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A rare case of bleeding into the Sylvian arachnoid cyst: A case report

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Abstract

Arachnoid cysts are primarily developmental in origin and constitute rare, benign lesions. Sylvian arachnoid cysts may infrequently present with subdural and/or intracystic hemorrhage. Hemorrhage is typically of venous origin and occurs due to stretching and tearing of bridging veins, depending on minor traumas. The annual risk of bleeding associated with Sylvian arachnoid cysts, with no additional complaints other than headache and an asymptomatic course, has been reported to be 0.04%. Symptoms can range from headache to coma, depending on the mass effect after hemorrhage. If there is no clinical evidence linking the arachnoid cyst, it is sufficient to perform surgery only for the hematoma without resecting it. In this case report, we present a rare instance of hemorrhage due to a Sylvian arachnoid cyst that developed after trauma and was observed in a patient who came to our clinic with a headache. In our patient, the cyst-dependent left parietal subdural hemorrhage was evacuated through a burr-hole craniotomy, and a closed-system drainage with a Hemovac drain was applied for 48 hours. During post-operative follow-up, complete resorption of subdural and intracystic hemorrhages was observed. A case-based surgical approach is necessary for bleeding due to arachnoid cysts in the Sylvian region.

Keywords: arachnoid cyst, hemorrhage into the cyst, intracranial cystic lesions, subdural hemorrhage

Introduction

Arachnoid cysts result from defects in the fusion of two layers of the arachnoid membrane during the early fetal period, which leads to a cyst's formation with cerebrospinal fluid accumulation between the two arachnoid membranes [1,2]. Arachnoid cysts account for 1% of nontraumatic space-occupying lesions in the skull [3,4]. Most arachnoid cysts in children are congenital [5,6], while in adults, they can be primary, congenital, or develop secondary to trauma, tumor, or infection [5]. The most common location is the middle cranial fossa (4/6), followed by the posterior cranial fossa (1/6), and the suprasellar, frontal, cerebral convexity, interhemispheric fissure, and quadrigeminal cistern (1/6) [2,7]. Arachnoid cysts are more common in children than adults [8], and Sylvian arachnoid cysts account for 40-50% of all intracranial cases [3]. In this case report, we emphasize the importance of a case-based surgical approach in hemorrhages associated with arachnoid cysts in the Sylvian region.

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Informed Consent
The authors stated that the written consent was obtained from the legal guardians of patient presented with images in the study.

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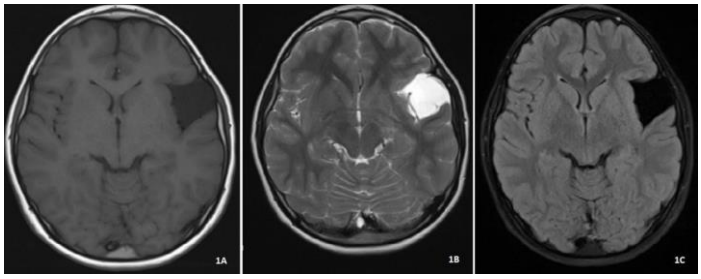
Case presentation

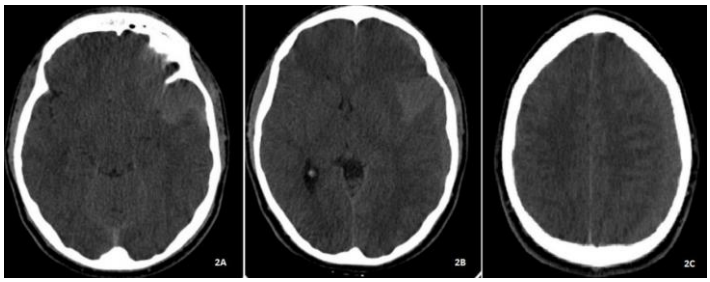
A 16-year-old male patient who had sustained a head injury with a slipped foot 20 days prior was admitted to our hospital with a complaint of severe headache that did not respond to analgesic treatments. The neurological examination was performed and evaluated as normal, and no pathology was detected in the fundus examination. Upon reviewing the patient's records in the radiology department of our hospital prior to the trauma, a well-contoured, thin-walled arachnoid cyst without mass effect was found in the Sylvian localization on Brain Magnetic Resonance Imaging (MRI). The arachnoid cyst was hypointense in the T1 axial sequence (Figure 1A), hyperintense in the T2-axial sequence (Figure 1B), and isointense with cerebrospinal fluid (CSF) in the FLAIR sequence (Figure 1C).

Figure 1: Brain magnetic resonance imaging of the patient (pre-traumatic period). 1A: An arachnoid cyst in the Sylvian localization, with smooth contours, thin walls and no mass effect, hypointense in the T1-axial sequence, 1B: hyperintense in the T2-axial sequence, 1C: isointense with the CSF in the FLAIR sequence.



After the head injury, a brain computed tomography (CT) scan was performed during the patient's admission to our hospital. A hyperdense hematoma was found within the arachnoid cyst in the left temporal region, and a subdural hemorrhage was detected in the left fronto-temporo-parietal region. The subdural hemorrhage was measured as 9 mm at its widest part in the extra-axial area and appeared slightly hyperdense. In addition, approximately 6 mm of subfalcine herniation was detected to the right in the midline structures of the brain (Figure 2A, 2B, 2C). Given the patient's clinical picture of persistent headache and resistance to analgesic therapy, it was decided to perform surgical treatment.

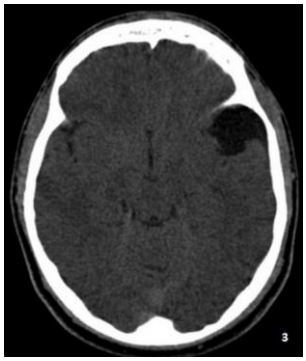
Figure 2: Brain computerized tomography of the patient (post-traumatic period). 2A: Hyperdense hematoma areas in the arachnoid cyst and the left temporal extra-axial region. 2B: A subfalcine herniation of approximately 6 mm to the right in the midline structures of the brain. 2C: A Subdural hemorrhage in the left fronto-temporo-parietal region measuring 9 mm at its widest point.



The subdural hematoma adjacent to the cyst was evacuated by performing a burr-hole craniotomy in the left parietal region, and closed-system drainage was applied for 48 hours. Following this treatment, the patient's headache resolved dramatically. In the post-operative period, a follow-up brain CT scan was performed, which showed that the subdural hematoma area had completely disappeared, and the hemorrhage in the left Sylvian arachnoid cyst had also disappeared (Figure 3). No additional neurodeficiencies were detected in the post-operative period, and the patient was discharged.

In this case report, we obtained a "written consent document" from the father of the child patient to use the patient's radiological images.

Figure 3: Brain computerized tomography (CT) of the patient (post-operative period). The disappearance of bleeding areas in the subdural space and within the arachnoid cyst and hypodensity in the arachnoid cyst.



Discussion

Arachnoid cysts are cystic cavities filled with CSF-like fluid within the arachnoid membranes. They are mostly formed due to developmental defects during the fetal period and are rare benign lesions containing collagen and cells. They may occur due to congenital, traumatic or inflammatory causes [9].

In a retrospective analysis of 208 cases of intracranial cysts performed by Rengachary and Watanabe from 1831 to 1980, Sylvian fissure-localized arachnoid cysts were reported most frequently, with a localization rate of 49%. This was followed by cerebellopontine angle (11%), supracollicular (10%), vermian and suprasellar (9%), interhemispheric (5%), convexity (4%), and clival (3%) localizations [5,10,11].

Middle cranial fossa cysts most commonly present with headaches, epileptic seizures, and contralateral muscle weakness. In addition, macrocrania, mental retardation, and behavioral disorders are among the symptoms of most pediatric patients [12,13].

It was reported in the literature that Sylvian arachnoid cysts were rarely (2.4%) associated with subdural and/or intracystic hemorrhage and hygroma clinics. The hemorrhages are almost always of venous origin and develop with the stretching and rupture of the bridging veins depending on minor traumas. Depending on the mass effect after the hemorrhage, various symptoms, from headaches to coma, may be observed in a previously asymptomatic patient [5,10].

Gassali et al. [5] proposed a classification system based on the appearances of Sylvian fissure-localized arachnoid cysts. Type-I Sylvian arachnoid cysts are small lenticular cysts located in the Sylvian fissure, the anterior pole of the middle fossa, and posterior to the sphenoid wing. This group has no mass effect and no midline shift. Type-II Sylvian arachnoid cysts are rectangular and involve the middle and proximal portions of the fissure outside the insular cortex. There is minimal midline shift in the Type-II group.

Type-III Sylvian arachnoid cysts are large, lenticular-shaped lesions and typically exhibit midline shifts. Macrocrania, or asymmetric bone enlargement in the middle cranial fossa, is commonly observed in this group. Cases of hemorrhage in or

adjacent to middle fossa cysts have been reported in the literature [5].

Arachnoid cysts are usually diagnosed through prenatal ultrasonography, cranial ultrasonography, brain CT, and brain MRI [14]. Brain MRI is the preferred diagnostic method as it provides information in three planes, eliminates bone artifacts, and provides detailed information about the exact localization and extensions of the cyst [15]. Diffusion MRI is useful for distinguishing epidermoid tumors, often confused with arachnoid cysts. The constructive interference in the steady state (CISS) MRI sequence is another important radiological examination for differential diagnosis of arachnoid cysts and determining surgical options. Brain CT can identify many arachnoid cysts and is used to differentiate them from cystic tumors that mimic arachnoid cysts and other cystic lesions by administering intravenous contrast material [5,6].

Treating arachnoid cysts is controversial, and many methods have been recommended [16]. Spontaneous regression has also been reported rarely in these cases [7,17].

Asymptomatic arachnoid cysts that do not show progressive growth or cause ventriculomegaly may be observed clinically and radiologically. As is generally recommended, if an arachnoid cyst is incidentally detected or is followed conservatively, the patient should be monitored at regular intervals (every 6 months for the first 2 years) with cranial CT and/or MRI. If the patient's clinical and radiological stability is in question at the end of this period, follow-up should be conducted annually. However, the literature has no definite consensus on this subject [18].

Absolute surgical treatment indications for arachnoid cysts include the observation of compression findings on neural tissues with mass effect, the development of symptoms of increased intracranial pressure syndrome, resistant epilepsy compatible with electroencephalogram (EEG) findings, and progressive hydrocephalus [8,12].

It has been reported that head trauma in arachnoid cysts increases the incidence of subdural hygroma or hematoma, potentially causing asymptomatic cases to become symptomatic in this way [19].

There is still no consensus on the preferred surgical method in the literature for treating arachnoid cysts, and treatment protocols vary depending on the case. Arachnoid cyst cases not complicated by hemorrhage may be sufficient in pure arachnoid cyst mouthing with subarachnoid distance. Commonly used surgical techniques include endoscopic cyst fenestration and cystoperitoneal shunt insertion. Both methods have been reported to yield positive results in the literature. Another technique involves internal shunt application to the subdural space, yielding positive results. Total resection of the cyst is often not possible during surgery. Although there are not enough reported cases in the literature, it has been reported that acetazolamide and corticosteroid treatment can be effective in cases treated conservatively [20].

In arachnoid cysts complicated by subdural hematoma or hygroma, in addition to mouthing the cyst with the subarachnoid space, evacuation of the hematoma or hygroma is recommended as part of the treatment [10,11,21].

Different treatment approaches have been reported for cases where Sylvian-localized arachnoid cysts are complicated by subdural hemorrhage [10,11,21]. The main question in these cases is whether the cyst should be treated in addition to draining the hematoma. According to a retrospective study by Parsch et al. [22], the risk of developing subdural hemorrhage or hygroma is five times higher in Sylvian arachnoid cyst cases compared to the normal population (2.43% vs. 0.46%). However, as in our case, it has been reported in the literature that the annual risk of hemorrhage is 0.04% in Sylvian-localized arachnoid cysts that do not have additional complaints other than a headache or show an asymptomatic course. Additionally, it has been reported that surgical treatment for hematoma evacuation alone is sufficient in these asymptomatic cases, as in our patient [11,23].

Conclusion

Traumatic subdural hematomas that develop as a complication of arachnoid cysts are rare. If there is no clinical evidence to suggest an association with the arachnoid cyst, it is usually sufficient to operate only on the hematoma without resecting it. In conclusion, a case-based surgical approach is required for bleeding due to arachnoid cysts in the Sylvian region.

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