

## Colloid Cyst Presenting as CSF Rhinorrhea: Case Report

Salem Tos<sup>1</sup>, Jana B. Z. Eleyan<sup>1</sup>, Mohammed Tammam<sup>2</sup>, Marah Mohammed Almalak<sup>3</sup>, Layth Al-Karaja<sup>1\*</sup>, Raef Najajra<sup>1</sup>, Mohammed Ayyad<sup>1</sup>, Maram AlBandak<sup>1</sup>, Ahmad Sharqiya<sup>4</sup>

<sup>1</sup>Al-Quds University, Jerusalem, Palestine.

<sup>2</sup>An-Najah, National University, Nablus, Palestine.

<sup>3</sup>Al-Azhar University, Gaza, Palestine.

<sup>4</sup>Perugia University, Italy.

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**Corresponding Author:** Layth Al-Karaja, Al-Quds University, Jerusalem, Palestine.

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### Abstract

Colloid cysts are non-neoplastic masses that typically arise in the brain and account for a small percentage of brain tumors. While they may be found incidentally in many cases, they can gradually grow and lead to various symptoms and complications. The use of diagnostic methods such as computed tomography (CT) scans and magnetic resonance imaging (MRI) has increased the detection of colloid cysts. Surgical intervention is often necessary for symptomatic cysts, and different surgical approaches can be utilized, including minimally invasive endoscopic removal.

We present a case of a 43-year-old patient with a large symptomatic colloid cyst in the third ventricle, managed through endoscopic removal. The patient initially presented with severe headache, chills, and rhinorrhea, and was initially diagnosed with bacterial meningitis. Further imaging studies confirmed the presence of a colloid cyst, and surgical intervention was performed successfully. This case highlights the importance of considering colloid cysts in the differential diagnosis of persistent headaches and CSF rhinorrhea and emphasizes the significance of early identification and appropriate management of these cysts to prevent serious complications.

**Keywords:** Colloid cyst, CSF rhinorrhea, third ventricle, endoscopic removal, bacterial meningitis, cerebrospinal fluid leak, hydrocephalus, intracranial pressure, surgical intervention.

### Introduction

A colloid cyst is typically a non-cancerous cyst that is commonly found within the brain. It accounts for approximately 0.5-2% of all tumors occurring in the brain [1]. In many cases, these cysts do not cause any symptoms or complications. However, they have the potential to gradually grow and lead to nonspecific symptoms such as hydrocephalus, rhinorrhea, and intracranial bleeding. More than 50% of the patients with colloid cysts are symptomatic at diagnosis necessitating surgical intervention as part of their ongoing treatment [2].

The incidence of colloid cysts is on the rise due to the widespread use and availability of diagnostic methods such as CT scans and MRI [3]. Symptomatic colloid cysts are typically managed through surgical procedures like fenestration or excision through a craniotomy. Another treatment option involves the insertion of a cyst peritoneal shunt [4]. We herein report the case of a 43-year-old patient with a large symptomatic colloid cyst located in the third ventricle, with mild enlargement of the lateral ventricles, managed with endoscopic removal of the cyst.

### Case presentation

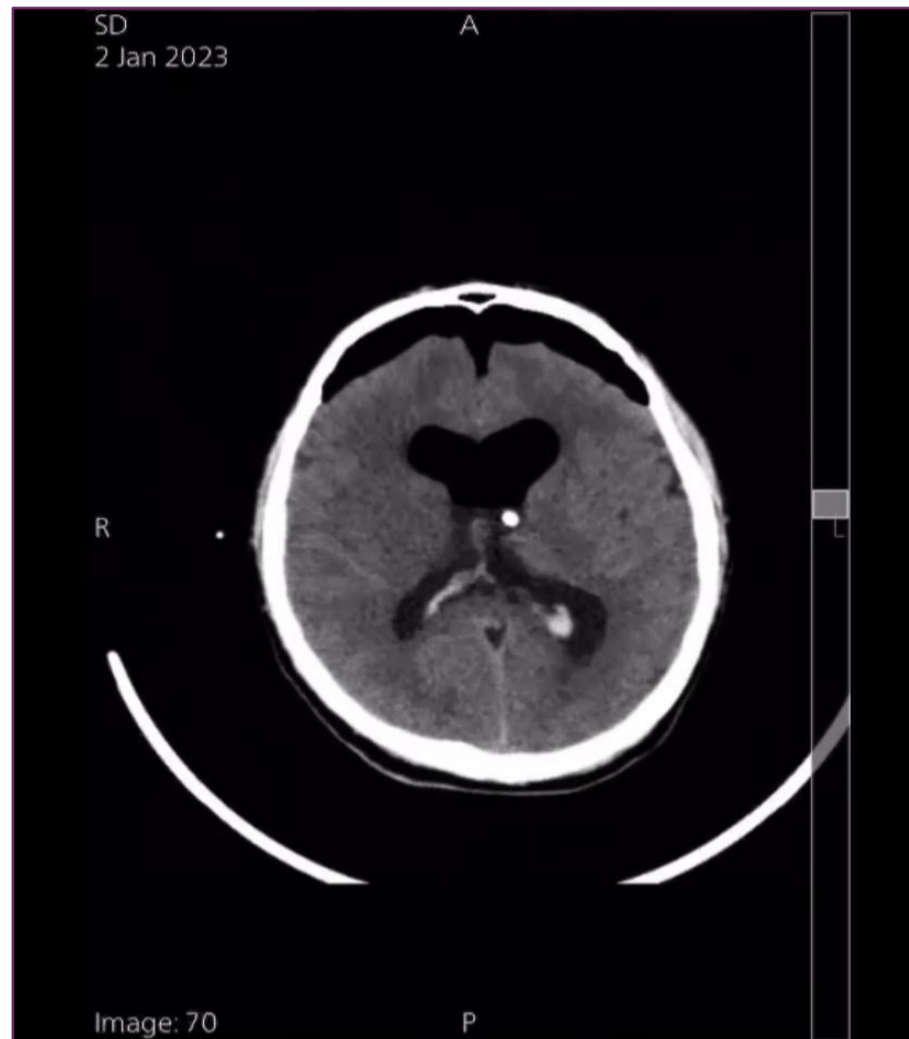
A 43-year-old patient with free past medical and surgical history was admitted to the hospital due to severe and persistent headaches that did not respond to analgesics, along with symptoms of drowsiness and chills that had been ongoing for two days. He also complained of rhinorrhea for 4 years. His body temperature was 37.8 °C, pulse 120 beats/minute; and blood pressure was 125/80 mm Hg. Glasgow Coma Score (GCS) was 15/15. There were no signs of meningismus and both the neurological and physical examinations revealed no abnormal findings. A lumbar puncture (LP) was performed, and the results of the cerebrospinal fluid analysis showed evidence of meningitis: white blood cell count (WBC) of 5000, protein level of 400, and glucose level of 15. Based on these findings, the patient was diagnosed with bacterial meningitis and intravenous antibiotics were administered, including vancomycin and ceftriaxone. Although the patient's condition improved, the headache and rhinorrhea persisted.

Further questioning revealed the patient has been experiencing constant dribbling of clear watery fluid from the right nostril for four years history. The extent of the leakage was significant, requiring the use of two boxes of tissues each day. It was especially noticeable during sleep, as the patient

consistently woke up to find his pillow wet. Despite its severity and duration, he didn't seek medical attention.

A brain computed tomography (CT) scan revealed the presence of a space-occupying lesion measuring 2.5 x 1 x 2.4 cm in the third ventricle. To further evaluate the lesion, a magnetic resonance imaging (MRI) scan with contrast

was conducted and revealed a cystic lesion with dimensions of 2.3 x 1.2 x 1.7 cm, characterized by a thin wall and no enhancement. The presence of mild in the lateral ventricles was also observed. The cyst appeared as a high signal on FLAIR 2, a slightly low signal on T2, and an isointense on T1-weighted images (**Figure 1**).



**Figure 1:** Preoperative MRI showed a high signal intensity on the FLAIR sequence with mild dilation of the lateral ventricles. This was consistent with the diagnosis of a colloid cyst.

Additionally, there were some non-specific high signal foci in the white matter on T2 and FLAIR sequences (**Figure 2**).



**Figure 2:** Coronal T2-weighted MRI showing a low T2 signal consistent with a colloid cyst (red arrow).

No midline shift was observed. Collectively, the findings were consistent with a colloid cyst. Thus, the patient was referred to surgery with complete removal of the cyst using an interhemispheric transcallosal approach. External ventricular drainage (EVD) was inserted during the procedure. Histological examination confirmed the presence of a colloid cyst. Fortunately, the patient tolerated the surgical procedure well, and no neurological complications were encountered.

#### Intraoperative course

Under general anesthesia, an endotracheal tube (ETT) tube and a foley catheter were inserted, and a central venous pressure line (CVP) was applied, in addition to needles for somatosensory evoked potentials (SSEP) and motor auditory potentials (AP).

During the surgical procedure, the patient was positioned supine with the head in a neutral position. An incision was made in the skin and subcutaneous tissue, located 3 cm in front and 4 cm behind the coronal suture. A 2 mm burr hole was created, followed by an 8 mm linear incision on the right frontal scalp, paramedian to the sagittal suture, extending to the pericranium.

The dura was opened using a C-shaped incision, and an interhemispheric approach was performed with the guidance of navigation. A 1 cm opening was made in the corpus callosum, revealing the tumor. Gross total resection (GTR) of the tumor was performed. Hemostasis was achieved using gel foam and sugecle, and autoplasty was performed using tachocline. An external ventricular drain (EVD) was inserted.

The surgical site was sutured, with the subcutaneous tissue closed using Vicryl 2.0 sutures. Before final closure, a drain was placed, and the skin was closed using monocryl 3.0 sutures. A dressing was applied to the surgical site. The colloid cyst was successfully removed without encountering any significant resistance during the procedure.

#### Post-operative

Ten days after the surgery, a CT scan of the brain was conducted following the removal of the external ventricular drain EVD. The scan revealed the presence of hemorrhagic foci and edema in the region where the surgery was performed, indicating post-operative changes. Additionally, air bubbles were observed in the dilated lateral ventricles.

Moreover, a brain cisternography revealed the presence of a small tract originating from the right temporal horn of the lateral ventricle. This tract extended anteriorly to the right sphenoid sinuses, indicating the location of the leak. The tract also extended into the right nasal cavity. Furthermore, a small defect measuring 3mm was noted in the inner table of the frontal sinus. 10 days post-operative, a computed tomography (CT) scan of the brain after EVD removal of S/P post right paramedian craniotomy interhemispheric transcallosal approach for GTR of the third ventricular space-occupying lesion revealed hemorrhagic foci and edema in the region of the surgery. Air bubbles were noted in the lateral ventricles which appeared dilated. A brain cisternography was performed and it demonstrated the presence of a small tract from the right temporal horn of the lateral ventricle passing anteriorly to the right sphenoid sinuses denoting the site of the leak, with extension to the right nasal cavity. Also, a small bony defect of the inner table of the frontal sinus measuring 3mm.

#### Investigations Done with Results

##### Lumbar Puncture (LP)

White Blood Cell (WBC) Count: 5000

Protein Level: 400

Glucose Level: 15

Diagnosis Bacterial meningitis

##### Brain Computed Tomography (CT) Scan

**Finding:** Space-occupying lesion measuring 2.5 x 1 x 2.4 cm in the third ventricle.

##### Magnetic Resonance Imaging (MRI) with Contrast

**Finding:** Cystic lesion with dimensions of 2.3 x 1.2 x 1.7 cm, thin wall, no enhancement, mild dilation of lateral ventricles, high signal on FLAIR, low signal on T2, isointense on T1-weighted images, non-specific high signal foci in white matter, no midline shift.

##### Post-operative CT Scan

**Finding:** Hemorrhagic foci, edema in the surgical region, air bubbles in the dilated lateral ventricles.

##### Brain Cisternography

**Finding:** Small tract from the right temporal horn of the lateral ventricle to the right sphenoid sinuses and nasal cavity, a small defect in the inner table of the frontal sinus.

#### Diagnosis Justified with Reason

- **Persistent Headaches and Rhinorrhea:** The patient had severe and persistent headaches not responding to analgesics and constant dribbling of clear watery fluid from the right nostril for four years.
- **Lumbar Puncture Results:** Showed evidence of meningitis (WBC count of 5000, protein level of 400, glucose level of 15).
- **CT and MRI Findings:** Revealed a cystic lesion in the third ventricle, consistent with a colloid cyst, characterized by specific imaging features (high signal on FLAIR, low signal on T2, isointense on T1).
- **Cisternography Findings:** Demonstrated a tract indicating CSF leak, which is unusual for colloid cysts but explains the patient's CSF rhinorrhea.

#### Treatment(s) Given with Result

##### 1. Initial Treatment

- **Antibiotics:** Intravenous vancomycin and ceftriaxone were administered for bacterial meningitis.
- **Result:** Improvement in meningitis symptoms, but persistent headaches and rhinorrhea.

##### 2. Surgical Intervention

- **Approach:** Interhemispheric transcallosal approach for gross total resection (GTR) of the colloid cyst.
- **Procedure**



- The patient was positioned supine.
- Incision made in the skin and subcutaneous tissue.
- A Burr hole was created, followed by a linear incision on the right frontal scalp.
- Dura opened using a C-shaped incision.
- 1 cm opening made in the corpus callosum to access the cyst.
- A gross total resection of the cyst was performed.
- Hemostasis is achieved using gel foam and sugecle.
- Autoplasty was performed using tachocline.
- External ventricular drain (EVD) inserted.
- The surgical site was sutured and closed.

- **Result:** Successful removal of the colloid cyst without significant resistance, confirmed by histological examination.

### 3. Post-operative Care

- **CT Scan:** Conducted 10 days post-surgery, showing hemorrhagic foci, edema, and air bubbles in the lateral ventricles.
- **Brain Cisternography:** Identified the tract causing the CSF leak.

### Discussion

Colloid cysts are benign growths with an epithelial lining and contain gelatinous material mainly consisting of cholesterol, mucin, old blood, and ions [5]. They constitute a minority of intracranial tumors, accounting for approximately 0.5-2% of cases [1]. Furthermore, they account for approximately 15-20% of intraventricular masses and constitute the most prevalent tumor type in the third ventricle, representing 55% of cases [6,7]. These cysts are typically small, ranging in size from 1-2 centimeters, and grow slowly due to the accumulation of their secretory and desquamated components [8]. Colloid cysts develop during early childhood and remain asymptomatic given their slow rate of growth. However, they may become symptomatic between the third and sixth decades of life [9]. Reported cases in the literature have described symptoms such as headache, nausea, vomiting, papilledema, gait disturbances, nystagmus, blurred vision, seizures, and even sudden death [8-13]. However, it is uncommon for colloid cysts to present with cerebrospinal fluid (CSF) rhinorrhea, with only two prior documented cases in the literature [14,15]. We hereby present an additional case of a patient with a colloid cyst presenting with CSF rhinorrhea along with headache.

Elevated intracranial pressure (ICP) frequently leads to presenting symptoms, with headache being the most reported complaint in most affected patients, accounting for 68-100% of cases [8]. It typically presents as an intense frontal headache, also called a thunderclap headache, often intermittent. This phenomenon is believed to occur as a result of the obstruction of CSF flow through the foramina of Monroe, whereby the colloid cyst functions as a "ball-and-valve" mechanism that impedes CSF outflow from the lateral ventricles, resulting in a sudden increase in intracranial pressure [16]. This, in turn, can lead to brief episodes of crescendo headaches with accompanying symptoms such as loss of consciousness or even fatality at the peak of the pain [8]. Although intermittent headaches and drop attacks are thought to be pathognomonic of colloid cyst obstruction, they are only present in about

one-third of diagnosed cases [17]. Interestingly, in contrast to patients with intracranial tumor-related headaches, individuals with colloid cyst-associated headache commonly exhibit alleviation of symptoms while in a supine position. This observation highlights a potential unique characteristic of colloid cysts and warrants further investigation [8].

Rarely, a fistulous tract between the ventricular system and paranasal sinuses can form due to bone erosions in fragile areas such as the sphenoid sinus, consequently leading to CSF rhinorrhea [18]. This condition is called obstructive rhinorrhea, and it is primarily attributed to long-standing hydrocephalus as the main underlying factor [15]. In our patient, cisternography revealed a small connection extending from the right temporal horn of the lateral ventricle to the right sphenoid sinus. This connection resulted in right-sided CSF rhinorrhea. The bacterial meningitis was likely caused by this fistula, which seems to have been present for approximately four years, and this itself, is an indication for early surgical intervention [19]. Diagnosis of a colloid cyst is usually confirmed with a CT scan, followed by MRI. The imaging characteristics of colloid cysts can vary depending on their size and composition density [20]. A colloid cyst obstructing the foramen of Monroe typically presents as a hyperdense, isodense, or hypodense rounded or ovoid lesion within the third ventricle. Brain MRI usually shows a hyperintense lesion on T1-weighted imaging and a hypointense lesion on T2-weighted imaging [8]. Hyperintense signals observed on FLAIR imaging serve as a significant predictor and risk factor for symptomatic colloid cysts and obstructive hydrocephalus [21]. Both CT and MRI can detect ventriculomegaly of the lateral ventricles with normal third and fourth ventricles in cases of obstructed foramen of Monroe.

Management of colloid cysts is usually surgical; since the removal of the cyst may improve CSF flow, improve the symptoms, and avoid the risk of neurological deterioration and sudden death [22]. There are several successful approaches to removing colloid cysts, including the transcallosal or transcortical approaches, as well as stereotactic or endoscopic aspiration. The transcallosal approach is usually the preferred surgical method due to cortical preservation and direct access to the cystic area during the procedure [23].

### Recommendations for Future Researchers

**Based on this case study, the following recommendations are made for future researchers**

- **Early Identification and Intervention:** Timely diagnosis and treatment of colloid cysts are crucial to prevent complications such as persistent headaches, CSF rhinorrhea, and potentially sudden death. Future research should focus on improving diagnostic techniques for early detection.
- **Comprehensive Evaluation:** Persistent headaches and CSF rhinorrhea, especially unresponsive to conventional treatments, should prompt thorough investigations including CT, MRI, and cisternography to rule out colloid cysts.
- **Surgical Techniques:** Research should explore and compare different surgical approaches for the removal of colloid cysts to determine the most effective methods with minimal complications.

- **Post-operative Monitoring:** Detailed post-operative imaging and monitoring are essential to identify and manage complications such as hemorrhagic foci, edema, and CSF leaks. Future studies should investigate optimal post-operative care protocols.
- **Long-term Outcomes:** Longitudinal studies are needed to evaluate the long-term outcomes of patients who undergo surgical removal of colloid cysts, including recurrence rates and quality of life post-surgery.

These recommendations aim to enhance the understanding and management of colloid cysts, ultimately improving patient outcomes.

### Conclusion

To the best of our knowledge, this is the third documented case report describing a colloid cyst presenting with CSF rhinorrhea accompanied by headache. Persistent and severe headaches unresponsive to analgesics, along with long-term CSF rhinorrhea, should prompt a thorough investigation to rule out the presence of colloid cysts. Early identification of a colloid cyst in the third ventricle is crucial as it can be life-threatening and lead to sudden death. Given such a clinical presentation, the medical and surgical team needs to consider colloid cysts in their differential diagnosis. While colloid cysts can be detected through CT or MRI scans, a comprehensive evaluation may be necessary, as was the case with our patient.

### References

1. Humphries RL, Stone CK, Bowers RC. (2011). Colloid cyst: a case report and literature review of a rare but deadly condition. *J Emerg Med*; 40(1):5-9.
2. Camacho A, Abernathy CD, Kelly PJ, Laws ER Jr. (1989). Colloid cysts: experience with the management of 84 cases since the introduction of computed tomography. *Neurosurgery*. 24(5):693-700.
3. Roldán-Valadez E, Hernández-Martínez P, Elizalde-Acosta I, Osorio-Peralta S. (2003). Colloid cyst of the third ventricle: case description and survey of the literature. *Rev Neurol*. 36(9):833-836.
4. Jeon JH, Lee SW, Ko JK, Choi BG, Cha SH, Song GS, Choi CH. (2005). Neuroendoscopic removal of large choroid plexus cyst: a case report. *J Korean Med Sci*. 20(2):335-339.
5. Ahmed SI, Javed G, Laghari AA, Bareeqa SB, Aziz K, Khan M, Samar SS, Humera RA, Khan AR, Farooqui MO, Shahbaz A. (2018). Third Ventricular Tumors: A Comprehensive Literature Review. *Cureus*. 10(10):3417.
6. Hamlat A, Casallo-Quiliano C, Saikali S, Adn M, Brassier G. (2004). Huge colloid cyst: case report and review of unusual forms. *Act Neurochir (Wien)*.146(4):397-401.
7. JA, Ross GJ, Parker RK, Patrizi JD, Stewart BJ. (1998). Colloid cyst of the third ventricle: radiologic-pathologic correlation. *Comput Assist Tomogr*. 22(4):524-527.
8. Spears RC. (2004). Colloid cyst headache. *Curr Pain Headache Rep*. 8(4):297-300.
9. de Witt Hamer PC, Verstegen MJ, De Haan RJ. (2002). High risk of acute deterioration in patients harboring symptomatic colloid cysts of the third ventricle. *J Neurosurg*. 96(6):1041-1045.
10. Upadhyaya AK, Sud PD. (1988). Psychiatric presentation of the third ventricular colloid cyst. A case report. *Br J Psychiatry*.152:567-569.
11. Hwang DH, Townsend JC, Ilsen PF, Bright DC. (1996). Colloid cyst of the third ventricle. *J Am Optom Assoc*. 67(4):227-234.
12. Ravnik J, Bunc G, Grcar A, Zunic M, Velnar T. (2014). Colloid cyst of the third ventricle exhibit various clinical presentation: a review of three cases. *Bosn J Basic Med Sci*. 14(3):132-135.
13. Silva D, Matis G, Chrysou O. (2012). Sudden death in a patient with a third ventricle colloid cyst. *Arquivos de Neuro-Psiquiatria*. 70(4):311.
14. Deepak, Kythasandra Shivakumar. (2010). Cerebrospinal fluid rhinorrhea and acquired anterior basal encephalocele in a patient with a colloid cyst of the third ventricle. *Neurology India*. 58(1):156-158.
15. Rovit RL, Schechter MM, Nelson K. (1969). Spontaneous" High-Pressure Cerebrospinal Rhinorrhea" due to lesions obstructing the flow of cerebrospinal fluid. *J Neurosurg*. 30(4):406-412.
16. Tenny S, Thorell W. (2021). Colloid brain cyst. StatPearls. Treasure Island (FL): StatPearls Publishing.
17. Taillibert S, Le Rhun E, Chamberlain MC. (2014). Intracranial cystic lesions: a review. *Curr Neurol Neurosci Rep*. 14(9):481.
18. Muzumdar D, Nadkarni T, Goel A. (2003). Spontaneous cerebrospinal fluid rhinorrhea as a presenting symptom of the aqueductal stenosis case report. *Neurol Med Chir (Tokyo)*. 43(12):626-629.
19. Gupta M, Gupta M, Bindra G, Singh S. (2013). Idiopathic sphenoid sinus CSF rhinorrhoea. *BMJ Case Rep*.
20. Algin O, Ozmen E, Arslan H. (2013). Radiologic manifestations of colloid cysts: a pictorial essay. *Can Assoc Radiol J*. 64(1):56-60.
21. Beaumont TL, Limbrick DD Jr, Rich KM, Wippold FJ 2nd, Dacey RG Jr. (2016). Natural history of colloid cysts of the third ventricle. *J Neurosurg*. 125(6):1420-1430.
22. Turillazzi E, Bello S, Neri M, Riezzo I, Fineschi V. (2012). Colloid cyst of the third ventricle, hypothalamus, and heart: a dangerous link for sudden death. *Diagn Pathol*. 7:144.
23. Grondin RT, Hader W, MacRae ME, Hamilton MG. (2007). Endoscopic versus microsurgical resection of third ventricle colloid cysts. *Can J Neurol Sci*. 34(2):197-207.