CASE REPORT

Cerebral Hydatid Cyst Management in a Sub-Saharan Setting: A Zambian Case Series

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ABSTRACT

Background: Human echinococcosis, a zoonotic disease caused by *Echinococcus* spp., is a neglected tropical disease with significant morbidity. Cerebral hydatid cysts, accounting for 3–4% of all intracranial space-occupying lesions, are predominantly seen in children and young adults, often affecting the parietal lobe. While hydatid disease is endemic in various regions, documented cases of cerebral hydatid cysts in Zambia are scarce. This case series represents one of the first detailed reports on cerebral hydatid disease in Zambia, contributing to the limited literature on this condition in sub-Saharan Africa.

Methods: This case series presents five patients diagnosed and managed for cerebral hydatid cysts at the University Teaching Hospital (UTH) and Levy Mwanawasa University Teaching Hospital (LMUTH) in Lusaka, Zambia. Clinical presentations, radiological findings, surgical interventions, and outcomes were analyzed to highlight diagnostic challenges and management strategies in a low-resource setting.

Results: The five cases included male patients aged 29 to 67 years, presenting with neurological deficits, seizures, and headaches. Brain imaging played a crucial role in diagnosis, revealing well-defined, non-enhancing cystic lesions, predominantly bi-lobed, with varying mass effects. Three patients underwent craniotomy for cyst excision, while one received only a ventriculoperitoneal shunt due to hydrocephalus. Histopathological analysis confirmed hydatid disease in all surgical cases. Surgical removal was successful in all operated patients, with no postoperative complications. One patient absconded before surgical intervention.

Conclusion: Although rare, cerebral hydatid cysts are an important neurosurgical pathology in Zambia, requiring heightened clinical suspicion, particularly in endemic regions. Imaging remains essential for accurate diagnosis, while surgical management presents unique challenges in resource-limited settings. This case series highlights the need for early detection, appropriate neurosurgical

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intervention, and improved awareness among both neurosurgeons and public health specialists to enhance patient outcomes.

INTRODUCTION

Human echinococcosis, a zoonotic disease caused by *Echinococcus* spp., is one of the 17 neglected tropical diseases[1]. Cerebral hydatid cysts, though rare, account for 3–4% of intracranial space-occupying lesions and predominantly affect children and young adults, with a male-to-female ratio of 1.5:1 [2,3]. These cysts are typically located in the perfusion region of the middle cerebral artery, most often in the parietal lobe[4]. A few studies have reported cerebral hydatid cysts in Africa, highlighting that children and younger adults are at high risk of infection[5, 6]. While hydatid cysts may affect other organs, cerebral lesions usually present with increased intracranial pressure and focal neurological deficits[6]. The expense associated with neuroimaging is a significant challenge in low-resource settings leading to delay in diagnois and treatment. Management involves careful surgical excision to prevent cyst rupture, followed by antiparasitic adjuvant therapy[5–7]. Additionally, prevention and public health involvement play a crucial role in disease control[8]. While hydatid disease is endemic in parts of North Africa, South America, the Mediterranean, the Middle East, and Central Asia[9], there is limited data on cerebral hydatid cysts in sub-Saharan Africa, particularly in Zambia. Here, we present a case series detailing the management of cerebral hydatid cysts in a low-resource setting, contributing to the scarce literature on this condition in the region.

MATERIALS AND METHOD

The five patients included in this case series were managed at the University Teaching Hospital (UTH) and Levy Mwanawasa University Teaching Hospital (LMUTH) in Lusaka, Zambia. **Table 1** presents the clinical profiles of these patients.

Table 1. Clinical profiles of five patients diagnosed with cerebral hydatid cysts

Age	GCS	Clinical Features	Cyst Findings	Location	Surgery	Surgical Procedure	Outcome
M/36	15	Severe HA, Rt hemiparesis, aphasia	Bi-lobed	Lt fronto-parietal	Yes	Cyst excision	Excellent
M/56	9	LOC, anisocoria, Rt facial palsy, Lt hemiparesis	Multiple	Bilateral	Yes	1) VPS 2) Cyst excision	Excellent
M/29	9	LOC, aphasia, convulsions, Rt hemiplegia	Bi-lobed	Lt frontal	Yes	Cyst excision biopsy	Excellent
M/67	15	Severe HA, convulsions	Bi-lobed	Lt frontal	No (LAMA)	N/A	N/A
M/43	15	Convulsions, severe HA	Single	Lt parietal	Yes	VPS	Good

Abbreviation: HA: Headache, Rt: Right, Lt: Left, LOC: Loss of consciousness, VPS: ventriculoperitoneal shunt, LAMA: Leave against medical advice, N/A not applicable, M:Male, GCS: Glassgow coma scale

Case presentations

Case 1

A 36-year-old male, employed as a farm worker with known exposure to livestock, was referred to the Neurosurgery Unit at UTH due to complaints of severe headache, right-sided body weakness, and difficulty speaking for the past two months. The patient had no significant family history of parasitic infections and no prior travel history. On examination, he was in good general health, with no signs of lymphadenopathy. His GCS was 15/15, but he exhibited expressive dysphasia and right-sided hemiparesis with muscle power of 3/5 in the lower limb, requiring support to walk. Laboratory investigations, including a full blood count (FBC) and CD4 count of 350, were within normal limits. Chest X-ray and abdominal ultrasound revealed no additional lesions. A CT scan (**Figure 1**) showed a bi-lobed, non-enhancing cerebral cyst in the left temporal lobe, accompanied by significant mass effect and midline shift, but without surrounding edema.

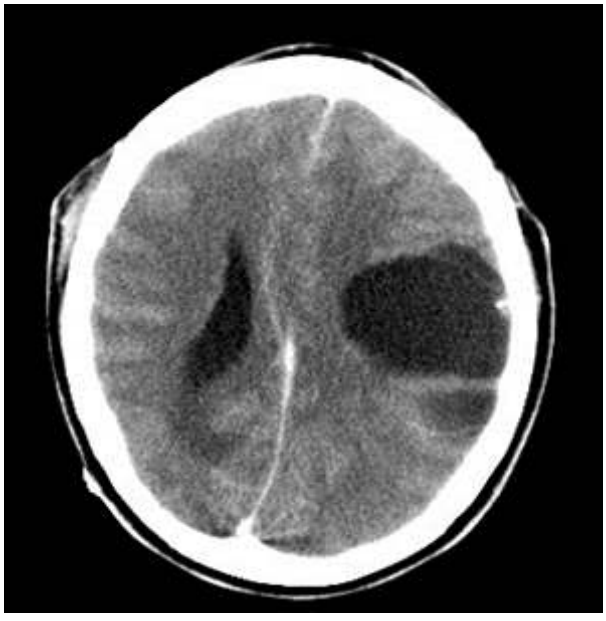

Figure 1: Brain Computed Tomograph (CT) scan showing a large bi-lobed cyst in the left frontal parietal region without surrounding cerebral edema. There is raised intracranial pressure as evidenced by the significant midline shift.

Surgical Intervention: Considering the size of the cyst, raised ICP and focal neurological deficits, a craniotomy was performed, and a multiloculated cyst with a thin wall and nodular components was extracted. The cyst ruptured upon extraction, necessitating copious irrigation with saline to minimize seeding and prevent anaphylaxis (**Figure 2**).

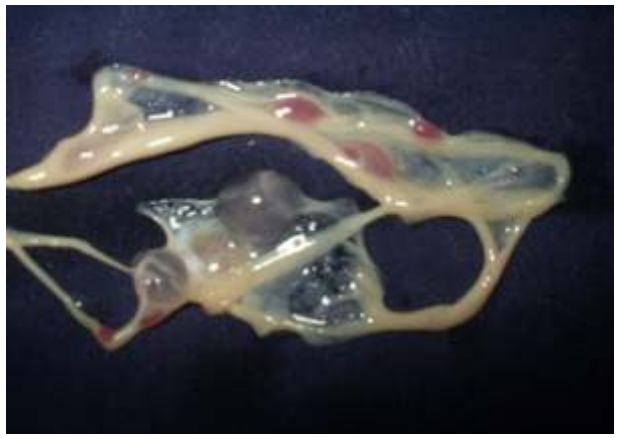

Figure 2: Ruptured Cerebral cyst capsule with multiple nodules following extraction during operation.

Postoperative Course: Histopathological analysis confirmed a cerebral hydatid cyst. A postoperative CT scan (**Figure 3**) showed complete cyst removal. The patient was started on praziquantel and albendazole and made a full recovery. Follow-up was uneventful, and the patient remained stable.

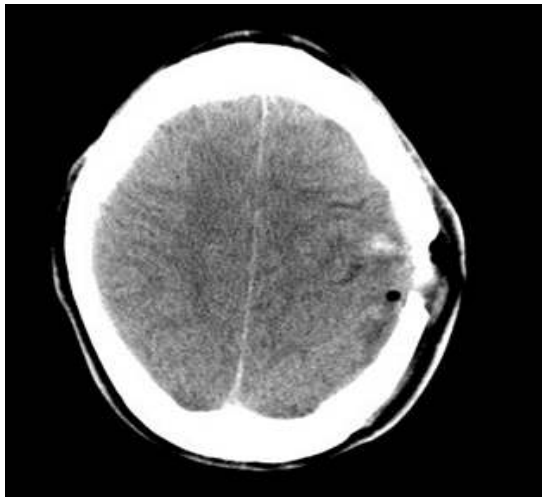

Figure 3: Postoperative Brain CT following complete removal of cyst.

Case 2

A 56-year-old male, with no significant family history of parasitic infections and a past medical history of chronic headaches and generalized seizures over the past few months, presented in an unconscious state with right facial palsy, a dilated right pupil, and left hemiparesis. His GCS on admission was 9/15. Routine blood tests were normal, and his HIV test was negative. Suspecting a space-occupying lesion (SOL), a CT scan (**Figure 4**) revealed hydrocephalus and multiple cystic lesions in both cerebral hemispheres. A provisional diagnosis of hydatid disease with hydrocephalus was made.

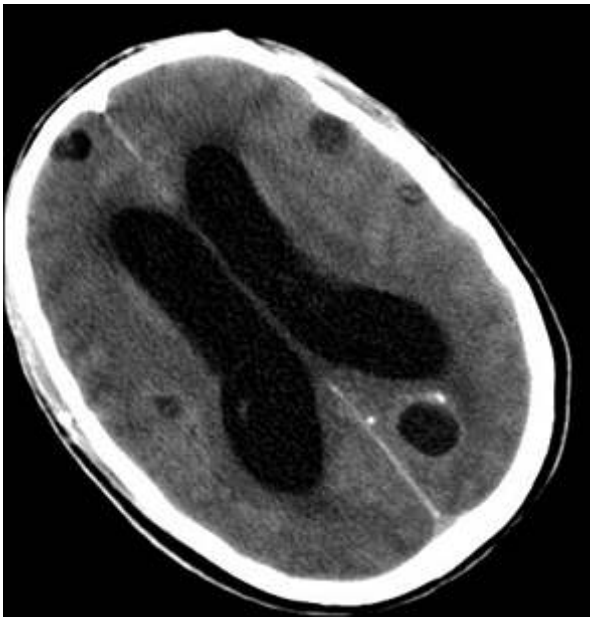

Figure 4: Brain CT scan showing abnormally dilated lateral ventricles (Hydrocephalus) with multiple bilateral cystic lesions

Surgical Intervention: In view of the severe hydrocephalus, the patient urgently underwent the insertion of a Ventricular Peritoneal Shunt (VPS). Postoperatively, the patient regained consciousness, and muscle strength gradually improved on the left side. Praziquantel and albendazole were started. Preoperative chest X-ray and abdominal ultrasound were negative for secondary cysts. Two weeks after the VPS surgery, a craniectomy was performed, and a cyst with a nodule was completely extracted (**Figure 5**). Histopathological analysis confirmed cerebral hydatid cyst. Albendazole and praziquantel were continued.

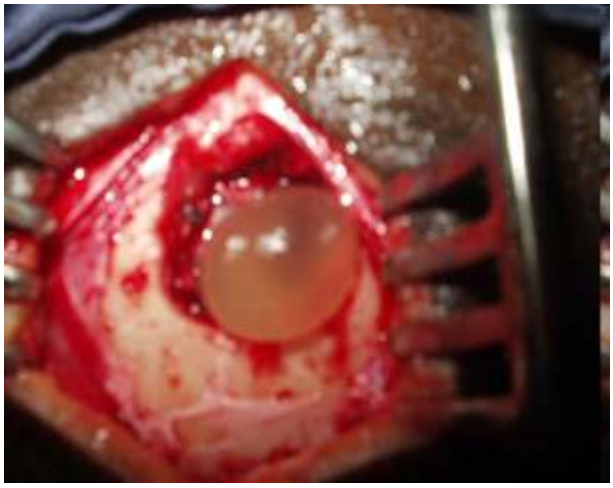

Figure 5: Intraoperative image showing the cyst intact during extraction.

Postoperative course: Despite follow-up, the patient declined further surgery to remove the other cysts, as he felt fully recovered after removal of the symptomatic cyst. No additional scans were taken as the patient was lost to follow-up.

Case 3

A 29-year-old male, with no prior history of parasitic infections, presented with a history of convulsions, aphasia, and right hemiplegia. Upon arrival at UTH, his GCS was 9/15. Laboratory investigations were normal. An MRI (**Figure 6**) revealed a bi-lobed cystic lesion in the left fronto-parietal lobe with significant midline shift, without surrounding edema. This was suggestive of a cerebral hydatid cyst.

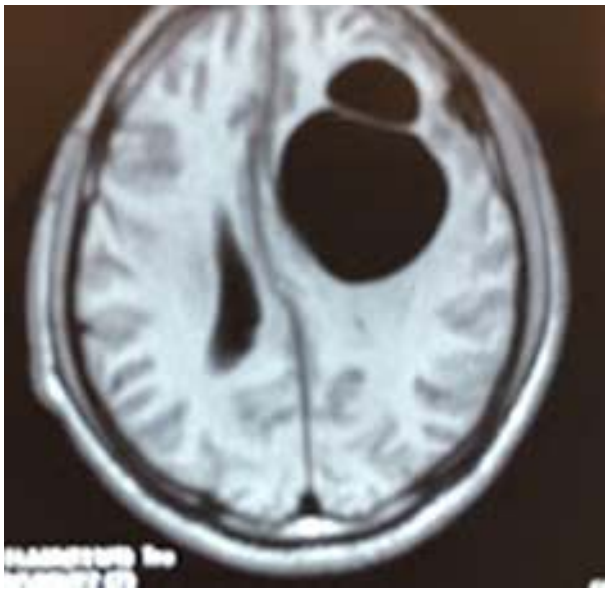

Figure 6: Magnetic resonance Image (MRI) showing a bi-lobed cystic lesion in the left frontal region with significant midline shift.

Surgical Intervention: Emergency craniotomy was performed to resect the cyst and alleviate increased intracranial pressure. The cyst was removed successfully. The cyst raptured upon extraction (**figure 7**) and saline wash was performed to avoid seeding and anaphylactic reaction. The patient regained consciousness postoperatively with no neurological deficits.

Figure 7: Specimen of the ruptured cystic lesion obtained intraoperatively.

Postoperative course: The patient was discharged on postoperative day three and prescribed an eight-week course of albendazole 400mg twice a day. No complications were reported, and he had a favorable recovery.

Case 4

A 67-year-old male presented with a history of severe headaches and seizures. His FBC was normal, and both chest X-ray and abdominal ultrasound were unremarkable. A CT scan (**Figure 8**) revealed a bi-lobed left frontal cystic lesion, typical of a cerebral hydatid cyst. The patient absconded prior to surgery. Efforts to locate the patient were unsuccefful.

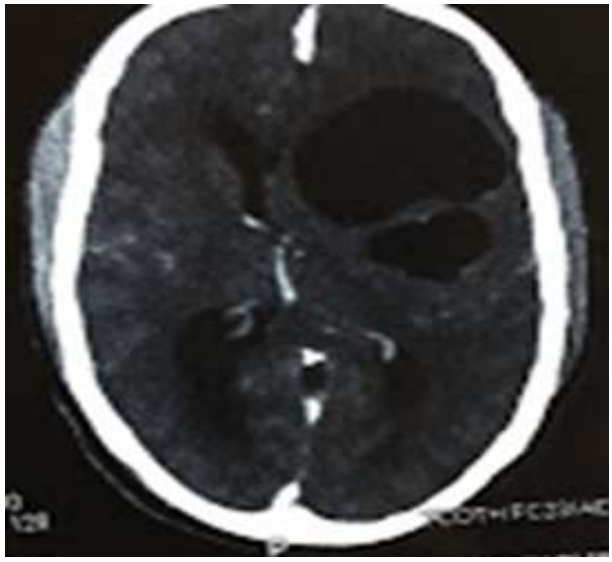

Figure 8: Brain CT showing a left frontal bi-lobed cystic lesion with significant midline shift.

Case 5

A 43-year-old male with a one-year history of convulsions and severe headache presented for evaluation. He had previously undergone VPS placement due to hydrocephalus. Imaging (Figure 9) showed a cystic lesion in the left parietal lobe, which was suspected to have been inadvertently drained during the VPS procedure.

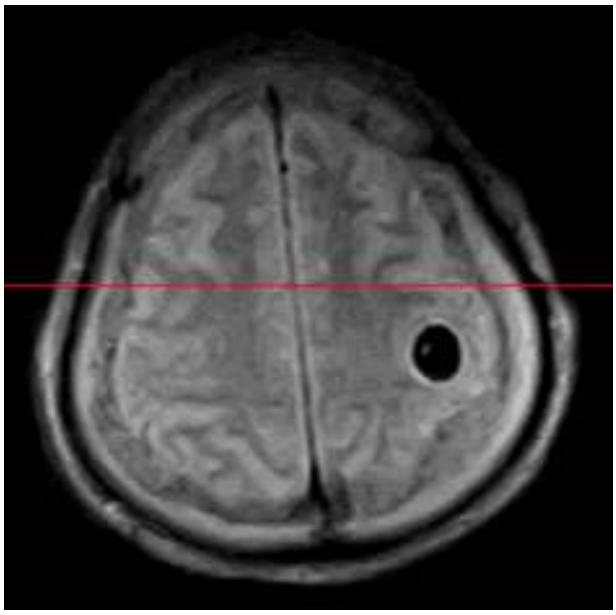

Figure 9: Brain MRI showing a cystic lesion in left parietal lobe without significant mass-effect of surrounding edema.

Management: The patient was admitted and started on albendazole for four months, with chest X-ray and abdominal ultrasound showing no additional lesions. He was discharged, and during his one-year follow-up, repeat CT and MRI scans showed no recurrence of the cystic lesion.

DISCUSSION

Cerebral hydatid cysts account for 1–3% of intracranial cystic lesions and are often undiagnosed preoperatively due to their rarity and non-specific presentation[10]. In our series, histopathological confirmation was obtained postoperatively in three patients. The Dowling-Orlando surgical technique yielded favorable outcomes, although intraoperative rupture occurred in one case, highlighting the challenges of surgical management in low-resource settings.

Diagnostic Challenges and Imaging Accessibility

Cerebral hydatid cysts manifest with non-specific neurological symptoms, including papilledema, headaches, seizures, and focal deficits, mimicking other intracranial cystic lesions[11]. Neuroimaging (CT/MRI) remains the cornerstone of diagnosis, typically revealing well-defined, non-enhancing cystic lesions[8]. However, in sub-Saharan Africa, access to advanced imaging is limited, leading to delayed diagnoses and higher surgical risk[12, 13]. Our findings reinforce the need for increased clinical suspicion and timely referral to neurosurgical centers, particularly in endemic regions.

Surgical Decision-Making and Intraoperative Challenges

The Dowling-Orlando technique remains the gold standard for en bloc removal, minimizing rupture and reducing recurrence risk[6]. However, unlike reports from high-resource settings, we encountered intraoperative rupture despite careful dissection. This differs from studies in Egypt and Turkey, where pediatric cases dominate, and controlled en bloc excisions are more commonly successful[14,15]. Our findings suggest that delayed diagnoses in adults may result in larger cysts with increased adhesion, complicating surgery. This underscores the need for enhanced surgical training and intraoperative tools in low-resource environments. The low exposure to cases in the non-endemic areas may also affect the risk of intraoperative cyst rupture.

Postoperative Outcomes and Long-Term Considerations

Medical management with albendazole and praziquantel is widely recommended as an adjunctive therapy to reduce recurrence risk, particularly after intraoperative rupture[5, 10]. In our series, patients who underwent total excision followed by antiparasitic therapy had excellent recovery, reinforcing the necessity of postoperative medical treatment in resource-limited settings. Long-term follow-up is crucial, as recurrence rates remain high in endemic regions where re-exposure is common.

Epidemiological and Preventive Aspects

Although hydatid disease is endemic in Africa, documented cases of cerebral hydatid cysts remain

scarce[16]. Our study highlights the possibility that many cases go undiagnosed or unreported, particularly in rural and underserved regions. While previous reports suggest pediatric predominance, our series consisted exclusively of adult patients, raising the question of whether undiagnosed childhood infections may only manifest symptomatically later in life.

From a public health perspective, prevention remains the most effective strategy. Transmission occurs through ingestion of Echinococcus eggs, making improved sanitation, veterinary control, and community education critical[17]. Studies in North Africa and the Middle East emphasize the role of livestock deworming, improved meat inspection, and awareness campaigns in reducing disease burden[8, 16]. Expanding such initiatives to sub-Saharan Africa could significantly lower the incidence of cerebral hydatid disease.

Study Limitations

This study has several limitations. First, the small sample size limits generalizability, and the retrospective design prevents definitive conclusions about disease prevalence. Second, only surgical cases were included, potentially underestimating the true burden of cerebral hydatid cysts, as medically managed or undiagnosed cases were not accounted for. Finally, due to limited follow-up data, long-term outcomes, recurrence rates, and the effectiveness of antiparasitic therapy in this cohort remain uncertain.

CONCLUSION

Our case series highlights the presence of cerebral hydatid cysts in Zambia, adding to the limited literature from sub-Saharan Africa. Early diagnosis through imaging, timely surgical intervention, and adjunctive antiparasitic therapy are critical for optimal outcomes. Given the challenges of diagnosis and treatment in resource-limited settings, this study emphasizes the need for heightened clinical suspicion, improved surgical training, and stronger public health interventions to reduce disease burden.

PATIENT PERSPECTIVES

Patients and caregivers faced significant delays in diagnosis, often attributing symptoms such as headaches, seizures, and neurological deficits to other common conditions. In some cases, initial misdiagnoses led to delayed referrals, increasing surgical complexity. Caregivers expressed anxiety over the surgical risks, particularly given the limited neurosurgical infrastructure in the region. Postoperatively, most patients reported substantial improvement in neurological symptoms and functional recovery, with relief from headaches and improved motor function. However, concerns regarding long-term recurrence, access to follow-up imaging, and the affordability of antiparasitic therapy remain prevalent. This highlights the need for early public awareness campaigns and improved access to neurosurgical care and post-treatment follow-up in endemic regions.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

All authors read and approved the final manuscript.

Informed consent

Informed consent was obtained from the caregiver and is available for review if requested.

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