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Convalescence complications of canine parvoviral infection in dogs

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Abstract

Canine parvovirus (CPV) is the leading cause of gastroenteritis associated mortality in puppies particularly of less than six months age. Canine parvovirus -2 and its subtypes CPV-2a, 2b and 2c are the etiological factors responsible for haemorrhagic gastroenteritis and myocarditis in puppies. Erythema multiformae, cutaneous clinical manifestations of CPV infection was reported in one Labrador puppy and convalescence complications of CPV infection like intestinal intussusception and rectal prolapse were reported in a Kanni and non-descript puppy respectively in this study. Proper immunization of bitches, periodical vaccination of young puppies from 42 days of age, weaning of puppies at 45 days age are the principle preventive strategies for prevention of CPV infection and associated life threatening complications in young dogs.

Keywords: canine parvovirus, dogs, erythema multiformae, intussusception, rectal prolapse

Introduction

Viruses are the most common etiological factors associated with the occurrence of infectious gastroenteritis in dogs of less than a year age. Canine parvoviral enteritis is endemic in India and is considered as the most pathogenic viral infection of dogs from weaning to six months age (Kapil, 1995) [11]. The disease is caused by Canine parvovirus (CPV) type 2 and its variants including CPV-2a, 2b and 2c (Greene and Decaro, 2012) [9]. Dogs of any breed, age, or sex are susceptible to this viral infection but puppies between 6 weeks and 6 months of age appear to be more commonly affected (Geetha and Selvaraju, 2021) [8]. The virus spreads rapidly among dogs via the faeco-oral route (direct transmission) or through oro-nasal exposure to fomites contaminated by faeces (indirect transmission) (Prittie, 2004) [14]. Foul smelling haemorrhagic gastroenteritis is the frequently encountered clinical manifestation of dogs affected with CPV and myocarditis is rarely presented. Dogs recovering from CPV infection rarely presented with erythema multiformae (erythematous lesions at mucocutaneous junctions), intussusception and sporadic presentation of rectal prolapse during their convalescence phase of CPV infection. The present case report describes in detail about the convalescent complications of CPV infection in dogs.

Materials and Methods

A two months old Labrador male puppy, one Kanni, male puppy of seven month age and one non-descript male puppy of five months age were presented to the Infectious disease unit of Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal with the history of absence of immunization, vomiting, anorexia, haemorrhagic enteritis. Pyrexia (40 °C), congested conjunctival mucous membranes, semi dry buccal mucosa, sunken eyeballs, nausea, haemorrhagic foul smelling enteritis and absence of detectable abnormality on abdominal palpation were the clinical findings observed in all puppies. Faecal sample was collected aseptically in a eppendorf tube containing neutral phosphate buffer saline (PBS) and subjected to commercially available lateral flow assay kit (Parvofind, Cisgen, India), and all puppies were positive for CPV infection. All animals were treated with Amoxicillin and cloxacillin (Intamox, Intas Pharmaceuticals Ltd., Ahmedabad) @ dose rate of 20 mg/kg body weight, ondansetron @ of 0.2 mg/kg body weight, pantoprazole @ of 1 mg/kg body weight, crystalloid fluids (Ringers lactate and 5% dextrose normal saline) after assessing the dehydration status for 7 days as per the recommendations of Greene and Decaro (2012) [9]. Labrador puppy developed erythematous lesions on the lips, around the eyes on third day of treatment typical of CPV infection. Alternate periodical topical application of glycerine along with Kiskin lotion (Intamox, Intas Pharmaceuticals Ltd., Ahmedabad) on the erythema

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multiformae lesions with parental therapy, resulted in uneventful recovery of the puppy. Whereas there was absence of significant clinical improvement in non-descript puppy and sausage shaped mass was palpated on abdominal palpation on fourth day of therapy. Contrast X ray was taken after administration of barium meal and its findings revealed stagnation of contrast material in the intestine indicative of intussusceptions/volvulus. The Kanni puppy developed rectal prolapse after 5 days of treatment and both (Non-descript and Kanni) were subjected to surgical interventions for exploratory laparotomy and manual reduction with fixation of prolapsed mass by stay sutures with post-operative care for seven days. All three puppies were recovered uneventfully after 10 days.

Results and Discussion

Canine parvoviruses (CPV) are the leading cause of most dangerous life-threatening highly contagious, fatal haemorrhagic gastroenteritis of puppies of less than six months age. Parvoviruses are small, single-stranded, non-enveloped DNA viruses (Carr *et al.*, 1997) [6]. Canine parvovirus -2 (CPV-2) was first described as a cause of deadliest haemorrhagic gastroenteritis of puppies in 1978 and was named as CPV type 2 differentiated from Canine parvovirus -1 (CPV-1), the minute virus of canines (Binn *et al.*, 1970) [3]. After its first emergence, the virus spread worldwide and now endemic in domestic and wild canids (Parrish *et al.*, 1988) [13]. Periodical antigenic mutations of CPV-2 ended in the evolution of newer subtypes including CPV-2a, CPV-2b and recently CPV-2c (Buonavoglia *et al.*, 2001) [5] which affects felines apart from canines (Greene and Decaro, 2012) [9]. The above antigenic variants have completely replaced their original type 2, which is still used in most commercial vaccines (Behera *et al.*, 2015) [4]. The disease is endemic in India and reported in various states including Tamil Nadu (Surendhar *et al.*, 2019) [17].

Classical clinical presentation of CPV-2 and its subtypes infection in canines is haemorrhagic gastroenteritis with pyrexia, septicaemia associated with gram-negative sepsis secondary to pathological damage of gastrointestinal tract of CPV-2 affected puppies (Appel *et al.*, 1979; Macartney *et al.*, 1984). After an incubation period of 3–7 days clinical signs such as anorexia, depression, vomiting and mucoid or bloody diarrhea, frequently dehydration and fever. Leukopenia is a constant finding, with white blood cell (WBC) counts dropping below 2000–3000 cells/ml of blood which could be used as a prognostic indicator (Geetha, 2015) [7].

Enteritis and myocarditis were the two clinical entities representing CPV-2 viral infection but myocarditis is rarely reported and it can develop from infection *in utero* or in puppies less than 8 weeks old born to unvaccinated bitches (Hoskins, 1997) [10]. It is usual that all puppies in a litter affected, often being found dead or succumbing within 24 hours after the appearance of clinical signs. The onset and progression of clinical disease is rapid, and clinical signs include dyspnea, crying, and retching (Robinson *et al.*, 1979) [16].

Canine parvoviral infection in three puppies (one Labrador, one Kanni and one non-descript) was confirmed by a spot diagnostic lateral flow assay kit developed by CISGEN, India (Plate – 1). Affected puppies had shown rare clinical manifestation of CPV infection, erythema multiformae and complication of the canine parvoviral infection including

intussusception and rectal prolapse.

Erythema multiformae is reported in Labrador puppy affected with CPV in the present study during the clinical recovery phase where erythematous lesions were noticed in the mucocutaneous junctions of eyes, lips and commissure of lips is in concordance with the reports of Greene and Decaro (2012) [9] (Plate – 2 & 3). The above authors described erythema multiformae, neurological form, urinary tract infection, phlebitis are rare clinical forms of CPV infection in dogs. They described erythema multiformae as multiple erythematous lesions around eyes, commissure of lips, perianal and abdomen regions of CPV affected dogs, which also reported in the present study except in the perianal region. Topical application of glycerine and lotions containing antibiotics, topical steroids aided in quicker recovery along with routine parenteral therapeutic measures involving antibiotics.

Significant clinical improvement was absent in Non-descript puppy affected with CPV in the present study even with intensive parenteral therapy as recommended by various authors including Greene and Decaro (2012) [9]. Presence of sausage-like firm mass in the abdominal palpation suggestive of intussusception and further confirmed by X-ray. Arup Das *et al.* (2017) [2] also reported that intestinal intussusceptions in a German Shepherd puppy affected with CPV and its surgical intervention. He described it as a common and life-threatening condition rarely occur in puppies affected with CPV, particularly at the ileocolic junction. Clinical findings of the above author were also noticed in the puppy with CPV infection associated with intussusception and referred for surgical intervention. Destructive pathological damage on mucosal and serosal layers of the intestine by CPV might be the reason for telescoping of intestinal loops especially at the junction of small and large intestine.

Kanni puppy affected with CPV in the present study had shown rectal prolapse (Plate – 4) during the course of treatment and further referred for surgical intervention. Viral enteritis particularly CPV infection is one of the predisposing factors for the incidence of rectal prolapse in dogs as reported by various authors including Reshma Jain (2016) [15] who reported rectal prolapse with intussusception in a German Shepherd puppy and its surgical intervention.

Clinical findings and complications of CPV infection in puppies indicate the significance of prevention of the deadliest CPV infection by periodical immunization of puppies and to avoid its potential life-threatening sequelae including intestinal intussusception. Regular immunization of bitches for protection of puppies through maternal antibodies, weaning of puppies at 45 days age, completion of series of vaccination in the early life of puppies are the effective primary preventive strategies recommended to save puppies from endemic CPV viral infection and its complications.



Plate 1: Lateral flow assay – CPV positive



Plate 2: Erythema multiformae around lips – CPV infection



Plate 3: Periocular erythema multiformae – CPV infection



Plate 4: Rectal prolapse – CPV infection

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