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Effect of therapeutic regimen on the survivility and mortality rates in canine Parvovirus infection

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Abstract
A total 64 numbers of dogs (36 male and 28 female) were divided age wise into three age groups *viz*. group A (1-3 months), group B (4-12 months) and group C (more than 12 months) with 24, 26 and 14 animals in the said age groups respectively and sex wise into exotic (52 animals) and indigenous breeds (12 animals) to study the effect of therapeutic regimen on the survivility and mortality rates in Canine Parvo Virus Infection. Inspite of aggressive therapy, the CPV infected dogs showing the symptoms of profuse vomition with foul smelling bloody diarrhoea were treated with parenteral fluid therapy, broad spectrum antibiotics, anti-emetics, anti-haemorrhagic and canine parvovirus anti serum with other supportive therapy. After recovering the survivility rate (85.71%) was found more in dogs above 12 months age group than other two Groups *viz*. 1-3 months (79.16%) and 4-12 months (73.03%) of age. Similarly, it was noted that the survival rate (90.62%) was more in dogs in CPV infection those were treated with conventional with hyper immune serum method than only conventional method of therapy (65.62%).

Keywords: Canine parvovirus, mortality, survivility, therapeutic regimen

Introduction
Gastroenteritis is one of the most common ailments in the canine population irrespective of breed, age and sex of the animal [4]. The Canine parvovirus infection (CPV) has become an important problem in dog population worldwide as it causes severe haemorrhagic gastroenteritis which may rapidly spreads in domestic dog populations as well as wild dogs with high morbidity (100%) and frequent mortality up to 10% [1] in treated dogs. Canine parvovirus enteritis is an acute, fatal and contagious gastrointestinal infection usually occurs in unvaccinated puppies between 6 to 20 weeks old [5]. Symptoms in puppies over two months include vomition, anorexia, nausea, haemorrhagic gastro enteritis, bloody diarrhoea with foul smell, leukopenia and myocarditis and also result in the disease exhibiting high morbidity (100%) and low mortality [15, 16] in treated puppies. The highest occurrence of CPV was during in summer followed by rainy season and winter also observed that the sexually intact dogs were at four times greater risk than spayed or neutered dogs and intact males were twice as likely as intact females in CPV enteritis [2, 3, 10]. Factors that predispose parvovirus infection in puppies are lack of protective immunity, overcrowding of animals in a small space, unhygienic, stressful environmental conditions [8, 14]. In neonatal animals, the virus replicates mitotically and FPV usually results in cerebellar hypoplasia, whereas myocarditis is caused by CPV [6]. The viral replication is limited to lymphoid and small intestinal cells causing temporary panleukopenia or lymphopenia in older animals. Virus has strong affinity for intestine, bone marrow, lymph nodes and invades to mitotic cells, after an incubation period of 7-14 days causing intestinal impairment [9]. Invasion of the bone marrow causes a decrease in the white blood cell count leading to increased susceptibility to bacterial infections and endotoxemia [7]. The present study revealed the effect of therapeutic regimen on the survivility and mortality rates in Canine Parvo Virus Infection.

Materials and Methods
A total of 64 nos. of parvoviral infected dogs were treated with broad-spectrum antibiotics sensitive towards secondary bacterial infection like Ceftriaxone + Sulbactam, Amikacin irrespective of age, sex and breed along with severity of infection (Table 1).

The above antibiotic drugs were administered during morning and evening daily to check daily secondary bacterial infection along with fluid therapy to maintain the electrolyte balance and also prevent shock, oral intake of water and food materials were withdrawn. Providing antiemetic drugs i.e. Ondansetron to check the vomition, administered proton pump inhibitor H2 Pantoprazole to check the acidity, using the haemacel to overcome the anaemic condition, to check the capillary bleeding anti haemorrhagic drug like Vit-K was given I/V till absence of blood in stool and also using B complex to restore energy. This therapy was continuing for 7-10 days or more according to severity to get better result.

Table 1: Therapeutic trail

Group no.	Type of breed		No. of dogs n=64	Treatment schedule
GROUP-(A)	Exotic	Small	10	a. Highly sensitive antibiotics Ceftriaxone+ sulbactam@ 20 mg/kg bwt once and amikacin@ 10 mg/kg bwt twice daily. b. Antiemetic drugs ondansetron @ 0.2 mg/kg I/V bid. c. Lactated Ringer solution (R. L) @20 ml/kg b.wt I/V twice D 5%@20 ml/kg bwt I/V twice daily. d. Plasma Expander-Haemacel @10ml/kg bwt I/Vtwice daily from day 0 to day 3. e. Pantoprazole@1mg/kgI/V24 hour's interval. f. Antihaemorrhagic Vitamin-K@5mg/kg bwt I/V twice daily, till absence of blood in stool. g. Vitamin-Bcomplex (Polybion) I/V with D5%. h. Astymin inj @ 5ml/kg/IV once daily from day 4 to day 7. i. Hyper immune sera@0.4ml/kg bwt.
GROUP-(B)		Medium	06	
GROUP-(C)		Large	36	
GROUP-(D)	Indigenous		12	

*C= (Conventional method) *T= (Conventional method with Hyper immune serum)
*C=(a)Ceftriaxone+ sulbactam@ 20 mg/kg bwt once and Amikacin@ 10 mg/kg bwt twice daily.
(b) Ondansetron@ 0.2 mg/kg I/V 12 hours of interval twice daily.
(c) Fluid Therapy Lactate Ringer (R. L) @20 ml/kg bwt I/V twice and D 5%@20 ml/kg bwt I/V twice daily.
(d) PlasmaExpander-Haemacel@10ml/kg bwt/I/V twice daily from day 0 to day 3.
(e) H2 blocker-Protonpump inhibitors pantoprazole@1mg/kg I/V24 Hours interval.
(f) Vitamin-K (Kaplin) @5mg/kg bwt I/V twice daily, till absence of blood in stool.
(g) Vitamin-B complex (Polybion) I/V with D5%.
(h) Astymin Inj @ 5ml/kg/IV.
*T= C+Hyper immune serum @ 0.04 mg/ kg bwt I/V daily.

Results

After the treatment, out of 64 nos. of CPV effected dogs 50 nos. of different age groups such as 19 (79.16%) nos out of 24nos between 1-3 months,19 (73.07%) nos. out of 26 nos. between 4-12 months and 12 (85.71%) nos. out of 14nos more than 12 months of age were survived, rest of them were died which is depicted in Table 2. So, the present scenario showed that the percentage of mortality is more in case of 4-12 months (26.29%) age group followed by 1-3 months (20.83%) and more than 12 months(14.28%) of age group and survivility is more in case of more than 12 months of age group followed by1-3 months and 4-12 months of age. Also found that the overall survival rate age wise is more in case of animal those treated with normal treatment with hyper immune serum (92.09%) than that of only normal therapy (66.53%). Which have been presented in Table 2.

Table 2: Survival and mortality rate in different therapeutic regimen based on age wise (n=64)

S. No	Age (month)	No of animal	Therapeutic Schedule	Survival%	Total Survival%	Mortality%	Total Mortality%
1	1-3	24	12-C	08-C (66.66)%	79.16%	04-C (33.33)%	20.83%
			12-T	11-T (91.66)%		01-T (8.33)%	
2	4-12	26	13-C	08-C (61.53)%	73.07%	05-C (38.47)%	26.92%
			13-T	11-T (84.61)%		02-T (15.39)%	
3	> 12	14	07-C	05-C (71.40)%	85.71%	02-C (28.60)%	14.28%
			07-T	07-T (100)%		00-T (0)%	

*C= (a) Ceftriaxone + sulbactam@ 20 mg/kg bwt once and Amikacin@ 10 mg/kg bwt twice daily.
(b) Ondansetron@ 0.2 mg/kg I/V 12 hours of interval twice daily.
(c) Fluid Therapy Lactate Ringer (R. L) @20 ml/kg bwt I/V twice and D 5%@20 ml/kg bwt I/V twice daily.
(d) PlasmaExpander-Haemacel@10ml/kg bwt/I/V twice daily from day 0 to day 3.
(e) H2 blocker-Protonpumpinhibitors pantoprazole@1mg/kg I/V24 hours interval.
(f) Vitamin-K (Kaplin)@5mg/kg bwt I/Vtwice daily, till absence of blood in stool.
(g) Vitamin-B complex (Polybion) I/V with D5%.
(h) Astymin Inj @ 5ml/kg/IV.
*T= C+Hyper immune serum @ 0.04 mg/ kg BW I/V daily.

After the treatment, out of 64 nos. of CPV affected dogs where males and females were 38 and 26 nos. respectively, 50 nos. of different breed of dogs, out of them 29(76.31%) no males out of 38 nos. and 21(80.47%) no out of 26 nos. females were survived, rest of them were died which is depicted in Table 3. So, the present study revealed that the percentage of survival rate is more in case of female (80.4%) and mortality rate is more in male (23.63%) than female (19.23%). Also found that the overall survival rate is more in case of animal those treated with normal treatment with hyper immune serum (90.88%) than that of only normal therapy (62.82%). Which have been presented in Table 3.

Table 3: Survival and mortality rate in different therapeutic regimen based on sex wise (n=64)

S. No	Sex	No. of animals	Therapeutic Schedule	Survival%	Total survival%	Mortality%	Total Mortality%
1	Male	38	C-19	C-12(63.15%)	29(76.31%)	C-07(36.85%)	09(23.63%)
			T-19	T-17(89.47%)		T-02(10.53%)	
2	Female	26	C-13	C-09(62.50%)	21(80.47%)	C-04(30.76%)	05(19.23%)
			T-13	T-12(92.30%)		T-01(7.70%)	

*C= (a) Ceftriaxone+ sulbactam@ 20 mg/kg bwt once and Amikacin@ 10 mg/kg bwt twice daily.
(b) Ondansetron@ 0.2 mg/kg I/V 12 hours of interval twice daily.
(c) Fluid Therapy Lactate Ringer (R. L) @20 ml/kg bwt I/V twice and D 5%@20 ml/kg bwt I/V twice daily.
(d) PlasmaExpander-Haemacel@10ml/kg bwt/I/V twice daily from day 0 to day 3.
(e) H2 blocker-Protonpump inhibitors pantoprazole@1mg/kg I/V24 hours interval.
(f) Vitamin-K(Kaplin)@5mg/kg bwt I/Vtwice daily, till absence of blood in stool.
(g) Vitamin-B complex (Polybion) I/V with D5%.
(h) Astymin inj @ 5ml/kg/IV.
*T= C+Hyper immune serum @ 0.04 mg/ kg bwt I/V daily.

After the treatment, out of 52 nos. of exotic and 12 nos. of indigenous breed of dogs were survived, 50 nos., where 39(80.92%) exotic and 11(91.66%) indigenous were survived, rest of them were died which is depicted in Table 4. So, the present study revealed that the percentage of survival rate is more in case of Indigenous breed and mortality rate is more in exotic breed. Similarly, out of 39 nos. of CPV infected exotic breed 9 (90%), 5 (83.33%) and 25 (69.44%) nos. of different size of small, medium and large were survived. So, it was observed that the percentage of mortality is more in large size dogs (30.56%) rather than medium (16.67%) and small size (10%) dogs. Also found that the overall survival rate (95.83%) is more in case of animal those treated with conventional treatment with hyper immune serum than that of only conventional therapy (71.38%) which have been presented in Table 4.

Table 4: Survival and mortality rate in different therapeutic regimens based on breed wise (n=64)

S No.	Breed		No. of animal	Therapeutic Schedule	Survival%	Total survival%		Mortality%	Total Mortality%	
1	Exotic	Small	10	C-05	C-04(80%)	90%	75%	C-01(20%)	10%	25%
				T-05	T-05(100%)			T-0(0%)		
2		Medium	06	C-03	C02(66.66%)	83.33%		C-01(33.33%)	16.67%	
				T-03	T03(100%)			T-0(0%)		
3		Large	36	C-18	C10(55.55%)	69.44%		C-08(44.44%)	30.56%	
				T-18	T15(83.33%)			T-03(8.33%)		
4	Indigenous		12	C-06	C05(83.33%)	91.66%	91.66%	C-01(16.66%)	8.33%	8.33%
				T-06	T06(100%)			T-0(0%)		

*C= (a)Ceftriaxone+ sulbactam@ 20 mg/kg bwt once and Amikacin@ 10 mg/kg bwt twice daily.
(b) Ondansetron@ 0.2 mg/kg I/V 12 hours of interval twice daily.
(c) Fluid Therapy Lactate Ringer (R. L) @20 ml/kg bwt I/V twice and D 5%@20 ml/kg bwt I/V twice daily.
(d) PlasmaExpander-Haemacel@10ml/kg bwt/I/V twice daily from day 0 to day 3.
(e) H2 blocker-Protonpump inhibitors pantoprazole@1mg/kg I/V24 hours interval.
(f) Vitamin-K(Kaplin)@5mg/kg bwt I/Vtwice daily, till absence of blood in stool.
(g) Vitamin-B complex (Polybion) I/V with D5%.
(h) Astymin inj @ 5ml/kg/IV.
*T= C+Hyper immune serum @ 0.04 mg/ kg bwt I/V daily.

After therapeutic regimens 50 animals were survived. Out of them 21 nos. by conventional method and 29 nos. by conventional plus hyper immune serum method were survived and also comparative study was revealed in this study basing upon absence of clinical signs.

Discussion

After therapeutic regimens given to 64 nos. of animals, 50 nos. were survived. Out of them, 21(65.62%) nos. of animal survived out of 32 nos. of CPV affected dogs under Group A subjected to conventional and 29(90.62%) nos. of dogs were survived under Group B when subjected to conventional with hyper immune serum method. The present study revealed that the survivility percentage is more in case of dogs under Group B which were treated with conventional with hyper immune serum therapy compare to dogs under Group A treated by only conventional method of treatment which was previously reported by Meunier *et al*. (1985) [12] due to infusion of antiserum causing neutralising the free virus present in plasma, impede viral spread by blocking entry into new target cells and suppress the release of new infectious virions from infected cells. Similarly, the rate of mortality was found to be more in CPV affected dogs Group A (34.38%) those were treated with conventional method compared to dogs under Group B (9.38%) conventional with hyperimmune serum method The same finding was reported by Macintire *et al*. (1997) [11] and Prittie *et al.* (2004) [13] due to providing passive immunization resulting in reducing the mortality and shortening the length of the disease.

Conclusion

It was concluded that the conventional with hyper immune serum method of treatment was found superior than that of conventional method of treatment in CPV affected dogs with more survivility rate.

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