ISSN: 2643-4474

Djalma de Campos Gonçalves Junior, et al. Neurosurg Cases Rev 2025, 8:170
DOI: 10.23937/2643-4474/1710170
Volume 8 | Issue 1
Open Access

Neurosurgery
Cases and Reviews

CASE REPORT

Mild Traumatic Brain Injury and Subacute Subdural Hematoma: Intraoperative Discovery of a Hemorrhagic Arachnoid Cyst

Djalma de Campos Gonçalves Junior*

Researcher, Anatomy Laboratory, SÃ£o Paulo State University (UNESP), Brazil

***Corresponding author:** *Djalma de Campos GonÃ§alves Junior, Researcher, Anatomy Laboratory, SÃ£o Paulo State University (UNESP), Brazil*

Abstract

Arachnoid cysts are benign congenital malformations typically located within the cerebrospinal fluid spaces of the brain. They are often asymptomatic and discovered incidentally. However, complications such as hemorrhage can render them clinically significant, especially following minor trauma. We present the case of a 19-year-old male who developed a progressive headache after mild head trauma. Neuroimaging revealed a right frontoparietal subacute subdural hematoma with significant midline shift. Unexpectedly, intraoperative findings revealed a hemorrhagic arachnoid cyst contributing to the mass effect. Surgical intervention involving hematoma evacuation and cyst fenestration led to complete symptom resolution. This case underscores the necessity of maintaining a high index of suspicion for arachnoid cyst complications even in cases of minor head injury and highlights the importance of timely surgical management to prevent neurological deterioration.

KeywordsArachnoid cyst, Subdural hematoma, Mild traumatic brain injury, Neurosurgery

Introduction

Arachnoid cysts (ACs) are cerebrospinal fluid-filled sacs that arise due to developmental anomalies of the arachnoid membrane [1]. They are generally asymptomatic and often detected incidentally during neuroimaging performed for unrelated reasons [1,2]. Nevertheless, under certain circumstances, particularly trauma, these cysts may become symptomatic due to hemorrhage into the cyst cavity or adjacent subdural space [2,3]. Minor head trauma has been recognized as a trigger for cyst rupture, leading to significant neurological sequelae [3]. The present case report adheres to the CARE Guidelines to ensure standardized and transparent reporting [4].

Case Presentation

A 19-year-old previously healthy male presented to the emergency department with a three-month history of progressively worsening right-sided headaches following a minor head trauma sustained during a low-velocity motorcycle accident. The trauma had occurred without helmet use, but there was no immediate loss of consciousness or neurological symptoms at the time. Over the subsequent weeks, he reported increasing headache intensity, interfering with daily activities.

Neurological examination was unremarkable, with a Glasgow Coma Scale score of 15, no focal motor or sensory deficits, and intact cranial nerves function. Fundoscopic examination revealed no papilledema.

Non-contrast computed tomography (CT) of the brain demonstrated a right frontoparietal subacute subdural hematoma causing approximately 8 mm of left ward midline shift. No overt skull fracture was noted. The hematoma was hypodense relative to the brain parenchyma, suggesting a subacute process.

Given the mass effect and clinical symptoms, urgent surgical intervention was planned. A right-sided craniotomy was performed. Upon opening the duramater, an unexpected finding of a hemorrhagic arachnoid cyst in the frontoparietal region was encountered. The cyst wall was thin and translucent, and active bleeding points were not observed at the time of

Citation: Djalma de Campos Gonçalves Junior (2025) Mild Traumatic Brain Injury and Subacute Subdural Hematoma: Intraoperative Discovery of a Hemorrhagic Arachnoid Cyst. Neurosurg Cases Rev 8:170. doi.org/10.23937/2643-4474/1710170

Accepted: May 14, 2025: **Published:** May 16, 2025

surgery. Bone remodeling consistent with chronic cyst presence was evident. Hematoma evacuation was under taken, followed by careful fenestration of the cyst wall into the adjacent subarachnoid space to restore normal cerebrospinal fluid dynamics and prevent recurrence.

The postoperative course was uneventful. The patient experienced immediate headache relief and demonstrated no new neurological deficits. Follow-up imaging at three months showed complete resolution of the hematoma and no reaccumulation of cystic fluid. The patient resumed normal activities without restrictions.

Discussion

Arachnoid cysts are relatively common intracranial lesions, accounting for approximately 1% of intracranial mass lesions [1]. They most frequently occur in the middle cranial fossa but can be found throughout the intracranial subarachnoid spaces [1,2]. Their pathogenesis is believed to involve the splitting or duplication of the arachnoid membrane during embryogenesis.

The majority of ACs is asymptomatic; however, symptomatic cases typically arise due to cyst enlargement, intracystic hemorrhage, subdural hematoma formation, or cyst rupture [2]. Minor head trauma, as seen in our patient, is a known precipitating factor, especially in younger individuals where cyst wall fragility may predispose to vascular disruption [3,5].

The mechanism leading to hemorrhage involves rupture of bridging veins stretched over the cyst surface or intrinsic vessel rupture within the cyst wall [3]. In our case, the absence of skull fracture and the chronicity of symptoms suggest that hemorrhage developed progressively over weeks, rather than acutely at the time of trauma.

Imaging findings in such cases can be misleading. While CT is useful for identifying subdural collections and midline shift, it may fail to differentiate between a simple hematoma and a hemorrhagic arachnoid cyst. Magnetic resonance imaging (MRI) could provide better characterization but was not performed in this emergency setting.

Surgical management remains the mainstay for symptomatic ACs complicated by hemorrhage. Options include simple evacuation, cyst fenestration, or cyst-peritoneal shunting depending on intraoperative findings [2,5]. In our patient, evacuation of the hematoma and fenestration of the cyst into the subarachnoid space were deemed sufficient, considering the cyst's location and communication potential.

Long-term prognosis is excellent when surgical intervention is timely. Recurrence rates are low when proper cyst fenestration is performed [2,5]. Our patient achieved full recovery without recurrence on follow-up, reinforcing the effectiveness of early surgical management.

Conclusion

This case emphasizes that even mild head trauma can unmask silent arachnoid cysts through hemorrhagic complications, leading to potentially serious mass effects. High clinical suspicion, prompt neuroimaging, and timely surgical intervention are critical for favorable outcomes. Awareness of this possibility is vital, particularly in young patients presenting with spontaneous subdural hematomas.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for his/her images and other clinical information to be reported in the journal.

Conflict of Interest

The authors declare no conflicts of interest.

References

1. Kwak YS, Hwang SK, Park SH, Park JY (2013) Chronic subdural hematoma associated with the middle fossa arachnoid cyst: Pathogenesis and review of its management. Childs Nerv Syst 29: 77-82.

2. Adin ME, Yildiz MS, Deniz MA, Behzadi AH, Mata-Mbemba D (2018) Arachnoid cysts with spontaneous intracystic hemorrhage and associated subdural hematoma: Report of management and follow-up of 2 cases. Radiol Case Rep 13: 516-521.

3. Mori K, Yamamoto T, Horinaka N, Maeda M (2002) Arachnoid cyst is a risk factor for chronic subdural hematoma in juveniles: Twelve cases of chronic subdural hematoma associated with arachnoid cyst. J Neurotrauma 19: 1017-1027.

4. Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, et al. (2014) The CARE Guidelines: Consensus-based clinical case reporting guideline development. J Clin Epidemiol 67: 46-51.

5. Liu Z, Xu P, Li Q, Liu H, Chen N, et al. (2014) Arachnoid cysts with subdural hematoma or intracystic hemorrhage in children. Pediatr Emerg Care 30: 345-351.