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RESEARCH ARTICLE

Primary Mediastinal Hydatid Cyst: A Rare Presentation of Echinococcosis in a Young 22-Year-Old Female

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Abstract: ***Background:*** Mediastinal echinococcosis (hydatid disease) is a rare manifestation of Echinococcus granulosus infection, accounting for less than 0.1% of all hydatid cyst locations. Its presentation may mimic other mediastinal masses, posing diagnostic and therapeutic challenges. ***Case Presentation:*** A 22-year-old female presented with chest pain for eight days, headache for four days, vomiting and diarrhoea for two days, and fever for three days. She had a prior history of a cystic lesion in the anterior mediastinum, confirmed on biopsy as Echinococcus granulosus. High-resolution CT thorax revealed a well-defined hypodense lesion in the prevascular region with thin internal septations and air pockets, closely abutting the manubrium sternum and pulmonary trunk. The patient underwent median sternotomy with complete excision of the cystic lesion. Intraoperatively, the lesion was encapsulated and removed intact to prevent spillage. Post-operative recovery was uneventful. ***Conclusion:*** Primary mediastinal hydatid cysts are uncommon and should be considered in the differential diagnosis of cystic mediastinal masses, especially in endemic regions. Complete surgical excision remains the treatment of choice, supported by anti-helminthic therapy to prevent recurrence.

Keywords: Mediastinal hydatid cyst, Echinococcus granulosus, thoracic surgery, median sternotomy, cyst excision.

INTRODUCTION

Hydatid disease, or echinococcosis, is a zoonotic parasitic infection caused by Echinococcus granulosus, commonly affecting the liver and lungs (1). The disease results from the accidental ingestion of eggs shed in the feces of definitive hosts such as dogs. The larvae penetrate the intestinal wall, enter the portal circulation, and form cysts in various organs (2). While hepatic and pulmonary involvement is most common, hydatid cysts can occur in almost any anatomical location through hematogenous or lymphatic dissemination (3).

Primary mediastinal hydatid cysts are exceedingly rare, accounting for less than 0.1% of all hydatid disease cases (4). Their occurrence in the prevascular or anterior mediastinum is particularly uncommon, making diagnosis challenging due to overlapping features with other cystic or neoplastic mediastinal lesions such as thymic cysts, bronchogenic cysts, or lymphangiomas (5). The clinical presentation is often nonspecific and depends on the size and location of the cyst, with symptoms arising from compression of adjacent mediastinal structures including the lungs, great vessels, or pericardium (6).

Imaging modalities such as contrast-enhanced computed tomography (CECT) and magnetic resonance imaging (MRI) are essential for characterization of the lesion and for differentiating hydatid cysts from other mediastinal masses (7). Serological tests and histopathological confirmation further aid diagnosis. Complete surgical excision remains the definitive treatment, as rupture or incomplete removal may lead to recurrence or anaphylactic reactions (8).

This case report describes a rare occurrence of a primary anterior mediastinal hydatid cyst in a young female, emphasizing its clinical presentation, radiological findings, surgical management, and postoperative outcome.

RESULTS AND OBSERVATIONS:

CASE PRESENTATION

Patient Information: A 22-year-old female, Keerti Shinde, presented to the outpatient department with complaints of chest pain for eight days, headache for four days, vomiting and diarrhea for two days, and intermittent fever for three days. There was no history of cough, hemoptysis, dyspnea, or weight loss. She had no known comorbidities or significant family history.

Clinical Findings: On general examination, the patient was afebrile, with pulse rate 103/min, blood pressure 120/76 mmHg, and SpO_2 99% on room air. Systemic examination revealed no abnormal respiratory or cardiovascular findings. No lymphadenopathy or organomegaly was noted.

History of Past Illness: The patient had been evaluated previously for a cystic lesion in the anterior mediastinum, for which a biopsy performed on 8th April 2025 revealed features suggestive of Echinococcus granulosus (hydatid cyst).

Diagnostic Assessment: A high-resolution computed tomography (HRCT) scan of the thorax revealed a well-defined hypodense lesion in the prevascular region of the anterior mediastinum, measuring approximately 6.4 × 4.5 × 5.7 cm. The lesion showed thin internal septations and few air pockets within it, extending up to the manubrium sternum without bony erosion. Posteriorly, the lesion was in close proximity to the main pulmonary trunk. No mediastinal shift, parenchymal, or vascular abnormality was noted. Bilateral apical pleural thickening was seen with normal pulmonary parenchyma. Few subcentimetric pretracheal and prevascular lymph nodes were also observed. These imaging findings were consistent with a hydatid cyst.

Therapeutic Intervention: After preoperative stabilization and antiparasitic prophylaxis with albendazole, the patient underwent surgical excision of the cyst via median sternotomy under general anesthesia. Intraoperatively, a well-encapsulated cystic mass was identified in the anterior mediastinum, adherent to the surrounding pleura but without invasion of adjacent structures. The cyst was carefully dissected and removed intact to avoid rupture or spillage. The surgical field was irrigated with scolicidal agents, and hemostasis was achieved.

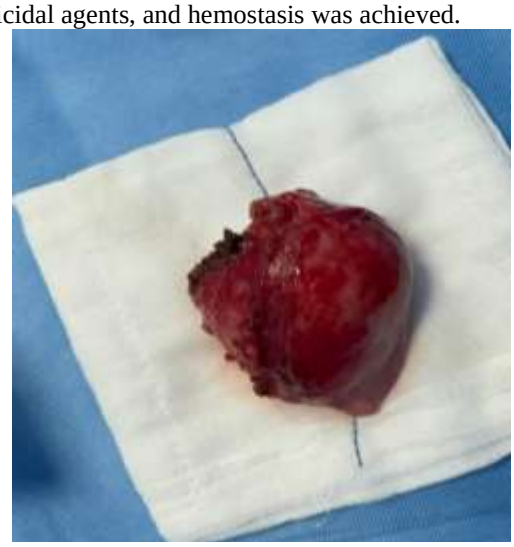

Fig 1: Gross specimen showing a well-encapsulated cystic lesion excised from the anterior mediastinum, measuring approximately 6 × 5 cm, with a smooth glistening outer surface and areas of congestion, consistent with a hydatid cyst.

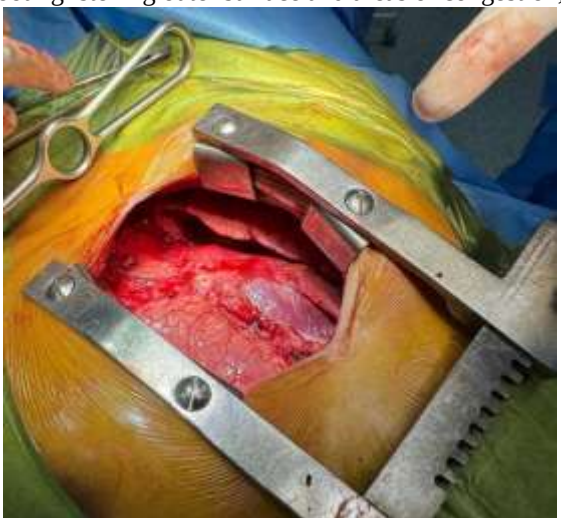

Fig 2: Intraoperative view following median sternotomy showing the sternal retractor holding the incision edges apart, exposing the anterior mediastinum. The pericardium and right lung are visible, with the cystic lesion site identified in the prevascular region.

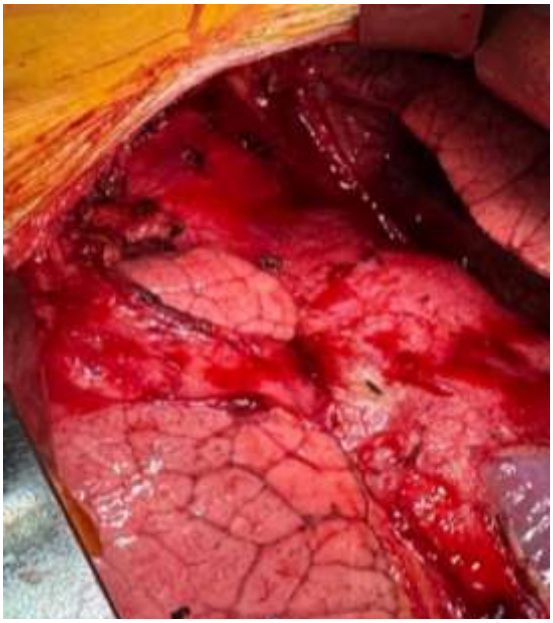

Fig 3: Intraoperative close-up view showing the anterior mediastinum after cyst excision, with the intact pleural surface and underlying right lung visible. The cyst bed appears clean, and haemostasis is achieved without spillage.

Gross Examination of Specimen: The excised specimen measured approximately 6 × 5 cm and appeared as a tense, encapsulated cystic mass with smooth outer surface and areas of congestion.

Histopathological examination : The excised mediastinal cystic mass revealed a specimen measuring 8.5 × 7 × 5 cm, drained of thick whitish fluid with a circumferential whitish membrane. Microscopic sections showed the cyst wall composed of an acellular laminated membrane and nucleated germinal lining, accompanied by numerous protoscolices. The surrounding tissue displayed fibrosis and infiltration by mononuclear cells with increased eosinophils. These features were consistent with a mediastinal cystic mass (enucleated) showing features suggestive of an echinococcal (hydatid) cyst with debris and protoscolices fragments.

Postoperative Course and Follow-up: The patient had an uneventful postoperative recovery. The sternotomy wound healed well without evidence of infection or seroma formation. The patient was continued on albendazole therapy for six weeks postoperatively and was discharged on the seventh postoperative day in stable condition. At one-month follow-up, she remained asymptomatic, and chest imaging showed no residual or recurrent lesion.

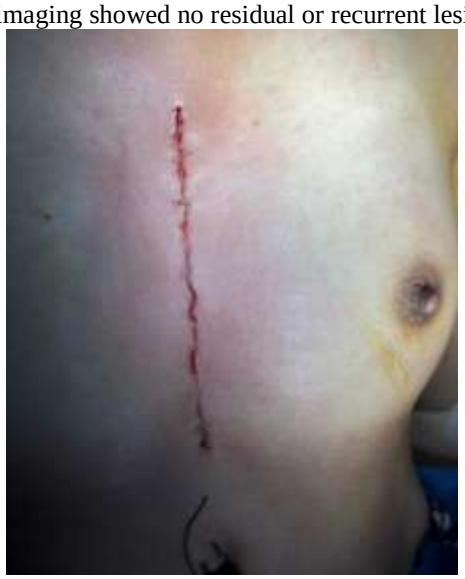

Fig 4: Postoperative image showing a clean, midline sternotomy incision closed with interrupted sutures after mediastinal hydatid cyst excision, with minimal bleeding and no evidence of wound infection or dehiscence.

DISCUSSION

Hydatid disease, caused by Echinococcus granulosus, is a parasitic zoonosis with global distribution, most prevalent in sheep-rearing regions such as the Mediterranean, South America, the Middle East, and parts of India (9). Humans act as accidental intermediate hosts, acquiring infection through ingestion of parasitic eggs excreted in the feces of definitive hosts like dogs (10). The larvae migrate via the portal circulation, typically localizing in the liver (60–70%) and lungs (20–30%). Involvement of the mediastinum is exceedingly rare, accounting for less than 0.1% of all hydatid cyst cases (11).

Primary mediastinal echinococcosis occurs through hematogenous dissemination or lymphatic spread, while secondary lesions may develop following rupture or spillage from adjacent pulmonary or hepatic cysts (12). The anterior mediastinum is the most frequent site of involvement due to its rich vascular and lymphatic supply. Clinical presentation is often nonspecific, with symptoms resulting from mass effect rather than parasitic activity (13). Patients may present with chest pain, dyspnea, cough, dysphagia, or rarely, superior vena cava obstruction. In the present case, the patient had chest pain and fever, with imaging findings revealing a cystic lesion in the prevascular region (13).
Radiological evaluation is crucial for diagnosis. HRCT and MRI help delineate cyst morphology, internal septations, and relationship with adjacent structures. The presence of a well-defined hypodense lesion with internal septations and air pockets, as seen in this case, is characteristic of hydatid cysts (7). Absence of bone erosion and vascular invasion helps differentiate hydatid cysts from neoplastic lesions such as thymomas or teratomas. Serological tests such as ELISA may support diagnosis but are not always conclusive (14). Histopathological confirmation remains the gold standard, showing laminated cyst wall and scolices typical of Echinococcus granulosus (1).

Surgical excision is the treatment of choice for mediastinal hydatid cysts. The primary goals are complete removal of the cyst without rupture and prevention of intraoperative spillage, which may lead to anaphylaxis or recurrence (15). The surgical approach depends on cyst location, median sternotomy is preferred for anterior mediastinal lesions, as performed in this case. Intraoperative use of scolicidal agents such as hypertonic saline or povidone-iodine helps sterilize the operative field (6). Postoperatively, albendazole therapy for 4–6 weeks reduces the risk of recurrence by eliminating residual microscopic parasitic elements (16).

The prognosis for mediastinal hydatid disease is excellent when managed promptly and completely. Recurrence is rare with total excision and appropriate postoperative antiparasitic therapy. Regular follow-up with imaging is recommended to detect potential recurrence early (17).

This case emphasizes the importance of considering hydatid disease in the differential diagnosis of mediastinal cystic lesions, particularly in endemic regions. Early diagnosis through imaging and complete surgical excision ensures favourable outcomes and prevents life-threatening complications such as cyst rupture or anaphylaxis.

CONCLUSION

Primary mediastinal hydatid cysts are exceptionally rare and often mimic other cystic mediastinal lesions, posing diagnostic challenges. Early recognition through imaging and histopathology is essential, especially in endemic regions. Complete surgical excision without rupture remains the definitive treatment to prevent recurrence and anaphylaxis. Postoperative albendazole therapy further reduces the risk of residual disease. Multidisciplinary collaboration between radiologists, surgeons, and pathologists ensures accurate diagnosis and optimal management. This case emphasizes the need to consider echinococcosis in the differential diagnosis of mediastinal cystic masses and demonstrates that timely surgical intervention leads to excellent clinical outcomes.

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