Hemorrhagic colloid cyst with intraventricular extension

Case report

YOJI TAMURA, M.D.,1 TEPPEI UESUGI, M.D.,2 ADAM TUCKER, M.D.,2 TOHRU UKITA, M.D.,2 MASAO TSUI, M.D.,2 HIROJI MIYAKE, M.D.,2 AND TOSHIHIKO KUROIWA, M.D.1

1Department of Neurosurgery, Osaka Medical College, Takatsuki, Osaka; and 2Department of Neurosurgery, Nishinomiya Kyoritsu Neurosurgical Hospital, Nishinomiya, Japan

Colloid cysts of the third ventricle presenting with acute obstructive hydrocephalus due to intracystic and intraventricular hemorrhage are extremely rare. The authors report a case of a 43-year-old man with a hemorrhagic colloid cyst that was treated using endoscopic surgery. A small colloid cyst of the third ventricle was initially diagnosed in the patient, and he was treated conservatively at that time. On admission to the authors’ institution he presented with sudden headache onset without neurological deficits. Computed tomography and MRI demonstrated a round hemorrhagic mass lesion in the third ventricle with bilateral intraventricular hemorrhage. Endoscopic resection was performed using a flexible videoscope. Only partial removal of the cyst was performed because of a tough cyst wall with highly viscous, hemorrhagic cystic contents. Histological examination revealed a typical colloid cyst wall and hemorrhage mixed within a mucinous substance. Postoperative serial neuroimaging demonstrated a gradual reduction in the residual cyst size and normalization in the lateral ventricle size.

Key Words • colloid cyst • hemorrhage • third ventricle • endoscopic surgery • oncology

Colloid cysts of the third ventricle are benign tumors and a well-known cause of sudden death due to acute obstructive hydrocephalus. In general, colloid cysts expand due to secretion of an amorphous and protein-rich fluid resulting in obstruction of CSF flow at the foramen of Monro. Although hemorrhage within the cyst can lead to cyst expansion, this condition is extremely rare. To the best of the authors’ knowledge, there have been only 9 cases of hemorrhagic colloid cysts reported in the English literature. In this paper we describe a patient harboring a colloid cyst of the third ventricle who presented with intracystic and intraventricular hemorrhage, and also review the literature of this unusual entity.

Case Report

History and Examination. This 43-year-old man presented with a sudden onset of headache while at work and was emergently transported to our hospital. Six years previously, the patient had presented with a mild headache, and using MRI was diagnosed with a small colloid cyst of the third ventricle without evidence of ventriculomegaly (Fig. 1). The patient was informed of the possible risk of sudden death, but he chose not to seek further neurological follow-up.

On admission, the patient’s consciousness was intact with no neurological deficits. Except for the above-mentioned colloid cyst, his medical history was unremarkable. Initial CT scans demonstrated a round, high-density mass lesion in the third ventricle with bilateral intraventricular hemorrhage and dilation of the lateral ventricles (Fig. 2A). Magnetic resonance imaging demonstrated a hemorrhagic cystic lesion with slightly high intensity on T1-weighted sequences and low intensity on T2-weighted sequences, with no significant contrast enhancement (Fig. 2B–D). Magnetic resonance angiography and 3D CT angiography showed no vascular lesions near the third ven-
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tricle. The clinical status of the patient improved following glycerol administration. Because the patient’s symptoms resolved after medical treatment, elective surgery was scheduled 1 week later.

**Operation and Postoperative Course.** The patient underwent endoscopic surgery via a right frontal bur hole. A flexible videoscope (VEF-V, Olympus Co.) was used for this procedure. After induction of anesthesia, the right lateral ventricle was cannulated with a peel-away catheter. A videoscope was inserted into the lateral ventricle and an intraventricular hematoma was detected. After removal of the intraventricular hematoma using forceps, the foramen of Monro was observed. Part of the colloid cyst appeared at the level of the foramen of Monro, but CSF flow was not completely blocked by the cyst wall. A videoscope was inserted into the third ventricle and the opening of the aqueduct was identified. Although cyst puncture was attempted through the foramen of Monro, the puncture was unsuccessful due to a tough cyst wall and an inadequate working penetration angle, resulting in removal of only a small specimen of the cyst wall. Next, the brain was uncapped at the inferomedial portion of the lateral ventricle and the cyst wall was exposed (Fig. 3A). The cyst wall was coagulated and punctured using endoscopic bipolar cautery. Evacuation of the cyst contents by catheter aspiration was difficult because hemorrhagic cystic contents were extremely viscous compared with typical colloid cysts. Therefore, the cyst contents were removed in piecemeal fashion by small cup forceps (Fig. 3B and C). Due to time constraints, the endoscopic operation resulted in only a partial removal of the cyst.

Histological evaluation revealed that the internal cyst wall was composed of ciliated and nonciliated cuboidal or columnar endothelial cells. The cyst contents included hemorrhage within a mucinous substance. There were no keratin clefts with giant cells. These findings were consistent with a pathological diagnosis of a colloid cyst with internal hemorrhage (Fig. 3D).

Postoperatively, the patient did not experience headache or any neurological deficits. He was discharged and followed-up conservatively with serial neuroimaging, which demonstrated a gradual reduction in the residual cyst contents.
cyst size and normalization in the lateral ventricle size. Twenty months later MRI demonstrated a reduced cystic lesion that showed high intensity on T1-weighted imaging and low intensity on T2-weighted imaging (Fig. 4).

Discussion

Colloid cysts account for 0.5%–1% of all intracranial tumors, with a yearly incidence of 3.2 cases per 1 million people. Patients usually present with increasing intracranial pressure from cyst expansion and blockage of CSF flow. Intracystic hemorrhage leading to symptomatic progression is extremely rare. There have been only 9 case reports of hemorrhagic colloid cysts, including 5 clinical cases and 4 autopsy cases. In several large series of colloid cysts, only 1 case of colloid cyst apoplexy was described, by Mathiesen et al.

Arterial hypertension and coagulation disorder have been described as risk factors for intracystic hemorrhage of a colloid cyst. However, in most cases without a significant medical history, including our case, the hemorrhagic cause is unclear.

All of the clinical cases were reported to present with progressive worsening of clinical status due to acute obstructive hydrocephalus and all cases required emergency ventricular drainage. Carrasco et al. reported on a middle-aged patient with a hemorrhagic colloid cyst and coincidental basal ganglia hematoma who underwent elective microsurgical removal after emergency ventricular drainage. The authors described this strategy as a valid and safe approach for hemorrhagic colloid cysts with sudden deterioration. Farooq et al. also reported the case of a 9-year-old girl with a hemorrhagic colloid cyst who presented with sudden onset of deterioration in the level of consciousness. The patient was treated with a similar approach and recovered uneventfully.

In autopsy case reports, 3 patients died because of clinical deterioration from obstructive hydrocephalus. Postmortem pathological examinations revealed evidence of old and/or fresh hemorrhagic changes within the cysts. In the present case, clinical status improved after glycercold administration only. However, in the event of progressively worsening neurological condition, we planned to perform an emergency ventriculostomy.

Several surgical modalities are used in the treatment of colloid cysts. Since Powell et al. reported on the usefulness of ventriculoscopy for the diagnosis and treatment of colloid cysts, there have been several reports of the use of endoscopic surgery for these lesions. Horn et al. described the endoscopic resection of colloid cysts as a safe and effective approach compared with the standard transcallosal approach. However, in cases of hard cyst contents or a cystic capsule densely adherent to the roof of the third ventricle, it is difficult to completely remove the entire cyst using only endoscopic surgery. Recently there have been reports of 2 patients who underwent endoscopic removal of hemorrhagic colloid cysts after an emergency ventriculostomy. One patient was a middle-aged woman who underwent endoscopic subtotal removal of a colloid cyst on the day following hemorrhagic presentation. The other patient was a middle-aged man who underwent endoscopic total removal of a hemorrhagic colloid cyst without clinical improvement after an external CSF shunt was placed at another institution. However, in both of these reports, the details of the operative findings were not described. In the present case, it was difficult to perform aspiration of the hemorrhagic cyst contents, which are not usually encountered in typical colloid cyst fluid aspiration. Because the size of the hemorrhagic cyst gradually resolved during the postoperative course, conservative treatment with serial neuroimaging follow-up was adopted. However, repeat endoscopic resection using a rigid endoscopic system or combined microsurgical resection of a residual cyst should be considered for achieving more complete resections in the future.

In the differential diagnosis of hemorrhagic colloid cysts, xanthogranulomas of the third ventricle should be considered. Cases of xanthogranulomatous change within colloid cysts or mixed tumors consisting of both of colloid cysts and xanthogranuloma have been reported previously. Some authors have described neuroepithelial cysts developing into colloid cysts, xanthogranulomas, or mixed tumors. Malik et al. concluded that cholesterol clefts detected in hemorrhagic colloid cysts were secondary to disintegration of the blood clot. Tatter et al. reported in detail on 2 cases with third ventricle xanthogranulomas. These investigators also concluded that these lesions arise as a result of hemorrhage into the walls of small colloid cysts, or were related to hemorrhage induced from the adjacent choroid plexus. However, Tomita et al. and Miranda et al. both reported third ventricle xanthogranulomas devoid of an epithelial component. The pathological correlation between a colloid cyst and a xanthogranuloma remains controversial.

Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Author contributions to the study and manuscript preparation include the following. Conception and design: Tamura. Acquisition of data: Uesugi, Ukita, Tsuji. Drafting the article: Tamura. Critically revising the article: all authors. Reviewed submitted version of manuscript: all authors. Approved the final version of the manuscript on behalf of all authors: Tamura. Study supervision: Miyake, Kuroiwa.
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