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Case report

The wandering hydatid cyst with arterial embolization: Diagnostic pitfalls and management strategies in resource-limited healthcare – A case report

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ABSTRACT

Hydatid disease, or cystic echinococcosis, is a zoonotic infection caused mainly by *Echinococcus granulosus*, transmitted through ingestion of parasite eggs from contaminated sources or contact with infected canines. Humans become accidental hosts, typically developing cysts in the liver and lungs, with rare dissemination to other organs. We report a case of a 65-year-old female with disseminated hydatid disease involving the left kidney, head of the pancreas, pelvic sidewall, right gluteal region, and left proximal medial thigh. The disease had spread extensively, affecting a large segment of the descending thoracic aorta and causing embolization into the mesenteric, iliac, and lower limb arteries. This case highlights the diagnostic challenges we faced, radiologic features, and management considerations in an advanced presentation of disseminated hydatidosis, particularly in a resource-limited setting where infectious disease specialists and vascular surgeons are not readily available.

Introduction

Human echinococcosis is a zoonotic infection, meaning it is transmitted to humans from animals, and is caused by parasitic tapeworms belonging to the genus *Echinococcus*. This disease manifests in distinct forms: cystic echinococcosis (CE), also referred to as hydatid disease or hydatidosis, which results from infection with the *Echinococcus granulosus* species complex; alveolar echinococcosis (AE), caused by *Echinococcus multilocularis*. Cystic and alveolar echinococcosis are the most clinically significant forms, posing major medical and public health concerns [1,2].

According to the World Health Organization 2021 report, over a million people may be affected by hydatid cysts worldwide at any given time. If treatment is not received, many of these individuals will have severe clinical symptoms that might be fatal. Every continent, with the exception of Antarctica, has cystic echinococcosis. In endemic areas, human incidence rates of cystic echinococcosis can exceed 50 cases per 100,000 person-years, and in some areas of China, Argentina, Peru, East Africa, and Central Asia, prevalence levels can approach 5–10 % [1].

The 2015 WHO Foodborne Disease Burden Epidemiology Reference Group (FERG) estimated that echinococcosis accounts for approximately 19,300 deaths and 871,000 disability-adjusted life years (DALYs) globally each year. The annual economic burden of cystic echinococcosis is estimated to be USD 3 billion, encompassing both healthcare expenditures for treatment and losses incurred by the livestock industry [3].

Hydatid cysts can develop in nearly any part of the body, either through primary inoculation or secondary dissemination. In *Echinococcus granulosus* infections, single organ involvement is observed in 85–90 % of cases, with a solitary cyst present in more than 70 % of patients. The liver is the most commonly affected organ, accounting for approximately two-thirds of cases, followed by the lungs, which are involved in roughly 25 % of patients [4]. Other less commonly affected sites, as documented in the literature, include the heart [5], pericardium [6], aorta [7], thyroid and salivary glands [8], adrenal gland [9], spleen [10], pancreas [11], kidneys [12], ureter, bones [13], brain [14], spinal cord [15], breast, ovaries [16], uterus [17], testis [18], muscles(such as the thigh and psoas) [19,20], orbit [21], and mesentery [22].

To the best of our knowledge, this case is unique in terms of the

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extent of organ dissemination. Vascular involvement includes the descending thoracic aorta, superior mesenteric artery, internal iliac artery, femoral and profunda femoris arteries, as well as the posterior branch of the right portal vein. Additionally, the spleen, head of the pancreas, left kidney, right gluteal region, and bilateral pelvic sidewall were also affected.

Case presentation

A 65-year-old female farmer from rural Ethiopia with a history of hypertension (on Amlodipine 5 mg daily for six years) and chronic hepatitis B with an undetectable viral load for the past year presented with acute abdominal complaints. She had experienced vague, intermittently cramping abdominal pain for approximately three months, without specific localization. During this period, she denied fever, jaundice, weight loss, anorexia, or vomiting.

On the day of presentation, she developed a sudden and severe worsening of her abdominal pain. This was accompanied by a brief syncopal episode and profuse diaphoresis, prompting urgent medical evaluation. She was admitted on November 02, 2024. Her initial vital signs were: blood pressure 160/100 mmHg, pulse 78 beats/min, respiratory rate 14 breaths/min, and temperature 36.4°C. Physical examination revealed marked lower abdominal tenderness but no peritoneal signs (rebound tenderness, guarding, or rigidity). The remainder of her systemic examination was unremarkable.

Laboratory workup was ordered and these are complete blood count, liver function tests, renal function tests, random blood glucose levels, urinalysis, and serological tests. Serology confirmed HBsAg positivity, which is compatible with her known chronic hepatitis B status. Hematological findings showed leukocytosis with a WBC count of 13,000/μL, left shift of 85.9 %, and ***eosinophilia of 11.37 %.*** All other investigations, including LFTs, RFTs, random blood glucose, and urinalysis, were within normal reference ranges for our laboratory.

Thus, after further diagnostic evaluation using radiological imaging specifically contrast-enhanced abdominopelvic CT scan (as shown in Figs. 1, 2 and 3) and abdominal sonography (as seen in Fig. 4) the final diagnosis was established as disseminated hydatid disease. The disease involved multiple structures, including the thoracic aorta, where it eroded the aortic wall and caused partial occlusion. Additionally, hydatid cyst embolization was identified, affecting the superior mesenteric artery (SMA) and extending into the iliac and femoral arteries. Other affected organs are the pancreas, spleen, kidneys, and musculoskeletal structures. Secondary thrombosis of the SMA was also noted; however, no infarction was observed.

Imaging findings

The following CT and ultrasound images show the extent of dissemination and vascular involvement :

Treatment and follow-up

Management of disseminated hydatid disease with vascular involvement is highly complex and requires a multimodal approach, incorporating medical, surgical, and interventional strategies. Albendazole 400 mg PO daily was initiated as the primary antiparasitic treatment. Rivaroxaban 10 mg PO daily was prescribed for secondary superior mesenteric artery (SMA) thrombosis, carefully balancing the risk of further embolization against potential hemorrhagic complications, particularly given the erosion of the aortic wall. Pantoprazole 40 mg PO daily was added for gastroprotection to mitigate potential gastrointestinal side effects from albendazole and rivaroxaban. Surgical and interventional options were considered but deferred due to the patient's hemodynamic stability, the absence of irreversible ischemia or organ infarction, and the unavailability of a vascular surgeon for

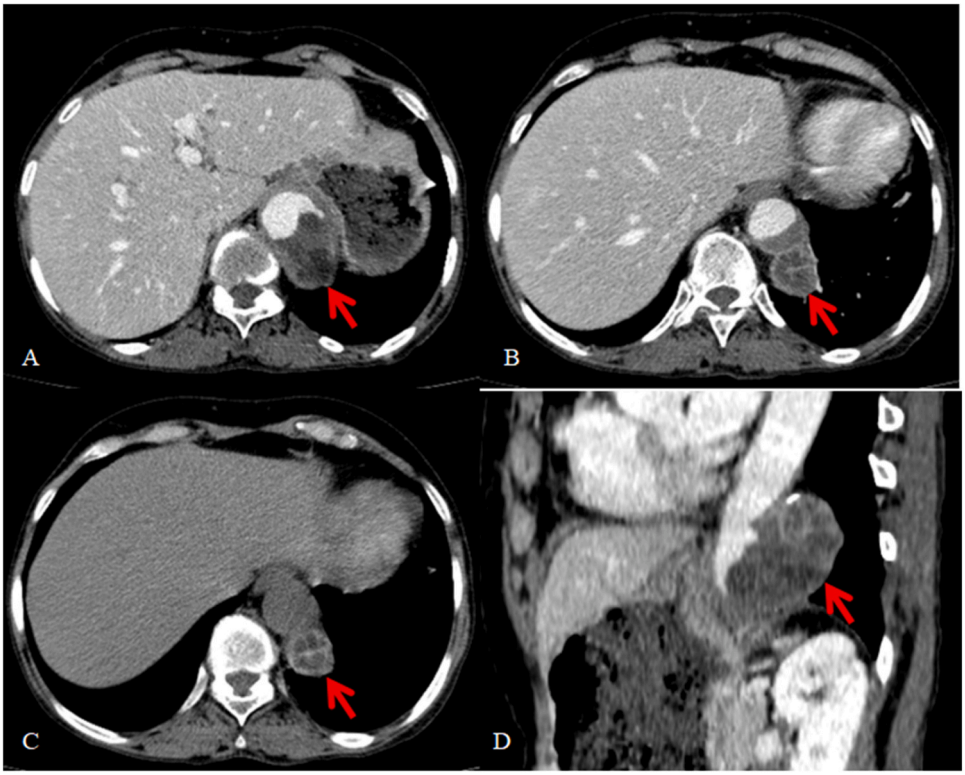


Fig. 1. Lower chest and abdominal CT images: (A & B) Contrast-enhanced axial images, (C) Pre-contrast axial image, and (D) Contrast-enhanced sagittal image of a patient with a hydatid cyst in the descending thoracic aorta. The images show a multilocular cystic lesion located in the lower posterior mediastinum, involving the left wall of the descending thoracic aorta (red arrows). The cyst measures 3.8 cm (transverse), 4.1 cm (anteroposterior), and 6.4 cm (craniocaudal). The lesion erodes the aortic wall and partially occludes the lumen, with areas of wall calcification.

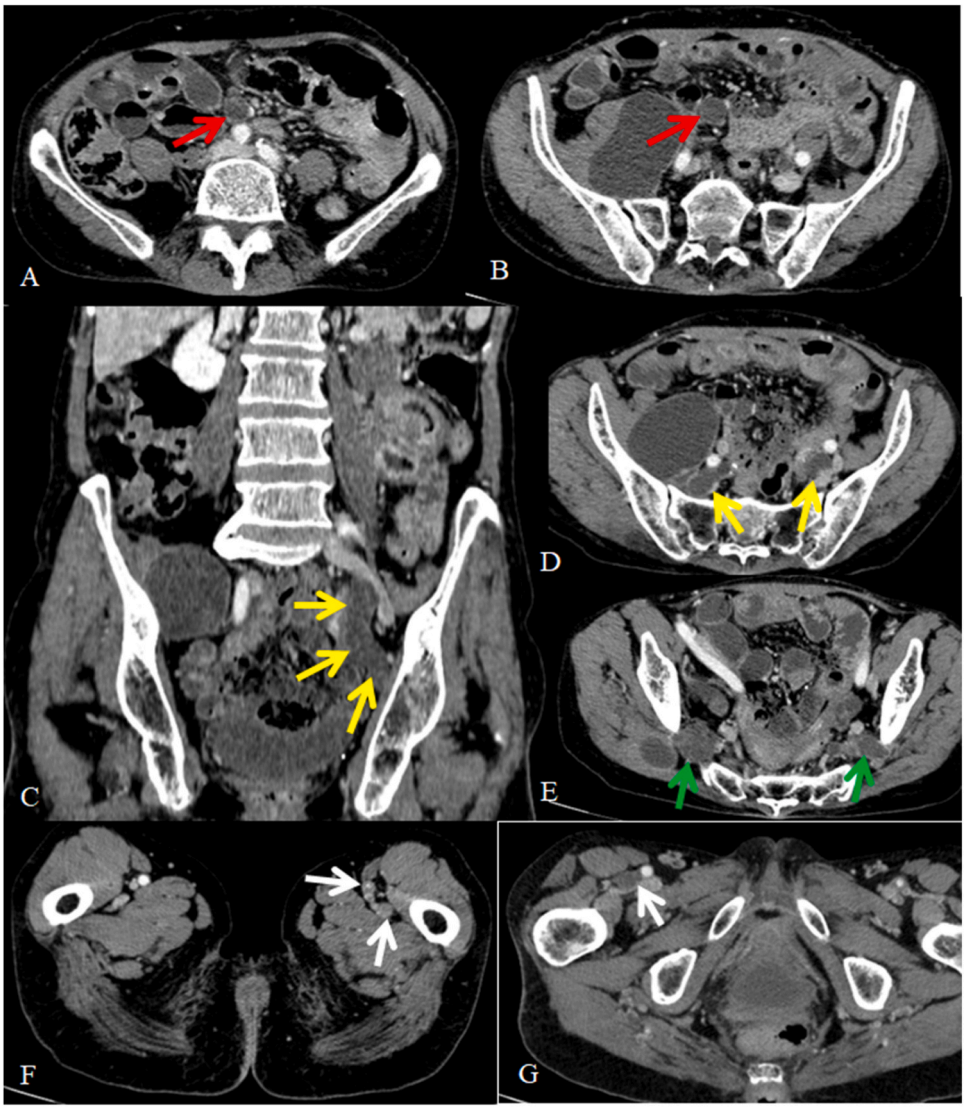


Fig. 2. Abdominal, pelvic, and proximal thigh contrast-enhanced CT images: Axial (A, B, D, E, F, and G) and coronal (C) images of a patient with embolic hydatid cysts in the mesenteric, iliac, and lower limb arteries. The scans reveal a long segment occlusive filling defect in the superior mesenteric artery, containing intraluminal multilocular cystic lesions (red arrows). Similar multilocular cystic occlusive filling defects are noted in the bilateral internal iliac arteries (yellow arrows), sciatic foramen region (green arrows), left femoral and profunda femoris arteries, and the intramuscular branch of the right femoral artery (white arrows).

consultation. After three months of telemedicine-based follow-up, she reported symptomatic relief and no recurrence of symptoms. However, due to financial constraints, she was unable to undergo post-treatment imaging to assess radiologic improvement.

Discussion

This case represents a rare and complex presentation of disseminated hydatid disease with extensive vascular involvement, a serious but uncommon complication. Hydatid disease, caused by *Echinococcus granulosus*, typically affects the liver and lungs; vascular dissemination, particularly involving the aorta, is extremely rare, and embolization is even rarer [4]. A recent systematic review of arterial echinococcosis identified only 32 confirmed cases reported worldwide [32].

A presentation of thoracic aortic wall erosion and arterial embolization, as in this patient, is an extremely serious and atypical presentation of the disease. The vascular complications of hydatid disease are infrequent but carry the risks of arterial occlusion, ischemia, aneurysm formation, and rupture; thus, early diagnosis and timely intervention are necessary [23,24].

Hydatid cysts grow very slowly, forming multiloculated cystic lesions in the affected organs. It results in rupture into the bloodstream with vascular invasion and hydatid embolization that can pursue the course of distal arteries, leading to ischemia with possible infarction. Such embolic cysts may well obstruct vital arteries, thus closely mimicking thromboembolic disease and thus causing significant morbidity [25,26]. The aorta is infrequently involved due to its being a high-pressure vessel, and when it does get affected, it can easily lead to the formation of pseudoaneurysms, rupture, and resultant catastrophic hemorrhage [7,27]. Though SMA occlusion was seen in this case, jejunal thickening without necrosis was observed, indicating ischemic insult but not irreversible injury to the tissues. This is particularly an ominous feature in disseminated hydatid disease, as was the case with this patient-the erosion of the aortic wall.

The hydatid cyst involvement of major arteries requires vascular surgeons, infectious disease specialists, and radiologists to have discussions on the best management strategy for the condition. The management of disseminated hydatid disease involving the vascular system is very challenging and often requires a combination of medical and surgical interventions. Albendazole is the first-line antiparasitic agent to

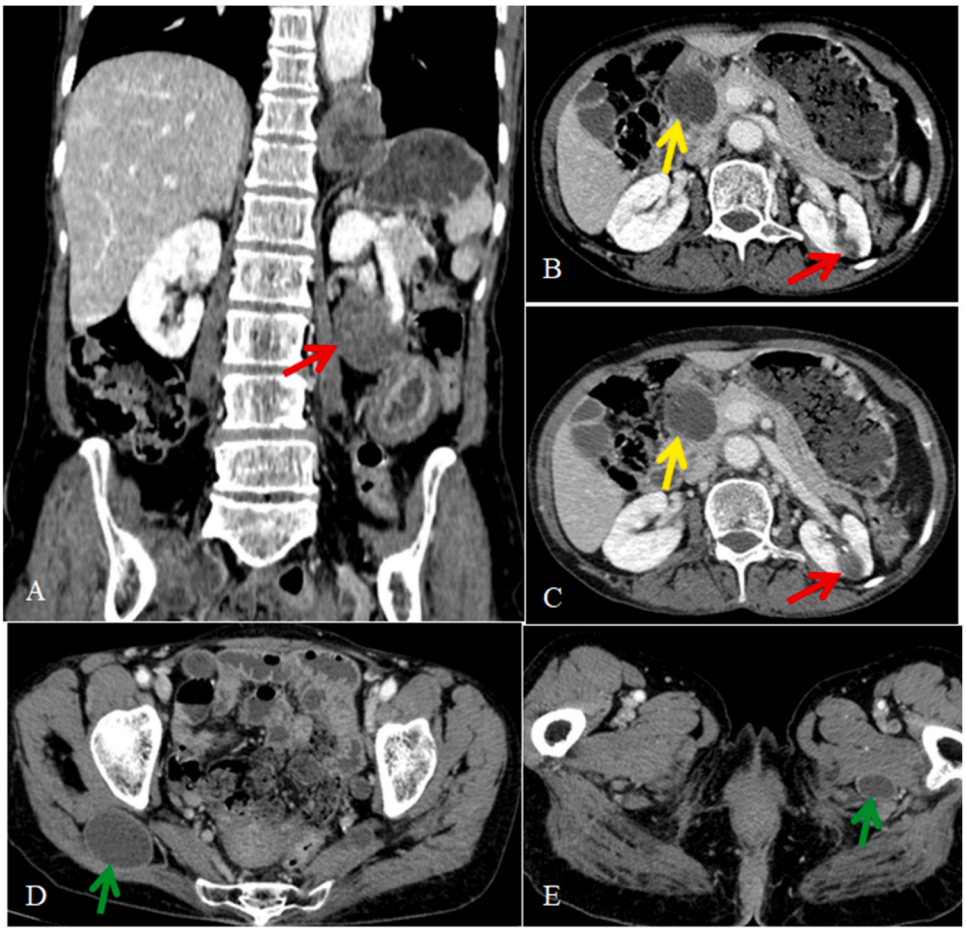


Fig. 3. Abdominal, pelvic, and proximal thigh contrast-enhanced CT images: Coronal (A) and axial (B, C, D, and E) images of a patient with disseminated hydatid disease (hydatidosis). The scans demonstrate multifocal multilocular cystic lesions in the left kidney (red arrows), pancreatic head (yellow arrows), right gluteal region, and left proximal medial thigh intermuscular planes (green arrows). The cysts show no enhancing components.

be used in the inhibition of cyst growth and reduction of recurrence risk [28,29].

Our case thus brings into light the importance of early recognition and appropriate medical intervention in disseminated hydatid diseases, especially vascular involvement in resource limited set up. Given the high morbidity associated with hydatid embolization and arterial occlusion, clinicians in endemic regions should maintain a high index of suspicion, especially in patients presenting with vascular occlusion syndromes without traditional thromboembolic risk factors. Advanced imaging modalities such as CT angiography and MRI are very important in early detection, risk stratification, and surgical planning [30]. It continues to be an infectious, vascular, and surgical challenge that requires close collaboration from many disciplines.

Diagnostic challenges

Clinical presentation

The clinical presentation of disseminated hydatid disease is often nonspecific, contributing to delayed diagnosis. In this case, the patient experienced mild, intermittent cramping abdominal pain for three months without systemic symptoms such as fever, weight loss, jaundice, or vomiting. However, a sudden onset of severe abdominal colic, syncope, and diaphoresis prompted urgent medical evaluation. These symptoms were subsequently linked to vascular complications, specifically hydatid cyst embolization affecting the superior mesenteric artery (SMA) and iliac arteries, leading to ischemia. Notably, SMA occlusion resulted in jejunal thickening without evidence of necrosis, suggesting an ischemic insult without irreversible bowel injury, thereby justifying the use of anticoagulation therapy.

Role of radiology

Ultrasonography serves as the primary diagnostic modality for identifying both cystic and alveolar echinococcosis in humans. This imaging technique is frequently complemented or validated by computed tomography (CT) and magnetic resonance imaging (MRI) to enhance diagnostic accuracy. Specifically, ultrasound is the preferred imaging method for diagnosing hepatic hydatid disease, as it effectively delineates characteristic features such as floating membranes, daughter cysts, and hydatid sand within cystic lesions. The radiologist's expertise in recognizing these distinct imaging findings is essential for early diagnosis and timely intervention, ultimately facilitating appropriate treatment and improving patient outcomes. Ultrasound (US) remains the screening modality of choice; however, when its findings are inconclusive, CT is recommended due to its high sensitivity and specificity in detecting calcified hydatid cysts. MRI, on the other hand, is the optimal imaging technique for visualizing cystic components in detail. Therefore, advanced diagnostic modalities such as CT and MRI play a crucial role in the comprehensive evaluation of hepatic hydatidosis [1, 30,31].

As illustrated in our case, utilizing available radiologic imaging techniques significantly improves diagnostic accuracy. Clinicians can rely on radiologic findings and imaging characteristics of the disease for decision-making in patient management. This comprehensive approach not only confirms the diagnosis but also helps differentiate it from other

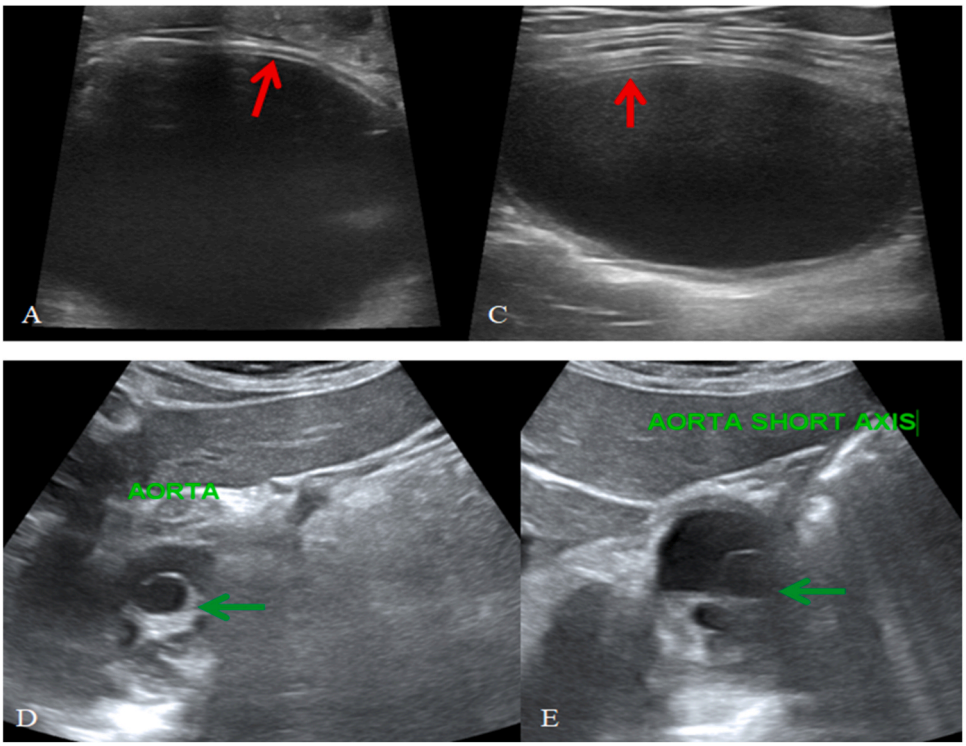


Fig. 4. Ultrasound images: Right pelvic side wall (A), right gluteal (B) and subcostal (D & E) regions of a patient with disseminated hydatid disease (hydatidosis). The scans demonstrate multifocal cystic lesions. The right pelvic side wall and gluteal cysts are unilocular with peripheral smooth double wall (red arrows). The aortic lesion is multilocular with internal multiple daughter cysts (green arrows).

potential conditions, ensuring a precise diagnostic process.

Conclusion

Hydatid cyst disease remains a significant global public health concern. Although it primarily affects the liver and lungs, rare cases can involve the vascular system and multiple organs, as demonstrated here. Advanced imaging, including CT angiography and MRI, is essential for detecting vascular involvement and guiding management. Early recognition, preventive strategies, and heightened awareness among healthcare providers are crucial, particularly in endemic and resource-limited settings, to enable timely intervention and reduce morbidity. In selected patients, non-surgical management may also be a viable option when resources or surgical expertise are limited.

Author statement

All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

Authorship

We confirm that all authors listed in this manuscript have made substantial contributions to the conception, design, execution, analysis, interpretation, and writing of the case report. All authors agree with the content and conclusions of the manuscript and have approved the final version for submission. The authors marked by [1] on the main manuscript contributed equally to this study and are regarded as co-first authors of this case report,

CRediT authorship contribution statement

Yegzeru Belete: Writing – review & editing, Writing – original draft, Supervision, Data curation, Conceptualization. **Abdulkerim Girma:** Writing – original draft, Visualization, Software, Data curation, Conceptualization. **Biruh Alemu Ashine:** Software, Investigation, Data curation. **Amanuel Anegagregn:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Ermiyas Sintayehu:** Visualization, Software, Investigation, Data curation.

Ethics approval

A single case report is exempt from institutional ethical approval in Hawassa University College of Medicine Health Sciences.

Data and Ethics

We confirm that all data presented in this manuscript is accurate and authentic. We have adhered to ethical guidelines and received approval from the relevant ethics committee or institutional review board (IRB) where necessary. We have obtained a written informed consent from the patient(s) involved in the case report.

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We agree to promptly respond to reviewers' comments and suggestions for revisions and to resubmit the manuscript after making any necessary changes. We understand that the editorial board has the final decision regarding the acceptance of the manuscript for publication.

Publication

We confirm that we are authorized to submit the manuscript for publication and that all authors have given their consent for submission. We acknowledge that publication will be subject to the journal's editorial and peer review process.

Declaration of Competing Interest

The authors declare that they have no competing interests in relation to this case report. There are no financial, personal, or professional conflicts that could have influenced the design, data collection, analysis, interpretation, or conclusions of this study. Furthermore, the authors have not received any funding, grants, or institutional support that might present a conflict of interest. This manuscript was prepared and submitted solely for academic and scientific purposes, with no external influences affecting its content or findings.

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