

同腹仔犬の致死的ヘルペス感染症

誌名	Japanese journal of veterinary science
ISSN	00215295
著者	柳澤, 利彦 畔高, 政行 美土路, 活男
巻/号	49巻3号
掲載ページ	p. 519-522
発行年月	1987年6月

Fatal Herpesvirus Infection in a Litter of Puppies

Toshihiko YANAGISAWA, Masayuki AZETAKA¹⁾, Katsuo MIDORO, Reiji TAKAHASHI, Kosaku FUJIWARA, and Kunihiko SAWA²⁾

Department of Veterinary Pathology and¹⁾ Department of Veterinary Microbiology, Faculty of Agriculture, University of Tokyo, Bunkyo-ku, Tokyo 113, and ²⁾Sawa Animal Clinic, 2349 Kurihara, Zama 228, Japan

(Received 12 March 1986/ Accepted 9 February 1987)

Jpn. J. Vet. Sci. 49(3): 519-522, 1987

KEY WORDS: herpesvirus, puppy.

Fatal canine herpesvirus(CHV) infection in neonatal puppies characterized by hemorrhage and necrosis in various tissues was first described by Carmichael *et al.* [1], and the occurrence has been reported in many countries [3, 10, 13]. In Japan, Motohashi and Tajima [11] isolated CHV from the lung of a diseased adult dog, while Hashimoto *et al.* [4, 5] and Hirai *et al.* [8] from neonatal puppies. This note is to describe pathology and virus isolation of an outbreak of the disease within a litter of puppies.

In May 1984, a Boxer bitch, which came from U.S.A. in 1983 and was 3.5 years old, whelped at full term eight puppies, five males and three females. It was the first whelping. She appeared to be clinically normal during pregnancy and after parturition having a neutralizing antibody titer of 1:8 against CHV.

The first clinical sign in the puppies was severe diarrhea appearing 2 weeks after birth. Anorexia and dyspnea were observed at their moribund stage. All the eight puppies died within 2 to 3 weeks after birth (Table 1). Two of them were autopsied on death and their lung and heart fixed in 10% formalin were brought to this laboratory. Five of the remaining puppies were autopsied at this laboratory and subjected to pathologic

observation and bacterial and viral assays. Tissues of main organs were fixed in 10% neutral buffered formalin, embedded in paraffin, and stained with hematoxylin and eosin (HE). Formalin-fixed lung and kidney specimens were also processed in osmium tetroxide for electron microscopy.

Five puppies autopsied at this laboratory had a small amount of amber and bloody fluid in the thoracic cavity and pulmonary edema, splenomegaly and enlargement of mesenteric lymph nodes were seen. There were disseminated petechiae and multiple greyish-white patches sized pin-head or millet on the serous surface of the kidney as well as lung, liver, heart and gut. Some of hemorrhagic lesions were shown to extend to the medulla of the parenchymatous organs (Fig. 1). Hyperemia and hemorrhage also appeared in the pancreas and thyroids of two cases. In four of five cases, several ascarids were parasitized in the duodenum.

Histopathology revealed disseminated coagulative necrosis with hemorrhage in the various organs including heart and brain (Table 1). In the lung desquamation of septal and bronchial epithelial cells was prominent and the alveolar lumens contained fibrinous exudate (Fig. 2). The liver had several well-circumscribed foci of coagulative necrosis without inflammatory

Table 1. Microscopic findings

Case No.	Age (Days)	Necrosis					Necrotizing pneumonia	Brain	
		Liver	Kidney	Myocardium	Adrenal	Intestines		Perivascular cuffing	Gliosis
119-1	14	n.e. ^{a)}	n.e.	++ ^{b)}	n.e.	n.e.	++	n.e.	n.e.
119-2	18	n.e.	n.e.	+	n.e.	n.e.	++	n.e.	n.e.
85	18	+	++	+	+	+	++	+	-
87	19	+	++	+	+	++	+	-	+
88	20	+	+	+	+	++	+	+	-
89	20	++	++	+	++	+	++	+	++
90	21	++	++	+	n.e.	++	++	+	+

a) Not examined.

b) Severity of lesions.

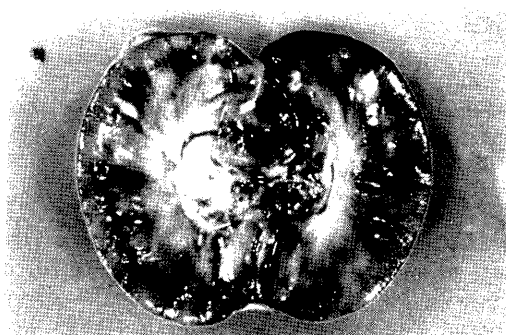


Fig. 1. Wedge-shaped hemorrhage in the kidney. Case No. 89.

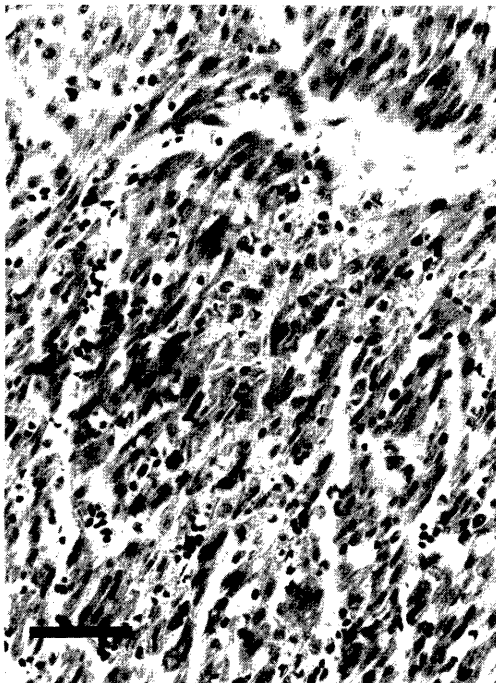


Fig. 3. Focal coagulative necrosis and slight mononuclear cell infiltration in the myocardium. Case No. 87. HE Bar=50 μ m.

reaction, and perivascular mononuclear cell infiltration were seen in the portal triads. Renal lesions were mainly located in the cortex, involving both glomeruli and tubules. Tubular epithelial cells and various types of glomerular cells were degenerated or necrotized with some areas of hemorrhage. In the pancreas and the lamina propria of the intestines necrotic foci with hemorrhage were produced. Coagulative necrosis or interstitial mononuclear cell infiltration was seen

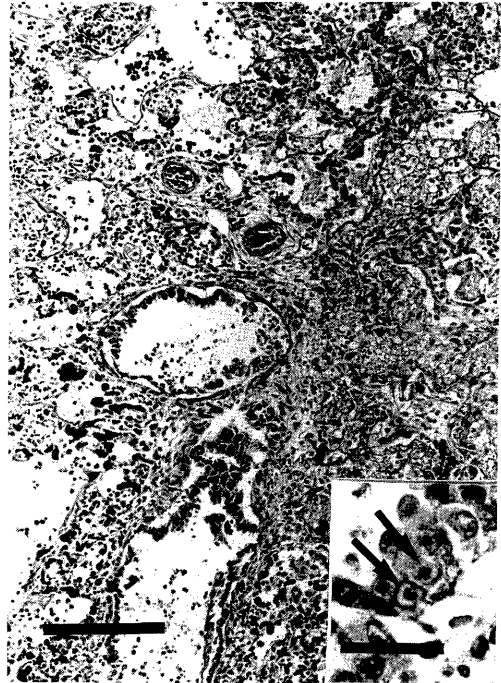


Fig. 2. Focal fibrino-necrotic pneumonia. HE Bar=100 μ m Inset: Intranuclear inclusions (arrows) in desquamated bronchial epithelial cells. Case No. 89. HE Bar=20 μ m.

also in the myocardium (Fig. 3). The brain was edematous and hyperemic, and focal necrosis with microgliosis were often seen in the cerebellar cortex. Perivascular cuffing of mononuclear cells and proliferation of vascular endothelial cells were often seen in the cerebrum.

Within parenchymal and epithelial cells in the vicinity of necrotic areas of affected organs, acidophilic or basophilic intranuclear and less frequently intracytoplasmic inclusions were detected. Electron microscopy revealed herpes virions within nuclear as well as cytoplasmic inclusions in the alveolar epithelium and various types of glomerular cells (Fig. 4).

Viruses were isolated in the primary dog kidney cell cultures from various tissues of five affected puppies, except from the spleen and mesenteric lymph nodes (Table 2). All the cultures inoculated with lung and kidney specimens showed typical cytopathic effects within 48 hr postinoculation. The isolates were identified as CHVs based upon physicochemical properties.

Although all the samples gave *Escherichia coli* as a secondary invader on blood agar, the

widespread distribution of the virus as well as pathologic changes in affected puppies suggested a major etiologic role of CHV in the present cases. We proposed a possibility that some cases which were diagnosed as bacterial infection of puppies, included herpesvirus infection of puppies. Similar necrotic changes of various organs were described by many authors in naturally and experimentally infected puppies, but there were no detail description of myocardial lesions as seen in this case.

In the present case, all the eight puppies died



Fig. 4. Immature virions (arrows) within the nucleus of a glomerular endothelial cell. Case No. 90 Bar=500nm.

consecutively within 3 weeks after birth, suggesting an occurrence of transmission within the litter, while the route of natural infection remained unknown. Uterine [5-7, 12] and vaginal [2,9,10] infections can be considered. In Japan, herpesvirus infections in canine species was rare disease [4, 11].

REFERENCES

1. Carmichael, L.E., Squire, R.A. and Krook, L. 1965. *Am. J. Vet. Res.* 26: 803-814.
2. Cornwell, H.J.C., and Wright, N.G. 1969. *Vet. Rec.* 84: 2-6.
3. Cornwell, H.J.C., Wright, N.G., Campbell, R.S.F., Roberts, R.J., and Reid, A. 1966. *Vet. Rec.* 79: 661-662.
4. Hashimoto, A., Hirai, K., Miyoshi, A., Shimakura, S., Yagami, K., Kato, N., Kunihiro, K., Fujiura, A. and Kitazawa, K. 1978. *Jpn. J. Vet. Sci.* 40: 157-169.
5. Hashimoto, A., Hirai, K., Okada, K., and Fujimoto, Y. 1979. *Am. J. Vet. Res.* 40: 1236-1240.
6. Hashimoto, A., Hirai, K., Suzuki, Y., and Fujimoto, Y. 1983. *Am. J. Vet. Res.* 44: 610-614.
7. Hashimoto, A., Yamaguchi, T., and Fujimoto, Y. 1982. *Am. J. Vet. Res.* 43: 844-850.
8. Hirai, K., Miyoshi, A., Yagami, K., Kato, N., Kunihiro, K., Fujiura, A., Shimakura, S., and Hashimoto, A. 1978. *Res. Bull. Fac. Agr. Gifu Univ.* 41: 139-153.
9. Huxsoll, D.L., and Hemelt, I.E. 1970. *J. Am. Vet. Med. Assoc.* 156: 1706-1713.
10. Love, D.N., and Huxtable, C.R.R. 1976. *Vet. Rec.* 99: 501-503.
11. Motohashi, T., and Tajima, M. 1966. *Jpn. J. Vet. Sci.* 28: 307-314.
12. Stewart, S.E., David-Ferreira, J., Lovelace, E., Landon, J., and Stock, N. 1965. *Science* 148: 1341-1343.
13. Watt, D.A., Spradbrow, P.B., and Lamberth, J.L. 1974. *Aust. Vet. J.* 50: 120-122.

Table 2. Virus isolation

Case No.	Organ					
	Heart	Lung	Liver	Intestine	Kidney	Brain
85	n.e. ^{a)}	+	n.e.	n.e.	+	n.e.
87	+	+	+	+	+	-
88	+	+	+	+	+	+
89	+	+	+	-	+	-
90	+	+	+	+	+	+

a) Not examined.

要 約

同腹仔犬の致死性ヘルペス感染症（短報）：柳澤利彦，畔高政行¹⁾，美土路活男，高橋令治，藤原公策，澤邦彦²⁾（東京大学農学部家畜病理学教室，¹⁾家畜微生物学教室，²⁾開業）——全身臓器の出血・壊死を特徴とし，細菌感染を伴う同腹仔犬の急性致死性ヘルペスウイルス感染症について病理学的に観察した。壊死巣周囲の変性細胞に，好酸性あるいは好塩基性の核内および細胞質内封入体が見られ，電顕で封入体内にウイルス粒子が認められた。腎・肺などから犬ヘルペスウイルスおよび大腸菌が分離された。