

Subdural Empyema as the Presenting Feature of a Cerebral Aneurysm in a Pediatric Patient in the Intensive Care Unit of a Teaching Hospital in Maputo, Mozambique: A Case Report

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Case Report

Keywords: Pediatric cerebral aneurysm, subdural empyema, infectious aneurysm, Mozambique

Posted Date: September 25th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10891263/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Cerebral aneurysms are rare in pediatric populations, accounting for less than 5% of all aneurysms. Etiologies are often congenital or infectious. To date, no cases of pediatric cerebral aneurysms have been reported in Mozambique.

Case Presentation:

We report the first documented case of a pediatric cerebral aneurysm in Mozambique. A 13-year-old boy was admitted to the Pediatric Intensive Care Unit (PICU) with a five-day history of sudden severe headache, fever, and right-sided focal seizures. Imaging revealed a right frontal parafalcine subdural empyema, which was surgically drained. Although the patient initially improved, he was readmitted 15 days later with a sudden loss of consciousness and generalized seizures. Encephalic Computed Tomography and angiography revealed intraventricular hemorrhage and ruptured aneurysms of the pericallosal and right middle cerebral arteries. Neurosurgical intervention was not available; The blood culture isolated *Staphylococcus aureus*, and broad-spectrum was considered, as well as supportive care, and the patient survived with neurological sequelae.

Discussion

This case highlights a rare and severe presentation of pediatric cerebral aneurysm associated with subdural empyema of likely infectious etiology. The vascular territories affected were atypical, and diagnosis was delayed due to the condition's rarity and limited resources.

Conclusion

Despite being rare, cerebral aneurysms in children should be considered in cases of neurological deterioration, especially with signs of intracranial infection. Early neuroimaging and timely neurosurgical care are essential for better outcomes in resource-limited settings.

Introduction

Aneurysms are defined as persistent dilations of blood vessels or the heart wall (1). They are typically described according to their morphology, size, location, and etiology, and can be classified as either ruptured or unruptured aneurysms (1).

Intracranial aneurysms are focal dilations of cerebral arteries, most commonly located within the circle of Willis. They are slightly more frequent in girls than boys (2, 3)

Aneurysms can be morphologically categorized as saccular, fusiform, or mycotic (infectious), with saccular aneurysms being the most common. These often occur at arterial bifurcations (3).

Pediatric cerebral aneurysms are rare, accounting for less than 5% of all intracranial aneurysms. Most available data come from case reports, with one of the earliest reports derived from an autopsy series of 3,000 cases (4–6). Congenital malformations, particularly involving the bifurcation of the middle cerebral artery, are the most common etiologies. Other contributing factors include infections, trauma, and idiopathic causes (7). Regarding anatomical distribution, aneurysms in the anterior communicating artery, posterior communicating artery, and the bifurcation of the middle cerebral artery represent approximately 35%, 35%, and 20% of cases, respectively (8). Reported infectious etiologies include fungal agents such as *Aspergillus*, *Candida*, and *Phycomycetes*, as well as bacterial agents like *Streptococcus* spp., *Staphylococcus aureus*, *Pseudomonas*, and *Haemophilus* species (9, 10). To date, no pediatric cerebral aneurysm cases have been reported in Mozambique. Here, we describe the first documented case involving a teenager who presented with subdural empyema and was admitted to the Pediatric Intensive Care Unit at Hospital Central de Maputo, a teaching hospital in Mozambique.

Case description

A 13-year-old male was admitted to the Pediatric Intensive Care Unit (PICU) with a five-day history of sudden-onset severe headache, fever (38.5°C), and focal seizures affecting the right side of the body. On physical examination during the postictal phase, the patient presented with anisocoria and decreased muscle strength (grade 4/5) on the left side.

Cranial computed tomography (CT) revealed a subdural fluid collection in the right frontal parafalcine region. Conservative management was initially adopted. However, due to persistent focal seizures, neurosurgery was performed, and drainage was performed, yielding 50 mL of purulent fluid. Empirical broad-spectrum antibiotic therapy was started. The patient showed good postoperative recovery and was transferred to the general pediatric ward. Blood culture revealed growth of methicillin-resistant *Staphylococcus aureus* (MRSA) and was covered by Vancomycin therapy.

Fifteen days later, the patient was readmitted to the PICU with a sudden drop in Glasgow Coma Scale (GCS) score from 15 to 4 and onset of generalized seizures. A repeat cranial CT scan showed intraventricular and right parietal subdural hemorrhage (Figures A, B). Malaria, HIV, blood dyscrasias, and arteriovenous malformations were ruled out in the context of spontaneous intracranial hemorrhage. Subsequent head CT angiography revealed ruptured aneurysms of the pericallosal artery and the right middle cerebral artery (Figures C and D).

Due to the unavailability of neurosurgical services for aneurysm repair at the facility, only supportive treatment was provided. The patient partially regained consciousness (GCS 12/15) but was left with significant neurological sequelae.

Discussion

This report describes the first documented case of pediatric cerebral aneurysm diagnosed at our institution in Mozambique. The patient, a previously healthy adolescent, presented with subdural empyema and later developed symptoms consistent with aneurysmal rupture, a rare and severe presentation in the pediatric population.

Intracranial aneurysms in children are rare, representing less than 5% of all aneurysms and accounting for approximately 13% of intracerebral hemorrhage cases in this age group (11). Unlike in adults, where aneurysms are typically idiopathic and degenerative, pediatric aneurysms are more often associated with structural anomalies, infections, trauma, or connective tissue disorders (7, 12). In our case, the initial diagnosis of subdural empyema and subsequent identification of ruptured aneurysms suggest an infectious etiology that was confirmed by blood culture, which isolated *S. aureus*. Infectious intracranial aneurysms in children have been linked to other pathogens such as *Streptococcus*, *Pseudomonas*, and *Haemophilus* species, fungi, among others (9, 10). In contrast, our patient had aneurysms in the pericallosal and right middle cerebral arteries, the latter being the third most frequently affected site in children (7, 13). The saccular morphology observed on CT angiography is less frequent in pediatric populations but aligns with findings in cases of infectious or congenital origin (13). According to the previous publications, infectious aneurysms have a significantly increased risk of rupture and bleeding, with high mortality rates, as was the case in the patient we presented, although it did not result in death (14).

Clinically, pediatric patients with intracranial aneurysms often present with sudden-onset severe headache, seizures, focal neurological deficits, or loss of consciousness — features all observed in our patient (15). The evolution from focal seizures to coma with generalized seizures further reflects the severity of rupture and hemorrhage.

Pediatric pseudoaneurysms, typically secondary to trauma or infection, are more common than true aneurysms in this age group. Hemorrhagic stroke in children also varies with age: coagulopathies predominate in neonates and infants, while vascular malformations, including aneurysms, are more common in older children and adolescents (12, 16). The recommended management of the infectious is the combination of antibiotic and endovascular therapy, which showed optimal outcomes (17).

Unfortunately, in many low-resource settings such as ours, neurosurgical capacity for aneurysm clipping or endovascular intervention is unavailable. As a result, management is limited to supportive care, and neurological sequelae are common.

This case reinforces the importance of considering cerebral aneurysms in the differential diagnosis of children with signs of intracranial infection and neurological deterioration. Timely neuroimaging, including CT angiography, is essential for early diagnosis, and investments in specialized care are urgently needed in low-resource contexts.

Conclusion

Cerebral aneurysms in children, although rare, should be included in the differential diagnosis when sudden neurological deterioration occurs, particularly in the context of intracranial infections. This case illustrates the potential for severe and delayed complications in resource-limited settings. Early neuroimaging and timely neurosurgical intervention remain critical to improving outcomes and reducing the risk of permanent neurological sequelae.

Abbreviations

PICU: pediatric intensive care unit; *S. aureus*: *Staphylococcus aureus*; CT: computed tomography; GCS: Glasgow Coma Scale; HIV: Human Immunodeficiency virus

Declarations

Ethics approval and consent to participate

As a case report, no ethical approval was needed.

Consent for publication

The caregiver (legal guardian) signed the informed consent for publication.

Availability of data and material

NA

Competing interests

The authors have no conflicts of interest to declare.

Funding

Authors' contributions –: J.S.F., AGM, A.C.M., NS, E.G. and VIMC **designed the report - principal investigator supervised the conduction** - J.S.F., and A.C.M. – **wrote the manuscript first draft.** J.S.F., – **Case description.** J.S.F., A.G.M, A.C.M, E.G., Y.Q.T., U.N.K, C.N, M.T.S and V.I.M.C. – **Writing review and editing.** V.I.M.C. – **All authors reviewed and approved the final manuscript.**

Acknowledgements

The authors thank the caregivers who consented to the publication of this case report and the Neurosurgical and imaging teams for supporting the diagnosis and follow-up.

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Figures

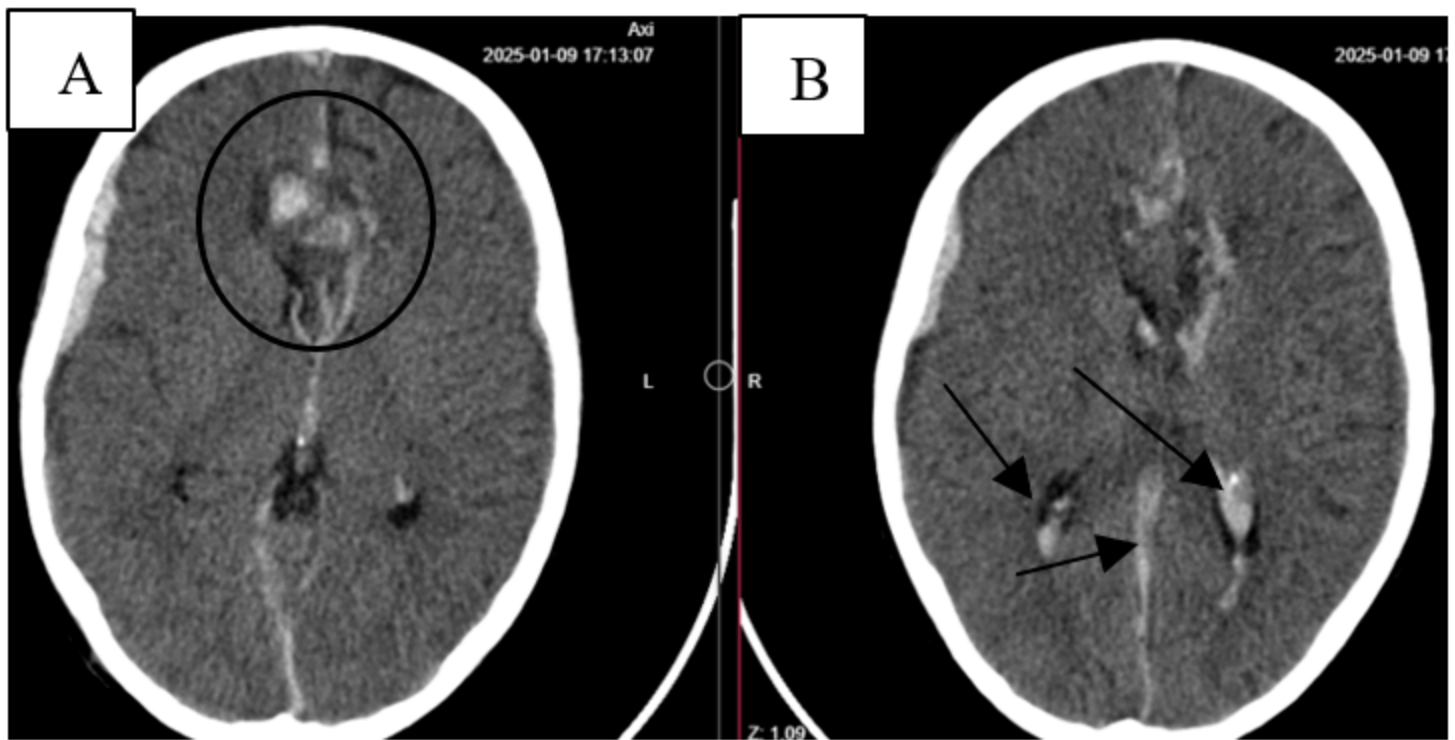


Figure 1: Head CT showing intraventricular and interhemispheric bleeding and subdural collection

Figure 1

See image above for figure legend

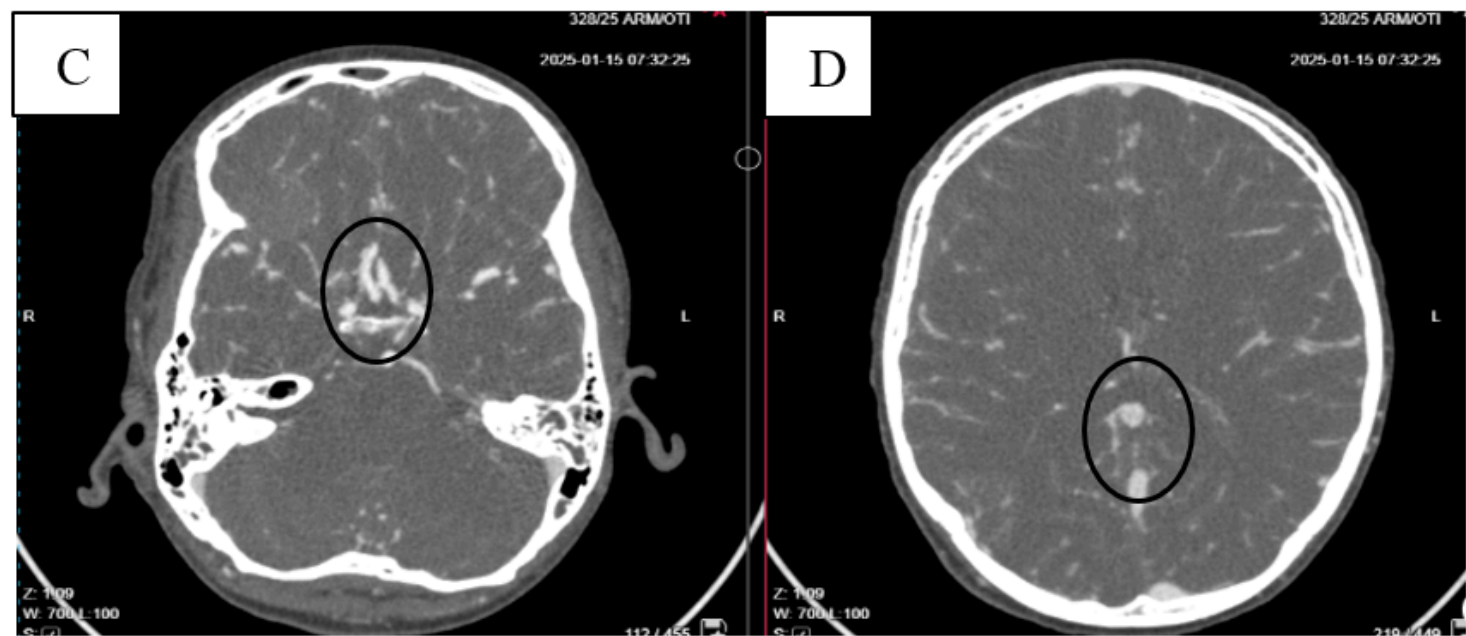


Figure 2: Cerebral angio CT showing

Figure 2

See image above for figure legend