



## Case Reports &amp; Case Series

## Unusual arachnoid cyst involving the third ventricle in an adult: Case report

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## ABSTRACT

**Introduction:** Intracranial arachnoid cysts are rare in adults. We report a large suprasellar arachnoid cyst involving a third ventricle in a 19 year old male.

**Case report:** A 19 year old male with mild cognitive impairment was admitted after an episode of loss of consciousness (LOC). A type 1 suprasellar arachnoid cyst (SAC-1) was diagnosed on CT (CT) and magnetic resonance (MR) imaging. Endoscopic fenestration was performed. At surgery, the cyst wall was noted to be markedly thickened with prominent vascularity. Histopathology showed thickened and densely fibrotic meninges, an unusual feature for an arachnoid cyst. 36 months after surgery, the patient remains asymptomatic.

## 1. Introduction

Arachnoid cysts represent 1% of intracranial lesions [1]. Suprasellar arachnoid cysts (SACs) are mainly congenital and are thought to arise from an imperforate membrane of Lilliequist [2]. The wall of an arachnoid cyst is typically pale translucent and avascular [3,4]. Most are asymptomatic. Cognitive decline, hydrocephalus and focal neurological deficits have been reported [5]. We report an unusual case of a very large SAC in an adult presenting as loss of consciousness.

## 2. History

A 19 year old construction worker was brought to hospital with a GCS of 14 and 12 h of anterograde amnesia having been found at the bottom of a stairwell. He was reported to have had episodes of vomiting and being increasingly vague in the previous 2 weeks. He had no significant medical history but had difficulty completing year 12 education at 16 years old due to “memory slowing”. There was no significant family history.

## 3. Examination

Physical examination was normal. There was no papilloedema and detailed neurological assessment revealed no abnormalities. Routine blood tests, cardiac investigations and EEG were normal.

## 4. Radiological evaluation

CT and MRA of the brain identified an 8 × 6 × 6 cm suprasellar cyst invaginating the third ventricle, splaying the septum pellucidum and causing bulging into the foramina of Monro producing obstructive dilatation of the lateral ventricles (Fig. 1). The cyst contents were iso-intense to CSF on MRI. There was no periventricular lucency, suggesting chronicity.

## 5. Operation

Endoscopic fenestration of the cyst was performed through the frontal horn of the right lateral ventricle using stereotactic guidance. The cyst wall was markedly thickened and opaque and white/blue in colour with prominent vessels (Fig. 2a). The wall was difficult to fenestrate requiring coagulation and sharp dissection. Several biopsies of the cyst wall were taken. Once the cyst was opened, the structures at the base of the foramen including the complete circle of Willis, the pituitary fossa and the optic chiasm were freely visible (Fig. 2b). The patient made an uneventful recovery and was discharged home 3 days post-procedure. Progress MRI scan at 6 weeks showed the cyst had collapsed with evidence of CSF flow through the ventriculostomy in the cerebral aqueduct. The lateral ventricles had reduced in size. 36 months following surgery, he remains well.

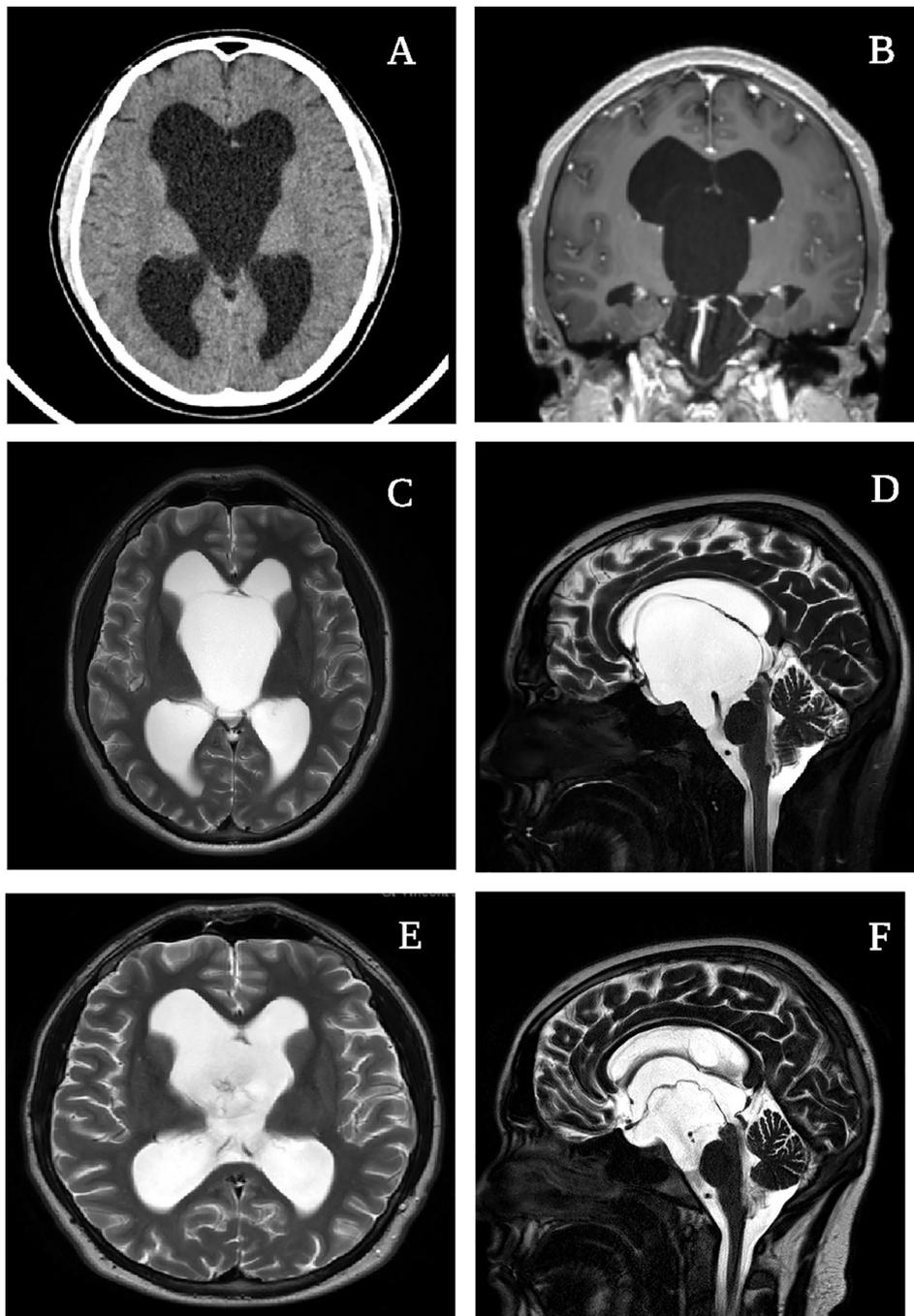
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**Fig. 1.** A: Gross symmetric dilatation of the lateral ventricles on initial CT. B: MRI showing a cystic structure in the third ventricle invaginating Foramina of Monro. C and D: Axial and Sagittal T2-weighted image demonstrating the lesion in the third ventricle displacing the pituitary infundibulum anteriorly and invaginating into the third ventricle.

E and F: Post-operative axial and sagittal T2-weighted MR images showing the collapsed cyst in the third ventricle.

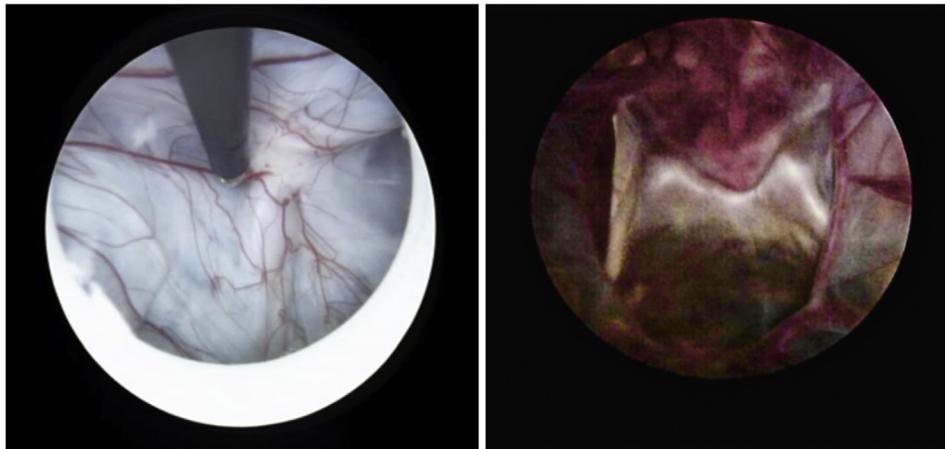
## 6. Histological evaluation

Microscopic section showed fragments of dense fibrous tissue (Fig. 3). The fibrous tissue was porous and cellular and contained several ectatic thin walled veins. In some regions, the tissue resembled thickened fibrotic leptomeninges although no meningotheial cells were identified with H&E staining. The appearances were consistent with an arachnoid cyst. The unusual thickness and fibrosis was unusual and probably due to the chronic nature of the lesion.

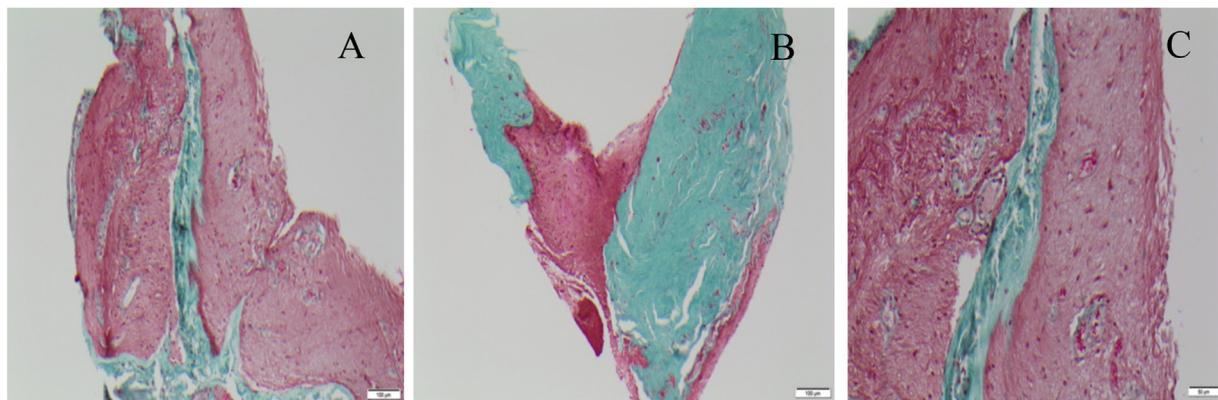
## 7. Discussion

SACs are rare in adults. The first reported case of SAC was in 1935 by Barlow et al. [4]. There have only been 74 reported cases in adults. This is the first reported case with an unusually thickened and highly vascularised wall.

Macroscopically, the cyst wall resembled dura mater. Microscopic examination demonstrated dense fibrous tissue without intervening leptomeninges in most areas. This is unlike a typical arachnoid cyst, the wall of which usually contains an inner, often incomplete layer of flattened meningotheial cells and a variably thickened outer



**Fig. 2.** Left: The thick and vascular cyst wall was punctured. Right: Skull base structures were visualized after cyst opening. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)



**Fig. 3.** Photomicrographs showing sections of cyst wall stained with Masson trichrome to highlight differences between cerebral tissue (red) and fibrous tissue (green). A & B: low power (100 $\times$ ) views showing apposition of dense paucicellular fibrous tissue and cerebral tissue. C high power (200 $\times$ ) view showing gliotic brain abutting thickened fibrous tissue. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

collagenous layer. The aetiology of arachnoid cysts remains unclear. Various mechanisms have been proposed. These include a “ball valve” mechanism with only one way flow of CSF into the cyst: secretion of fluid into the cyst or a slit-valve like structure of the arachnoid membrane that occurs around the basilar artery and opens and closes with arterial pulsation [6].

Clinical manifestations of arachnoid cysts are variable. Visual abnormalities and hyperthalamic/pituitary dysfunction have been reported [7]. The clinical features of SAC-1 may be due to obstructive hydrocephalus or intermittent foraminal obstruction, possibly secondary to the pendulous nature of the cyst and include drop attacks or head bobbing [7]. Head movement by displacing the cyst posteriorly is thought to partially relieve the obstruction of the foramen of Monro [7]. For symptomatic cases, cyst fenestration or excision is recommended through open craniotomy or increasingly through endoscopic fenestration [2]. In our patient, gross dilatation of the lateral ventricles and the absence of radiological evidence of transependymal CSF flow suggested the ventriculomegaly was longstanding. The history of deteriorating cognition and vomiting suggests raised intracranial pressure prior to his presentation. Sudden loss of consciousness may be secondary to acute on chronic obstruction of the foramen Monro similar to that described with colloid cysts of the third ventricle<sup>6</sup> or possibly as a result of compression of the hypothalamic cardiovascular regulatory centres [7]. Adult SACs are very rare. We present a case of a very large SAC-1 with an unusually thickened and highly vascularised wall.

## Disclosures

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

## Author contributions

Conception and design: Steel, Ong, Frydenberg. Acquisition of data: Ong. Analysis and interpretation of data: all authors. Critically revising the article: all authors. Reviewed submitted version of manuscript: all authors.

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