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# Haematological and Therapeutic Aspects of Canine Parvovirus (CPV) Infections in Crossbred pups

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**Abstract**

The study focused on haematological and therapeutic aspects of Canine parvovirus infection in crossbred pups. Twenty PCR (using primer pair $H_{for}$ /$H_{rev}$) were confirmed CPV in pups in age group of 6-8 weeks. The haematological parameters revealed low white blood cells (WBC) count in 90% pups, low red blood cells (RBC) counts in 60% pups, low haemoglobin (Hb) values in 60% pups and differential leukocyte counts showed neutropenia in 85% pups and lymphopenia in 60% pups. All the affected pups were treated with Cefpodoxime, vitamins and fluid therapy. Fourteen pups recovered completely within five days. Two pups recovered completely within seven days and four pups with severe leucopenia and neutropenia, expired during course of treatment.

*Keywords:* Canine parvovirus; pup; haematology; infection; therapeutic.



## Introduction

Canine parvovirus type 2 (CPV-2) is responsible for severe and highly contagious gastroenteric diseases in pups. The canine parvovirus infection is manifested with clinical signs such as vomiting, dullness and diarrhoea/dysentery. In puppies, the prodromal signs such as lethargy, anorexia and fever appear 4-5 days after infection (PI), followed by an acute onset of vomiting and hemorrhagic diarrhea (5-6 days PI) (Macartney *et al.,* 1984). Young ones are the worst affected, as there is no solid immunity during the first few weeks of life, due to fall in maternally transferred antibody level. Factors that predispose to parvoviral infection in puppies are lack of protective immunity, intestinal parasites and overcrowded, unsanitary, and stressful environmental conditions. (Hoskins, 1997). This paper deals about Hematological and therapeutic aspects of Canine Parvovirus (CPV) infection in crossbred pups.

## Material and Methods

Twenty PCR diagnosed (using primer pair $H_{for}$ / $H_{rev}$ that amplify a 630bp fragment of the gene encoding capsid protein of canine parvovirus) CPV cases of non descript pups in age group of 6-8 weeks presented for this study. Whole blood and blood smear were taken from CPV diagnosed pups for haematological parameters and DLC. Therapy is mostly supportive, aimed at restoring fluid, electrolyte and acid-base balance and preventing secondary bacterial infections.

## Results and Discussion

The classical signs of parvoviral enteritis such as anorexia, lethargy, vomition and hemorrhagic fluid diarrhea were observed in all pups. In CPV infected pups, white blood cells (WBC) counts were 3-5×$10^3$ /µL in 18 pups and 8-16× $10^3$ /µL in 2 pups (normal WBC value ranges between 6-17× $10^3$ /µL. Red blood cells (RBC) counts were 4 - 5 × $10^6$ /µL in 12 pups and 6-8× $10^6$ /µL in 8 pups (normal RBC value ranges between 5.5-8.5×$10^6$ /µL). Haemoglobin (Hb) values were 6-11 g/dl in 12 pups and 13-17 g/dl in 8 pups. (Normal Hb value ranges 12-17× g/dl). The differential leukocyte counts were neutropenia (20-45) in 17 pups and lymphopenia (6-12) in 12 pups. All the affected pups were treated with susp. Cefpodoxime (Cefpet[a]) @ 10 mg/kg PO, Inj. Tribivet[a] (Thiamine + Pyriodoxine + Cyanocobalmin) @1ml IM and Inj. Intalyte[a] @10 ml/kg IV for 5 days. Fourteen pups recovered completely within five days and another two pups within seven days. Four pups with severe leucopenia and neutropenia died during course of treatment.

CPV infected pups deaths can occur at any age, depending on when maternally derived antibody (MDA) wanes. As MDA wanes and before the

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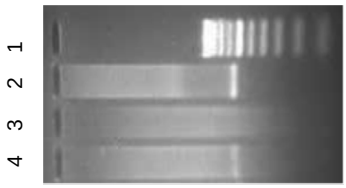


1-100 bp ladder 2- Positive control (product size 630bp)
3- Negative control 4-Clinical sample

Fig. 1: Diagnosis of canine parvovirus infection by primer pair $H_{for}$/ $H_{rev}$(that amplify a 630bp).

animal makes antibodies of its own, a window of susceptibility occurs during which parvovirus, if present can infect the young animal. There ensues a race between the virus and the pup's immune system. The most characteristic clinical form induced by CPV is represented by hemorrhagic enteritis, the extent of which is often dependent on MDA titers of infected pups at the moment of infection. Leukopenia is a constant finding, with white blood cell (WBC) counts dropping below 2000–3000 cells/mL of blood. Molecular diagnostic techniques like PCR based methods have been the most reliable techniques and have high degree of sensitivity and specificity in early detection of CPV from faecal samples (Decaro et al., 2005). Primer pair $H_{for}$ /$H_{rev,}$ amplify a large fragment of capsid protein-encoding gene (VP2) of CPV-2 (Buonavoglia et al., 2001). Primers Hfor (5'CAGGTGATGAATTTGCTACA3') and $H_{rev}$ (5'CATTTGGATAAACTGGTGGT 3'), located at nucleotide position 3556-3575 and 4166-4185 of CPV genome respectively yield a 630bp product. Sequencing of PCR product amplified by this primer pair provided ample information about types/strains of canine parvovirus involved in a particular infection.

Haematological parameters of CPV infected pups revealed low white blood cells (WBC) count in 90% pups (3-5×$10^3$/µL ), low red blood cells (RBC) counts in 60% pups (4-5×$10^6$/µL), low haemoglobin (Hb) values in 60% pups (6-11 g/ dl), neutropenia in 85% pups and lymphopenia in 60% pups. The virus replicates in gastroenteric associated lymphoid tissues and is disseminated by infected leukocytes to germinal epithelium of crypts of small intestine, causing diarrhea. Infection of leukocytes, mainly circulating and tissue associated lymphocytes induces acute lymphopenia often associated with neutropenia (Pollock, 1982).

With aggressive therapy and supportive care, a survival rate of 80% has been achieved. The survival rate in CPV infection is as low as 64% when associated with treatment and 91% in absence of treatment (Otoo *et al.,* 1997). Fluid replacement is the cornerstone of treatment for dogs with CPV enteritis and should be continued until oral intake is resumed. Hemorrhagic diarrhea and mucosal sloughing can lead to bacterial translocation, endotoxemia and sepsis. Cephalosporin group antibiotics provide excellent coverage against gram negative and anaerobic bacteria which may originate from the gut (Georgopapadakou *et al.,* 1989).

## Conclusions

In CPV infected crossbred pups, haematological parameters like white blood cells (WBC) count, red blood cells (RBC) counts and haemoglobin (Hb) will be low. With aggressive therapy and supportive care, highest a survival rate can be achieved.

## References

Buonavoglia, C., Martella, A., Pratella., M, Tempesta, A., Cavalli, D., Buonavoglia, G., Bozz,o G., Decaro, N and Carmichael, L.E **(2001)**. Evidence for evolution of canine parvovirus type-2 in Italy. *J. Gen.Virol.* **82**: 3021-25.

Decaro, N., Elia, G., Campolo, M., Desario, C., Lucente, M.S, Bellacicco, A.L and Buonavoglia, C **(2005)**. New approaches for the molecular characterization of canine parvovirus type 2 strains. *J. Vet. Med.* **52**: 316-19.

Georgopapadakou, N.H., Bertasso, A., Chan, K.K., Chapman, J.S., Cleeland, R., Cummings, L.M., Dix, B.A and Keith, D.D. **(1989)**. Mode of action of the dual-action cephalosporin Ro 23-9424. *Antimicrob Agents Chemother*. **33**: 1067-71.

Hoskins, J.D. **(1997)**. Update on canine Parvoviral enteritis. *Vet. Med.* **8:** 697-09.

Macartney, L., Mclandish, I.A.P, Thompson, H and Cornwell, H.J.C. **(1984)**. Canine parvovirus enteritis-1: clinical, haematological and pathological features of experimental infection. *Vet. Rec.* **115**: 201-10.

Otto, C.M, Drobatz, K.J and Soter, C. **(1997)**. Endotoxemia and tumor necrosis factor activity in dogs with naturally occurring parvoviral enteritis. *J. Vet. Intern. Med.* **11:** 65-70.

Pollock, R.V. **(1982)**. Experimental canine parvovirus infection in dogs. *Cornell Vet.* **72**: 103-19.

Pollock, R.V and Carmichael, L.E. **(1982).** Maternally derived immunity to canine parvovirus infection: transfer, decline and interference with vaccination. *J.Vet. Med. Assoc.* **180**: 37-42.

Rang, H.P,. Dale, M.M., Ritter, J.M and Moore, P.K. **(2003)**. *Pharmacology* (5th Ed.) Edinburgh: Churchill Livingstone.