NOTE

Prevalence and Conversion of Canine Parvovirus Antibody in Various Dog Colonies in Japan

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As reported previously [1], in Japan canine parvovirus (CPV) was first isolated in March, 1979, and the first appearance was already detected serologically in January, 1979. Recently, Mohri et al. reported that the first sero-positive case was detected in Kyushu area even in July, 1979 [8]. Since then, the disease seems to have spread all over the country, and the sero-positive dogs have been increasing in number. But, in our previous serologic survey, samples were taken mainly in Tokyo and Saitama areas, and the most of them were from veterinary hospitals. So, little was known on the spread of CPV infection within isolated and properly conditioned dog colonies. In the present report, authors describe the prevalence of CPV infection in the dog colonies in different areas in Japan and the seroconversion in some of them.

Samples were taken from 18 dog colonies in December, 1979 through November, 1981. The outline of the dog colonies is summarized in Table 1. Virus isolation and serologic survey were performed by the same methods and criteria as described before [1]. A total of 401 canine serum samples were examined by hemagglutination-inhibition (HI) test.

Tables 1 and 2 are the results of the

examinations. None of the 18 dog colonies examined was free from CPV infection regardless of location, origination, object and breed for making colonies. The HI positive rate ranged from 20% (colony I) to 100% (colonies B, C, E and K), and 16 colonies showed more than 50% in positivity. Out of 401 dogs examined, 320 (80%) were sero-positive.

Groups I and II (Table 2) were university colonies. In colonies B and E, all the examined dogs were sero-positive without history of clinical illness of CPV infection. Colony I had the lowest positive rate in this survey. In this colony, all the serum samples were collected on arrival of dogs. After that time, the colony suffered severe hemorrhagic enteritis suspicious of CPV infection, which was fatal to some dogs. Samples were taken multiple times in Group II. In colonies F and R, second and third examinations were performed with an interval of 2-3 weeks. After clinical illness had ceased, all the examined dogs became sero-positive, in which HI antibody titers were very high ($\geq 1:512$) in most cases.

Group III (Table 2) was composed of laboratory dog colonies. Examinations were performed 3 times in colony H. Differ-

Table 1. Background of dog colonies examined and prevalence of HI antibody against canine parvovirus

Colony symbol	Period	Area	Source ^a	Purpose ^b	Breed ^c	Positive/Examined ^d
A	Dec. 1979	Kanto	U	E	M	24/27 (89)
B	May 1980	Kanto	U	E	B & M	3/3 (100)
C	May 1980	Kanto	U	E	M	5/5 (100)
D	May 1980	Kanto	B	B	O	17/18 (94)
E	June 1980	Kyushu	U	E	M	11/11 (100)
F	June, July and Dec. 1980	Kanto	U	E	B & M	15/24 (63)
G	June-Aug. 1980, Feb. 1981	Hokuriku	U	E	B & M	7/13 (54)
H	June and Dec. 1980, Feb. 1981	Kanto	I	B & E	B	59/67 (88)
I	Oct. and Nov. 1980	Kanto	U	E	M	3/15 (20)
J	Nov. 1980	Kyushu	U	E	M	6/21 (29)
K*	Nov. 1980	Kansai	PC	E	B	20/20 (100)
L	Dec. 1980	Kansai	PC	E	B	30/33 (91)
M	Dec. 1980, Jan. 1981	Kanto	I	B & E	B	21/30 (70)
N	Jan. 1981	Kanto	B	B	O	7/11 (64)
O	Feb. 1981	Kanto	B	B	O	8/9 (89)
P**	Feb. 1981	Kanto	I	B & E	B	12/20 (60)
Q*	Sept. and Nov. 1981	Kanto	PC	E	B	63/64 (98)
R	Sept.-Nov. 1981	Kanto	U	E	B	9/10 (90)
Total						320/401 (80)

^a U=University.
B=Breeder.
I=Institute.
PC=Pharmaceutic company.

^b E=Experiments.
B=Breeding.
B & E=Breeding and experiments.

^c M=Mongrel.
B & M=Beagle and mongrel.
O=Others.
B=Beagle.

^d Positive=HI titer of $\geq 1:128$.
()=Positive %.

* Imported.

** Inactivated feline panleukopenia virus vaccination.

ent dogs were examined and clinical illness was observed sporadically at each time. Most dogs were sero-positive through all examinations. In colony M, after ceasing of clinical illness, all the examined dogs were sero-positive and HI antibody titers were $\geq 1:512$. In the present survey, colony P was the only one with the history of parvovirus vaccination (inactivated feline panleukopenia virus). All the dogs were

vaccinated at 7 and 10 weeks old and serum samples were taken at 7 months old. But, the apparent infection was observed in it and some dogs had high titer of the HI antibody raised again.

In Group IV, consisting of colonies raised in pharmaceutic companies, beagle dogs in colonies K and Q were all imported. Neither clinical illness nor history of the parvovirus vaccination had been recorded

Table 2. Cumulative data on CPV infection in each colony

Group ^a	Colony symbol	Period	History of clinical illness	Virus isolation	Positive/Examined ^b	HI titer ^c											
						8 V	8	16	32	64	128	256	512	1024	2048	4096	8192 ≥11
I	B	May 1980	— (—) *	ND**	3/3								3				
	E	June 1980	— (—)	ND	11/11								2	6		2 1	
	A	Dec. 1979	+ (—)	+	24/27	1		1		1	1	1	3	3	10	5 1	
	C	May 1980	+ (—)	—	5/5								4		1		
	I	Oct. and Nov. 1980	— (—)	—	3/15	11				1	1		2				
	J	Nov. 1980	+ (+)	—	6/21	9	3		3		2	1	2	1			
II	F	June and July 1980	— (—)	ND	6/11	5					1				5		
		Dec. 1980	+ (+)	+	3/7	1		2		1	1	2					
		Dec. 1980	+ (—)	ND	6/6					1			2	1	1	1	
	G	June–Aug. 1980	— (—)	ND	3/5	2								1		2	
		Feb. 1981	+ (+)	+	4/8	2	1			1	1		3				
	R	Sept. and Oct. 1981	— (—)	ND	0/9	9											
		Oct. 1981	+ (+)	ND	7/7								1	1	1	2 2	
		Nov. 1981	+ (—)	ND	8/8					1				4	1	1 1	
	III	H	June 1980	+ (+)	ND	7/9	2					1	1	3	1		1
Dec. 1980			+ (+)	ND	7/10				1	2	2	4	1				
Mar. 1981			+ (+)	ND	45/48	1			1	1	13	9	17	2	3	1	
M		Dec. 1980	+ (+)	—	0/10	7	1	2									
		Jan. 1981	+ (—)	—	20/20								7	9	1	1 2	
P†		Feb. 1981	+ (+)	—	12/20		1	2	1	4	7	2	2	1			
IV	K‡	Nov. 1980	— (—)	ND	20/20						11	8	1				
	L	Dec. 1980	+ (+)	ND	30/33					3	7	10	10	3			
	Q‡	Sept. 1981	— (—)	ND	32/32						4	7	13	5	2	1	
		Nov. 1981	— (—)	ND	31/32					1	3	7	9	6	6		
V	D	May 1980	+ (—)	ND	17/18	1							5	6	4	1 1	
	N	Jan. 1981	+ (—)	ND	7/11	4					1		5		1		
	O	Feb. 1981	+ (—)	ND	8/9	1						1	1	5	1		

^a I, II=Universities. III=Institutes. IV=Pharmaceutical companies. V=Breeders.^b Positive=HI titer of $\geq 1:128$.^c Expressed as the reciprocal of the highest serum dilution giving complete HI pattern.

* ()=Recorded at the time of serum collection.

** Not done.

† Inactivated feline panleukopenia virus vaccination.

‡ Imported.

in these colonies, and serum samples were taken 1–4 weeks after introduction of the dogs. Almost all the dogs were sero-positive. Judging from these results and history, it was suspected that imported dogs might have been infected before or on the way of importation.

Group V was made up of breeding colo-

nies for pet dogs. Serum samples were taken mainly after ceasing of clinical illness. All 3 colonies in this group were sero-positive as a whole, and most dogs had high titer of the HI antibody ($\geq 1:512$), but only young dogs aged less than 4 months were sero-negative ($<1:8$). After the maternal antibody had declined, pups

seemed to be susceptible to CPV in these colonies.

There have been some reports on the serologic survey of CPV infection [1-10, 12, 13], but they have mentioned only a few dog colonies at most.

Because the number of the dog colonies examined was limited and they were not chosen at random, present results might not reflect the precise spread of CPV infection in Japanese dog colonies. But the colonies examined were located in different areas in Japan, and most of them were kept isolatedly in good condition. Therefore, it is reasonable to conclude that CPV infection has spread among dog colonies rather in a short time since it started in Japan.

Once CPV entered a colony, most dogs in it were infected rapidly. In other reports [5, 9], the sero-positive rates have been always very high in kennel dogs and closed dog colonies. CPV seems to spread quite rapidly and wholly among closed dog population. *Parvovirus* is known as one of the most stable viruses, and is not inactivated easily by usual disinfectants as Scott reported on feline parvovirus (feline panleukopenia virus) [11]. This nature of the virus seems to be the main reason for such radical spread. And once a colony was contaminated by CPV, it might remain for a long time with continuous infection as was seen in colony H (Table 2, Group III).

There were some sero-positive colonies without the history of clinical manifestations (colonies B, E, K and Q). In the other colonies, where clinical manifestations were occasionally observed, the infection was mild or subclinical for the most. Considering the present data as well as previous reports [9, 12, 13], in some colonies, inapparent CPV infection and subsequent sero-conversion might occur as a whole.

In conclusion, it is possible to say that, in Japan, CPV infection already spread widely among dog colonies isolated and kept in good condition.

To control viral infections, dogs raised for experimental use have been usually vaccinated to canine distemper and infectious canine hepatitis up to date. Nevertheless, in the present situation, they are still guardless against CPV in Japan. Therefore, in addition to above two vaccines, the vaccination to all the dogs with a vaccine made from CPV should be routinely applied on their arrival for every experimental use.

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要 約

集団飼育犬における、イヌ・パルボウイルス抗体の分布と動態について（短報）：平沢 勉・畔高政行・小西信一郎——良好な管理下にある18コロニーの集団飼育犬について、イヌ・パルボウイルス抗体の分布と動態について検索した。検索した全コロニーで HI 抗体陽性例を検出し、総検査頭数 401 例中 320 例（80%）が抗体陽性であり、隔離・飼育されている犬集団にも本ウイルスが広く蔓延していることが確認された。