

Colloid cysts of the third ventricle exhibit various clinical presentation: a review of three cases

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ABSTRACT

Colloid cysts are benign intracranial tumors usually occurring in the front part of the third ventricle. Clinical presentation may be non-specific and heterogeneous. The problems are frequently associated with development of hydrocephalus, these cysts may cause. We describe three cases of patients with diverse clinical symptoms, who underwent surgery for colloid cysts of the third ventricle. In the first patient, the colloid cyst caused a sudden deterioration of consciousness due to an acute hydrocephalus. The cyst in the second and third patient was discovered accidentally, during the course of epileptic seizures treatment and due to chronic headache with quantitative and qualitative deterioration of consciousness in the setting of chronic hydrocephalus, respectively. Surgery improved health in all three patients.

KEY WORDS: colloid cyst, hydrocephalus, ventricles, surgery

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INTRODUCTION

Colloid cysts are rare congenital and benign intracranial tumors, representing up to 2% of all intracranial neoplasms [1-3]. They usually occur in the anterior and antero-superior part of the third ventricle [4,5]. The cysts may cause obstruction of the foramen Monroe and as a result of impeded cerebrospinal fluid (CSF) flow; hydrocephalus with lateral ventricle dilatation may form. Clinical presentation is heterogeneous. The symptoms may be non-specific or related to the rate of hydrocephalus development [4,6]. They may demonstrate as headaches and intracranial hypertension. Sudden deaths associated with acute hydrocephalus or cardiovascular failure due to abrupt disturbance in hypothalamic function have also been described [2,4,7,8]. Colloid cysts may be a completely accidental finding as well, when the patient performs imaging of the head due to the complaints that are unrelated to the cyst. The incidence of colloid cysts is increasing owing to extensive use of modern diagnostic methods such as computed tomography (CT) and magnetic resonance

imaging (MRI) of the head [4,9]. The purpose of this paper is to describe the heterogeneity of symptoms caused by these cysts with a clear illustration of the patients.

CASE REPORTS

Case 1

A 56-year-old lady was suffering a number of years due to an intense chronic headache. The first MRI of the head showed a small colloid cyst in the third ventricle (Figure 1a). Repeated imaging in the next years revealed no increase in the cyst volume. After some time, a sudden deterioration of consciousness with coma evolved. CT imaging of the head revealed acute hydrocephalus and increase in the cyst volume with obstruction of both foramina Monroe.

External ventricular drainages in frontal horns of the left and right lateral ventricles were inserted. The control CT scan revealed resolution of the hydrocephalus and after discontinuation of sedation, the patient was neurologically intact. MRI confirmed a colloid cyst of the third ventricle of 1 cm in diameter with obstruction of CSF flow (Figure 1b). Through the right interhemispheric transcalsal-transforaminal approach, the cyst was completely removed. Further recovery was unremarkable. Control MRI three months after the surgery showed no recurrence of the cyst or hydrocephalus, as was four years thereafter. The histological sample taken during the operation is shown on Figure 1c.

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Case 2

A 38-year old gentleman was treated at the neurological department due to seizures arising as a result of alcohol deprivation. The CT and later MRI of the head showed a small colloid cyst of the third ventricle, about 9 mm in diameter, which was already narrowing left foramen Monroe. No hydrocephalus was documented (Figure 2). The patient has never suffered from headaches before and no clinical signs of hydrocephalus were observed. Through the interhemispheric transcallosal-transversal approach, the colloid cyst was removed. Recovery was good and the control CT scan was unremarkable. The patient was followed up for five years and during this time, the cyst did not recur.

Case 3

A 28-year old patient was suffering for several years due to intermittent attacks of severe headaches. They were accompanied by occasional quanti- and qualitative disorders of consciousness (somnia and confusion). Imaging of the head

showed extensive chronic hydrocephalus and a 2 cm large colloid cyst of the third ventricle with obstruction of both foramina Monroe (Figure 3). Through the interhemispheric transcallosal-transforaminal approach, the cyst was removed. Postoperative course was uneventful. The head CT scan during follow up showed ventricular dilatation with no cyst recurrence. Two years after the operation, no recurrence was found and the patient is doing well.

DISCUSSION

Colloid cysts are benign formations, covering 15% to 20% of intraventricular tumors [2,8]. Although solitary and sporadic, rare examples of cysts on other locations and familial forms are known [10-12]. In all three cases of described patients, a solitary colloid cyst of the third ventricle was the common pathology. However, they differed in their clinical presentation. Various symptoms are characteristic of colloid cysts that may be detected incidentally for unrelated symptoms or because of specific problems caused by the cyst itself. These

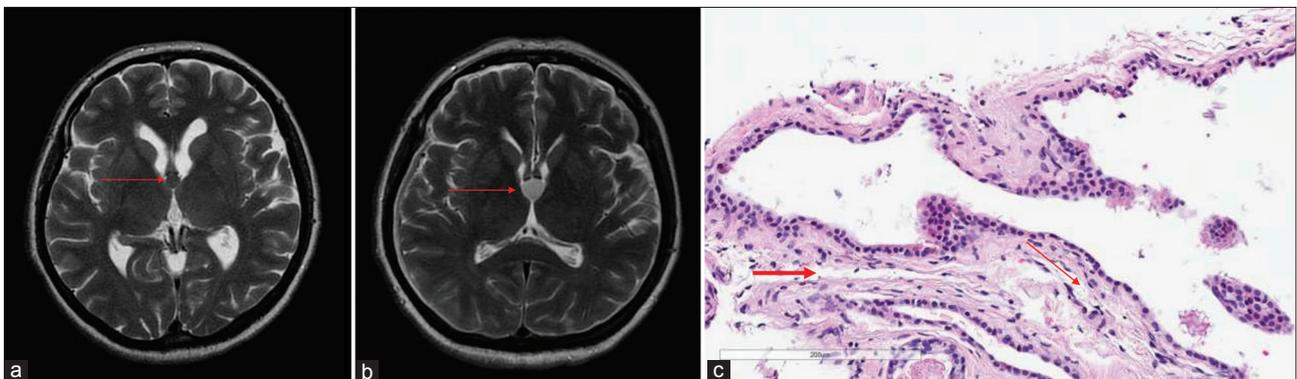


FIGURE 1. Axial T2-weighted MR image showing a small colloid cyst with hyperintense content (arrow) (a). On axial T2-weighted MR image, a large colloid cyst obstructing foramina Monroe is visible (arrow) (b). In comparison to previous image (a), this cyst is larger. Histopathological specimen (c). The cyst wall is made of two layers: outer fibrous connective tissue layer (thick arrow) and inner flattened cuboidal to columnar epithelium (thin arrow)

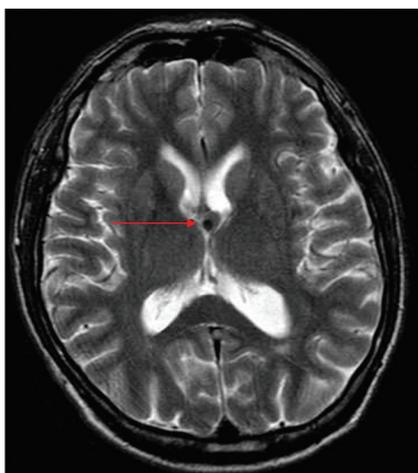


FIGURE 2. T2-weighted axial MR image. Approximately 9mm large colloid cyst partially occludes left foramen Monroe (arrow). No hydrocephalus is yet visible

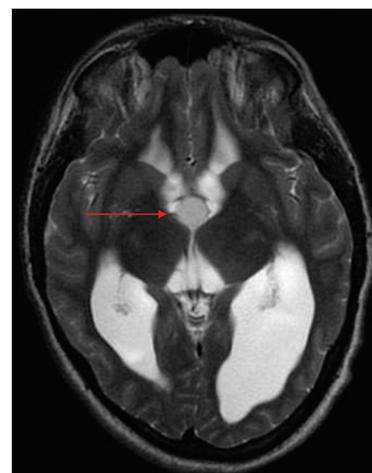


FIGURE 3. T2-weighted MRI, axial image. A large, slightly hyperdense colloid cyst (arrow) with obstruction of foramina Monroe and extensive chronic hydrocephalus is visible

are often the result of different forms of hydrocephalus as well as irritation of major important centers around the third ventricle [2,4,6,13]. In addition to headache, nausea and vomiting, the symptoms may also present as disorders of consciousness, psychiatric symptoms and even sudden death [8,13-17]. In the first patient, the colloid cyst was growing slowly and finally caused a sudden and complete blockage of CSF outflow from the lateral ventricles. Acute hydrocephalus formed, leading to a rapid deterioration of consciousness. This raises the question of whether the colloid cyst abruptly increased in volume or there was a rapid displacement of the cyst towards foramina Monroe, resulting in their blockage. An increase in the cyst volume may be possible due to accumulation of its content and as a result of bleeding into the cyst. Both increase the cyst volume, which may result in sudden death [5,8,18]. Headache and worsening of consciousness in the setting of cyst enlargement may arise from blockage of foramina Monroe, ventricles and consequent brain herniation [8]. In the second patient, the cyst was discovered accidentally and was asymptomatic. The operation was recommended due to the possibility of the cyst growth during the coming years, which could cause unexpected deterioration of consciousness, as shown in the first case. In the third patient, the cyst caused chronic hydrocephalus with intermittent symptoms of increased intracranial pressure. It can be assumed that in this case, the CSF flow was disturbed for many years and the size of the ventricles was increasing slowly. The transient worsening of symptoms was a consequence of occasional complete CSF blockage. At some critical point of CSF pressure, the flow was restored again, hydrocephalus decreased and the intracranial pressure diminished, which also reduced the symptoms. It is likely in this patient, that over the years the cyst was expanding slowly, causing the symptoms becoming more frequent and more pronounced.

Since the clinical presentation of colloid cysts is non-specific, its presence may be confirmed only by diagnostic imaging, CT and MRI [1,9]. Due to different composition and density of the contents, which depends on the quantity of cholesterol and protein, cysts may have a diverse appearance during imaging [9,19]. Cysts with a high content of cholesterol and protein are hyperdense on plain CT, hyperintense on T1- and hypointense on T2-weighted MRI sequences [1,9,19]. In addition to the size, the cysts of our patients varied also according to their composition. The radiological density of cysts rises with the solidity of their contents, which was particularly notable on the CT images. Accordingly, the appearance of cysts in the first two patients was hyperdense and in the third patient isodense with the brain parenchyma. The differences in the cyst content were evident also during the operation. In the first two patients, the cysts were filled with gelatinous, dense content. The cyst of the third patient was

indeed filled with liquid content and its appearance on CT was isodense. After administration of contrast medium, the cysts did stain neither on CT nor on MRI. This is not a feature of most of the colloid cysts [19,20].

Surgical treatment of colloid cysts encompasses three techniques: stereotactic aspiration, endoscopic fenestration and microsurgical approach [8,18,21,22]. Mainly, the latter two are being used. Not only the size and location of cysts, also their content affects the success of treatment. Some cysts may be drained with stereotactic aspiration completely or their volume may be reduced, but only if the content is not too dense [8,18]. Usually, the treatment is surgical, either through craniotomy or endoscopic, since only the removal of the cyst or at least its fenestration may improve the CSF flow, the symptoms and consequently prevents the risk of sudden neurological deterioration [2,16]. Microsurgery is demanding due to deep midline location and the proximity of vital structures and for that reason the neuroendoscopy may be used as an alternative [23]. It is described as a less invasive technique with qualities such as reduced operative time, lower morbidity and quicker recovery after the procedure. While microsurgery is more aggressive for the patient, both techniques are equal in mortality and shunt dependency [21,24]. However, not all colloid cysts may be removed completely during neuroendoscopy. It is known that incomplete resection carries a higher risk of recurrence and also in time, the cyst may recur. On the other hand, microsurgery is associated with a higher rate of total resection [21,23,24]. Total resection of colloid cyst carries an excellent prognosis and in the endoscopic group, the reduced number of total resections may lead to a higher recurrence rate in long-term follow up, which might be a serious disadvantage of endoscopy [22,25]. According to Sheikh et al., the microsurgical technique leads to complete resection of the cysts in 98% in comparison to neuroendoscopy, where the success is 58% [24]. Despite the possibility of cyst recurrence and higher reoperation rate, some reports state that also with the endoscopic technique, the risk of recurrence and reoperation is minimal with meticulous coagulation of the cyst wall and when complete resection is achieved [22,23].

All our patients were treated microsurgically through transcallosal approach and we managed to remove the cysts entirely. No postoperative complications were documented in all three patients and after four, five and two years of follow up, respectively, no cyst recurrence was observed.

Among approaches to the cysts, the transcortical-transventricular and transcallosal are predominantly used, with the former bearing higher morbidity. According to the literature, no significant difference in mortality was found between the two operational techniques [24]. Rarely, subfrontal lamina terminalis approach may be used [22,24]. The potential complications include transient or permanent memory and

motor deficits, seizures, haemorrhage, hydrocephalus and infection [21,22]. We prefer the transcallosal approach as the cortex may be spared and due to direct surgical access to the cyst area. The likelihood of complications is higher in those cysts, which are rapidly increasing (bleeding into cyst) and in large cysts [26-29].

CONCLUSIONS

On the basis of the cyst size, the accompanying hydrocephalus and the duration of symptoms, the risk of sudden neurological deterioration cannot be predicted. Therefore, surgical treatment is recommended. Early detection and prompt treatment with complete removal of the cyst leads to improvement of symptoms and has an excellent prognosis.

DECLARATION OF INTEREST

The authors declare no conflict of interest.

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