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CASE REPORT

Posterior Mediastinal Hydatid Cyst with Spine and Chest Wall Involvement

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Abstract: Hydatid cyst, which is caused by Echinococcus larvae, is a worldwide zoonotic disease which can affect virtually any organ in the body. Although the liver and lungs are the most commonly affected, it can occur in other parts of the body. Mediastinal hydatid cysts are incredibly rare, but imaging is crucial to diagnose and determine the extent of involvement and complications. In this article, we present a case of posterior Mediastinal hydatid cyst with adjacent chest wall and spinal involvement, diagnosed through chest CT and histopathology.

Keywords: hydatid cyst, mediastinum, spine, lytic bone lesion

Introduction

Hydatidosis, also known as hydatid cyst (HC), is a worldwide zoonotic disease caused by the larval form of Echinococcus with two different types responsible for its occurrence: Echinococcus granulosus, the more common type, with dogs serving as its primary host and more frequently observed in pastoral communities. Echinococcus alveolaris/multilocularis is less common but more invasive and fox is the main host. Humans can accidentally become infected by consuming food contaminated with parasite eggs or having close contact with an infected dog.[1]

HC can happen practically anywhere in the body and frequently concentrates in the liver and lung. Depending on the organ affected and the stage of the disease, different symptoms may be present.[1,2]

Hydatid cysts can be diagnosed with excellent sensitivity and specificity using medical imaging modalities. Unenhanced computed tomography (CT) is used when ultrasound is poor, such as with chest or brain hydatid cysts, when identifying calcification, and in obese patients. Additionally, magnetic resonance imaging (MRI) is used, which is superior for displaying cyst wall, contents, and nearby neural involvement.[2]

Hydatid cysts come in a variety of sizes and shapes depending on their growth phase and location, which can make them difficult to distinguish from benign or malignant neoplasms in some situations, such as this one where the mediastinum is involved. In that situation, incorporating MRI with diffusion-weighted imaging (DWI) sequences and ultrasound with high resolution imaging (when the location is accessible for scanning) helps us further characterize the cyst and its contents and distinguish HC from other different cystic lesions that have occurred in that specific organ.[2,3]

Here, we present a case of hydatid cyst in posterior mediastinum with adjacent chest wall and spinal involvement.

Case Presentation

A 65-year-old male patient presented to the medical outpatient department (OPD) with a one-year history of dry cough and a two-month history of back pain, along with a left-sided chest heaviness. He had been visiting various clinics and taking cough medication and oral antibiotics, but with little improvement. Recently, he had started experiencing burning and tingling sensations around his left chest wall.

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On physical examination, the patient appeared to be chronically ill, but his vital signs were within the normal range. The patient's chest wall was asymmetric, with a slightly tender fluctuant mass present on the left lateral and posterior side. Chest radiography showed a rounded and homogeneous opacity on the left hilar region with "hilar overlay sign" and indistinct aortic outline, suggesting a possible posterior Mediastinal lesion. Pre- and post-contrast computed tomography (CT) of chest was then performed using a 64-slice, Philips scanner.

The CT of the chest revealed a well-defined cystic mass (fluid density) in the left posterior mediastinum extending from T4 to T10 vertebral levels, abutting the descending aorta and pushing the adjacent left lower lobe of the lung antero-laterally. Minimal enhancement of the cyst wall was observed on the post-contrast study. Localized regions of calcification were present in the inferior portion and lateral wall of the cyst (Figures 1 and 2).

Additionally, there was lytic destruction of posterior vertebral bodies of T7 and T8, as well as the pedicles and transverse processes of eight thoracic vertebrae. Also, the left eighth rib was destroyed in an expansile, lytic fashion. Left neural foraminal widening with perineural fat effacement was noted at T6-T7 and T8-T9 vertebral levels. No lung parenchymal lesion was seen and the abdominal ultrasound was normal. Relevant test results revealed a minor leukocytosis of 14,200 cells/mL and a slightly elevated ESR of 40mm/hr.

Considering some aggressive lesions of posterior Mediastinal space lesion with chest wall extension, a CT-guided biopsy was performed. Histopathologic findings revealed multiple fragments of a cellular laminated fibrous tissue with intense foreign body-type giant cell granuloma, accompanied by a few small mature lymphocytes. These were predominantly mixed chronic mononuclear inflammatory cells on a satellite granular necrosis debris background, which are consistent with a hydatid cyst (Figure 3).

Albendazole was finally prescribed to the patient and a surgical option was provided as well. However, the patient declined the surgical treatment option and went home.

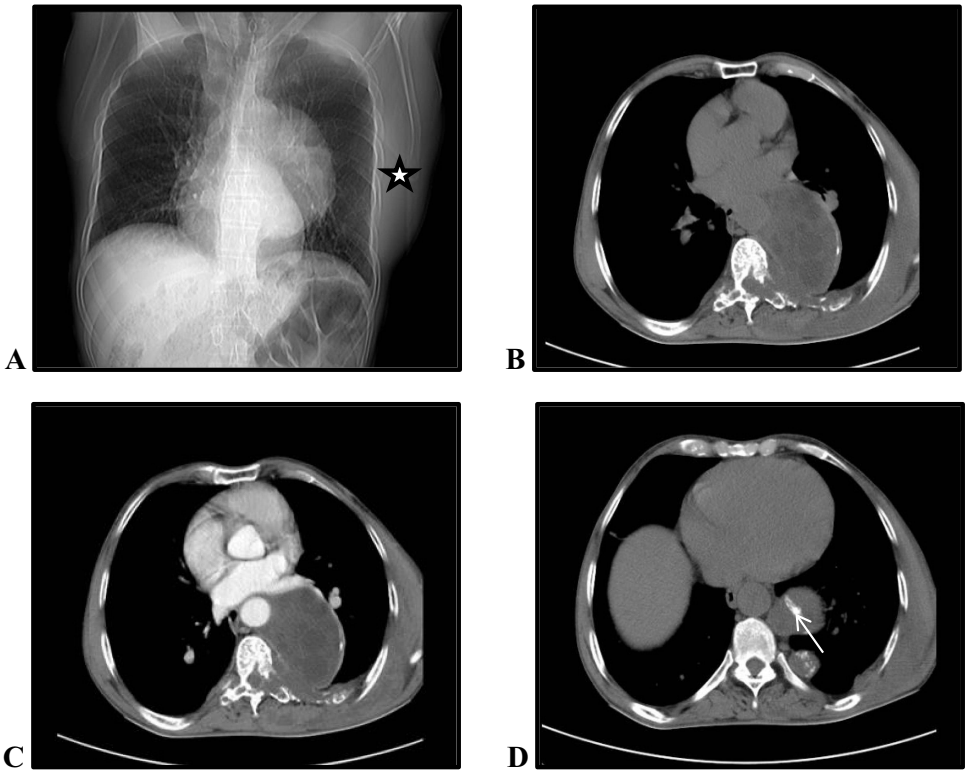

Figure 1 Scout film showing a well-defined homogenous opacity in left hilum with hilar overlay sign and indistinct descending aorta localizing the lesion in posterior mediastinum. Increased density of the left side chest wall with asymmetry is noted (white star) (**A**). Axial pre- and post-contrast chest CT image in the Mediastinal window at T5 level shows a large (> 10 cm), non-enhancing, low density (HU values on CT show low density (mean HU ± SD = − 1 ± 10)) cyst with lytic lesion of adjacent vertebral body and rib seen (**B** and **C**). Areas of calcification are seen in the cyst wall and superior part of the cyst (white arrow) (**D**).

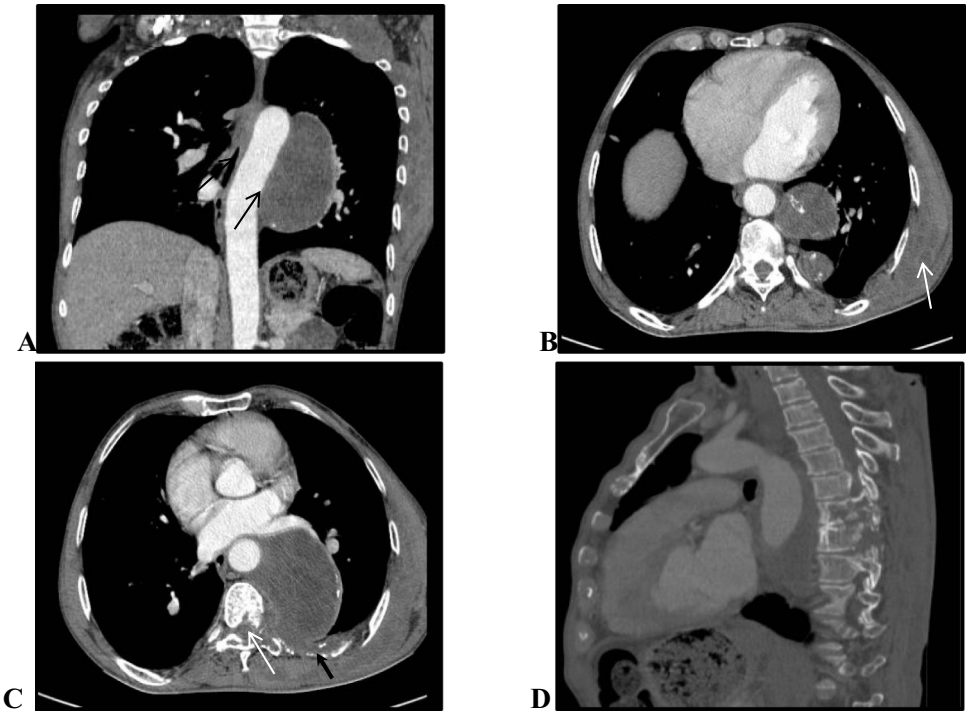

Figure 2 Coronal image reconstruction shows the close relationship between the cyst and descending aorta (black arrow) (**A**). Axial, post-contrast CT images at T5 level show chest wall asymmetry with multiple cystic lesions, with minimal wall enhancement (white arrow) (**B**). Axial Mediastinal window and sagittal bone window reconstruction show lytic lesions of posterior vertebral body, left pedicle and transverse process with adjacent ribs seen (short black arrow). There is widened left side neural foramen and perineural fatty effacement (white arrow) (**C** and **D**).

Discussion

Hydatidosis commonly affects the liver and lungs, with the lungs being the most frequently affected area in the thorax. However, other extra-pulmonary areas can also be affected, such as the pleural cavity, fissures, mediastinum, heart, vascular systems, chest wall, and diaphragm.[1,4] The parasite gains access to the liver or lungs after entering the human intestines and can then spread to almost any organ through systemic circulation, except for the hair, teeth and fingernails. The rarity of hydatidosis in other organs may be explained by the filtering effect of the liver and lungs on the parasites' spread.[4,5]

Mediastinal hydatid cysts (HC) are rare, occurring in only 0.5–2.6% of patients with hydatid disease.[4,6] There have been more than 100 cases of Mediastinal hydatid cyst documented in the literature so far.[4] HC development in the mediastinum may be primarily via systemic circulation or it may spread there when a peripherally located lung HC ruptures. It may also occur due to the dissemination of the cyst through the diaphragm or the lymphatic systems in the abdomen.[7] In our patient, there is no sign of lung or liver involvement on the chest CT or abdominal sonography to suggest primary systemic seeding.

Mediastinal HC can cause a range of symptoms, and the severity and presentation of these symptoms depend on the size, location, and involvement of adjacent structures. Chest pain and signs of mediastinal compression, such as cough, dyspnea, dysphagia, and dysphonia, are commonly observed. The condition may be discovered incidentally or due to complications, including rupture of the cyst into a large vessel or the heart.[1,8]

In our case, the patient's persistent cough, chest discomfort, and back pain were caused by the involvement of nearby structures such the vertebrae, ribs, and chest wall muscles.

In addition to the rarity of mediastinal HC, this case is unique in presenting evidence of osseous involvement, which is a rare condition involved in only 0.5–4% of primary hydatidosis cases. When hydatid cysts involve bones, they primarily affect the spine and pelvis, with spinal hydatid disease being the most frequently encountered type of bone involvement.[8,9] Our patient had involvement of vertebrae and adjacent ribs. In contrast to other sites, bone involvement

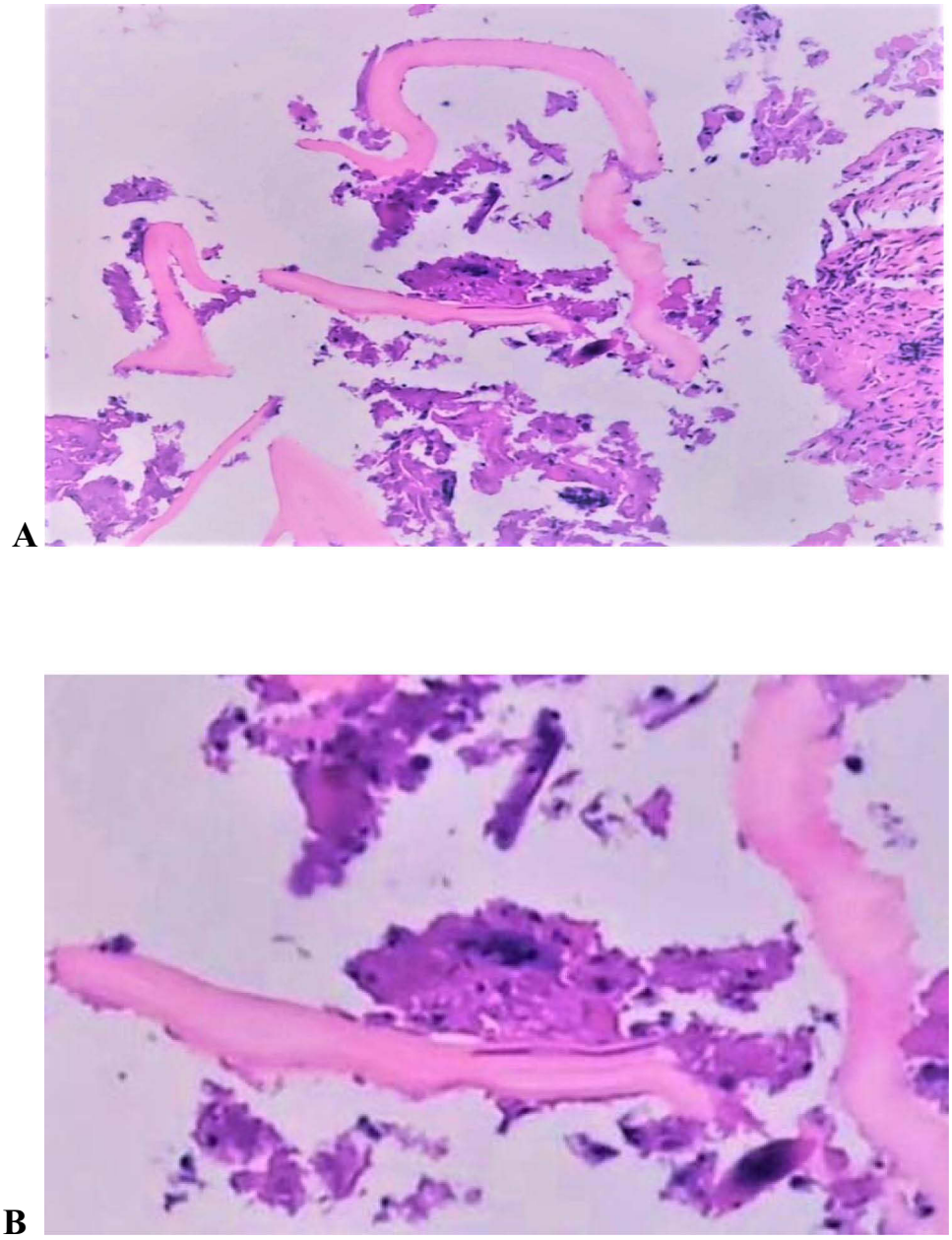

Figure 3 H and E stained histologic sections from chest wall biopsy 10x (**A**) and 20x (**B**) show multiple fragments of acellular laminated fibrous tissue with intense foreign body-type giant cell granuloma accompanied by a few small mature lymphocytes, predominant chronic mononuclear inflammatory cells on satellite granular necrotic debris background.

lacks pericyst development, which allows the parasite to proliferate along the path of least resistance, often following the bone canals in a branching pattern. Due to their slow growth, many cysts replace the osseous tissue between trabeculae. As the disease advances, it can invade and destroy the cortex, leading to infection of surrounding tissues.[8,10]

Vertebral involvement in hydatidosis can be challenging to differentiate from other conditions such as tuberculous spondylitis or chronic osteomyelitis. Bone erosion may be mistaken for malignant tumors.[10] CT or MRI imaging can help us to distinguish between them. Due to portovertebral venous shunts, spinal hydatid cysts initially affect the vertebral bodies. They exhibit cystic fluid together with CSF (cerebrospinal fluid) attenuation on CT scan and fluid signal intensity on MRI. Bone lesions usually lack rim enhancement or wall calcification.[11,12] Other distinguishing features include

absence of osteoporosis and sclerosis, lack of damage to the disk spaces and vertebral bodies, spread of the disease via sub-periosteal and sub-ligamentous paths, para-spinal extension, and involvement of a contiguous rib.[9]

In our case, the CT imaging features, growth direction, and patterns of bone loss are consistent with hydatid infection. Tissue biopsy was made easier to reach because of soft tissue involvement on the chest wall. Histology ultimately confirmed the diagnosis of hydatid infection.

Conclusion

A rare case of posterior Mediastinal hydatid cyst extending to the chest wall and causing lytic vertebral and adjacent rib lesions in an adult is presented. Clinicians in endemic areas should consider this entity when evaluating patients with Mediastinal lesions or vertebral lytic lesions. Additionally, when a hydatid cyst presents in an unexpected way, combining several imaging modalities like CT and MRI can help us to reach a diagnosis and avoid doing unnecessary invasive procedures.

Abbreviations

OPD, outpatient department; HC, hydatid cyst; CT, computed tomography; MRI, magnetic resonance imaging; CSF, cerebrospinal fluid; DWI, diffusion weighted imaging.

Data Sharing Statement

The datasets used during the current study are available from the corresponding author on reasonable request.

Ethical Consideration

To publish this case report and related images, we received written informed consent from the patient.

Acknowledgment

We thank the patient for allowing the publication of this case report.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; they took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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