Scientific Research Publishing

Open Journal of Modern Neurosurgery, 2026, 16(1), 105-112
https://www.scirp.org/journal/ojmn
ISSN Online: 2163-0585
ISSN Print: 2163-0569

Therapeutic Modalities of Symptomatic Arachnoid Cysts in Togo

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How to cite this paper: Kpelao, E., Alihonou, T., Doleagbenou, A.K., El Kader Moumouni, A., Ahanogbe, M.H., Egu, K., Adjagbebou, Y.M., Segbedji, K.K., Bakonde, S., Lawson, D., Hima-Maiga, A. and Beketi, A. (2026) Therapeutic Modalities of Symptomatic Arachnoid Cysts in Togo. *Open Journal of Modern Neurosurgery*, **16**, 105-112.
https://doi.org/10.4236/ojmn.2026.161010

Received: October 3, 2025
Accepted: December 28, 2025
Published: December 31, 2025

Abstract

Introduction: The origin and pathophysiology of arachnoid cysts are controversial with several theories. Most intracranial arachnoid cysts are asymptomatic and often an incidental radiological finding; they may be treated conservatively. For symptomatic cases, many different operative procedures have been proposed. Having several therapeutic methods, we report your choices in the management of symptomatic arachnoid cysts. **Material and method:** This is a cohort of 8 symptomatic arachnoid cysts managed in the neurosurgery unit of Sylvanus Olympio hospital. We compared outcomes according to the surgical technique used. The follow-up period was between 6 and 36 months. **Results:** There was a female predominance (6 females and 2 males). The average age of adults was 48.6 years and that of children was 1.5 years. The main clinical signs were intracranial hypertension (100%) and frontal syndrome (50%). Head trauma and intracystic hemorrhage were identified as risk factors in 2 cases. Seven patients underwent surgery using several techniques: 4 excisions, 1 puncture and 2 cysto-peritoneal shunts. There was spontaneous resolution of the cyst in one patient. Recovery was better for patients who underwent excision. **Conclusion:** Symptomatic arachnoid cysts can be treated in several ways. We preferred excision for adults and a shunt for children/infants.

Keywords

Symptomatic Arachnoid Cyst, Surgical Techniques, Togo

1. Introduction

Intracranial arachnoid cysts form when the arachnoid membrane that surrounds

the subarachnoid space splits or duplicates and then fills with fluid, forming a cyst. It is a pathological condition often creating a disturbance in intracranial dynamics due to the shift and displacement of surrounding structures as well as intracranial hypertension [1]-[5]. Their etiology and physiopathology are controversial with several theories: genetic, familial, malformative, traumatic or infectious [6]-[11]. Most intracranial arachnoid cysts are asymptomatic and often an incidental radiological finding; those may be treated conservatively [12]-[16]. For symptomatic cases, many different operative procedures have been proposed, including cyst excision, stereotactic aspiration, cyst fenestration, cystocisternostomy, ventriculocystostomy, and cystoperitoneal shunt treatment [17]-[22]. Having several therapeutic methods, we report your choices in the management of symptomatic arachnoid cysts.

2. Materials and Methods

This was a cohort of symptomatic arachnoid cysts managed in the neurosurgery unit of Lomé University Hospital (Sylvanus Olympio). We characterized cyst as "symptomatic" based on the presence of signs of intracranial hypertension, and/or the presence of a recent neurological deficit and the mass effect on imaging. We compared both clinical and radiological evolutions according to the therapeutic modality used. The follow-up was between 6 and 36 months.

Table 1. Main clinical signs of the cases.

	Sex	Age	Symptoms	Location
Case 1	M	19 y	ICH*, seizure, right hemiparesis	Left frontal
Case 2	M	61 y	ICH, frontal syndrome**	Left frontal
Case 3	F	62 y	ICH, seizure, right hemiparesis, frontal syndrome	Left, fronto-temporal (**Figure 1**)
Case 4	F	2 y	Psychomotor retardation, left hemiparesis, ICH	Right, fronto-temporal
Case 5	F	1 y	ICH, intracystic hemorrhage	Left, temporal (**Figure 2**)
Case 6	F	39 y	ICH, frontal syndrome	Right frontal
Case 7	F	54 y	ICH, frontal syndrome	Left frontal (**Figure 3**)
Case 8	F	57 y	ICH	Left, parietal (**Figure 4**)

*Intracranial hypertension; **Misconduct, agitation, urination.

Table 2. Outcomes according to the technique.

	Technique	Outcomes	
		Clinical	Radiological
Case 1	Excision	Regression of hemiparesis and ICH	Disappearance of kyste
Case 2	Excision	Regression of frontal syndrome and ICH	Disappearance of kyste
Case 3	Excision	Regression of frontal syndrome, ICH and hemiparesis	Disappearance of kyste
Case 6	Excision	Regression of frontal syndrome and ICH	Disappearance of kyste
Case 4	Shunt	Regression of hemiparesis and ICH	Reduction of cyst volume
Case 5	Shunt	Regression of ICH	
Case 7	Spontaneous resolution	Regression of frontal syndrome and ICH	Disappearance of kyste
Case 8	Puncture	Regression of ICH	Reduction of cyst volume

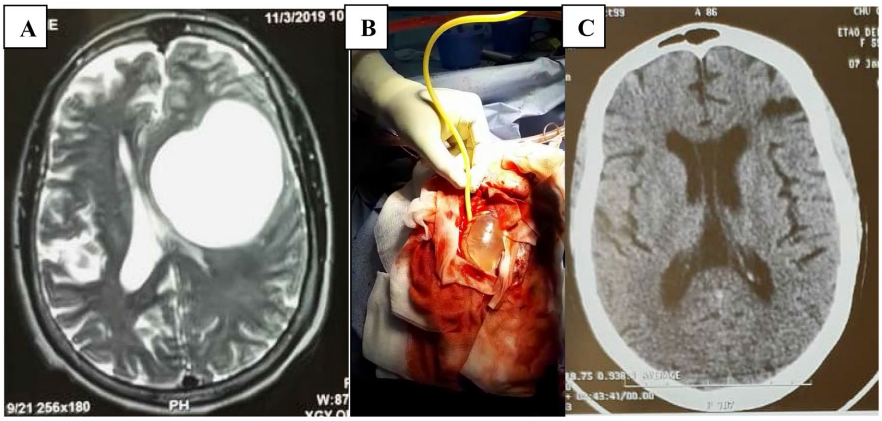

Figure 1. Left fronto-temporal arachnoid cyst (A). Operative picture showing urinary catheter because the hydatid cyst had been evacuated initially (B). Control showing cerebral re-expansion (C).

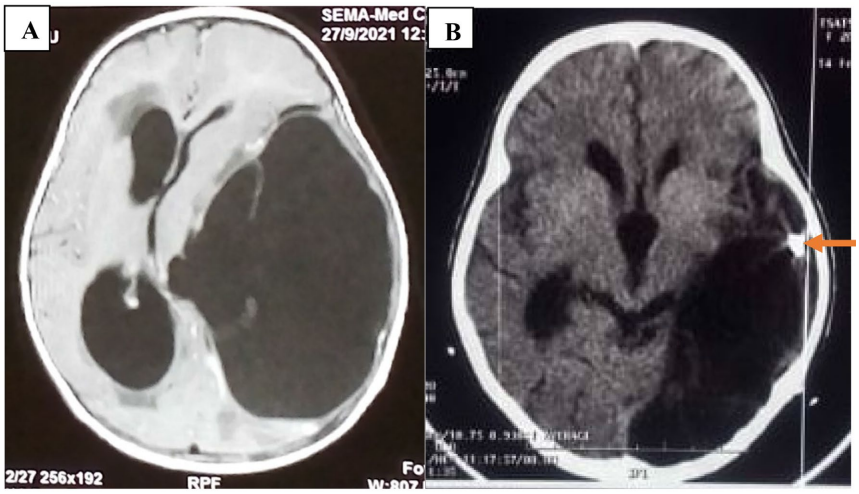

Figure 2. Left temporal arachnoid cyst (A). Postoperative control showing the shunt catheter (arrow) and the disappearance of the mass effect (B).

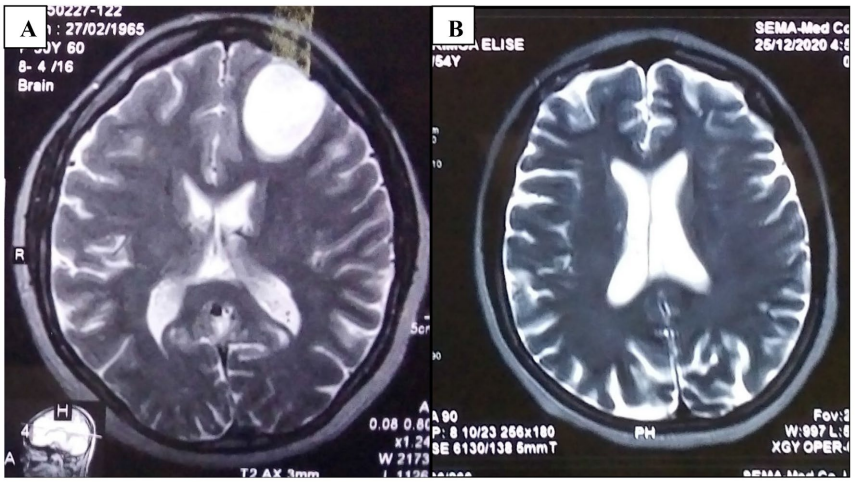

Figure 3. Left frontal arachnoid cyst (A). Control after spontaneous resolution 5 years later (B).

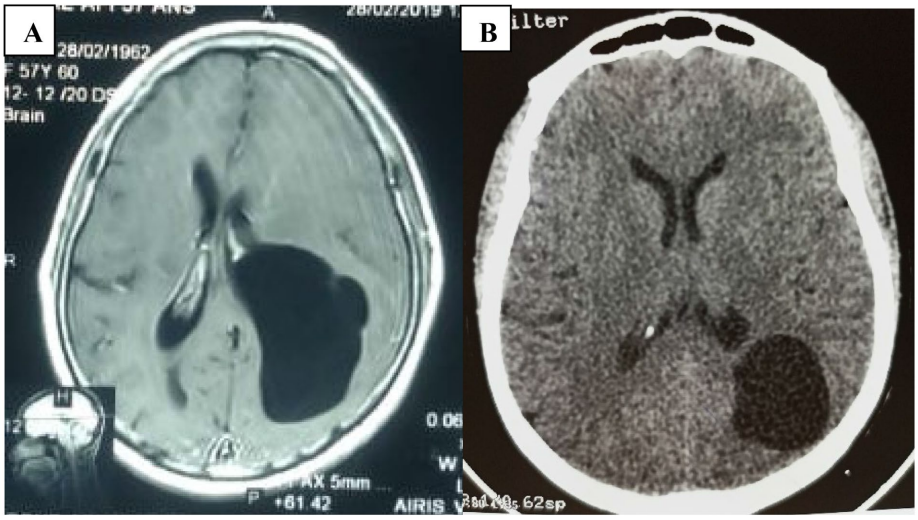

Figure 4. Left parietal arachnoid cyst treated by puncture (A). The control CT scan noted a reduction of cyst size (B).

3. Results

Eight patients (6 adults and 2 children) were treated for symptomatic arachnoid cysts. Females predominated (6 females and 2 males). The average age of adults was 48.6 years and that of children was 1.5 years. The significant antecedents were high blood pressure in 4 patients. The main clinical signs are summarized in **Table 1**. A recent head trauma had been identified as a favorable factor in one case (adult) confirmed by hematic fluid during surgery. Intracystic hemorrhage also occurred in one child (hemorrhagic fluid). The onset of symptoms was progressive over 6 months in adults. Imaging had shown various locations of arachnoid cyst with a mass effect including 1 intra-parenchymal (**Table 1**). In 2 cases the hydatid cyst was suspected. Seven patients were operated on using several techniques: 4 cyst excisions, one cyst puncture and 2 cyst shunts. In one patient, there was spontaneous resolution of the cyst confirmed by MRI which occurred 5 years after initial one. The patient refused the surgery. The investigation revealed that, in fact, she had been admitted to a prayer camp. It was to confirm the clinical improvement that she came back for control imagery. We noted diverse clinical improvement on follow-up with Ad integrum recovery for patients who underwent cyst excision (disappearance of misconduct and urination). Control imaging noted disappearance of the cyst or absence of mass effect in the majority of cases (**Table 2**).

4. Discussion

The arachnoid cyst presents diverse symptomatology associated with signs of Intracranial Hypertension (ICH) and/or focal signs depending on their location [14] [23]. In addition to ICH signs presented by the patients, we predominantly observed a frontal syndrome related to the location of the cysts. This could be mistaken for vascular dementia, especially in the elderly. The finding is widely docu-

mented in the literature [24] [25]. Indeed it is important to ensure the responsibility of the cyst on the symptomatology before indicating surgery because most cysts are discovered accidentally. Surgical methods for symptomatic cysts are varied, each with advantages and disadvantages [6] [21] [26]. Our selection criteria were age, location, size and potential for postoperative recurrence.

We preferred cyst excision for frontal location in adults even though our sample is very small and can be a major limitation to conclude. This approach is justified by the fact that the main differential diagnosis of the arachnoid cyst is the hydatid cyst, which requires management by open surgery with particular technique [27]. Also, brain expansion is better due to huge cerebral mass of frontal lobe. Excision remains the best surgical technique for all locations to limit recurrence even with complications, including hemorrhage, dural tear and subdural hygroma. The success rate exceeds 90% according to the authors [6] [21] [22] [26]. We did not register any complications. One of the best radiological proofs of the cyst is the cerebral re-expansion after surgery, especially for cysts located frontally; we got it for all our cases.

Temporal cysts, especially in children, are congenital and often associated with cerebral atrophy, which makes brain expansion difficult after excision, unlike frontal cysts. The excision may be less effective due to the potential persistence of a cavity. We have therefore favored shunting in these cases. Shunts are effective in reducing the size and pressure of a cyst, but complications include infection, overdrainage, shunt dependency, shunt obstruction, and shunt malfunction [21] [26] [28]. The goal here is to reduce cystic and intracranial pressure.

The last surgical option less used and documented is the cyst puncture. It is simple technique but with high risk of recurrence. We obtained a good clinical result even though there was only a reduction in the cyst size on the control CT scan.

There have been few documented cases of arachnoid cysts with spontaneous regression but it may be more common than reported in the literature, and their frequency is probably underestimated due to the lack of systematic monitoring of patients with asymptomatic cysts [29] [30]. The cause of spontaneous resolution is not understood. Spontaneous resorption of the cyst can occur after head trauma or treatment of an infection that induced it [29] [31]-[33]. The common mechanism evoked for all spontaneous resolutions is the rupture of cyst walls in the subarachnoid spaces [29] [34] [35]. This rupture can occur according to several mechanisms.

First cyst enlargement due to fluid secretion or the presence of an increased osmotic gradient related to a high concentration of protein. The second mechanism is head trauma which can facilitate wall rupture [34]. Even in patients with no major trauma, excessive breathing, coughing or sport activities can produce sufficient stress to tear the arachnoid membrane [34]. It is this second mechanism that we retained to explain the resolution of cyst in our patient. We believe that the spirituality mentioned was only a coincidence.

It seems that the majority of non-surgical resolution of intracranial arachnoid cysts occurs in children and young adolescents rarely in adulthood which makes our case special [34] [35].

5. Conclusion

Arachnoid cysts are most often asymptomatic malformations and are discovered incidentally. For symptoms, several therapeutic methods are available. We found through this study, that excision would be more effective in adults like the shunt is more suitable for children/infants.

Authors' Contributions

Essossinam Kpélao: substantial contributions to conception and design, acquisition of data, drafting the article and revising it critically for important intellectual content; final approval of the version to be published. **Thierry Alihonou**: substantial contributions to conception and design, acquisition of data, and final approval of the version to be published. **Agbéko K. Doléagbénou**: drafting the article and revising it critically for important intellectual content; final approval of the version to be published. **Ab El Kader Moumouni**: drafting the article and revising it critically for important intellectual content; final approval of the version to be published. **Kodjo H. M. Ahanogbé**: final approval of the version to be published. **Komi Egu**: final approval of the version to be published. **Adjagbebou Yawovi Michel**: drafting the article and revising it critically for important intellectual content; final approval of the version to be published. **Kossi K. Ségbédji: f**inal approval of the version to be published. **Solim Bakondé:** final approval of the version to be published. **Dzidoula Lawson**: substantial contributions to conception and design, acquisition of data, and final approval of the version to be published. **Abdoulaye Hima-Maïga:** drafting the article and revising it critically for important intellectual content; final approval of the version to be published. **Anthony K. Békéti**: drafting the article and revising it critically for important intellectual content; final approval of the version to be published. All authors read and agreed to the final version of this manuscript and equally contributed to its content and management.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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