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Lung Cysts: Unveiling the Mystery of a Multi-Organ Parasite

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1. Introduction

Cystic echinococcosis (CE), caused by the larval stage of Echinococcus granulosus remains a significant parasitic zoonosis worldwide [1,2]. While the disease is still highly prevalent in endemic regions such as the Mediterranean, the Middle East, South America, and Central Asia, increasing globalization, migration, and international travel have led to a growing number of cases being identified in non-endemic areas [3,4]. The liver is the organ most frequently affected, accounting for 50–70% of cases, followed by the lungs in 20–30% [5]. In about 10–15% of patients, multiple organs are simultaneously involved, most commonly the liver and lungs [6]. In non-endemic settings, diagnosis is often delayed or missed, as clinical manifestations can closely resemble other conditions such as bacterial pneumonia, tuberculosis, abscesses, or even malignancies [7]. In these contexts, imaging studies, supported by serology and histopathology, represent the cornerstones for establishing a correct diagnosis [8]. Management typically requires a combination of anti-parasitic therapy and surgical or percutaneous interventions [9]. In this article, we present the case of a woman residing in Florida, USA, who was diagnosed in Switzerland with combined pulmonary and hepatic echinococcosis. We also review the literature, focusing on the diagnostic and therapeutic challenges posed by this uncommon presentation in a non-endemic setting.

2. Case Presentation

A 54-year-old woman from Florida, USA, presented to the Emergency Department of Lugano Hospital (Southern Switzerland) in September 2024 with a one-week history of fever (37.4 °C), cough, and hemoptysis. She had arrived in Switzerland three weeks earlier for vacation. Her past medical history was notable only for epilepsy, for which she was on lamotrigine therapy. She denied any recent rural travel, contact with livestock, or consumption of untreated water. On examination, breath sounds were reduced over the left lung base. Laboratory studies revealed a mildly elevated C-reactive protein level (28 mg/L; normal < 5 mg/L). A chest X-ray demonstrated an opacity in the left lower lobe, interpreted as pneumonia, and she was therefore started empirically on oral levofloxacin before being discharged home.

Two days later, she re-presented with ongoing fever and hemoptysis. Chest CT revealed a thick-walled cavitary lesion measuring 35 × 20 mm in the left lower lobe (Figure 1A). Bronchoscopy showed no endobronchial obstruction, but bronchoalveolar lavage (BAL) demonstrated marked eosinophilia (39%). Serology for Echinococcus granulosus returned positive and was confirmed by Western blot. Further staging with abdominal CT and MRI identified a 7 cm cyst in segment IV of the liver, causing compression of the left hepatic duct (Figure 1B). No additional cerebral or systemic involvement was detected. Taken together, the clinical, radiological, and serological findings were consistent with multi-organ cystic echinococcosis. At this point, a multidisciplinary team including infectious disease specialists, pulmonologists, thoracic surgeons, and hepatobiliary surgeons was convened to decide the optimal therapeutic approach. Albendazole (10 mg/kg/day) and praziquantel (60 mg/kg/day) were initiated one day before pulmonary surgery. The patient underwent wedge resection of the left lower lobe lesion. Eight weeks later, hepatic cystectomy was performed. Both procedures were uneventful. Anti-parasitic therapy was continued for six weeks after-hepatic surgery. After three months of follow-up, the patient completely recovered, with normal liver function tests and no clinical or radiological recurrence.

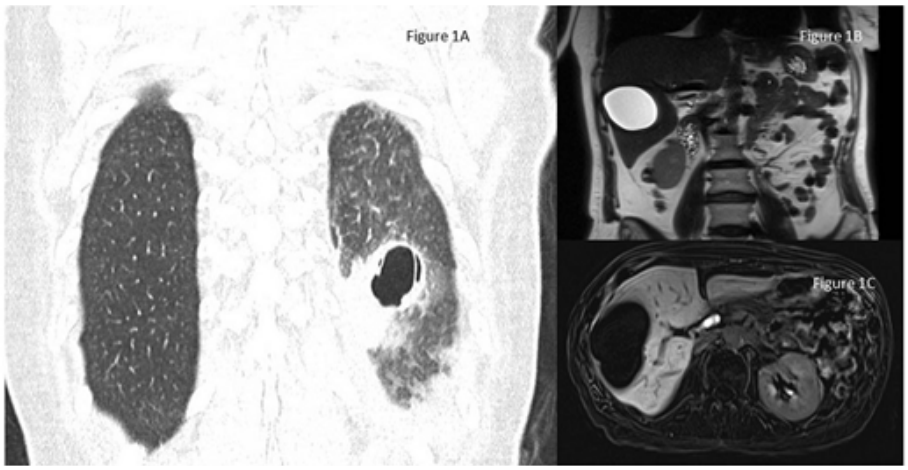

Figure 1: Lung (1a) and Hepatic Cysts (1b And 1c) Due to Echinococcus Granulosus

3. Discussion

Hydatid disease continues to represent a considerable diagnostic challenge in non-endemic settings, especially when patients lack clear epidemiological risk factors. In the present case, the patient's exposure history was uncertain, and it is plausible that the infection had been acquired during previous, unrecognized travel to an endemic area. Clinically, hemoptysis is a well-known manifestation of pulmonary echinococcosis, most often resulting from rupture of a cyst into the bronchi [10]. Interestingly, in our patient the cyst remained intact, suggesting that the bleeding was more likely the consequence of surrounding inflammatory changes rather than direct rupture. From a diagnostic perspective, chest CT plays a central role in defining the morphology and characteristics of pulmonary cysts, while MRI offers superior detail in assessing hepatic involvement [11]. Although eosinophilia in bronchoalveolar lavage fluid is non-specific, in the appropriate clinical context it may provide an additional clue toward a parasitic etiology. Serological testing remains essential to establish the diagnosis, even though its sensitivity and specificity vary according to both the stage and anatomical location of the cyst [12].

With regard to treatment, surgery is still considered the gold standard for managing both pulmonary and hepatic echinococcosis. Perioperative administration of antiparasitic agents such as albendazole reduces the likelihood of intraoperative spillage and recurrence [13,14]. The combination of albendazole with praziquantel has been proposed to enhance scolicidal activity, although robust evidence is still lacking [15]. Ultimately, the complexity of management in multi-organ disease underscores the need for a multidisciplinary approach, ensuring tailored surgical planning and optimal patient outcomes.

3.1. Clinical Learning Point

This case illustrates how the empiric treatment of presumed community-acquired pneumonia may delay the recognition of less common etiologies. Although the initial choice of a fluoroquinolone was in line with international guidelines for patients with comorbidities, the persistence of symptoms despite adequate antimicrobial coverage should raise concern for alternative diagnoses. Particular attention should be paid to atypical findings, such as eosinophilia, which may serve as an important clue to parasitic infections and warrant early reconsideration of the differential diagnosis.

3.2. Review of the Literature

Table 1 summarizes available papers on the synchronous hepatic and pulmonary diagnosis of echinococcosis in non-endemic settings. It remains controversial wheter the surgical approach should be made simoultaneously or not; nevertheless, outcomes were favourable with both approaches. A systematic review by Stojkovic highlighted that multi-organ involvement complicates management and often requires staged procedures; as a consequence, for our case we decided for a combined approach [8]. Taken together, the cases at the moment published illustrate several recurring themes. First, the diagnostic delay is frequent, since the initial clinical picture often mimics community-acquired pneumonia, lung abscess, or tuberculosis. Only persistent or atypical findings—such as hemoptysis, eosinophilia, or imaging of cavitary lesions with atypical features—can lead to the suspicion of echinococcosis. Second, comprehensive staging using CT and MRI is essential, as extra-pulmonary disease may otherwise be missed. Third, therapeutic strategy varies: while some teams have favored simultaneous resections to shorten hospital stay, most reports—including our case—adopt staged surgery to minimize intraoperative contamination and complications. Fourth, in all reports, albendazole was used pre- and post-operatively as adjunctive therapy; the addition of praziquantel, as in our patient, is less common but biologically plausible given its scolicidal activity [16]. Finally, outcomes in published cases have been consistently favorable when diagnosis was established before complications such as cyst rupture or secondary infection occurred [17].

Author, Year	Country	Organs involved	Presentation	Treatment	Outcome
Smith et al., 2017 [15].	UK	Liver + Lung	Cough, chest pain	Albendazole + staged surgery	Recovery
Rossi et al., 2019 [16].	Italy	Liver + Lung	Fever, hemoptysis	Albendazole + simultaneous surgery	Recovery
Chen et al., 2020 [17].	USA	Liver + Lung	Dyspnea	Albendazole + hepatic surgery, lung lobectomy	Recovery
Present case, 2025	Switzerland	Liver + Lung	Fever, hemoptysis	Albendazole + praziquantel + staged surgery	Recovery

Table 1

4. Conclusion

This case emphasizes the importance of considering echinococcosis in the differential diagnosis of cavitary lung lesions, even in patients from non-endemic areas. Early imaging, serology, and multidisciplinary management are pivotal for optimal outcomes in multi-organ disease.

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