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Review

# Giant, calcified colloid cyst of the lateral ventricle

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ABSTRACT

We report a patient with a giant, calcified colloid cyst in the left lateral ventricle. Colloid cysts are slow growing, benign lesions, commonly originating in the roof of the anterior third ventricle near the foramen of Monro. Many colloid cysts are small lesions which are either discovered incidentally or cause headache, visual changes, memory deficits, and/or syncope. Giant colloid cysts are rare. A 40-year-old man presented with a month long history of worsening headaches and was found to have a multiloculated 5 cm intraventricular mass with an anterior hyperdensity, suggestive of calcification, arising within the lateral ventricles. He underwent an interhemispheric transcallosal approach for resection of the mass. The pathology was consistent with a giant colloid cyst with calcification in the anterior cyst wall. Giant, calcified mass is a rare presentation of colloid cyst. Although rare, this diagnosis remains an important consideration in the differential diagnosis of any calcified, cystic intraventricular mass.



## 1. Introduction

Colloid cysts are benign growths that account for 1% of all newly diagnosed intracranial lesions [1]. They are congenital lesions that arise from aberrant folding of the primitive neuroepithelium and typically consist of a mucoid or dense hyaloid substance surrounded by a fibrous epithelial lining. Although the majority of colloid cysts arise in the roof of the anterior third ventricle near the foramen of Monro [2], they have occasionally been reported in other locations, including the septum pellucidum and fourth ventricle [3]. Although the most common presenting symptom is headache, several other presentations, including syncope and sudden death, have also been associated with colloid cysts [4].

Surgical resection, or wide fenestration and drainage of colloid cysts is often curative, especially because the majority of lesions are less than 2 cm in maximal diameter and are fluid-filled [4,5]. Less commonly, colloid cysts may present with atypical features related to size, consistency, and/or histopathological characteristics, posing unique and potentially unexpected treatment challenges. In the current report, we describe a patient with a giant, calcified intraventricular mass which was determined to be a colloid cyst following surgical intervention. We aim to describe the unique surgical and pathological aspects of this patient, and review the associated literature regarding giant or calcified colloid cysts.

## 2. Case report

A 40-year-old man presented with a month long history of worsening headaches. He also complained of occasional episodes of diplopia, which were worse when looking to his left. His wife noted an incident 2 weeks prior to presentation, when the patient got lost while driving through the neighborhood he had lived in for several years. A neurological examination revealed no neurologic deficits, including cranial nerve palsies. A non-contrast CT scan of the head showed a large intraventricular mass with an anterior hyperdensity, consistent with calcification (Fig. 1A). MRI showed a non-enhancing, multiloculated mass centered in the left lateral ventricle, measuring $5.3 \times 4.8 \times 4.0$ cm (Fig. 1B–E). There was increased signal intensity within the mass on both T1- and T2-weighted imaging, suggestive of proteinaceous material, as well as a focus of susceptibility artifact identified on gradient echo sequences within the substance of the lesion, suggestive of calcification or possibly hemorrhage (Fig. 1D). The MRI also demonstrated ventriculomegaly of the lateral ventricles, without concurrent enlargement of the third and fourth ventricles. The differential diagnosis, based on imaging, included an atypical colloid cyst, calcified neurocysticercosis cyst, cystic ependymoma, or intraaxial tumor (pleomorphic xanthoastrocytoma) with extension into the ventricle.

The patient was taken to the operating room for an interhemispheric transcallosal approach for a microscopic cyst resection. Once the craniotomy was completed and the dura was opened, a right frontal ventriculostomy was inserted to facilitate brain

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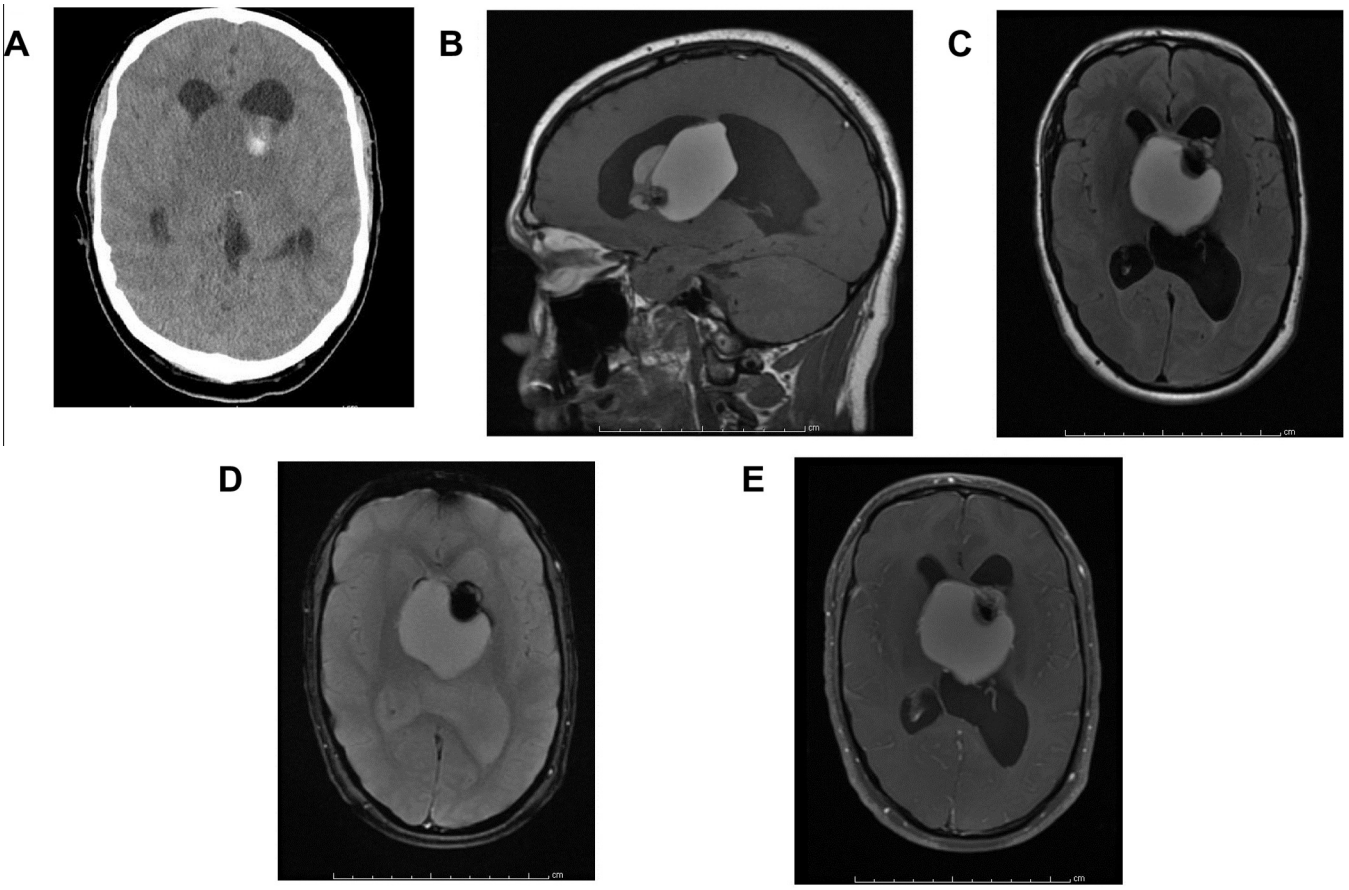


**Fig. 1.** Preoperative imaging of a giant calcified colloid cyst of the lateral ventricle: (A) Axial non-contrast head CT scan, (B) sagittal non-contrast T1-weighted MRI, (C) axial non-contrast T1-weighted MRI, (D) axial gradient echo MRI, (E) axial postcontrast T1-weighted MRI.

relaxation. Once the right lateral ventricle was entered, the cyst capsule was identified and opened, expressing a yellowish-green and oil-like fluid. Once the cyst fluid was drained, an extracapsular microdissection was performed to detach the capsule from surrounding structures. A microscopic total resection of the cyst and its entire capsule was performed, and a ventricular catheter was left in place. Immediately following the operation, he remained neurologically intact. However, the following morning he developed transient weakness in the left upper extremity and an expressive aphasia. An MRI showed complete resection of the intraventricular mass, with edema in the right thalamus, globus pallidus and corona radiata, most consistent with a venous infarct. The patient was maintained on intravenous dexamethasone and fluids, and over the next several days his neurologic symptoms improved. By postoperative day 5, he had returned to his neurological baseline. He required insertion of a ventriculoperitoneal shunt and was discharged home 4 days after his shunt insertion. At the follow-up 16 months later, he continued to be neurologically intact. A surveillance MRI showed a gross total resection of the lesion with no evidence of recurrence.

The histopathologic examination of the resected tissue revealed a multicystic lesion with ciliated, low cuboidal-to-pseudostratified epithelium overlying a collagenous stroma of variable thickness (Fig. 2). Scattered mucin-containing cells, areas of denuded epithelium and a focus of squamous metaplasia were dispersed within the epithelium. There was evidence of a remote and recent hemorrhage with xanthogranulomatous change. The periodic acid Schiff diastase stain highlighted the basement membrane and rare mucin-containing cells. The cytokeratin 7 immunostain stained the epithelium diffusely and strongly, while the cytokeratin 20 immunostain demonstrated focal weak-to-moderate staining of the epithelium (Fig. 3). The final diagnosis was a colloid cyst.

## 3. Discussion

Colloid cysts are benign developmental growths that comprise approximately 1% of intracranial lesions. They are typically located at the roof of the anterior third ventricle near the foramen of Monro, and frequently present with a cyst diameter of less than 1 cm, due to their propensity to cause cerebrospinal fluid obstruction. According to our review of the literature, colloid cysts typically range from 3–40 mm in diameter and are generally well-circumscribed masses. The colloid contents of these cysts can vary greatly in consistency, from a secretory fluid to occasional reports of semi-solid or calcified material [6]. Most colloid cyst contents are between these extremes, containing a viscous fluid with a gelatinous appearance. These contents are thought to be derived from both secretory and breakdown products of the cyst epithelial lining. Other materials including cerebrospinal fluid, fat, blood breakdown products, and cholesterol crystals may also be frequently encountered in these cysts.

Spectroscopic studies have revealed the presence of various ions, including sodium, calcium and magnesium, dispersed within the mucinous cyst contents, which are thought to contribute to the high density of these lesions on CT scans. However, hypodense or isodense cysts have also been described [7]. Following contrast administration, the surrounding capsule often enhances. On MRI, the appearances of colloid cysts are more variable. About half of colloid cysts are hyperintense on T1-weighted imaging, with the remainder being either hypointense or isointense to brain