Benign Intracerebellar Cyst without Epithelial Lining

SHUNSUKE SUGITA, YASUO SUGITA, EIICHIRO HONDA, AKIRA OKURA,
KAZUYA MORIMOTO, HITOSHI MORIMITSU, NAOKO FUJIMURA,
TERUKAZU KURAMOTO AND MINORU SHIGEMORI

*Department of Neurosurgery, Kurume University School of Medicine,
Kurume, 830 Japan*

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Summary: A case of benign intracerebellar cyst is reported in a 61-year-old woman who presented progressive neurological deficits. MRI and operative findings could not reveal any evidence of neoplastic growth. The biopsied cyst wall revealed normal cerebellar tissue. The simple cyst of the cerebellum is rare, thus we discuss the clinical features and etiology of this rare entity.

Key words: benign cyst — non-neoplastic cyst — intracerebellum — CT — MRI

Introduction

Many types of benign intracerebellar cysts have been described. However, solitary non-neoplastic intracerebellar cysts that have walls without epithelial lining are very rare (Antoni, 1926; Lindau, 1926; Szigethy, 1928; Cushing, 1931; Silverberg, 1971; Sundbarg et al. 1972; Vaquero et al. 1981; Weisberg, 1982). Though these cysts cause progressive neurological deficits, CT or MRI fail to detect any enhanced lesions. These cysts are usually filled with clear or yellow fluid and biopsies of the cysts wall reveal only neuroglial tissues without ependyma or arachnoid.

Case Report

A 61-year-old woman came to our hos-

pital with a 2-month history of headache, ataxic gait and dizziness. A marked progression of her symptoms was observed during the month before admission. Her consciousness was clear and her neurological examination showed broad-based ataxic gait, truncal ataxia and impairment of tandem walk. Bilateral papilledema was also seen. The reflexes were normal. Hemoglobin, white blood cell count, urinalysis, electrolytes and liver function were normal. CT scan revealed a non-enhancing hypodensity mass in the cerebellar vermis. MRI showed hypointensity and hyperintensity mass lesion on the T1-weighted image and the T2-weighted image, respectively. A detailed MRI examination could not detect any mural nodule or tumoral lesion. The fourth ventricle was compressed by the vermian mass, but had no communi-

Address for correspondence: Dr. S. Sugita, Department of Neurosurgery, Kurume University School of Medicine, 67 Asahi-machi, Kurume, 830 Japan.

cation. A tonsillar herniation was observed (Fig. 1). Vertebral angiography showed an avascular mass with stretching of the posterior inferior cerebellar arteries. A suboccipital craniectomy with laminectomy of the C-1 vertebra exposed a large cyst of the vermis, filled with clear fluid. Operative exposure showed no mural nodule and no communication with the fourth ventricle. Several biopsies, taken from the cyst wall, showed normal cerebellar tissue, no evidence of hemorrhage or neoplasm (Fig. 2). Her postoperative course was excellent. During the following days, her neurological deficits improved gradually. Three years after surgery, her neurological examination showed no abnormality.

Discussion

A non-neoplastic cyst can arise from a degenerated area of the brain, as a sequel to processes such as infection, parasitosis, hemorrhage, infarction or trauma. However, in our case, we could not find any evidence of lesions through neuroradiological, operative and histological examinations. Furthermore, a non-neoplastic intraparenchymal brain cyst can be congenital; most cases reported were arachnoid cyst and porencephaly (Harsh et al. 1986); others were epithelial cyst, ependymal cyst and colloidal cyst (Schenk, 1966; Jakubiak et al. 1968; Bouch et al. 1973; Palma, 1975; MacGregor et al. 1976; Friede and Yasargil, 1977; Azzam and Timperley, 1981; Giombini et al. 1981; Markwalder et al. 1981; Takeshita et al. 1982; Oro et al. 1983; Inoue et al. 1985). However, the histopathological findings showed that

Fig. 1. MRI shows hypointensity and hyperintensity mass lesion in the cerebellar vermis on the T1-weighted image (A) and T2-weighted image (B), respectively. The fourth ventricle is compressed by the vermian mass. Sagittal imaging also reveals the vermian mass lesion (C). Tonsillar herniation can be observed.

Fig. 2. Photomicrograph of a histological section showing that the wall of the cyst consists of normal cerebellar tissue. There is no epithelial lining. H & E, $\times 100$.

our case was different from all these reported cases. To our knowledge, there were fifteen cases of cerebellar cysts reported, including our case, where histological examination of the cyst wall showed normal cerebellar tissue with glial reaction (Table 1) (Antoni, 1926; Lindau, 1926; Szigethy, 1928; Cushing, 1931; Silverberg, 1971; Sundbarg et al. 1972; Vaquero et al. 1981; Weisberg, 1982). The etiology and pathogenesis of these cysts are not clear. Silverberg (1971) considered that these cysts do not have a congenital origin but rather represent a degeneration of a cerebellar astrocytoma which could contain xanthochromic fluid. The fact that 8 out of 15 reported cases of simple cerebellar cysts contained a yellow or protein-rich fluid is consistent with this view. Vaquero et al. (1981) also supported this hypothesis because radiograms of their case, a 25-

year-old man, revealed the signs of chronic intracranial hypertension and marked thinning of the bone in the occipital area. Three cases of similar supratentorial cysts were reported in one decade (Nakasu et al. 1986; Wilkins and Burger, 1988; Wester and Pedersen, 1992). Pathohistological studies of these cyst walls also showed normal brain tissues without epithelial lining and connection of the ventricle. Wilkins et al. (1988) considered that such cysts might be formed by budding from the ventricular system, with subsequent loss of ependymal cells. In our case, the cyst arised from near the fourth ventricle and was full of clear fluid. Furthermore, detailed neuroradiological studies and operative exploration failed to prove any evidence of a mural tumor nodule. Therefore, we speculate that our case of cyst in the cerebellum may have orig-

TABLE 1.

Fifteen cases of cerebellar cyst without epithelial lining

Case No.	Author(s)	Age/ Sex	Symptoms	Location	Fluid within the cyst	Histopathological findings of the cyst wall
1	Antoni (1926)	45F	headache, vomiting, ataxic gait	right cerebellar hemisphere	?	cell-poor neuroglial fibers, many Rosenthal fibers, no tumor
2	Lindau (1926)	52M	headache, vomiting, dizziness, died prior to surgery	cerebellar vermis	protein-rich yellow fluid	thick glial fibers, no tumor
3	Szigethy (1928)	47F	vomiting, dizziness, papilledema, left-sided dysmetria, died in 1 week	left cerebellar hemisphere including vermis	yellow fluid	glial fibers, no tumor
4	Cushing (1931)	? M	acromegaly, mild cerebellar symptoms	cerebellum	xanthochromic fluid	non-neoplastic portion
5	Silverberg (1971)	50M	headache, vomiting, nystagmus, Romberg sign positive, ataxia	right cerebellar hemisphere	protein-rich yellow fluid	multiple interlacing glial fibers adjacent to the granular cell layer, no tumor or hemorrhage
6	Silverberg (1971)	62M	disorientation, truncal ataxia	cerebellar vermis	protein-rich yellow fluid	variety of sizes and shapes of the hyaline Rosenthal fibers, no evidence of tumor
7	Silverberg (1971)	52F	headache, vomiting, papilledema, nystagmus, unsteadiness of gait	left cerebellar hemisphere	yellow fluid	several large astrocytes and stellate cell bodies within a loose, cystic, glial fiber meshwork
8	Silverberg (1971)	70M	dysphonia, palsies of CN 9-12, neurofibroma arose from CN9, headache, vomiting, ataxia, died 1 month after radiation	left cerebellar hemisphere	?	similar to case 5, no tumor
9	Sundborg et al. (1972)	62F	papilledema	cerebellar vermis	yellow fluid	located in both the white and gray matter, extensive spongy vacuolization change and mild gliosis
10	Vaquero et al. (1981)	25F	headache, vomiting, diplopia, papilledema, truncal ataxia, dysmetria on the left	left cerebellar hemisphere	?	cerebellar tissue with edema and gliosis
11	Vaquero et al. (1981)	46M	headache, vomiting, dizziness, papilledema, truncal ataxia	right cerebellar hemisphere	non-xanthochromic fluid	cerebellar tissue with gliosis
12	Weisberg (1982)	55F	headache, vomiting, ataxic gait, truncal ataxia, nystagmus, papilledema	cerebellar hemisphere	yellow fluid	gray-white gliotic cyst wall, no evidence of hemorrhage
13	Weisberg (1982)	50M	progressive gait instability, headache, vomiting	unilocular vermis and right cerebellar hemisphere	clear fluid	gliotic cell wall with prominent vascular change and no evidence of hemorrhage
14	Weisberg (1982)	25F	gait and truncal ataxia, right CN6 paresis	multilocular vermian and medial left cerebellar cyst	clear fluid	grayish-white and tan tissue with no evidence of neoplasm normal cerebellar tissue with gliotic reaction
15	Present case	61F	gait and truncal ataxia, headache, dizziness, papilledema	cerebellar hemisphere	clear fluid	normal cerebellar tissue, no tumor and hemorrhage

inated from this mechanism. More detailed examinations of future cases might give an answer to what the nature of a benign cerebellar cysts is.

Non-neoplastic cerebellar cysts are encountered in late-to-middle aged patients (see Table 1) (Weisberg, 1982). So the next question is how a cyst can expand and grow slowly. The cyst usually contains protein-rich fluid, and exists near the ventricle system. CSF might permeate a cyst due to an osmotic difference.

Surgical treatment, which consisted of opening or aspirating the cysts, brought about good results. Thus, an accurate diagnosis and operation are very important for a patient who is suffering from benign cerebellar cyst.

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