Surgery

Cerebellopontine Angle Meningioma Expanding into the Sella Turcica in a Dog

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ABSTRACT. A 10-year-old, female poodle was presented with left paresis and vestibular signs, following left enophthalmus and atrophy of the cheek. Magnetic resonance imaging revealed a mass along the base of the brain and extending from the left cerebellopontine angle to the sella turcica. The mass showed isointensity on the T1-weighted image and T2-weighted image, and was enhanced by contrast medium (Gd-DTPA). Although occipital craniotomy was carried out and the mass removed, the dog died without recovering from the anesthesia. The tumor was diagnosed pathologically as fibroblastic meningioma.

KEY WORDS: canine, cerebellopontine angle meningioma, sella turcica.


Meningiomas are believed to be derived from arachnoid cap cells and arachnoidal granulations, particularly where arachnoid cells project into the dural venous sinuses, and are the most typical brain tumors in dogs [9]. The development site of meningioma includes the falx cerebri, convexity, tentorium cerebelli and cerebral ventricle [9], and in dogs, the anterior cranial fossa such as the falx cerebri and convexity is a common site of development [6], but there are few reports of other development sites [3, 9].

The authors encountered a dog that was referred with left paresis and vestibular signs in which was observed a meningioma extending from the left cerebellopontine angle to the sella turcica. We report the case here.

A 10-year-old female poodle was presented with abnormality of the left eye on day 60 before the initial examination at Nihon University Animal Medical Center and was treated at another animal hospital. Nevertheless, the dog was presented with left enophthalmus, nonspecific pain and atrophy of the cheek on day 30 before the initial examination. The dog was referred with left paresis and vestibular signs in which was observed a meningioma extending from the left cerebellopontine angle to the sella turcica. We report the case here.

Although the dog was continuously treated with predonisolone (0.5–2 mg/kg subcutaneous injection [SC]) and piperacillin sodium (20 mg/kg bid intravenous injection [IV]), its condition deteriorated. Since the dog was presented with left paresis and left circling, magnetic resonance (MR, FlexArt® MRT 50GP, 0.5T, Toshiba, Tokyo, Japan) imaging, brainstem auditory evoked potential and cerebrospinal fluid (CSF) examination were performed.

MR imaging revealed a mass in the left cerebellopontine angle, showing isointensity on the T1- and T2-weighted images (Figs. 1a, b) and enhanced by contrast medium (Gd-DTPA, Magnevist®, Shering, Berlin, Germany; 0.1 mmol/}

Fig. 1. A magnetic resonance (MR) axial image at the medulla oblongata level. (a): T1-weighted image (TR 350 TE 15 FA 90 NAQ 2.5). (b): T2-weighted image (TR 4,000 TE 120 FA 90 NAQ 3.0). A tumor showing that isointensity exists on the left side of the medulla oblongata and compresses the cerebellum and the medulla oblongata. A “Cerebrospinal fluid Cleft” is observes around the tumor (arrow head).
kg IV) (Fig. 2a). In addition, the periphery of the mass showed linear hyperintensity on the T2-weighted image, suggesting “CSF cleft” (Fig. 1b). The mass touched the petrous bone and compressed the cerebellum and the medulla oblongata. The mass also went along the left base of the brain and extended to the sella turcica, compressing the pituitary gland on the right side (Fig. 2b, 3) (arrow). The brainstem auditory evoked potential examination revealed depression of wave I and a deficit of waves II–V on the left side. The CSF examination revealed a cell count of 11/mm³, monocytic pleocytosis, 82 mg/dl of protein and 2+ of Pandy’s test (normal range: cell count 0–7/mm³, protein 25–40 mg/kg, Pandy’s test negative) [4].

After the MR imaging, the dog was presented with vestibular symptoms such as left head tilt and nystagmus, and these symptoms gradually deteriorated. Although the authors are able to select from various treatments, such as radiotherapy, chemotherapy and surgery, we selected surgery because the dog’s symptoms had deteriorated. The authors performed a suboccipital craniectomy and administered osmotic diuretic (Glyceol®, CHUGAI, Tokyo, Japan; 10 ml/kg IV) and furosemide (0.7 mg/kg IV) to decrease intracranial pressure. General anaesthesia was induced with midazolam (0.1 mg/kg IV) and butorphanol (0.1 mg/kg IV), and maintained with isoflurane. Sodium methylprednisolone succinate (30 mg/kg IV) was given just before the craniotomy was performed. The dog was positioned in sternal recumbency with the head at 90° flexion. The occipital bone was exposed via a midline incision through the skin from the anterior of the torus occipitalis to the C3. A hole was opened in the occipital bone with a high-speed drill and expanded with a rongeur. After the cerebellum was exposed, a part of the cerebellum was removed to expose the mass.

A dark brown mass was visible, located on the left side of the brain stem. The mass, which had well-defined borders, was removed piece by piece under microsurgery, but, we were not able to remove all of the mass. The dural defect was not sutured. Fascia was placed instead of dura and fixed with fibrin glue (Beriplast®, Aventis Pharma Japan, Tokyo, Japan). A gelatin sponge was placed over the fascia. The muscles and superficial soft tissues were closed routinely. Nevertheless, the dog died without recovering from the anesthesia.

Histologically, the removed mass consisted of spindle shaped cells containing elliptic or short spindle nucleus and the mass was diagnosed as fibroblastic meningioma.

The dog was presented with enophthalmus in the early stage, and was subsequently presented with depression of eyelid reflex, atrophy of the left masticatory muscle and occlusion of the nasal foramen. It was considered that these symptoms were due to compressing the facial, sympathetic and trigeminal nerves. It was also considered that the non-specific pain was due to increased pressure in the posterior cranial fossa [7]. Authors considered that the ataxia in walking, which developed after cranial nerve disorders and pain, was due to compression of the brain stem by the tumor. As left paresis, vestibular symptoms such as nystagmus and
head tilt and deficit of the left auditory sense on the auditory evoked potential examination were observed on day 23 after the initial examination, these symptoms were suggestive of growth of the tumor.

On MR imaging, the tumor was seen to go along the base of the brain and extend from the cerebellopontine angle to the sella turcica. Although the symptoms of a sella turcica lesion cause multiple cranial neuroparalysis resulting in ocular movement dysfunction, blepharoptosis, absent papillary reflex, visual disorder and disturbance of consciousness [9], this did not occur in this case.

In view of the clinical course of this case, it was suggested that the tumor originated in the petrous bone in the cerebellopontine angle, in which the trigeminal, facial and vestibulocochlear nerves travel, and extended to the sella turcica. In tumors originating in the cerebellopontine angle in humans, it was reported that after acoustic tumors, meningiomas were the second most common [10, 13]. In animals, although the variety of tumors and their incidence are unknown due to the nonexistence of epidemiologic surveys of cerebellopontine angle tumors, there are reports about meningiomas, trigeminal nerve tumors and choroid plexus tumors [9].

In the symptoms of these tumors, choroid plexus papilloma causes vestibular disorder and pontomedullary signs such as nystagmus, head tilt, circling and pharyngolarynx paresis [8]. Trigeminal nerve tumor causes sensory paralysis of the face and atrophy of the masticatory muscle [9]. It was reported that nonspecific headache, cervical pain and trigeminal nerve disorders occurred frequently in human cerebellopontine angle meningioma, and these symptoms resembled those of this case. In veterinary medicine, to the best of our knowledge, there are no detailed descriptions of the symptoms of cerebellopontine angle meningiomas.

In the MR imaging of these tumors, it was reported that because choroid plexus tumors originate in the fourth ventricle, they touch the ventricle and sometimes cause ventricular enlargement [11], but the tumor in this case did not touch the ventricle and no ventricular enlargement was observed. It was reported that trigeminal nerve tumors in humans originate in the petrous bone and extend to the cavernous sinus, and most cerebellopontine angle meningiomas originate in the dorsal surface of the petrous bone [1, 10, 13]. It was also reported that cerebellopontine angle meningiomas might extend to the clivus in the middle cranial fossa and the cavernous sinus, after going along or crossing the tentorium cerebelli [10]. In veterinary medicine, there are no detailed descriptions of MR images of trigeminal nerve tumors and cerebellopontine angle meningiomas.

In the MR images of this case, although it was difficult to distinguish from trigeminal nerve tumor, the tumor touching the petrous bone went along the base of the brain and arrived at the sella turcica, therefore showing the characteristic findings of human cerebellopontine angle meningioma.

In the CSF findings of meningomas, monocytic mild pleocytosis and a mild increase in protein are observed [4]. Likewise, in this case, CSF examination revealed monocytic mild pleocytosis and a mild increase in protein, suggesting that the blood-CSF barrier was injured.

Although there are some reports on cerebellopontine angle meningioma in veterinary medicine [2, 5, 12], detailed reports about MR images of the disease are few [6]. In addition, to the best of our knowledge, there is no report about a case of the disease expanding into the sella turcica. This case, considered to exhibit the characteristic clinical findings and MR images of cerebellopontine angle meningioma, is valuable.

REFERENCES