

## **Pathological Study on Idiopathic Acinar Atrophy of the Pancreas in a Dog**

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### **Introduction**

Pancreas atrophy — general disappearance of pancreatic exocrine tissue without inflammation — has been especially observed in young dogs<sup>(6)</sup>. Dahme noted that pancreas atrophy occurs mainly in dogs two to six years old and should be differentiated from congenital pancreas hypoplasia<sup>(12)</sup>. Recently, Hashimoto et al. reported two cases of canine juvenile acinar atrophy of the pancreas in German shepherd and Akita breeds<sup>(3,4)</sup>. The authors observed an idiopathic atrophy case in a mongrel dog.

### **Case History**

An approximately 2-year-old female, black-haired, middle-type mongrel was brought to the Veterinary Medical Teaching Hospital of Rakuno Gakuen University because of a 4-day history of diarrhoea.

The dog had a good appetite but was emaciated. Stools were muddy and yellowish white in color, containing fatty substances and unable to digest gelatine. The dog was administered antibiotics, antidiarrheic and pancreatine powder but its condition worsened: on December 22, 1984, it died after seven days of hospitalization.

### **Materials and Methods**

The dog was autopsied the next day after death. Tissue specimens were collected from every part of the body, especially with extra care from the pancreas, and fixed in 10% formalin. The specimens were embedded in

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paraffin and stained with hematoxylin and eosin (HE): the pancreas specimens were additionally stained with Launoy's method, Hellman's variation of Davenport's method, Masson's trichrome, aldehyde fuchsin (AF), and silver impregnation.

## Results

### (1) Pancreas

Macroscopically, the organ was 32 cm in length, 1-2 cm in width, very thin — it looked like lace work — and weighed 5 g (Fig. 1).

Microscopically, the lobules were atrophied in variable sizes and separated by edematous interstitium (Fig. 2). With HE stain, lobular structure was observed but acinar structure was difficult to ascertain and the parenchym consisted of two types of cells: the dominant in number were diffusely located water clear cells, which had vast and almost empty cytoplasm, and round and darker nuclei (Fig. 3). These cells were characterized as follows: there were sparsely scattered deep blue granules with AF stain or brown granules with Davenport's stain in the cytoplasm (Fig. 4); and reticular fibers were scarcely observed around the cells (Fig. 5). The other type were single-layered epithelial cells crowded around a very narrow lumen (Fig. 6): the nuclei were larger and paler, and cytoplasm was slightly eosinophilic and narrow and did not contain Launoy's stain-positive granules. With Masson's trichrome stain, reddish granules were scattered in cytoplasm of the former cells, and finely foamy substances were crowded in the latter. In the interstitium, blood vessels and excretory ducts were distinctly observed.

### (2) Other organs

Within the right ventricle, two worms of *Dirofilaria immitis* were harbored.

Microscopically, fibrosis in the small intestinal mucosa and atrophy of the lymphnodes were observed.

## Discussion

It is unfortunate to have the discussion based on unsatisfactory conditions, i. e. insufficient clinical observations and results from delayed autopsy.

The pancreas was thin and like lace but the longitudinal length was sufficiently long: it might suggest the organ was once well developed and atrophied later. Prentice et al. classified six cases of pancreatic atrophy in young beagle dogs into two types — Type I atrophy where few small lobules scatter, and Type II where acinar lobules are apparently reserved — and they suggested Type I might be hypoplastic rather than atrophic<sup>(7)</sup>. In the present case, as lobular structure is acknowledged, the finding suggested an

atrophy pattern. In textbooks, pathogenetic explanations of the disease are varied, for instance, Jubb et al. regarded the disease as hypoplastic, Joest as atrophic, and Dahme mentions that accurate differentiation of hypoplasia from atrophy is not always easy.

The pancreatic parenchyma apparently consisted of two types of cellular elements: one formed an alveolar structure and the other a sheet-like arrangement. The former were regarded as exocrine acinar tissue and the latter as islet, depending on the staining properties, but the cell types consisting of islet could not be differentiated.

The disease usually occurs in young dogs. Reviewing 21 reported pancreas atrophy cases, atrophy was observed in 4 under 6-months, 6 under 12-months, 9 under 18-months and 2 under 24-months old dogs<sup>(6)</sup>. Jubb et al. describe hypoplasia of the pancreas is not revealed until the affected animals became 1 year of age. Although the age of the present case was thought to be approximately 2-years, this estimation is only approximate. The dog had a 4-day history of diarrhoea, but the intestinal mucosa was fibrotic suggesting that intestinal dysfunction had started earlier.

The disease most often occurs in large-type breeds particularly German shepherd<sup>(1)</sup>, but is also found in Beagles<sup>(7)</sup>, Akitas<sup>(4)</sup> and other breeds<sup>(6)</sup>. The present case is a black-haired, middle-type mongrel with unknown familial history. As lymphocyte or other cellular infiltration was not observed in the present case, viral participation in the idiopathic occurrence might be deniable. While Rogers mentions the sex predilection of the disease favors female<sup>(8)</sup>, Kast refers the sex ratio to approximately 1:1<sup>(6)</sup>.

### Summary

A 2-year old female mongrel had revealed pancreas insufficiency syndrome and died after a 4-day diarrhoea history.

The pancreas was long enough in size but had a thin like lace work and weighed only 5 g.

Microscopically, the parenchyma consisted of various-sized lobular structures. The lobules were constituted by endocrine tissue predominantly and atrophied acinar tubules. No cellular infiltration was observed.

As the intestinal mucosa was fibrotic, pancreatic insufficiency probably occurred earlier than the diarrhoea.

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## 要 約

約2歳の雌雑種犬が急性の膵臓不全症候群を示して死亡した。

膵臓の全長は常であったが、実質はレース状に菲薄で、重量は僅か5gであった。

顕微鏡下、膵臓の小葉構造は大小不同で、実質は膵島組織が優位を占め、外分泌性腺房は強い萎縮を示した。細胞浸潤は認められなかった。

小腸粘膜は線維化し、膵臓萎縮は臨床症状発現のかなり前から存在したことを示唆した。

## Explanation of figures

- Fig. 1. The pancreas, photographed after fixation.
- Fig. 2. Various-sized atrophied lobules are separated by edematous interstitial tissue. HE stain,  $\times 22$
- Fig. 3. The lobule consists of islet-tissue predominantly and atrophied exocrine tissue. See Fig. 6, also. HE stain,  $\times 160$
- Fig. 4. With AF stain, most of the islet cells contain sparse fine granules stained deep blue. Crowded cell groups located peripherally are atrophied exocrine tissues. AF stain,  $\times 320$
- Fig. 5. The patchy clear zones (P) in the parenchyma are islets, and residual areas are atrophied exocrine tissues. Silver impregnation,  $\times 320$
- Fig. 6. Exocrine epithelia are arranged closely around narrow tubular lumen and appear ribbon-like (arrows). HE stain,  $\times 320$

