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Infected congenital pericardial cyst with mass effect on adjacent structures, a rare presentation in an infant in LMIC setting: a case report and review of literature

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Abstract

Background Giant pericardial cysts are rare mediastinal lesions that can lead to significant morbidity if complicated by infection, compression of adjacent structures, or secondary complications such as right-sided heart failure. This case report highlights the diagnostic and therapeutic challenges of managing an infected giant pericardial cyst in a resource-limited setting in Africa.

Case presentation A 2 months old infant presented with symptoms of fast breathing, dyspnea, fever, and signs of right-sided heart failure, including peripheral edema and ascites. Imaging studies, including chest X-ray and computed tomography (CT), revealed a large cystic mass in the pericardial region compressing the right heart chambers. Emergency Surgical excision was performed, and histopathological analysis confirmed the diagnosis of an infected pericardial cyst. Postoperatively, the patient recovered well, with resolution of symptoms, including signs of right-sided heart failure, and no recurrence at follow-up.

Conclusion This case underscores the importance of considering pericardial cysts in the differential diagnosis of mediastinal masses, particularly in the presence of infectious symptoms or cardiac compression leading to right-sided heart failure. It also demonstrates the feasibility of successful management through timely surgical intervention, even in resource-limited settings. This report contributes to the sparse literature on infected pericardial cysts and provides valuable insights into their management in low-resource environments.

Clinical trial number Not applicable.

Keywords Pericardial cyst, Infection, Heart failure, Infants, Case report

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Background

Congenital pericardial cyst is a rare anomaly with an incidence of 1 in 100,000 often discovered incidentally during imaging for other conditions [1, 2]. These cysts typically remain asymptomatic, but when symptoms do arise, they are usually due to compression of adjacent structures. The right side cardiac compression can result diastolic dysfunction, right ventricular outflow obstruction and/or congestive heart failure [3]. Compression of the lung and hila can result in obstruction of right mainstem bronchus and compression of adjacent lobe of the lung resulting in repeated respiratory tract infection, cough, dyspnea and cyanosis. Giant infected pericardial cysts, in particular, are rare and can present significant clinical challenge. This case report addresses a rare and severe instance of giant pericardial cyst which was infected, leading to compression of right heart chambers and right lung in a 2 month old infant. Most congenital pericardial cysts are asymptomatic and usually the diagnosis made in utero with prenatal ultrasound. This report aims to highlight the clinical presentation, diagnostic approach, and management strategies for such unusual and life-threatening condition, with a focus on challenge faced with complicated presentation.

Case presentation

The patient is a 2 month old male infant, delivered at gestational age 39 + 5 weeks via vaginal delivery with a birth weight of 3.2 kg. The baby was admitted to the pediatric intensive care unit (PICU) due to respiratory distress, cyanosis, and poor feeding. Prenatal care was uncomplicated, and no congenital anomalies were detected on routine prenatal ultrasound. However mother had history of treatment for malaria during third trimester of her pregnancy.

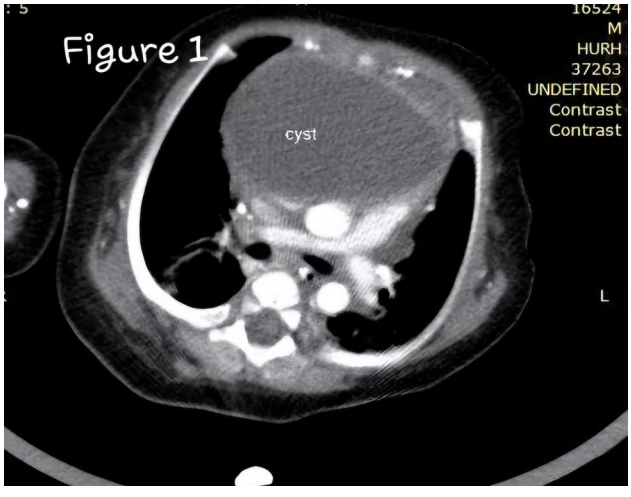

Fig. 1 Contrast enhanced CT scan image of Pericardial cyst before surgery

The symptoms progressively worsened, prompting transfer to the PICU for further evaluation and management. There was no history of maternal infections or complications during pregnancy.

The baby was treated for early onset neonatal sepsis at the age of 7 days. He stayed in hospital for 10 days and readmitted with the above complaint.

Physical examination

On examination, the newborn was in severe respiratory distress, with tachypnea, cyanosis, and subcostal and intercostal retractions. Vital signs included a heart rate of 196 bpm weak, respiratory rate of 70 breaths/min, oxygen saturation of 75% on room air, and blood pressure of 55/30mmHg. Cardiovascular examination revealed tachycardia with muffled heart sounds, and respiratory examination showed decreased breath sounds on the right side. The abdomen was soft and non-tender with positive signs of fluid collection, and there was mild peripheral cyanosis pedal and pretibial edema.

Diagnostic workup

1. Chest X-ray: Revealed a large, rounded mass in the right cardiophrenic angle, causing mediastinal shift and compression of the right side of the heart.
2. Echocardiography: Demonstrated a large pericardial cyst compressing the right atrium and ventricle, with impaired right ventricular filling. No structural heart defects were noted.
3. CT Scan of the Chest: Confirmed a giant pericardial cyst measuring 8 cm x 6 cm with thickened walls and fluid density suggestive of infection (Fig. 1).
4. Laboratory Tests: Showed an elevated white blood cell count of 28,000/μL and elevated C-reactive protein of 125 mg/L]. Blood cultures were sent to identify the causative organism. The result came back with growth of gram positive cocci in group suggesting staphylococcus which was sensitive to vancomycin. Other organ function testes were normal.

Diagnosis

The infant was diagnosed with an infected giant congenital pericardial cyst with right chamber compression.

Management

1. Initial Stabilization: The baby was intubated and placed on mechanical ventilation for respiratory support. Intravenous fluids and inotropic support (dopamine) were administered for hemodynamic stability, and broad-spectrum antibiotics (e.g., ampicillin and gentamicin) were initiated empirically.

2. Surgical Intervention: The newborn underwent emergency surgical excision of the cyst via open anterolateral thoracotomy. Intraoperative findings included a large, infected pericardial cyst adherent to the right atrium and ventricle, which was initially drained and cyst completely excised(Figs. 2 and 3). The chest cavity irrigated with warm saline and chest drain left in situ.
3. Postoperative Care: The baby was monitored in the PICU with continued mechanical ventilation, hemodynamic support, and antibiotics adjusted based on culture results. Both blood culture and fluid aspirated culture showed growth of gram positive cocci bacteria in groups which was sensitive for vancomycine.

Biopsy section showed tissue composed of predominantly oval to spindle cell exhibiting bland nucleus fine to hyperchromatic nuclei inconspicuous nucleoli with moderate amount of eosinophilic cytoplasm set in abundant collagenous stroma. There are frequent cystic space filled with hemorrhage. Infiltrate of inflammatory cells majority being small mature lymphocytes admixed with plasma cells are seen. No necrosis or mitosis seen.

Diagnosis being inflammed percardial cyst

Daily chest X-rays were performed to monitor for complications. On 8th post operative day baby extubated safely and transferred to the ward to finish 14 day course of antibiotics.

4. Follow-Up: The baby was discharged on postoperative day 14 and scheduled for follow-up with pediatric cardiology and repeat echocardiography. Control chest radiography(Fig. 4) after 2 weeks of discharge showed normal and bedside echocardiogram identified no abnormality.

Discussion

A pericardial cyst is typically considered a congenital anomaly whereby incomplete fusion in embryogenesis leads to herniation or weakness in pericardial sac, forming a diverticulum [1, 4]. This outpouching can either persist as a pericardial diverticulum or form a pericardial cyst when the communication to pericardial sac obliterated. The cyst usually contain clear fluid and, with most patient diagnosed via incidental finding on routine chest imaging. It is considered rare, with an approximate incidence of 1 in 100,000. In symptomatic case patient usually present with effect of compression and mass effect of the cyst on adjacent structures [2, 4].

Pericardial cyst infection is even more uncommon and in infants, these cysts pose significant diagnostic and therapeutic challenges, especially in LMICs where access to advanced health care facilities and timely intervention can be limited.

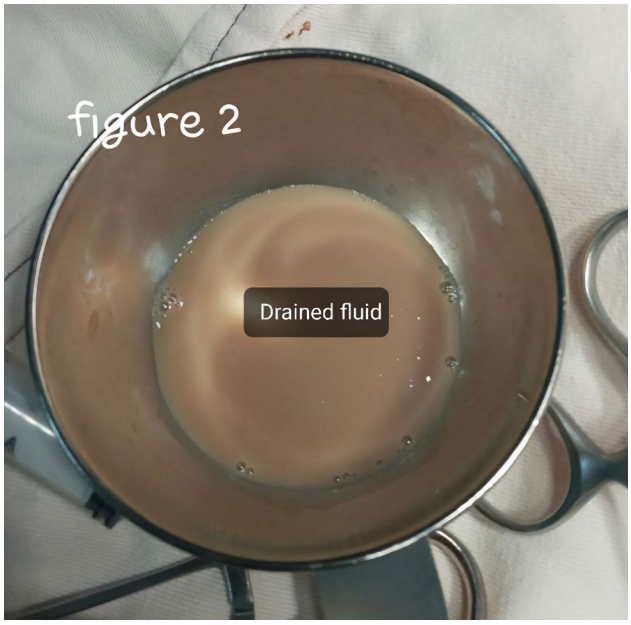

Fig. 2 Drained infected cyst fluid during surgery

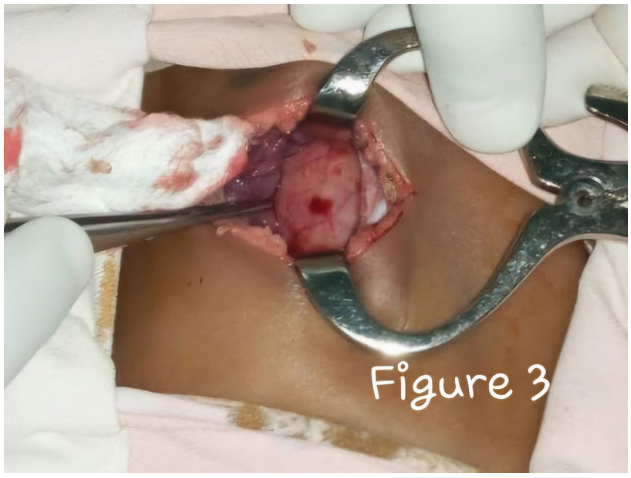

Fig. 3 Intraoperative gross picture of pericardial cyst before excision

Congenital pericardial cysts are rare benign mediastinal masses that are typically asymptomatic and often discovered incidentally during imaging for unrelated conditions [1]. However, in rare cases, these cysts can become symptomatic due to complications such as infection, hemorrhage, or compression of adjacent structures, including the heart and lungs [2]. This case presents a newborn with an infected giant congenital pericardial cyst causing significant right chamber compression, a condition that is exceptionally rare in the neonatal population. The clinical presentation, diagnostic challenges, and management strategies in this case underscore the

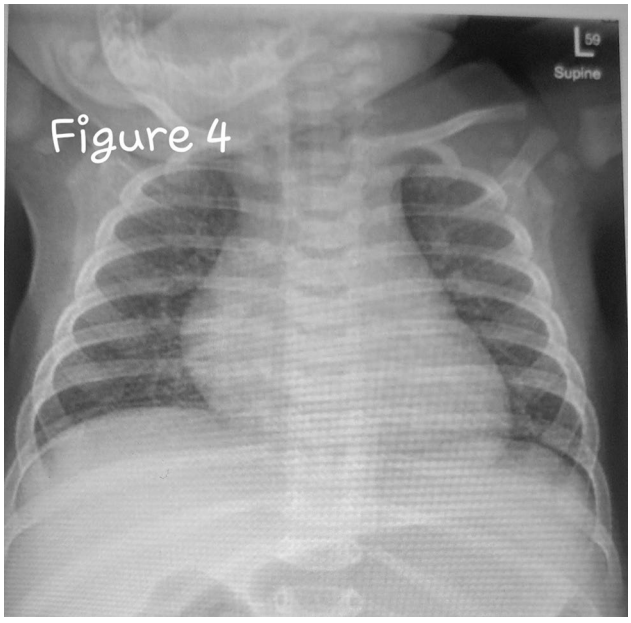

Fig. 4 Control chest x ray taken during follow up

importance of early recognition and intervention in such life-threatening scenarios.

The pathophysiology of congenital pericardial cysts is not fully understood, but they are believed to arise from developmental abnormalities during the formation of the pericardium [3]. These cysts are typically lined by mesothelial cells and filled with clear fluid. While most cases remain asymptomatic, complications such as infection or rapid enlargement can lead to significant morbidity. In this case, the cyst became infected, likely due to hematogenous spread of bacteria, leading to systemic inflammation and localized compression of the right atrium and ventricle. This compression impaired cardiac filling and resulted in respiratory distress and cyanosis, which are hallmark symptoms of cardiac tamponade or significant mediastinal compression [4, 7].

The diagnosis of pericardial cysts in newborns is challenging due to their rarity and nonspecific clinical presentation. In this case, the initial chest X-ray revealed a large mass in the right cardiophrenic angle, which prompted further imaging with echocardiography and CT scan. Echocardiography is particularly valuable in assessing the cyst's impact on cardiac function, while CT provides detailed anatomical information, including the cyst's size, location, and relationship to adjacent structures [2, 3]. The presence of thickened cyst walls and fluid density suggestive of pus on CT scan confirmed the diagnosis of an infected pericardial cyst. Laboratory findings, including elevated white blood cell count and C-reactive protein, further supported the diagnosis of an infectious process.

The management of infected pericardial cysts requires a multidisciplinary approach involving neonatologists, pediatric cardiologists, and pediatric cardiothoracic surgeons. Initial stabilization focuses on addressing respiratory and hemodynamic instability, often requiring mechanical ventilation and inotropic support [2, 7]. Broad-spectrum antibiotics should be initiated empirically to cover potential bacterial pathogens, with adjustments made based on culture results. Definitive treatment involves surgical excision of the cyst, which was successfully performed in this case. Surgical intervention not only alleviates the compression but also prevents recurrence and reduces the risk of further complications [2–4]. Postoperative care includes close monitoring for complications such as reaccumulation of fluid, pneumothorax, or infection, as well as long-term follow-up to assess cardiac function and ensure complete resolution [5, 6].

Differential diagnosis of a pericardial cyst in an infant involves distinguishing it from other congenital or acquired mediastinal and pericardial lesions [8, 9]. Some differentials include bronchogenic cyst, cystic teratomas, lymphatic malformations and pericardial effusions [8]. Bronchogenic cysts often located near the trachea and appear on imaging as well defines fluid filled structures [9]. Teratomas are more complex in structure compared to simple appearance of pericardial cysts. On imaging teratomas appear heterogeneous with fat, calcification and cystic component [9, 10]. Lymphatic malformations are more infiltrative to surrounding structures and less well defined than simple pericardial cysts. The other important differential diagnosis is pericardial effusion which surrounds the heart unlike the localized pericardial cyst [10].

This case highlights the importance of early diagnosis and prompt intervention in managing infected congenital pericardial cysts in newborns. The rarity of this condition and its potential for life-threatening complications necessitate a high index of suspicion and a coordinated approach to care. Advances in imaging techniques and surgical management have significantly improved outcomes for affected infants, as demonstrated in this case. However, further research is needed to better understand the pathogenesis of these cysts and to optimize diagnostic and therapeutic strategies.

Conclusion

The case of an infected giant pericardial cyst in an African patient highlights the rarity and complexity of this condition, emphasizing the importance of timely diagnosis and multidisciplinary management. Despite the challenges posed by limited healthcare resources in certain regions, this case demonstrates that with appropriate imaging, surgical intervention, and postoperative

care, favorable outcomes can be achieved. The successful resolution of symptoms and prevention of complications, such as cardiac tamponade or sepsis, underscores the critical role of early detection and intervention. This report adds to the limited literature on infected pericardial cysts, particularly in the African context, and serves as a reminder for clinicians to consider this diagnosis in patients presenting with mediastinal masses and signs of infection. Further research and case documentation are needed to better understand the epidemiology, optimal management strategies, and long-term outcomes of this rare condition in resource-limited settings.

Abbreviations

CT	Computerized tomography
PICU	Pediatric Intensive Care Unit
LMIC	Low and middle income country

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12887-025-05606-8.

Supplementary Material 1

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Dr. Ashagre Gebremichael Ganta-conceptualization, Data Curation, Formal Analysis, Writing- Original Draft preparation. Dr. Wintana Tesfaye Desta-Visualization, Resources, validation, writing-review & editing.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethical approval and consent to participate
Ethical approval obtained from ethics committee of the Hawassa University specialized hospital to publish the case report. The study was performed accordance with the ethical standards laid down in 1964 Declaration of Helsinki and its later amendments. Written informed consent obtained from legal guardian to participate in the study.

Consent for publication
Written informed consent was obtained from the patient's guardian(father) for publication of this case report and any accompanying images. A copy of the written consent is available for review by Editor-in-Chief of this journal.

Competing interests
The authors declare no competing interests.

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