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Pulmonary and Hepatic Hydatidosis: A Case Report

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ABSTRACT

Background: Hydatidosis is a parasitic zoonotic disease caused by *Echinococcus granulosus* and *E. multilocularis*. It can be transmitted to humans by ingesting contaminated food or contacting infected animals. The disease primarily affects the liver, with the lungs being the second most commonly involved organ.
Case presentation: We report the case of a 26-year-old female diagnosed with concomitant hydatidosis. The patient was treated with albendazole (400 mg), and bronchoscopy was performed under general anesthesia to clear the airway of ruptured cyst contents. Saline instillation and aspiration were subsequently used to remove the contents of the lesion originating from the posterior segment of the right lower lobe.
Conclusion: This case demonstrates the necessity of raising public awareness about the transmission, early detection, and management of hydatidosis. The rarity of concurrent pulmonary and hepatic involvement in a young patient from an urban area underscores its clinical significance and reinforces the need for vigilance in diagnosis and treatment.

Keywords: *Hydatidosis, Echinococcus granulosus, Pulmonary, Hepatic, Albendazole*

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Introduction

Hydatidosis (Echinococcosis) is a parasitic infection caused by *Echinococcus spp*, most commonly affecting the liver and lungs.[1-4] This condition is prevalent in rural regions of the Middle East, North Africa, East Africa, Eastern Europe, China, South America, Central Asia, the Mediterranean, India, and Pakistan.[2,4,5] The reported prevalence is notably higher in rural areas (5.6%) than in urban areas (3.7%)[6] .

Alveolar echinococcosis and cystic echinococcosis are the two most common types in humans.[3,4] Polycystic and unicystic echinococcosis are less common forms of cystic echinococcosis, each caused by different species.[4] Cystic echinococcosis is caused by *Echinococcus granulosus*, alveolar echinococcosis by *E. multilocularis*, polycystic echinococcosis by *E. vogeli*, and unicystic echinococcosis by *E. oligarthrus*.[3]

The parasite's life cycle involves an intermediate host, typically livestock such as cattle, and carnivores such as dogs and wolves. These primary hosts disseminate the parasite's eggs through their feces. Humans can accidentally ingest these eggs by consuming contaminated water or food. Once ingested, the eggs hatch in the intestine, releasing oncospheres that penetrate the intestinal wall and are transported to the liver. If the oncospheres bypass the liver, they enter the bloodstream and may disseminate to nearly any organ, with the lungs being a common secondary site.[2] Hepatic involvement may present with abdominal discomfort, weight loss, and jaundice-related skin discoloration.

Imaging techniques, such as computed tomography (CT) and ultrasonography, are the primary diagnostic tools for hydatidosis, with results typically confirmed through serological tests. Cysts outside the hepatic and pulmonary systems often pose diagnostic challenges due to their multifaceted presentations, which may mimic other pathological conditions such as lung carcinoma, blood clots, Rasmussen aneurysms, and neoplasms.[7] The current case, involving both the liver and lungs, underscores the need to recognize diverse clinical presentations.

Treatment options for echinococcosis include surgery, such as laparoscopic pericystectomy, and percutaneous intervention.[5] Although surgery is effective, it has limitations, including prolonged hospitalization, the risk of abdominal adhesions, infection, and postoperative pain. For patients unable to undergo surgery, long-term anti-infective therapy with benzimidazoles (albendazole or mebendazole) is recommended.[3,5]

This case underscores the need to consider echinococcosis even in non-rural settings. Clinicians should include echinococcosis in the differential diagnosis, even in the absence of typical risk factors.

Case Presentation: *Patient demographics/ Chief complaint*

A 26-year-old female sales representative working in a mall presented with a one-month history of persistent cough and a one-day history of hemoptysis.

Initially dry, the cough had become productive over the past two weeks, with purulent and slimy sputum.

Clinical history: The patient consulted a pulmonologist and was prescribed symptomatic treatment for the cough. However, despite persistent symptoms, chest radiography revealed a cavitary lesion in the right mid-zone with associated infiltrates. Baseline laboratory investigations are summarized in Table 1.

Considering the clinical presentation, sputum studies were conducted to rule out pulmonary tuberculosis (TB). The patient presented with five to six episodes of blood-tinged sputum, approximately one spoonful per episode, indicating bleeding in

Table 1) Baseline laboratory investigations at the time of presentation

Laboratory Parameters	Mean Values
Hemoglobin | Albumin/Globulin (g*/dL)*	9.6|3.70|3.10
Hematocrit %	29.9
Creatinine | Calcium | Phosphorus | BUN | Urea (*mg/dL*)	0.66|8.76|4.4|10.97|23.50
Sodium | Potassium | Chloride | Bicarbonate *(mmol/L*)	141|4.13|106|23.1
SGOT | SGPT | GGTP | ALP (*U/L*)	23|18|18|83
Direct | Indirect Bilirubin (*mg/dL*)	0.20|0.12
PT	12.6
CRP (*mg/L*)	6.47
HbA1c *%*	5.80%
HbsAg	Non-reactive
Mycoplasma Antibody	Negative

*Blood Urea Nitrogen (BUN), Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT), Gamma-Glutamyl Pyruvate Transaminase (GGTP), Alkaline Phosphatase (ALP), Prothrombin Time (PT), C-reactive Protein (CRP), Hemoglobin A1c (HbA1c), Hepatitis B Surface Antigen (HbsAg)

the airways, likely from a ruptured hydatid cyst in the lungs. The frequency of episodes increased the day prior to presentation, prompting the patient to seek medical attention.

The patient's serum Echinococcus IgG level was elevated at 2.19 index units, exceeding the positive cutoff of 1.1, suggesting current or prior exposure to *Echinococcus* species. While seropositivity indicates the presence of specific antibodies, it does not definitively confirm active hydatid disease.

Risk assessment: The patient presented with acute hemoptysis (one-day duration) and a chronic cough persisting for one month. Two weeks prior to presentation, she was treated for right-sided pneumonia in her home country, the Syrian Arab Republic. Given Syria's endemicity for *Echinococcus* and her recent travel history, this epidemiological context is clinically relevant. The patient denied secondary exposures, including contact with contaminated water, insect/animal bites, or consumption of raw food.

Radiological findings : Chest radiography revealed two cavitary lesions with dense, homogeneous opacity in the right lower zone (Figure 1). Additionally, nodular and cavitary lesions were observed in the right mid-zone, accompanied by prominent broncho vascular markings. A well-defined nodular opacity was also seen in the lower posterior zone of the right lung, overlapping the liver shadow (indicated by red arrows). High-resolution chest CT (HRCT) revealed a large, thin-walled cavitary lesion (wall thickness ~6 mm) in the superior segment of the right lower lobe, measuring 47 × 39 mm, with internal free-floating membranes and scolices, surrounded by subtle ground-glass haze, as shown in Figure 1. Another cystic, non-enhancing lesion measuring 27 × 25 mm was identified in the same segment, inferior to the first lesion, with a Magnetic Resonance Venography (MRV) of 23 HU.

The third predominant fluid attenuation lesion, measuring 43 × 39 mm was observed in the posterobasal segment of the right lower lobe, as shown in Figure 1. Evidence of ground-glass opacities and centrilobular tree-in-bud patterns was noted in the superior segment of the right lower lobe. The visualized part of the upper abdomen

revealed a large (83 x 82 mm), non-enhancing, predominantly fluid attenuation lesion, occupying the right lobe of the liver, with mild perilesional edema.

Diagnosis: The clinical presentation, along with radiological and serological findings, was consistent with hydatidosis (echinococcosis) involving both the lungs and liver. The expectoration revealed the contents of a cystic echinococcus.

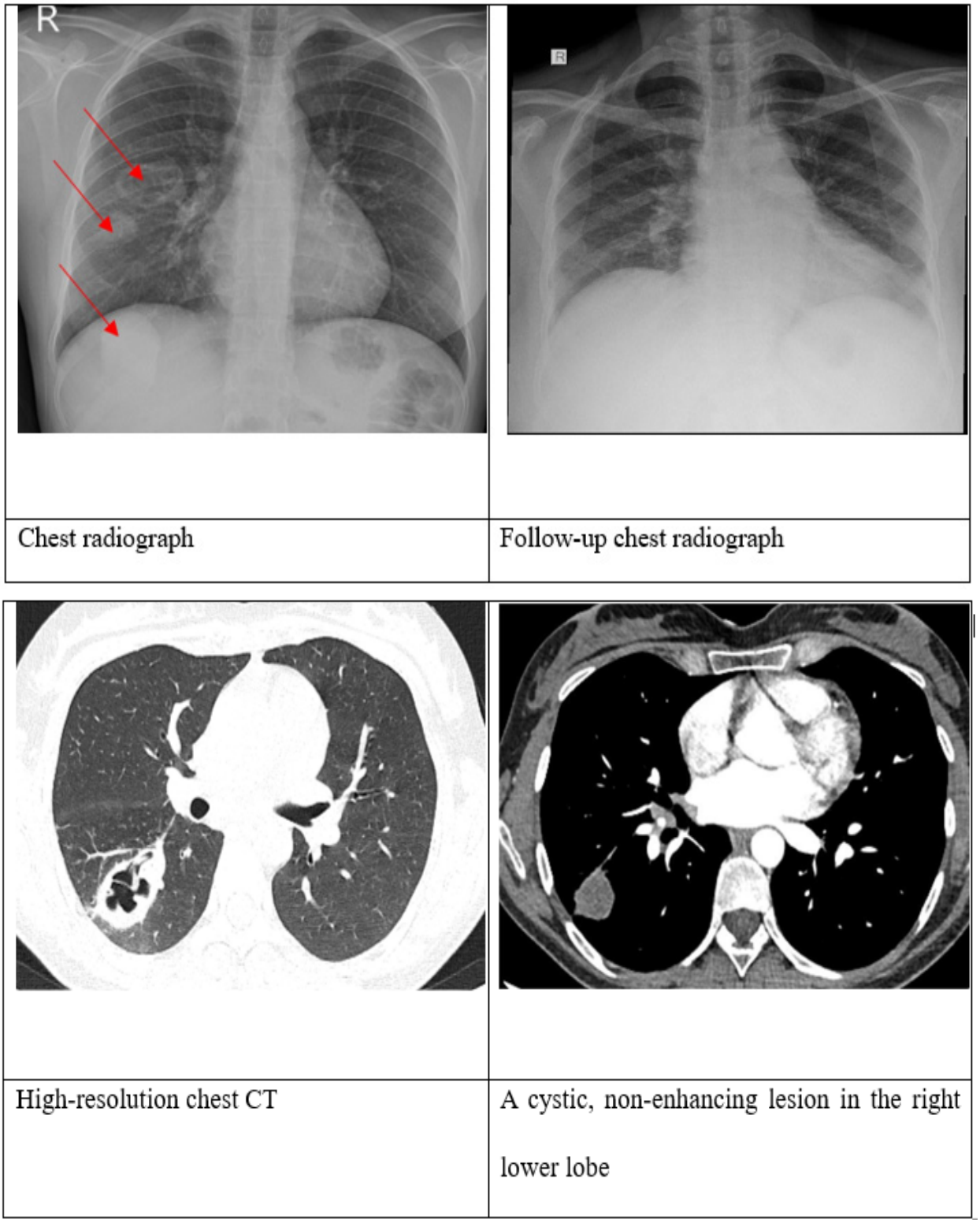


Figure 1) Radiograph and CT findings of the patient

Management : Albendazole 400 mg was initiated twice daily, with regular monitoring of liver function and blood counts over a four-week period. Combination therapy with praziquantel is typically reserved for complex cases or those demonstrating resistance to standard treatment. In this case, since the patient was awaiting surgical intervention, a four-week course of albendazole monotherapy was selected as the preferred regimen.

Bronchoscopy was performed under general anesthesia, using an I-gel No. 3 supraglottic airway device to evacuate the contents and clear the airways. A membrane-like structure was observed in the right main bronchus, along with blood-tinged purulent secretions in the bronchial segments of the right lower lobe (Figure 2).

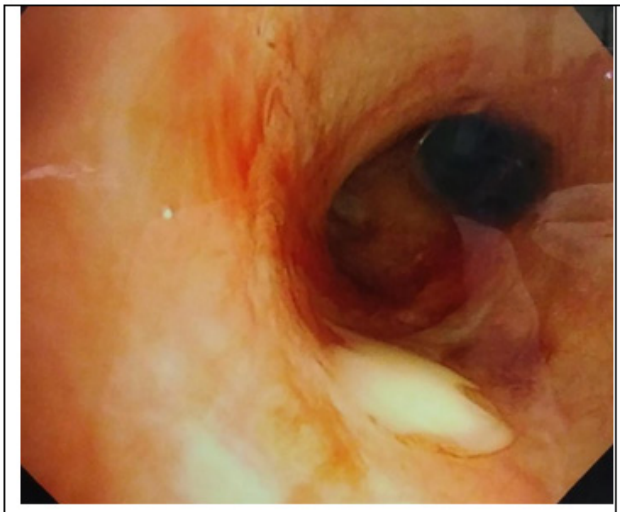
A fleshy lesion protruding from the posterior segment of the right lower lobe in the superior bronchial segment, along with its contents, was observed (Figure 2). The contents were aspirated following saline instillation.

Inflamed, hyperemic mucosa was noted throughout the bronchial segments of the right lower lobe; however, no active bleeding or mass lesions were detected. The visualized segments were patent up to the subsegmental level. The patient was closely monitored for potential anaphylactic reactions and was administered hydrocortisone 100 mg twice daily on the day of the procedure.

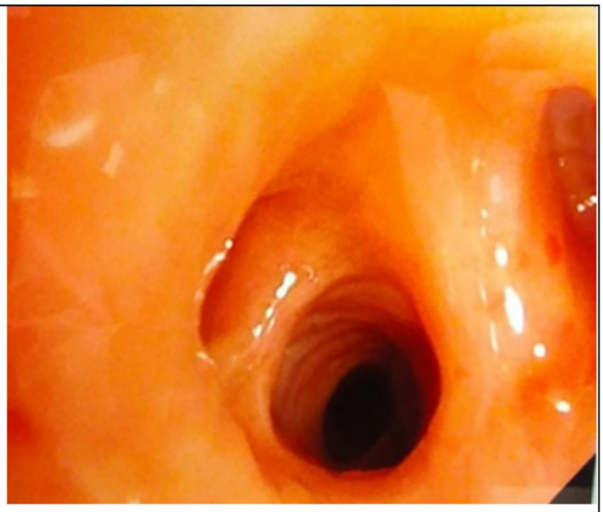
Risk factor analysis : A detailed history was obtained to assess any association with pets or raw meat consumption, both of which the patient denied. The patient was a nonsmoker.

Microbiological investigations: The hydatid serology test was highly positive, confirming the diagnosis of hydatidosis. The bronchoalveolar lavage (BAL) test results for *Mycobacterium tuberculosis* cultures were negative. No evidence of scolices or parasitic elements was detected, and the stool examination for ova and parasites was negative.

End-stage management plan: Consultations with thoracic and gastrointestinal surgeons were sought for further management. It was decided to continue albendazole therapy for 4-6 weeks, followed by reassessment and



Bronchoscopy image showing membrane-like structure



Bronchoscopy image showing fleshy lesion

Figure 2) Bronchoscopy findings of the patient

surgical intervention as needed.

Follow-up and Prognosis: A radiograph was obtained three weeks post-discharge, demonstrating reasonable resolution (Figure 1).

Discussion

Hydatidosis remains prevalent in many livestock-raising regions, yet it is often underreported in scientific literature. The World Health Organization (WHO) estimates the annual incidence of human echinococcal infection to exceed 0.05%.[8] Given its impact, prioritizing comprehensive studies on this parasitic infection and increasing awareness among livestock farmers about its associated risks is essential.

Hydatidosis is typically asymptomatic, with most cases identified incidentally through imaging or after the onset of complications.[6,9] However, when symptoms occur, they are typically dependent on the location of the cyst within the body. Respiratory symptoms such as coughing, chest pain, and shortness of breath may develop in lung cysts. When cysts are located in the liver, patients may experience symptoms such as fever, abdominal discomfort, and hepatomegaly.[4] In the present case, the patient presented with mild hemoptysis, suggestive of lung hydatidosis.

Cyst rupture is a major concern, as it can result in parasitic dissemination to surrounding organs and may trigger anaphylactic shock, or complications such as trauma, rhinorrhea and dyspnea, which can arise from surgical procedures performed to remove the cysts.[2,4] In the present case, a bronchoscopy was performed to remove the contents of the ruptured cyst. Bronchoscopy was chosen to prevent complications such as dissemination and to ensure airway patency. Additionally, 100 mg of hydrocortisone was administered prophylactically to reduce the risk of adverse reactions.

In adults, the liver is the most commonly affected organ, while in children, pulmonary involvement is more frequent.[10] Some patients may also develop both hepatic and pulmonary cysts concurrently.[10] In the present case, the patient exhibited simultaneous involvement of both the lungs and liver. Coexistence of pulmonary and hepatic hydatidosis occurs in 4% to 25% of cases, with the right lower lobe being most commonly affected.[8] In the present case, the right lower lobe of the patient's lung was primarily involved.

In terms of treatment, smaller or uncomplicated cysts (less than 5 cm) generally respond well to albendazole, administered alone or in combination with praziquantel.[2] Several studies have demonstrated the efficacy of combination therapy. Popova et al. reported a treatment regimen involving albendazole (15 mg/kg) and praziquantel (40 mg/kg) administered weekly, a protocol also found to be effective by Suarez et al.[11,12] In our case, as well as in the study by Roman et al., albendazole 400 mg was administered twice daily.

However, drug therapy for hepatic hydatid cysts may not always result in complete cyst resolution, particularly for larger cysts (>10 cm) or those at risk of rupture, which often necessitate surgical intervention. Laparoscopy is rarely performed due to risks such as dissemination and recurrence, whereas total cystopericystectomy is preferred for its lower complication rate.[4,13] Other surgical options include segmentectomy, cyst excision by enucleation, and wedge resection, with intraoperative irrigation using agents such as 0.5% silver nitrate or 15% hypertonic saline to minimize the risk of anaphylaxis and parasitic dissemination.[10]

In our case, bronchoscopy was performed due to its minimally invasive nature, facilitating the removal of ruptured cysts. This approach

eliminates the need for surgery, anesthesia, and prolonged hospitalization, while reducing complications and morbidity. Also, bronchoscopy is a cost-effective alternative to conventional surgical treatments.[14]

Puncture-aspiration-injection-reaspiration (PAIR) is an alternative for patients who cannot undergo surgery. It prevents recurrence, morbidity, and death.[4,15] However, it carries risks such as hemorrhage, anaphylaxis, infection, and cyst decompression, leading to biliary fistulas.[15] Ongoing studies are investigating new treatment approaches, such as percutaneous thermal ablation (PTA), which utilizes a radiofrequency ablation (RFA) device to eliminate the germinal layer of the cysts. As the treatment is still experimental, further research and regulatory approval are required before it can be widely implemented.[4] Simultaneous pulmonary and hepatic hydatidosis is uncommon and is typically observed in rural or endemic regions with frequent exposure to livestock or dogs. This case report offers a distinctive contribution to the literature by detailing a patient from an urban environment with no prior history of direct animal exposure or conventional risk factors. The lack of traditional exposures challenges established epidemiological assumptions and broadens our comprehension of disease transmission. The urban presentation highlights emerging risk factors, such as international travel and the consumption of contaminated food, that may facilitate parasite transmission even in non-endemic regions. Indirect exposure can occur in commercial settings, such as shopping malls, where contact with contaminated surfaces or food may lead to infection without direct encounter with animals. This example underscores the need for clinicians to consider hydatidosis in urban patients presenting with cystic lesions, even in the absence of traditional risk indicators. The management in this case entailed a synergistic strategy of albendazole therapy and interventional aspiration with saline instillation, yielding a positive outcome. This strategy highlights the benefits of integrating medicinal and procedural interventions rather than relying solely on a single modality, especially in cases of multi-organ involvement.

Conclusion

In summary, this case of concomitant pulmonary and hepatic hydatidosis illustrates the successful integration of medical therapy with interventional procedures. Notably, clinicians should consider bronchoscopy as a diagnostic and therapeutic tool in cases of ruptured pulmonary hydatidosis, particularly when patients present with persistent cough, hemoptysis, or suspected cyst rupture. In urban settings, where exposure to definitive hosts may be less obvious, maintaining a high index of suspicion for hydatidosis in patients with atypical presentations is essential. This case underscores the importance of a multidisciplinary approach and the need to remain informed about evolving interventional strategies to optimize outcomes in complex hydatid disease.

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