

Hydrocephalus in a Dog: A Case Report

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Introduction

Hydrocephalus is an abnormal accumulation of fluid within the ventricles of the brain. It occurs sporadically in pups, calves and foals and may be congenital or acquired.^{2,7,11,12)}

Congenital hydrocephalus is well-known in the brachycephalic breeds in pups.^{7,12)} It also has been reported in pigs,⁷⁾ bears⁵⁾ and experimental animals^{6,13)} with familial incidence. Congenital cases may be present with a malformation of the central nervous system such as cerebellar agenesis, or there may be stenosis of a communicating channel for the fluid.^{2,4,7,8,10)}

Acquired hydrocephalus is fairly common in animals but does not approach in severity the congenital defect. The causes are almost always obstructive but minor degrees of ventricular dilatation occur in association with cerebral atrophy.^{2,11)} These cases follow obstruction to the flow of cerebrospinal fluid, and may be due to tumors,^{3,8)} parasites,^{7,12)} meningeal adhesions,¹³⁾ vitamin B₁₂ deficiency⁹⁾ or other cerebral diseases.^{1,6)}

Reported here is a case of the recent experience in a pup at the animal clinic of our college.

Case History and Clinical Findings

A female pup (Korean native breed) about 2 months old was brought to us because of circling movement and salivation on August 1, 1978. Although the dog did not appear to be blind, she looked weak or dizzy and when she attempted to walk, would weave or

stagger. Frequently, she would walk in a circle for a minute or longer to the right. These symptoms were first observed late in July and were progressive.

She was normal in nutritional condition but showed anorexia. The pup never displayed a slightest emotion when approached or spoken by anyone. The dog died one day after admission to the clinic.

According to the owner, she was one of 4 pups; another 3 pups died immediately after birth. The cause of death of them was unknown.

Results

Gross Findings: At necropsy, no gross lesions were observed in the viscera. The cranium was apparently normal in size and shape. When it was opened, however, both lateral ventricles were greatly dilated and only thin rim of the cerebrum was observed (Fig. 1). There was excessive cerebrospinal fluid within the dilated lateral ventricles. The surface of brain inner cavity was flattened and the sulci were narrow. These



Fig. 1. Extremely dilated lateral ventricles with tumor on the right cerebellar hemisphere (arrow).

observations suggested that there was a marked increase in the pressure of the cerebrospinal fluid. It was unable to find Monro's foramen due to severe dilatation of the lateral ventricles. A black mass approximately 2 cm in diameter was found on the right cerebellar hemisphere. It was soft and spongy, sharply defined and compressible (Fig. 1).

Microscopic Findings: The tissues were fixed in 10% neutral formalin and sections cut at 6 μ m were stained with haematoxylin and eosin (H & E) and were appropriate, by Gomori's silver impregnation method.

Apart from oedema, vascularization and slight glial cell proliferations, microscopic examinations revealed no obvious inflammatory reactions in the brain (Fig. 2). On sections stained with H & E, the tumor was composed of large, cavernous, vascular spaces filled with blood (Fig. 3). Also, there were small, capillary-like lumina dispersed among the cavernous channels.

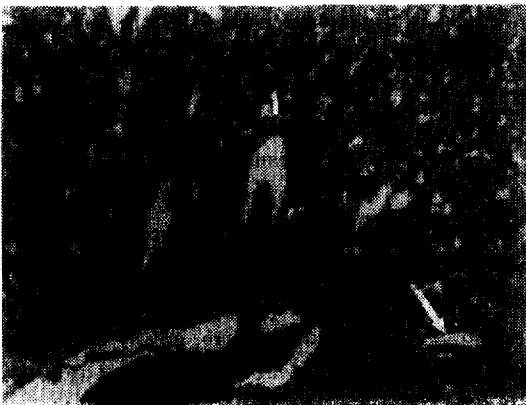


Fig. 2. Slight microglial cell proliferation (1) and vasularization (arrow); H & E stain, $\times 200$.

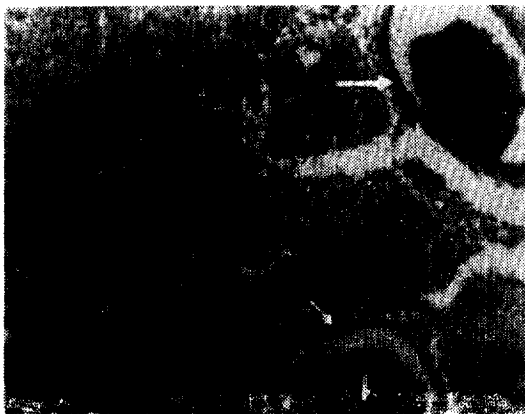


Fig. 3. Cavernous hemangioma (arrows) filled with blood (1); H & E stain, $\times 200$.



Fig. 4. Reticular fiber of cavernous hemangioma (arrows) filled with blood (1); Gomori's silver impregnation, $\times 200$.

It was noted on the sections stained with Gomori's silver impregnation method that the dilated vascular spaces were separated by reticular fibers (Fig. 4). The diagnosis of cavernous hemangioma was made.

Discussion

As causes of hydrocephalus in animals, practically and theoretically, several mechanisms involving over production, obstruction of flow and decreased reabsorption of cerebrospinal fluid have been implicated.²⁾ As previously mentioned in the present study, hydrocephalus may be due to tumors in ventricles. The tumor observed in this case, however, is unlikely to be the primary cause of hydrocephalus because of its location. Hemangioma has been reported on the choroid plexus of a dog without hydrocephalus.⁸⁾

Malformation is the main cause of hydrocephalus in the young animals.^{7,12)} In this case, the age of the animal and the severity of the condition suggest that the hydrocephalus was congenital. Also, a partial obstruction of aqueduct of Sylvius and Luschka's foramen is suspected due to congenital malformation.

Summary

Hydrocephalus in the dog is well-known but, in fact, rare clinically. Recently, we had experienced one such case in a 2 months old, female Korean breed pup,

which was characterized by circling movement and salivation.

At necropsy, severely dilated ventricles and cerebral atrophy were observed. Rather well-circumscribed tumor was found on the right cerebellar hemisphere. On microscopic examination, oedema, vascularization, glial cell proliferation and cavernous hemangioma were confirmed.

A diagnosis of congenital hydrocephalus was made and the hemangioma was not the cause of this hydrocephalus.

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개에 발생한 뇌수腫 一例

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抄 錄

개의 뇌수腫은 잘 알려져 있으나 실제 臨床的으로 흔하지는 않다. 著者들이 最近 經驗한 例는 二個月齡 암컷의 雜犬으로 回轉運動 및 流涎이 主症狀이었다.

剖檢上 大腦 實質의 萎縮을 동반한 극심한 左右 側腦室의 擴張, 小腦 右側半球에 直徑 2cm 程度의 腫瘍을 發見했다.

이의 顯微鏡所見은 약간의 腦實質組織浮腫, 新生毛細血管 및 微細膠細胞의 增殖所見을 보였고 腫瘍組織은 海綿狀 血管腫으로 認定되었다.

患畜의 年齡 및 病變의 程度로 보아 先天性 腦水腫으로 診斷했고, 血管腫은 그 位置上 本 疾患의 一次的인 原因으로는 생각되지 않는다.