotic breeds were more prone to CPV infection. Regarding the season, the highest prevalence was noticed in the month of December to February, i.e. during winter season.

#### Introduction

Canine Parvovirus [CPV] is the most important viral cause of acute canine enteritis leading to severe damage of the intestinal barrier and occasional myocarditis in dogs. It is highly contagious and often fatal disease. This viral infection in canine population was 1st recognized in 1978 that caused parvovirus enteritis and myocarditis in U.S.A. After that this infection was observed in Canada, Australia and England and followed by other countries. (Anon 1979, McCandlish et al., 1979). In India the disease was recorded in Tamil Nadu in 1981 [Babu and Thangaraj, 1981; Madhav Rao and Yathiraj, 1983]. Subsequently the disease has been recorded in various states of the country as a professional challenge.

Both line and attenuated CPV vaccine have already been developed but the vaccine too sometimes cannot guarantee the absolute control to this disease if not given on time and when proper hygiene is not maintained.

## **Etiology**

'Parvo' means small (Latin), Canine Parvovirus belongs to genus Parvovirus and family Parvoviridae. The genome is a non-enveloped single stranded DNA virus whose diameter ranges between 18-24 nm. The virus can withstand high temperature and can remain viable in fomites for many years (Buxton and Fraser, 1977). This virus is sensitive to sodium hypochloride and can be destroyed by using 2% sodium hypochlorite.

It has been postulated that the recent infection in dog may be caused by mutation of virus of mink or cat (Rott, 1981). It is assumed that this virus has got close antigenic relationship with Feline panleukopenia viruses which infect the cat population (Farrell et al., 1972). There is opinion that possible CPV-2 is a modified feline panleukopenia virus that while pressuring pathogenesis has changed its host by means of selection and adaptation (Craig, 1980). Recently Parvovirus-II (CPV-2) has been reported to cause the disease in most of the countries of the world. Parvovirus-I (CPV-1) has also been described but it seldom causes diseases. It is impossible for the Parvovirus population to exist genetically in the nature (Rott, 1981). Mutation rate of the virus is too high. The disease condition therefore has been more complicated after the emergence of new variants namely CPV-2a, CPV-2b and CPV-2c.

## **Pathogenesis**

The virus enters the body through the mouth from ingestion of contaminated food, water or other contaminated materials. Once the virus enters the dog's body it will incubate for 3-7 days before the animal shows the symptoms. The virus initially targets the lymphoid tissues of oropharynx where it replicates and multiplies numerously which is then released freely in bloodstream to cause viraemia. Henceforth, systemic infection sets in within next 3-4 days as the virus goes and attacks new organs that contain rapidly dividing cells like gastric mucosa and intestinal lining.

**PART-1;** The virus has affinity towards rapidly multiplying cells like the delicate intestinal epithelium cells, lymphopoietic systems and bone marrow.

**PART-2:** Infection in-utero in pup of 8 wks age or unvaccinated puppies which are without any maternal antibodies. There are also chances of affecting main organ i.e., heart causing myocarditis. (Gillespie et al., 1958; Pollock 1981).

Gastritis is one of the most common gastrointestinal symptoms shown by the animals due to inflammation of the gastric mucosa caused by the parvovirus. The weakness or injury to the gastric mucosa results in stomach acids to further damage and inflame the lining. If the mucosal damage is severe, acute gastritis can progress to erosive gastritis, which consists of shallow lesions of the stomach lining (i.e., gastric erosions), painful ulcerations or sores, and small areas of bleeding within the mucosa. It is the gastrointestinal tract where the heaviest damage occurs.

The normal intestine possesses little finger like protrusion called “villi” which helps to increase the surface area available for the absorption of fluids and nutrients. The villi further possess “microvilli” which is microscopic protrusion to increase more surface area for absorption. The cells of the villi are relatively short lived and are readily replaced by new cells generated in the rapidly dividing area at the foot the villi called the Crypts of Liberkuhn. This is the exact place right at crypts where the parvovirus strikes hard, making the villus blunt or say destroyed. And this necrosis when reaches the blood vessels of intestine, it causes the bloody diarrhea.

The second form of CPV is cardiac syndrome, or myocarditis, which can affect puppies under 3 months old. The most dramatic manifestation of CPV-2 myocarditis is the sudden death in young pups or follow a brief period of dyspnoea and sometimes sings of enteritis. The collapsed dying pup may have cold extremities, pale mucosa and show gasping respiration or terminal convulsions. Acute heart failure with respiratory distress occurs in pup between 4 and 8 weeks of age. Subacute heart failure occurs in older pups usually 8 weeks or more. They are tachypnoeic or dyspnoeic especially on exercise. The abdomen is swollen with hepatomegaly and ascetic fluid is blood tinged. There is tachycardia, sometimes arrhythmias and weak pulse. Most dogs die due to cardiogenic shock. However, if the animal survives it will suffer from chronic myocardial and circulatory complications.

### **Clinical Findings**

Two forms of manifestations are observed in Parvovirus infection

Parvovirus gastroenteritis and

Parvovirus myocarditis

#### **Parvovirus enteritis**

Clinical symptoms are typical of bad cases of haemorrhagic gastroenteritis. High rise of temperature in initial stage of the disease but gradually turn to subnormal level with the advancement of vomition and diarrhoea. Signs of inappetance, podypsia, wretching, frothy yellow coloured vomitus and restlessness. Leucopenia not as distinct as in cats (Ackermann, 1982). Severe dehydration and exhaustion due to fluid and electrolyte loss can cause death leading to peripheral circulatory failures.

#### **Parvovirus myocarditis**

Pups under 10 weeks of age usually suffer from this form. Heart muscles are damaged causing circulatory failure. Respiratory problems and pulmonary oedema are not uncommon. Cardiogenic shock is the cause of most animals' death. In case the animal survives, it will suffer from chronic myocardial and circulatory complications (Hayes et al., 1979; Jezky et al., 1979).

## **Diagnosis**

### **History – history of deworming and vaccination**

#### **Clinical signs**

Estimation of CBC (Complete Blood Count) and biochemical parameters-lymphocytosis

Seasonal occurrence

#### **Treatment**

There is no specific treatment against the virus. Symptomatic treatments are to be rendered.

Fluid therapy like DNS (Dextrose Normal Saline), Normal Saline (NS), Ringer's Lactate solution (RL), depending upon the severity of the condition.

- Antacid like pantoprazole @1 mg/kg body weight, strictly I/V, twice a day
- Antibiotics like ceftriaxone @10 mg/kg body weight, I/M or I/V or S/C with combination of another antibiotic i.e. injection Amikacin @10 mg/kg body weight, I/M or I/V or S/C or metronidazole @15mg/kg body weight, I/V.
- #ceftriaxone is a broad spectrum antibiotic to counterattack both the gram positive and gram negative bacteria whereas Amikacin is given to act specifically on small intestine.
- Antiemetics like Ondansetron @0.5 mg/kg body weight or Perinorm @0.2 mg/kg body weight, s.o.s
- Withholding the food till vomiting and diarrhea is content.
- Multivitamins

To support the above treatment given below is a case of parvovirus being treated in the TVCC of Jalukie, Peren, Nagaland;

On 24th of June, 2022, a puppy (local breed) of 4 months old having a body weight of 4.5 kg infected by parvo virus was brought in our TVCC clinics. The history revealed that the puppy was already weaned from its mother 2 months back, it was off fed and vomition was there since 2 days back, and the watery diarrhea was observed since morning. History of neighbor's dog being affected by parvo virus was also noted. The history taking also revealed that the puppy was neither dewormed nor vaccinated.

#### **The clinical observation was as follows:**

- Rectal temperature: 102°F
- Mandibular lymph node: swollen
- Popliteal Lymph Node: No abnormalities detected (NAD)
- Mucous membrane: NAD
- Dehydration: +++

In accordance to the history and clinical observation the required treatment was preceded. On first day DNS and RL was infused @80 ml each through I/V twice a day. For gastritis pantoprazole injection @1 ml to be given twice a day, antibiotic Ceftriazone(250 mg) injection given @ 1.2 ml through I/V twice a day to be continued for 5 days, and also another antibiotic was given along with it i.e. Amikacin injection @ 0.3 ml via I/V route to be given twice a day for 5 days, for antiemetic Ondansetron injection was given @1 ml through I/V and lastly Tribivet vitamin injection (Vit. B2, B6 and B12) was given @1ml via I/V route.

On second day the same treatment was continued and from third day onwards the antiemetic Ondansetron was discontinued as the vomition was stopped and the rest treatment continued till 4th day.

The above animal responded within four days of treatment. The immunity of the above dog was better, so it responded within few days but not all dog's response to treatment this quick. Sometimes it also depends on the love and proper management and care provided by the pet owners. Pets are unable to explain their pain, sufferings and other emotions therefore it can only depend on the owner for their needs and their proper management.

## **Control**

- Strict hygiene is to be maintained in the locality and in the kennel itself where the outbreak has set in.
- Isolation of infected animal from the healthy animal.
- Proper disposal of excreta.
- Regular and periodic vaccination of the dogs after 2 months of age which is followed by booster after 1 month of vaccination and then annual vaccination should be done.

## **Conclusion**

Parvovirus has been a fatal disease of canine and especially very fatal to puppies of below 8 weeks of age. Due to its ability to be transmitted through hands, clothes and most likely rodents, insects and infected animals, it is virtually impossible to have a kennel that will not eventually be exposed to the disease. The response to treatment depends on the immunity, age and body condition of the animal, depending on this condition the animal tend to response within 3 to 4 days and some takes 15 to 20 days for the response to treatment, while some unfortunate ones succumb to the infection. Therefore, the necessary preventive measures must be undertaken to immunize the susceptible dogs including the stray dogs with potent and efficacious live attenuated vaccines that are available in India in accordance to vaccination protocol in order to check the spread of the disease.

Prompt symptomatic treatment, restoration of fluids and electrolytes, and antibiotics to prevent the bacterial infection by a veterinarian will increase survivability in infected puppies and dogs. But vaccination program should be considered the best way to control this disease in dogs.

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