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An Atypical Mass-Like Presentation of Pulmonary Sarcoidosis: Diagnostic Challenges and Review of Differential Diagnoses

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Abstract

Background: Sarcoidosis is a multisystem granulomatous disease that most commonly affects the lungs, though its presentation is highly variable. While bilateral hilar lymphadenopathy and perilymphatic nodules are the classical radiological features, atypical forms such as mass-like opacities can mimic malignancy and lead to diagnostic delays.

Case Presentation: We describe the case of a 42-year-old woman who presented with persistent cough, weight loss, and an FDG-avid mass-like consolidation in the left lower lobe. Initial investigations suggested possible malignancy or infection. Bronchoscopy with Broncho alveolar lavage and brushings was non-diagnostic. However, endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) revealed non-caseating granulomas. Elevated serum angiotensin-converting enzyme (ACE) and hypercalcemia supported the diagnosis. Given a contraindication to corticosteroids due to comorbid bipolar I disorder, she was initiated on methotrexate and folic acid.

Conclusion: This case highlights the diagnostic complexity of atypical pulmonary sarcoidosis and emphasizes the importance of a systematic approach integrating clinical, radiological, and histopathological findings. Clinicians must consider sarcoidosis in the differential diagnosis of mass-like lung lesions to avoid unnecessary interventions and ensure timely treatment.

Keywords: Sarcoidosis; Lungs; Lower lobe and malignancy

Commentary

Sarcoidosis is a chronic inflammatory disease of unknown etiology, characterised by the formation of non-caseating granulomas in involved organs, most frequently the lungs and intrathoracic lymph nodes. First described by Hutchinson in 1877, sarcoidosis remains a clinical enigma due to its protean manifestations and variable course [1]. The current understanding suggests that the disease arises from an exaggerated immune response to an unidentified antigen in genetically susceptible individuals [2,3]. The global incidence of sarcoidosis varies significantly by region and ethnicity, ranging from 2.3 to 11 per 100,000 persons annually [4]. Higher rates have been reported in Northern European populations, particularly in Sweden and Iceland, and among African Americans in the United States, who also experience more severe disease [5]. A bimodal age distribution is commonly observed, with a peak incidence in individuals aged 25–40 years and a second, smaller peak in women over 50 [6]. While pulmonary involvement is nearly universal, extrapulmonary manifestations may include cutaneous, ocular, hepatic, splenic, cardiac, and neurological involvement [7]. Classic pulmonary sarcoidosis typically presents with bilateral hilar lymphadenopathy, upper lobe predominant perilymphatic nodules, and reticulonodular infiltrates. However, atypical presentations such as mass-like consolidations, alveolar opacities, cysts, or cavitation occur in up to 25% of cases and may resemble infections or malignancy [8,9]. In this report, we present a case of pulmonary sarcoidosis that initially mimicked a neoplastic process due to its mass-like appearance and extensive metabolic activity on PET-CT. We highlight the diagnostic

workup, radiologic considerations, differential diagnoses, and therapeutic approach, referencing the latest American Thoracic Society (ATS) guidelines [10].

Case Presentation

A 42-year-old woman with a 20-pack-year smoking history presented to the emergency department with a 6-month history of persistent dry cough, intermittent chest discomfort, progressive exertional dyspnea, and unintentional weight loss of approximately 5 kilograms. She denied fever, night sweats, haemoptysis, hoarseness, or upper respiratory tract symptoms. There was no significant occupational or environmental exposure, recent travel, or history of tuberculosis contact.

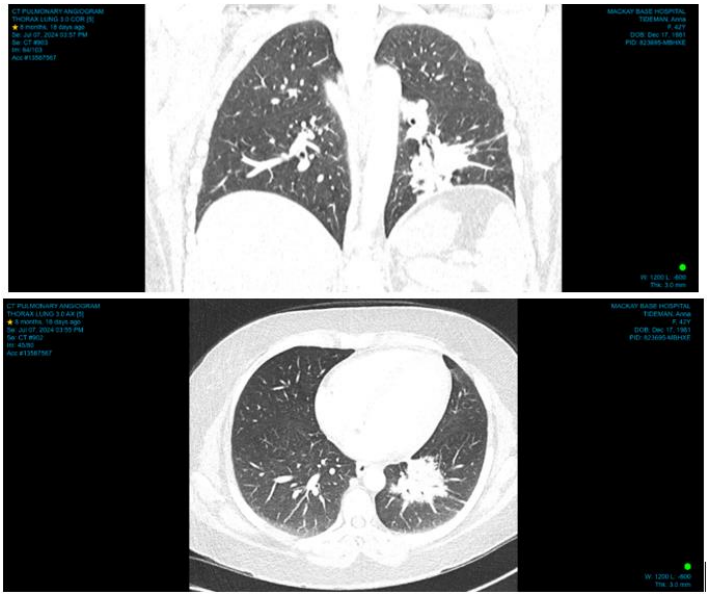


Figure 1: *CTPA showing 5.6 x 6.1 cm spiculated, mass-like consolidation in the medial aspect of the left lower lobe with central air bronchograms, adjacent atelectasis, and multiple bilateral hilar and mediastinal lymph nodes.*

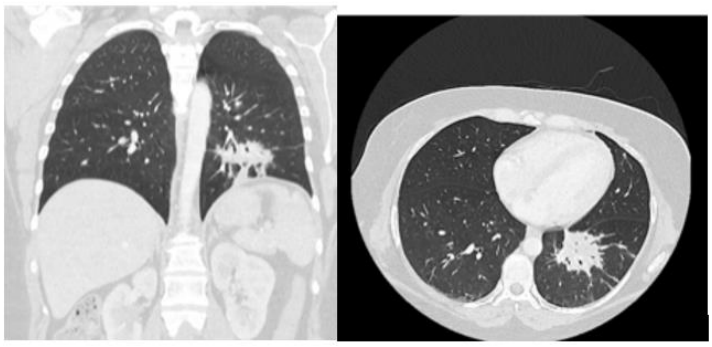
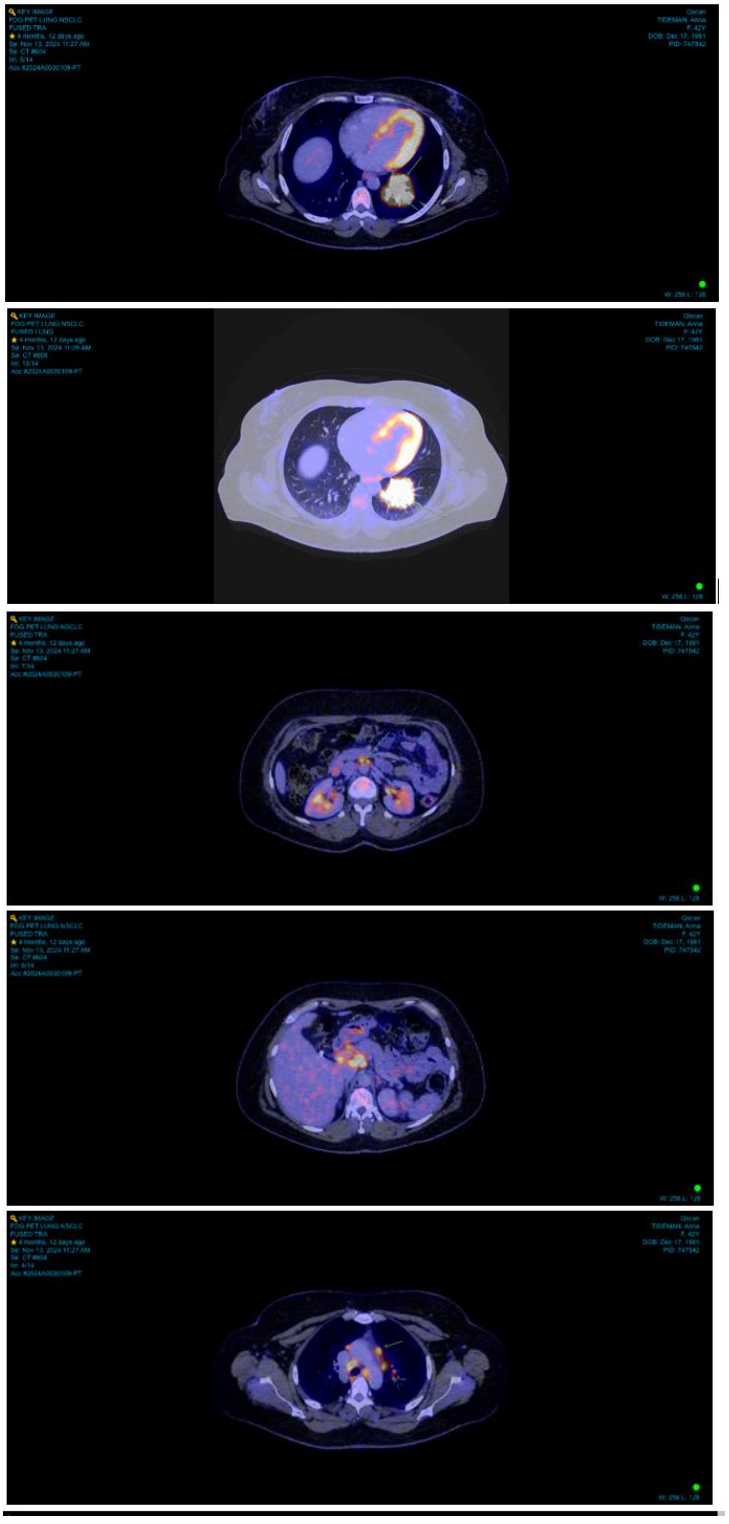


Figure 2: *Follow-up CT Chest, Abdomen, Pelvis and Neck showing persistent, unchanged in size, lesion in the left lower lobe.*

Her past medical history included bipolar I disorder, managed with mood stabilisers, and no known autoimmune disease. On physical examination, she was afebrile with a respiratory rate of 18 breaths per minute, heart rate of 96 beats per minute, blood pressure of 123/80 mmHg, and oxygen saturation of 98% on room air.



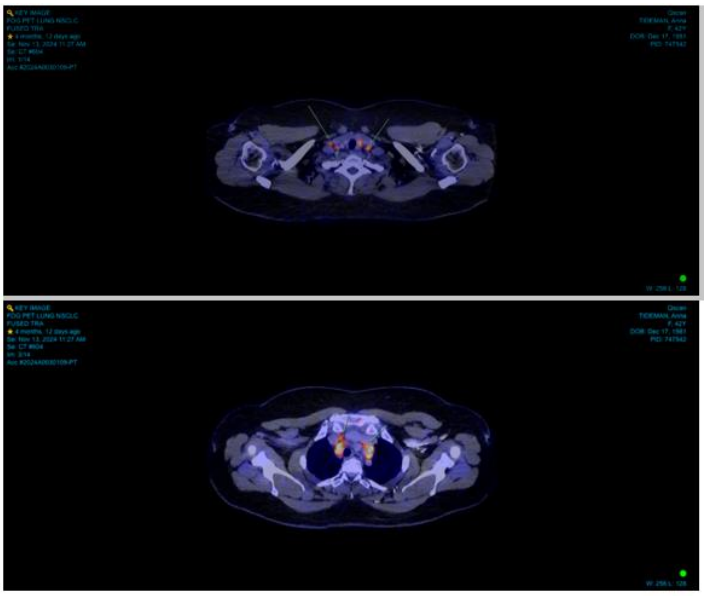
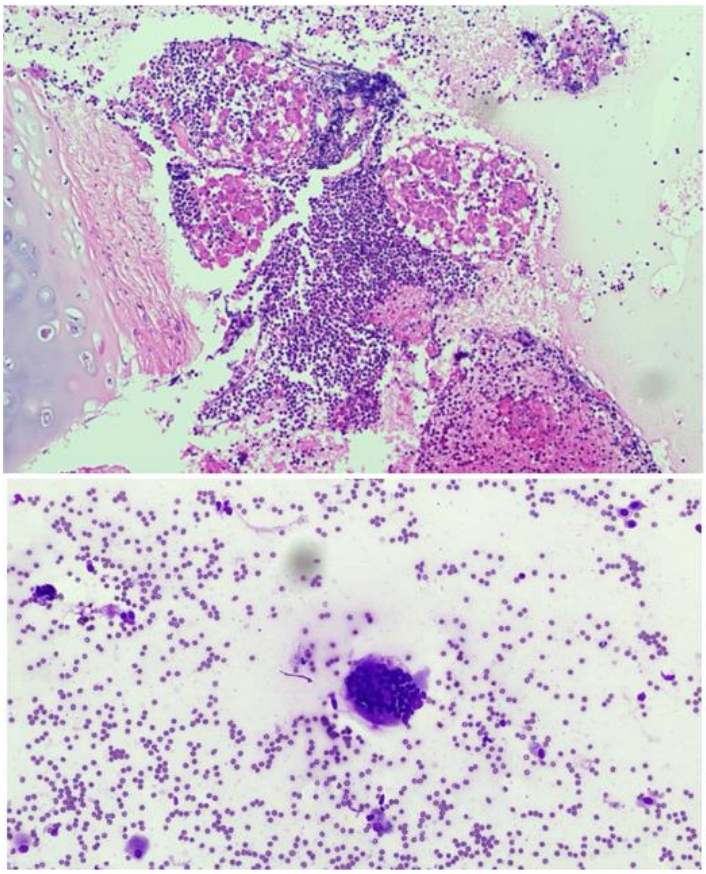


Figure 3: *PET-CT showing intense FDG uptake in the pulmonary lesion (SUVmax >10), bilateral hilar and mediastinal lymph nodes, bilateral supraclavicular and retroperitoneal lymph nodes, and the spleen.*



Chest auscultation revealed normal vesicular breath sounds bilaterally without wheeze or crackles. No palpable lymphadenopathy, rash, joint swelling, or peripheral stigmata of systemic illness were present. Initial laboratory investigations revealed leukocytosis with a white blood cell count of 16.8 x10⁹/L, neutrophilia (13.4 x10⁹/L), elevated CRP (8.8 mg/L), and a normal procalcitonin. Liver function tests, renal function, electrolytes, and cardiac biomarkers were within normal limits. D-dimer was elevated, prompting a CT pulmonary angiogram (CTPA), which excluded pulmonary embolism but identified a 5.6 x 6.1 cm spiculated, mass-like consolidation in the medial aspect of the left lower lobe with central air bronchograms, adjacent atelectasis, and multiple bilateral hilar and mediastinal lymph nodes.

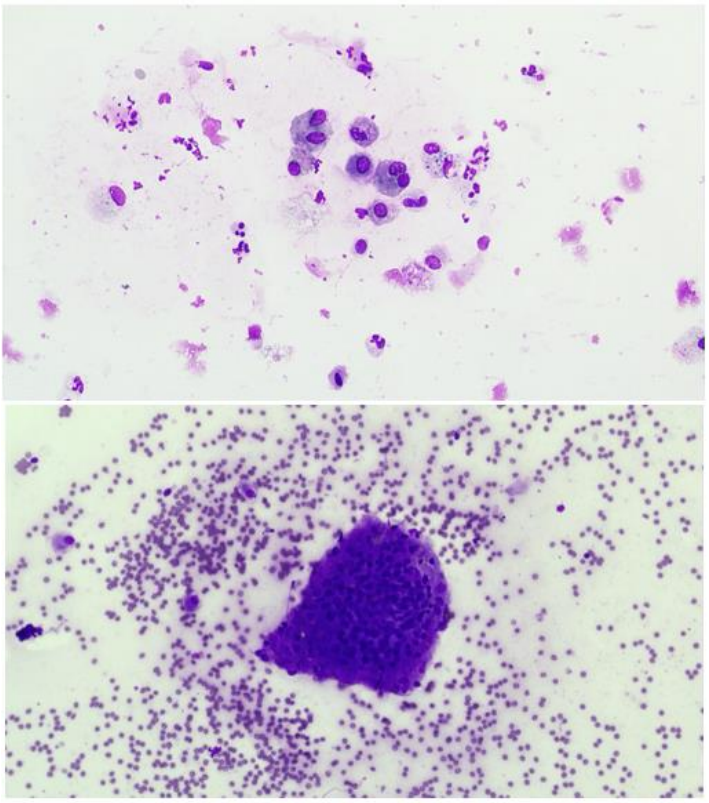


Figure 4: *EBUS-TBNA histopathology showing non-caseating granulomatous inflammation with epithelioid histiocytes and multinucleated giant cells.*

She was discharged with a presumptive diagnosis of atypical pneumonia and commenced on oral doxycycline and amoxicillin-clavulanate. However, her symptoms persisted despite additional empirical treatment with azithromycin. Her general practitioner ordered a CT scan of the chest, abdomen, pelvis, and neck, which confirmed the persistent lesion in the left lower lobe, now unchanged in size. A positron emission tomography-computed tomography (PET-CT) scan demonstrated intense FDG uptake in the pulmonary lesion (SUVmax >10), bilateral hilar and mediastinal lymph nodes, bilateral supraclavicular and retroperitoneal lymph nodes, and the spleen.

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ordered a CT scan of the chest, abdomen, pelvis, and neck, which confirmed the persistent lesion in the left lower lobe, now unchanged in size. A positron emission tomography-computed tomography (PET-CT) scan demonstrated intense FDG uptake in the pulmonary lesion (SUVmax >10), bilateral hilar and mediastinal lymph nodes, bilateral supraclavicular and retroperitoneal lymph nodes, and the spleen. Additional workup included a transthoracic echocardiogram (TTE), which showed normal biventricular size and function with no evidence of cardiac sarcoidosis. An abdominal MRI with hepatobiliary contrast revealed no hepatic parenchymal lesions. Blood tests showed elevated serum ACE (218 U/L), hypercalcemia (2.60 mmol/L), and elevated LDH (282 U/L). Full pulmonary function testing was normal, with an FEV1 of 100% predicted, FVC of 98%, and DLCO of 118%. Given the clinical, radiological, and histological findings, a diagnosis of pulmonary sarcoidosis was established. Due to the presence of bipolar I disorder, systemic corticosteroids were contraindicated. After consultation with the psychiatry team, she was commenced on methotrexate 7.5 mg once weekly and folic acid supplementation five days per week. She was reviewed in clinic 3 months later with symptomatic improvement.

Discussion

Pulmonary sarcoidosis can present with a wide range of radiographic appearances. While the classic presentation involves bilateral hilar lymphadenopathy and upper zone micronodular opacities, atypical manifestations including focal consolidation, solitary nodules, and mass-like lesions have been reported in up to 30% of cases [11,12]. These atypical presentations pose significant diagnostic challenges and may result in misdiagnosis as malignancy or infection [13]. The differential diagnosis for a spiculated, FDG-avid mass in the lung includes primary lung carcinoma, particularly adenocarcinoma; granulomatous infections such as tuberculosis and histoplasmosis; and lymphoproliferative disorders such as Hodgkin lymphoma [14,15]. PET-CT, while sensitive, lacks specificity in distinguishing malignancy from inflammatory processes. Splenic FDG uptake, although uncommon, has been described in systemic sarcoidosis and may aid in differentiating from neoplastic conditions [16]. Histopathological confirmation remains essential for diagnosis, particularly in atypical cases. EBUS-TBNA has emerged as a minimally invasive, highly sensitive tool for obtaining diagnostic tissue from mediastinal and hilar lymph nodes, with a diagnostic yield exceeding 80% in sarcoidosis [17]. Sarcoidosis may be associated with hypercalcemia due to increased extrarenal production of 1,25-dihydroxyvitamin D by activated macrophages in granulomas. Elevated serum ACE levels, while non-specific, are supportive when used in conjunction with other clinical and histological findings [18]. Corticosteroids are the mainstay of treatment for symptomatic pulmonary sarcoidosis, particularly in patients with functional impairment or progressive disease. However, steroid-sparing agents such as methotrexate, azathioprine, and mycophenolate mofetil are often employed in patients with steroid contraindications or intolerance [19,20]. This case highlights the importance of multidisciplinary management, particularly in patients with psychiatric comorbidities, where corticosteroids may exacerbate underlying mental illness.

Conclusion

This case report underscores the diagnostic complexity of pulmonary sarcoidosis, especially when presenting with mass-like lesions mimicking malignancy. Clinicians must maintain a high index of suspicion and adopt a systematic diagnostic approach, integrating radiological, histopathological, and clinical data. EBUS-TBNA is a valuable diagnostic tool in such cases, facilitating tissue confirmation while minimizing invasive procedures. Multidisciplinary collaboration is essential, particularly when standard treatments are contraindicated. Early recognition and appropriate management can improve outcomes and reduce unnecessary interventions in patients with atypical sarcoidosis presentations.

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