Spontaneous Rupture of a Presumed Colloid Cyst of the Third Ventricle

—Case Report—

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Abstract

An 83-year-old man presented with gait disturbance, dementia, and urinary incontinence that had progressed over 2 months. Computed tomography (CT) of the brain revealed hydrocephalus due to a well-demarcated, round hyperdense mass in the third ventricle, which was not enhanced by contrast agent. Ten days after the initial evaluation, CT revealed that the cyst in the third ventricle had disappeared. Magnetic resonance imaging revealed spontaneous rupture of the lesion and remnants of cyst wall anchored to the anterior roof of the third ventricle. Thereafter, the symptoms of hydrocephalus subsided. However, 6 months later the patient's condition gradually deteriorated and the ventricles dilated without any evidence of tumor regrowth. Surgical intervention was not performed as the family of the patient withheld consent. The natural history of colloid cysts of the third ventricle remains unclear. Spontaneous rupture of a presumed colloid cyst of the third ventricle should be considered when planning treatment.

Key words: colloid cyst, spontaneous rupture, third ventricle

Introduction

Colloid cyst of the third ventricle is a rare benign intracranial neoplasm arising in the anterior region of the third ventricle. This lesion is often responsible for neurological signs such as headache, seizure, mental alterations, and occasionally sudden death related to obstruction of the foramen of Monro. Asymptomatic colloid cysts associated with sudden death and acute hydrocephalus occur mostly among younger adult patients. Colloid cysts have recently been detected by computed tomography (CT) and magnetic resonance (MR) imaging studies of patients with head injury or complaints of headache. However, colloid cysts are thought to be relatively uncommon in elderly patients.¹³⁾ We describe an 83-year-old patient with a cystic lesion presumed to be colloid cyst in the third ventricle that spontaneously ruptured without intervention, followed by recurrence of hydrocephalus without cyst regrowth. A review of the literature showed that this is the first case report of a spontaneously ruptured colloid cyst of the third ventricle.

Case Report

An 83-year-old man presented with gait disturbance, urinary incontinence, and dementia that progressed over a period of 2 months. The patient had an unremarkable medical history and he was independent before the event. CT revealed a hyperdense lesion in the third ventricle and obstructive hydrocephalus (Fig. 1). The lesion was not enhanced after infusion of contrast medium. MR imaging demonstrated a well-demarcated round lesion in the anterior region of the third ventricle, which appeared as homogeneous isointensity on T₁-weighted images (Fig. 2A, B) and low signal intensity on T₂-weighted images. T₁-weighted MR imaging with gadolinium revealed thin peripheral enhancement of the tumor cyst (Fig. 2C). Surgical intervention was considered for this patient. However, 10 days later CT revealed that the colloid cyst of the third ventricle had disappeared. MR imaging demonstrated a shrunk cyst wall attached to the anterior roof of the third ventricle (Fig. 3). At that time the patient did not manifest any of the signs of meningeal irritation such as neck rigidity, headache, or mental alteration. Neurological signs and symptoms of hydrocephalus gradually improved, although the ventriculomegaly remained

unchanged.

Two months later, the patient was discharged, but using a wheelchair. However, his gait deteriorated and urinary incontinence and dementia recurred 3 months after discharge. CT 4 months after discharge revealed further enlargement of the ventricles without evidence of cyst regrowth (Fig. 4). Surgical intervention was advised to divert the cerebrospinal fluid (CSF) flow, but his family refused permission

for surgery. Follow-up CT and MR imaging 6 months after discharge revealed that the colloid cyst of the third ventricle remained shrunk with no signs of regrowth and ventriculomegaly remained unchanged.

Discussion

Colloid cysts of the third ventricle are rare benign intracranial lesions that account for approximately 0.5% to 1.0% of primary brain neoplasms.^{11,16)} Colloid cysts are histologically composed of cuboidal, columnar, or pseudostratified epithelial lining with interspersed mucous goblet cells. The epithelium rests on a thin layer of connective tissue. The cyst content is composed of periodic acid-Schiff-positive amorphous material, sometimes containing necrotic leukocytes or cholesterol clefts or both.^{7,10,12)} Histo-

Fig. 1 Computed tomography scan on admission demonstrating a homogeneously hyperdense lesion in the third ventricle. Signs of obstructive hydrocephalus are present.

Fig. 3 Follow-up magnetic resonance images in the coronal (A) and sagittal (B) planes showing the shriveled cyst wall attached to the anterior roof of the third ventricle (arrow).

Fig. 2 Initial T₁-weighted magnetic resonance images of the brain in the coronal (A) and sagittal (B) planes demonstrating a homogeneously isointense cystic lesion occupying the anterior part of third ventricle. Administration of gadolinium revealed thin peripheral enhancement of the cyst wall (C).

Fig. 4 Follow-up computed tomography scan 8 months after rupture of the colloid cyst revealing the dilated ventricular system and periventricular low density with no evidence of tumor regrowth.

logical studies including immunohistochemical staining and ultrastructural analysis have shown that colloid cysts originate via ectopic endodermal elements that migrate into the velum interpositum during the development of the central nervous system.^{7,10,12)}

Approximately two thirds of colloid cysts are homogeneously hyperdense compared to the brain on CT. The signal characteristics of colloid cysts on MR imaging vary widely. The most common appearance is a mass that is hyperintense on T₁- and hypointense on T₂-weighted imaging. However, colloid cysts can appear as virtually any signal intensity on any pulse sequence.¹⁴⁾

In our patient, the high density of the cyst on CT required differential diagnosis from bleeding into the cyst. Although the findings of the cyst contents including MR imaging were consistent with those of hematoma in the acute phase, the clinical findings of hydrocephalus had progressed over 2 months. Furthermore, there was no evidence of ventricular hemorrhage after rupture of the cyst.

Patients may present with a variety of symptoms, such as intermittent headaches, memory loss, seizures, and behavioral disturbances. In addition, sudden death can occur due to abrupt blockage of the CSF pathway, especially in the foramen of Monro. Various types of surgical intervention have been per-

formed to treat colloid cysts of the third ventricle, including transcallosal and transcortical craniotomy,^{5,6)} stereotactic cyst aspiration,⁹⁾ or endoscopic removal of the cyst,¹⁾ and indirect palliation of the associated hydrocephalus, with CSF diversion. More asymptomatic colloid cysts of the third ventricle have been incidentally identified since the introduction of CT and MR imaging. However, little is understood about the natural history of colloid cysts.

Sudden death and acute hydrocephalus associated with colloid cysts often occur in young adults.^{3,16)} However, the number of patients with diagnoses of colloid cysts is likely to decrease with age.⁶⁾ With aging, colloid cyst cells secrete an amorphous, proteinaceous material resulting in cyst formation and expansion.¹⁵⁾ A gradually enlarging cyst can be accommodated at the foramen of Monro without disturbing the CSF flow and the patient may remain asymptomatic. At some point, most cysts are likely to stop enlarging and a steady state of CSF flow and absorption is achieved. However, if the cyst enlarges rapidly, CSF flow becomes obstructed and symptoms of increased intracranial pressure develop.¹⁵⁾ One explanation for the age distribution of colloid cysts of the third ventricle may be that these cysts rupture or spontaneously shrink, thus avoiding detection over the lifespan of a patient.

Reduction of a colloid cyst of the third ventricle has occurred in only one case previously, which was reduced in size and density after ventriculoperitoneal shunting.⁸⁾ Our case of a presumed colloid cyst of the third ventricle spontaneously regressed without surgical intervention.

Ventriculomegaly gradually progressed over a few months after the obstruction caused by the cyst in the foramen of Monro was resolved in our patient. Whether leakage of the cyst contents into the ventricles results in any inflammatory sequelae is unclear. However, postoperative hydrocephalus requiring an additional shunt has occurred despite complete cyst resection.¹⁾ Sylvian aqueductal obstruction is possible secondary to inflammatory sequelae.^{2,4)} Xanthogranulomatous inflammation associated with colloid cysts of the third ventricle is considered to result from bleeding and subsequent macrophagic reaction.¹⁷⁾ Although such a reaction may result from desquamation of the cells lining the inner surface of the cyst wall or from the irritative action of the colloid material, these clinicopathological findings are thought to suggest that the walls of colloid cysts rupture.

We concluded that spontaneous shrinkage of the cyst in our patient was caused by rupture of the cyst wall, since only 10 days elapsed between initial identification of the lesion and detection of its regres-

sion. Furthermore, although the symptoms of hydrocephalus gradually improved due to regression of the cyst, hydrocephalus recurred within a few months. We postulate that the non-obstructive hydrocephalus in our patient was associated with cyst contents leaking into the ventricular system, which led to the disturbance of the CSF absorption. The mechanism responsible for rupture of the cyst was unclear, but there was no evidence of ventricular hemorrhage on follow-up CT and no clinical signs of infection.

The clinical course of the patient is important when considering a treatment strategy for colloid cysts of the third ventricle. Prophylactic surgery for asymptomatic colloid cysts of the third ventricle remains controversial.^{3,15,16)} However, the possibility of spontaneous rupture of these cysts should also be kept in mind. If surgery is indicated, the surgical team must ensure that the cyst contents do not spill into the ventricular system.

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