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A Complicated Pulmonary Hydatid Cyst Mimicking Lung Cancer and Diagnosed After Lobectomy

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Abstract

Complicated pulmonary hydatid disease may resemble malignancy when its usual cystic appearance is obscured. We report a 65-year-old Moroccan farmer who presented with six months of recurrent low-volume hemoptysis, left basal chest pain, fatigue, and a 10-kg weight loss. Computed tomography demonstrated a suspicious, apparently solid left lower lobe mass measuring 49.3 × 42 × 36.5 mm and abutting the pleura, with no mediastinal lymphadenopathy or reported hepatic lesion. Bronchoscopy revealed inflammatory changes of the bronchial mucosa without any visible endobronchial tumor, while CT-guided transthoracic biopsy demonstrated nonspecific chronic fibroinflammatory changes with no evidence of malignancy. Positron emission tomography/computed tomography demonstrated mild fluorodeoxyglucose uptake, with a maximum standardized uptake value of 2.4, and no other suspicious hypermetabolic focus. Persistent suspicion of a resectable primary lung malignancy prompted the multidisciplinary team to recommend diagnostic and therapeutic surgery. Left lower lobectomy with lymph node dissection revealed a markedly altered hydatid cyst containing hydatid membranes, extensive suppurative inflammation, necrosis, and fibrosis. No malignancy was identified, and the sampled lymph nodes were reactive. The immediate postoperative course was favorable, and the patient was clinically stable at the one-month postoperative assessment. Postoperative albendazole was initiated after the histopathological diagnosis at 400 mg twice daily for one month. This case illustrates how a complicated pulmonary hydatid cyst can enter a lung cancer diagnostic pathway despite a nondiagnostic biopsy and low fluorodeoxyglucose uptake on PET/CT. Pulmonary echinococcosis should remain in the differential diagnosis of an atypical lung mass in an endemic setting, even without a detected hepatic lesion.

Categories: Radiology, Pathology, Pulmonology
Keywords: atypical presentation, cystic echinococcosis, hemoptysis, histopathology, lobectomy, lung cancer mimic, positron emission tomography, pulmonary hydatid cyst, pulmonary mass

Introduction

Cystic echinococcosis remains endemic in Morocco. A national retrospective study of 7,385 hospitalized cases between 2011 and 2021 reported pulmonary involvement in 15.68% of patients, with 62.96% originating from rural areas [1]. Transmission is associated with the dog-livestock cycle, with human infection resulting from the accidental ingestion of parasite eggs in contaminated environments [2].

Pulmonary cystic echinococcosis is an important manifestation of hydatid disease. Although an uncomplicated cyst may have a recognizable imaging appearance, complicated lesions can be difficult to distinguish from other pulmonary disorders [3,4]. In a surgical series of atypical pulmonary hydatidosis, lesions initially considered malignant included solid masses and cavitary or necrotic abnormalities [5]. Radiological reviews have also described atypical appearances of complicated pulmonary hydatid cysts that can mimic other lung diseases [6,7]. The diagnostic consequences are substantial when a patient undergoes an oncological workup before the parasitic nature of the lesion is established.

We describe a pulmonary hydatid cyst diagnosed on a lobectomy specimen in an older man with hemoptysis, weight loss, and an apparently solid peripheral lung mass. The case is informative because a nondiagnostic transthoracic biopsy and mild fluorodeoxyglucose uptake did not resolve the discrepancy between the suspicious clinical presentation and the absence of histological evidence of malignancy.

Case Presentation

A 65-year-old Moroccan man who had worked as a farmer for approximately 30 years presented with a six-month history of recurrent low-volume hemoptysis, left basal pleuritic chest pain, fatigue, and unintentional weight loss of 10 kg. He reported no dyspnea. His medical history included type 2 diabetes mellitus with poor glycemic control and long-term passive tobacco smoke exposure.

He was afebrile and clinically stable, with a performance status of 1 and a body mass index of 20.5 kg/m². Chest examination was unremarkable, and no peripheral lymphadenopathy was detected. Capillary blood

glucose was 2.4 g/L, with no glycosuria or ketonuria. Laboratory testing showed a normal total leukocyte count and no eosinophilia, with an absolute eosinophil count of 0.04 × 10^9/L. C-reactive protein was elevated at 32.6 mg/L. Selected laboratory findings are summarized in Table *1*.

Parameter	Result	Laboratory reference
Hemoglobin	12.3 g/dL	13-18 g/dL
Leukocytes	6.24 × 10^9/L	4.0-10.0 × 10^9/L
Neutrophils	3.44 × 10^9/L	1.50-7.00 × 10^9/L
Eosinophils	0.04 × 10^9/L	0.02-0.50 × 10^9/L
Platelets	270 × 10^9/L	150-400 × 10^9/L
C-reactive protein	32.6 mg/L	0-5
Serum glucose	13.76 mmol/L	3.89-6.11
Glycated hemoglobin	9.8%	<5.7%
Creatinine	57.5 µmol/L	63.6-110.5
Urea	5.33 mmol/L	2.83-7.16
Albumin	38 g/L	35-52
Aspartate aminotransferase	17 U/L	<50
Alanine aminotransferase	19 U/L	0-55
Prothrombin activity	96%	70-140
Activated partial thromboplastin time	23.0 seconds	23.0-33.0

TABLE 1: Selected laboratory findings during the preoperative workup

Chest CT demonstrated an apparently solid lesion in the lateral basal segment of the left lower lobe, measuring 49.3 × 42 × 36.5 mm and abutting the parietal pleura. Its appearance was considered suspicious for a pulmonary tumor. Background centrilobular emphysema was present. No mediastinal lymphadenopathy was reported, and the liver and adrenal glands were described as normal (Figure *1*).

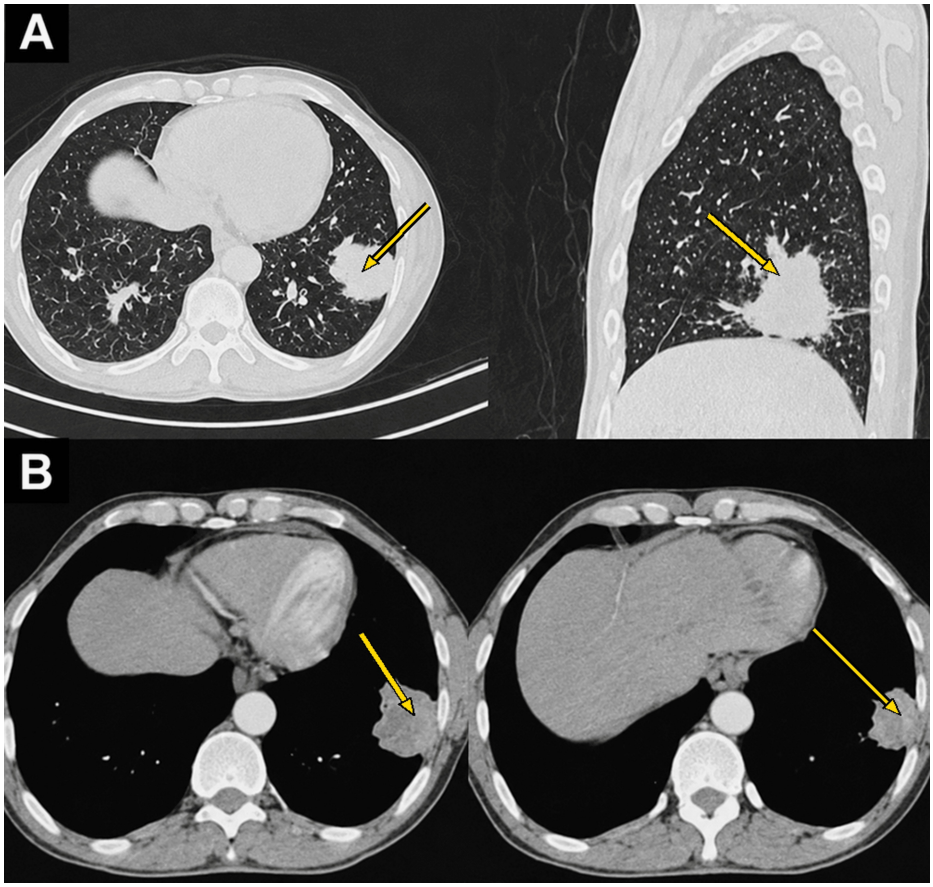


FIGURE 1: Preoperative Chest Computed Tomography Showing a Left Lower Lobe Mass Suspicious for Malignancy (Yellow Arrows)

Chest computed tomography (CT) demonstrating an irregular, apparently solid mass in the lateral basal segment of the left lower lobe, measuring 49.3 × 42 × 36.5 mm and abutting the parietal pleura. (A) Axial and sagittal images in lung windows showing the peripheral pulmonary mass (yellow arrows). (B) Axial images in mediastinal windows demonstrating the solid-appearing lesion and its close relationship with the pleura (yellow arrows). The overall radiological appearance was suspicious for primary lung malignancy.

Flexible bronchoscopy showed nonspecific inflammatory changes of the bronchial mucosa, without any visible endobronchial lesion. CT-guided transthoracic biopsy revealed nonspecific chronic fibroinflammatory changes, with no evidence of malignancy (Figure *2*).

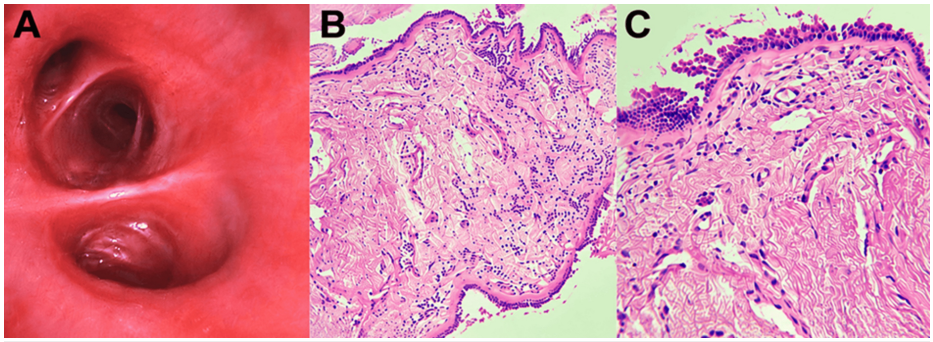


FIGURE 2: Bronchoscopic and Histopathological Findings of the CT-Guided Transthoracic Biopsy

(A) Flexible bronchoscopy showing inflammatory changes of the bronchial mucosa, without visible endobronchial tumors or thickening of the bronchial spurs. (B, C) Histopathological examination of the CT-guided transthoracic biopsy specimen showing nonspecific chronic fibroinflammatory changes, with no evidence of malignancy (hematoxylin and eosin staining; B: ×20, C: ×40).

Because the biopsy did not provide a specific explanation for the mass, the case was discussed at a multidisciplinary thoracic oncology meeting, which recommended fluorodeoxyglucose positron emission tomography/CT (FDG PET/CT). FDG PET/CT showed an irregular pleura-abutting mass in the same segment, measuring 37 × 29 × 36 mm, with a maximum standardized uptake value (SUVmax) of 2.4, compared with a reported hepatic reference SUV of 2.0. No other suspicious hypermetabolic focus was reported (Figure *3*).

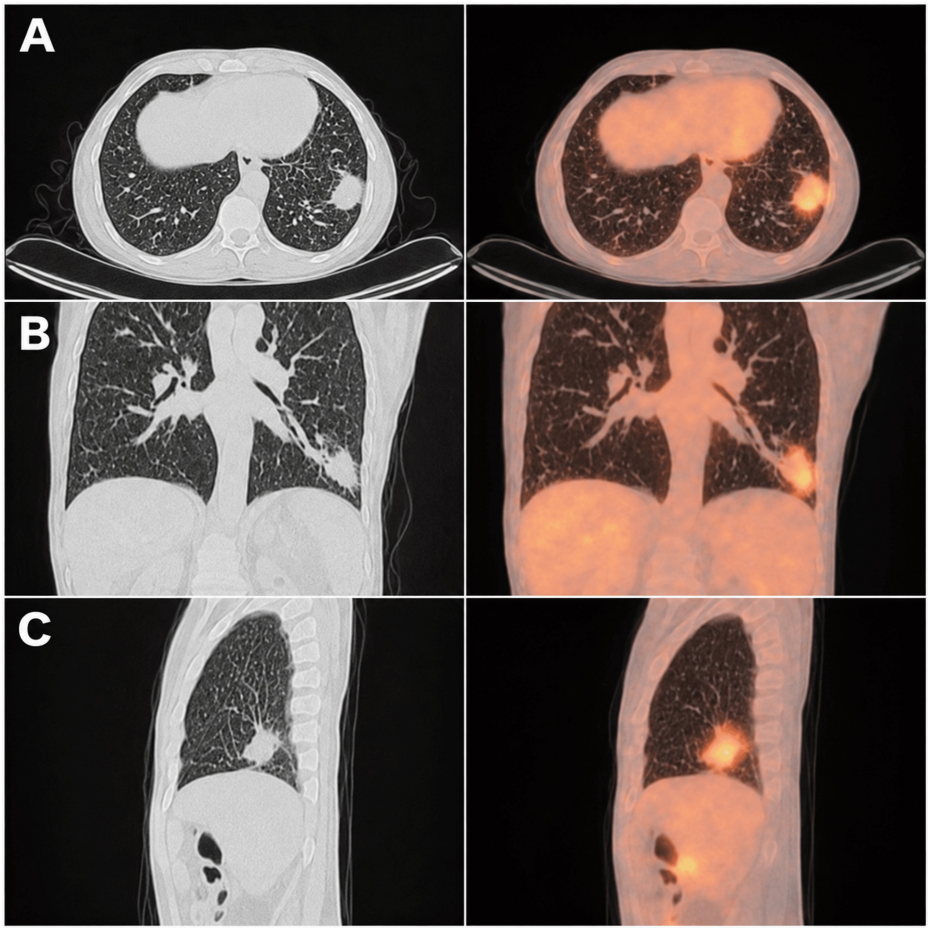
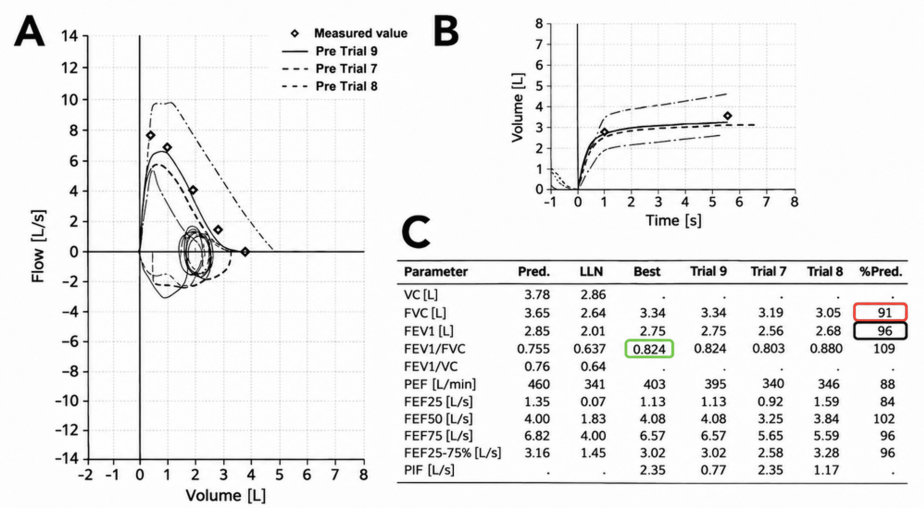


FIGURE 3: Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Showing Mild Uptake in the Left Lower Lobe Mass

Fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) showing an irregular pleura-abutting mass in the lateral basal segment of the left lower lobe, measuring 37 × 29 × 36 mm, with mild FDG uptake (SUVmax 2.4), compared with a reported hepatic reference SUV of 2.0. (A) Axial CT images and fused FDG PET/CT images. (B) Coronal CT images and fused FDG PET/CT images. (C) Sagittal CT images and fused FDG PET/CT images. No other suspicious hypermetabolic focus was identified.

Despite this mild uptake, the integrated clinical and morphological assessment remained concerning for a localized primary lung malignancy. Using the maximal diameter of 49.3 mm on the diagnostic chest CT and the absence of nodal or distant disease on the available imaging, the suspected lung cancer was provisionally staged as cT2bN0M0 (stage IIA). The multidisciplinary team recommended diagnostic and therapeutic surgery.

Preoperative spirometry showed a forced expiratory volume in one second of 2.75 L (96% predicted), a forced vital capacity of 3.34 L (91% predicted), and a ratio of 0.824 (Figure *4*).



Parameter	Pred.	LLN	Best	Trial 9	Trial 7	Trial 8	%Pred.
VC [L]	3.78	2.86	.	.	.	.	.
FVC [L]	3.65	2.64	3.34	3.34	3.19	3.05	91
FEV1 [L]	2.85	2.01	2.75	2.75	2.56	2.68	96
FEV1/FVC	0.755	0.637	0.824	0.824	0.803	0.880	109
FEV1/VC	0.76	0.64	.	.	.	.	.
PEF [L/min]	460	341	403	395	340	346	88
FEF25 [L/s]	1.35	0.07	1.13	1.13	0.92	1.59	84
FEF50 [L/s]	4.00	1.83	4.08	4.08	3.25	3.84	102
FEF75 [L/s]	6.82	4.00	6.57	6.57	5.65	5.59	96
FEF25-75% [L/s]	3.16	1.45	3.02	3.02	2.58	3.28	96
PIF [L/s]	.	.	2.35	0.77	2.35	1.17	.

FIGURE 4: Preoperative Spirometry Showing Preserved Pulmonary Function

Preoperative spirometry demonstrating preserved pulmonary function. (A) Flow-volume loop. (B) Volume-time curve. (C) Spirometric parameters showing a forced expiratory volume in one second (FEV1) of 2.75 L (96% of predicted), highlighted by the black rectangle; a forced vital capacity (FVC) of 3.34 L (91% of predicted), highlighted by the red rectangle; and an FEV1/FVC ratio of 0.824, highlighted by the green rectangle.

VC = vital capacity; PEF = peak expiratory flow; FEF25, FEF50, and FEF75 = maximal expiratory flows at the indicated lung volumes; FEF25-75% = mean forced expiratory flow between 25% and 75% of FVC; PIF = peak inspiratory flow.

His diabetes was managed with endocrinology input, and insulin treatment was documented by the time of surgery.

The patient underwent left lower lobectomy through a posterolateral thoracotomy. Pleural adhesions adjacent to the mass were released. Lymph node dissection included hilar, interlobar, subcarinal, and pulmonary ligament specimens. No notable intraoperative complication was reported.

Gross examination of the resected pulmonary lobe revealed a poorly demarcated, firm, whitish cystic lesion measuring 4.5 × 4 × 3.5 cm and containing folded membranous structures. Histological examination showed characteristic laminated hydatid membranes surrounded by an intense suppurative and chronic inflammatory reaction, with extensive areas of necrosis and fibrosis. These findings established the diagnosis of a markedly altered pulmonary hydatid cyst with prominent suppurative changes. No granulomas or malignancy were identified. The sampled lymph nodes showed reactive changes (Figure *5*).

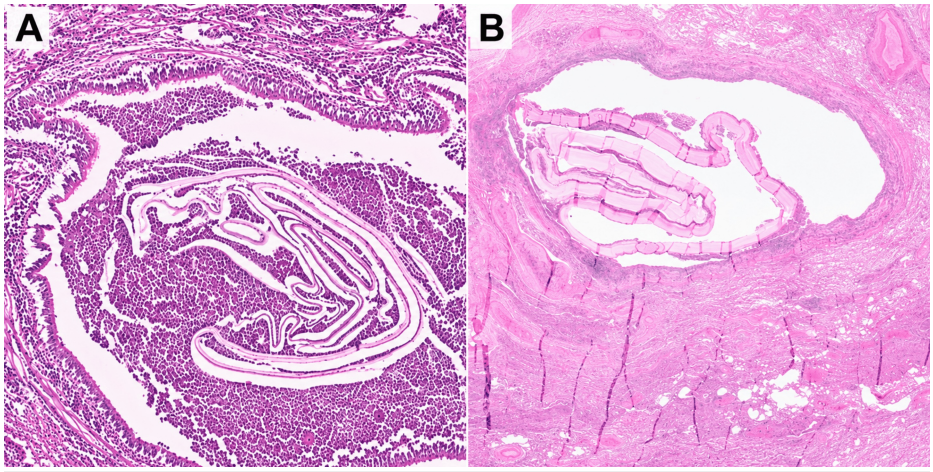


FIGURE 5: Histopathological Findings of the Resected Pulmonary Hydatid Cyst

(A) Pulmonary parenchyma involved by a hydatid cyst, showing prominent suppurative and necrotic inflammatory changes with a peripheral fibroinflammatory reaction (hematoxylin and eosin staining, ×10 magnification).

(B) Cystic lesion containing abundant laminated hydatid membranes within a cavity surrounded by a peripheral fibroinflammatory reaction (hematoxylin and eosin staining, ×1 magnification).

After the histopathological diagnosis, a targeted exposure history revealed that dogs were present in the patient's surroundings and that he raised and cared for sheep. Echinococcal serology was not requested postoperatively because identification of hydatid membranes in the resection specimen had established the diagnosis, and the treating team considered additional serological confirmation unnecessary.

The immediate postoperative course was favorable. After two days of intensive care monitoring, the patient was transferred to the thoracic surgical ward and subsequently discharged. Because hydatid disease had not been suspected preoperatively, albendazole was initiated after the histopathological diagnosis, at 400 mg orally twice daily for one month. At the one-month postoperative assessment, he was clinically stable. Albendazole was well tolerated clinically and biochemically; after one month of treatment, aspartate aminotransferase was 18 U/L and alanine aminotransferase was 20 U/L, both within the laboratory reference intervals. Chest radiography showed postoperative left hemi-thoracic volume loss and pleural thickening attributed to scarring (Figure *6*).

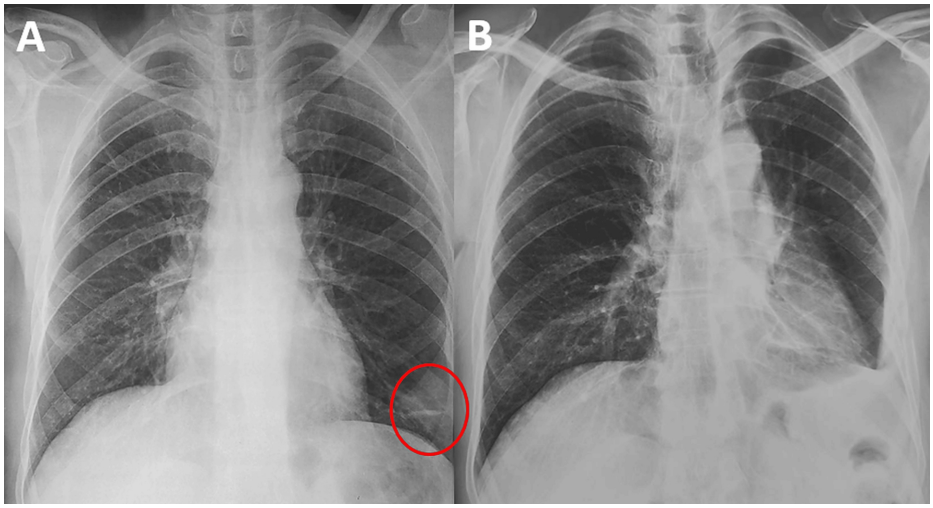


FIGURE 6: Comparison of preoperative and postoperative chest radiographs

(A) Preoperative chest radiograph showing a faint opacity in the left lower lung field (red circle).

(B) Postoperative chest radiograph showing left hemithoracic volume loss and pleural thickening consistent with postoperative scarring.

Discussion

The principal diagnostic difficulty was the combination of a clinically concerning presentation and an apparently solid pulmonary mass. Recurrent hemoptysis, substantial weight loss, older age, and irregular lesion contours made lung cancer a reasonable working diagnosis. However, no preoperative sample demonstrated cancer. The diagnostic uncertainty persisted until examination of the surgical specimen established hydatid disease.

The resection specimen provides a plausible pathological explanation for the misleading appearance. Hydatid membranes were accompanied by extensive fibrosis, necrosis, and suppuration. These changes may have obscured the expected cystic character, as imaging reviews describe atypical appearances of complicated pulmonary hydatid cysts [6,7]. The broader phenomenon is documented: Yazici et al. described 15 atypical pulmonary hydatid cases, including lesions resembling solid tumors, with nondiagnostic transthoracic biopsies in three patients [5]. Our case extends these observations by linking the nonspecific preoperative findings with extensive suppurative and fibrotic changes in the resected lesion.

PET/CT also requires careful interpretation. The lesion SUVmax of 2.4 was only slightly higher than the reported hepatic reference SUV of 2.0 and did not provide strong metabolic evidence of malignancy. In the atypical hydatidosis series, SUVmax values ranged from 2 to 7.8 among the five patients who underwent PET/CT [5]. Darwish et al. likewise reported an infected pulmonary hydatid cyst with suspicious CT and PET findings in a patient with weight loss [8]. Ozkan et al. reported FDG accumulation in an infected pulmonary hydatid cyst [9], while Yang et al. described pericystic hypermetabolism in a ruptured pulmonary hydatid cyst despite absent uptake within the cyst itself [10]. These observations illustrate that FDG uptake in or around a hydatid lesion may reflect inflammatory complications and cannot be interpreted in isolation as evidence of malignancy. In our patient, PET/CT did not establish the etiology of the mass; the decision to operate followed the overall clinical assessment.

No hepatic lesion was described, and the eosinophil count was within the laboratory reference interval. Neither finding excluded the eventual parasitic diagnosis. Pulmonary involvement can occur without hepatic disease, and routine laboratory abnormalities are not diagnostic of hydatid infection [4]. The postoperative history of dogs in his surroundings and sheep husbandry provided an epidemiological context compatible with echinococcosis. These exposures were elicited only after the diagnosis, emphasizing the value of a targeted exposure history early in the evaluation of an atypical lung mass. Serology was not performed in this case: the diagnosis was subsequently established by the identification of hydatid membranes in the resection specimen.

The initial biopsy sampled nonspecific fibroinflammatory tissue. In retrospect, this could reflect the altered tissue surrounding the cyst. Once pulmonary hydatid disease is suspected, further percutaneous puncture requires particular caution because cyst puncture can cause pleural dissemination and is contraindicated in pulmonary cystic echinococcosis [3]. In our patient, biopsy was undertaken during the cancer workup, before

the parasitic etiology was recognized.

Surgery is central to pulmonary hydatid management, with parenchymal preservation preferred whenever feasible [11]. Anatomical resection may nevertheless be required for severe local damage or when a complicated lesion cannot be distinguished from malignancy [4]. In this case, lobectomy was selected for a suspected resectable lung tumor. The records do not establish whether a lesser resection could have been performed had the parasitic diagnosis been recognized earlier. The educational implication is to broaden the preoperative differential, rather than to assert retrospectively that the lobectomy was avoidable.

The 2025 World Health Organization guidance suggests postoperative albendazole when spillage is suspected or has occurred in surgically treated uncomplicated active lung cysts of 5 cm or less; that recommendation is conditional and based on expert consensus [12]. Its direct scope differs from the markedly suppurative lesion reported here. Our patient received albendazole at 400 mg twice daily for one month after histopathological confirmation. Treatment was well tolerated, with normal transaminases after one month. The short follow-up does not establish the regimen's effectiveness in preventing recurrence. Although the early clinical outcome was favorable, longer follow-up is needed to assess disease control and recurrence.

Conclusions

A complicated pulmonary hydatid cyst can present as a suspicious solid-appearing lung mass with hemoptysis and weight loss. In this patient, the diagnosis was established only after left lower lobectomy, when hydatid membranes and extensive suppurative and fibrotic changes were identified. The case supports maintaining pulmonary echinococcosis in the differential diagnosis of an atypical lung mass in an endemic setting, even when no hepatic lesion or eosinophilia is detected. Mild FDG uptake and a nonspecific biopsy should be interpreted alongside the clinical and morphological findings, with continued attention to alternative diagnoses.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Drafting of the manuscript: Mehdi Maaroufi

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Supervision: Hanaa Harraz, Khadija Chaanoun, Hanane Benjelloun, Nahid Zaghba

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **AI use statement:** The authors have declared that no AI tools were used during the work or in the drafting of this article. The authors take full responsibility for the work. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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