A Canine Case of Gliosis with Cyst Formation in the Posterior Fossa

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ABSTRACT. A 5-month-old male Great Pyrenees with symptoms of convulsions, circling, and a head tilt was referred to the Animal Medical Center of Nihon University. On a magnetic resonance image (MRI), a cyst in the posterior fossa was noted and a part of the cyst enhanced by gadoteridol. Based on MRI and clinical findings, the patient was tentatively diagnosed with a cyst formation tumor, and an operation to open the cyst and remove the part enhanced by contrast was performed. Postoperatively, the clinical course was good. Pathologically, the removed tissue was diagnosed as a gliosis with cyst formation.

KEY WORDS: canine, MRI, posterior fossa cyst.

In humans subjects, cyst forming diseases occurring in the posterior fossa include hemangioblastoma, astrocytoma, arachnoid cysts, Dandy-Walker malformation (DWM) and mega cisterna magna [2]. The differential diagnosis of these diseases is difficult because the clinical signs and age at onset are very similar. In veterinary medicine, the same cystic diseases in the posterior fossa have been reported. The diagnosis of meningioma, arachnoid cysts and DWM by means of magnetic resonance imaging (MRI) and computed tomography (CT) have also been reported [1, 3–6]. Authors report here a case of gliosis with a cyst in the posterior fossa in a dog that was diagnosed on the basis of MRI, gross and histological findings.

The dog was a 5-month-old male Great Pyrenees. It suddenly developed lameness 1 month prior to the initial presentation followed by right circling and a head tilt two days later. At the first examination the temperature was 39.4 °C, the heart rate was 96/min and respiration was panting. The first blood biochemical examination showed high serum alanine aminotransferase and high cholesterol, but no abnormalities were noted on other examinations. Twelve days later the dog showed signs of dropping of the right labialis, nystagmus, convulsion of the right thoracic limb and right hemiparesis. Corticosteroid, non-steroidal anti-inflammatory drugs and vitamin E were administered at another hospital but the symptoms did not improve. The patient was referred to the Animal Medical Center of Nihon University.

Upon neurological examination on the day of surgery, left hypermetria and a depression of menace reflex were noted. Since the cyst was located in the right cerebellum, the authors suspected hypermetria caused by compression of the cerebellum. We also speculated that vestibular signs in the head tilt and circling were due to compression of the right brain stem. Right facial convulsions of the dog were considered to be due to irritation of the facial nerves.

An MRI examination was performed with an MRI (FlexArt®, Toshiba), which had a magnetic field intensity of 0.5 T. A coil for the geniculum was used. The T1-weighted image was obtained by means of the spin-echo method (TR 350 msec, TE 15 msec) and the T2-weighted image by the fast spin echo method (TR 4,000 msec, TE 120 msec). A cyst which showed hypo-intensity on the T1-weighted and hyper-intensity on the T2-weighted images was noted in the right cerebellum and it displaced the cerebellum and the brain stem to the left. In this case, the authors concluded that the lesion was a cyst because it was a clear space-occupying lesion, which showed hypo-intensity on the T1-weighted images and hyper-intensity on the T2 weighted images. A part of the cyst wall was enhanced by gadoteridol (ProHance®, BRACCO International) on the contrast T1-weighted images (Figs. 1, 2). A part of the cyst wall was also enhanced by gadoteridol.

Based on these MRI findings, a cystic tumor was suspected and we planned to surgically remove the part of the wall enhanced by gadoteridol.

Anesthesia was induced with diazepam (1 mg/kg intravenously [IV]) and maintained with sevoflurane. The dog was positioned in sternal recumbency with the head at 90° flexion. Via a midline incision through the skin from the anterior of the torus occipitalis to the C3, the occipital bone was exposed. A hole was then opened in the occipital bone with a high-speed drill and expanded with a rongeur.

After the position of the cyst was confirmed, the cystic contents were aspirated with a 25-gauge needle on an injection syringe. The fluid contained a cell count of 1/mm³, 962 mg/dl of protein and Pandy’s test 4+.

Before opening the cyst the thinning right cerebellar hemisphere covering part of the cyst was removed. A part of the cyst was revealed and then opened. Entire ablation of the cyst was not done. The cerebellum was moved to the left.
cranially with a spatula to allow access to the cerebellopontine angle. The vascular proliferative tissue was determined and removed. Hemorrhaging after the tissue was removed was stopped with a bipolar electrocoagulator. The area in which craniectomy was done was closed with a fascia and fibrin glue (Beriplast, Hoechst Marton Roussel, Tokyo). The muscles and cutis was closed by a routine method. The removed tissue was pathologically diagnosed as gliosis (Fig. 3).

Postoperatively, sodium methylprednisolone succinate (5
mg/kg IV) for the prevention of edema and cefazolin (25 mg/kg IV) for prevention of infection were administered daily for 7 days. The dog was disoriented for 3 days after surgery and during this period had a fever of between 39.1 and 41.5°C together with dystasia and nystagmus. On the 2nd day, lidocaine hydrochloride (0.5 ml) was administered because a premature ventricular contraction was noted on the electrocardiograph and the dog subsequently improved. On the 4th postoperative day, administration of sodium methylprednisolone succinate was stopped and misoprostol (2.5 µg/kg) was started to treat vomiting.

On the 10th postoperative day after surgery, no vomiting or hyperpyrexia was observed and vestibular symptoms such as nystagmus and unsteady gait improved. Surgical removal of the cyst was performed in the right cerebellum and cerebellopontine angle, and the subsequent nystagmus was considered to be due to surgical invasion of the vestibular nerve. The dog was able to walk and was discharged from our hospital on the 15th postoperative day. Five months postoperatively, a recurrence of the cyst, previous clinical signs, seizures and nystagmus were not noted (Fig. 4).

Pathologically the removed tissue was diagnosed as gliosis with a cyst, and no tumor tissue was seen. The authors speculated that the gliosis occurred because the interval between onset and the operation was long. Based on the above mentioned findings the authors originally diagnosed cerebellar astrocytoma, but pathologically there was the possibility of an arachnoid cyst with hemorrhage and inflammation. The surgical procedure for cyst formation tumor is removal of the tissue, and the surgical procedure for an arachnoid cyst is drainage and/or opening the cyst [2]. The authors considered that the good prognosis in this case was due to a combination of the removal of the proliferative tissue and opening the cyst.

Fig. 3. Photograph of the tissue removed from the dog. Many gliacytes with no variant forms were noted. The findings were suggestive of gliosis.

Fig. 4. MRI at the 5th postoperative month after surgery. Although partial atrophy of the cerebellum was noted on the dorsal plane contrast T1-weighted image (a), no cyst or compression of the cerebellum or brain stem was also noted on the transverse plane contrast T1-weighted image (b).
REFERENCES