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CASE REPORT

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An unusual case of nodular pulmonary amyloidosis

Sarina Nikzad | **Amna A. Al-Arnawoot** | **Michael Cabaero** | **Patrik Rogalla**

Department of Medical Imaging, Toronto General Hospital, Toronto, ON, Canada

Correspondence
Sarina Nikzad, Department of Medical Imaging, Toronto General Hospital, Toronto, ON, Canada.
Email: serena.nikzad@mail.utoronto.ca

Abstract

Nodular pulmonary amyloidosis is a rare and localized manifestation of amyloid deposition in the lungs. This rare entity, though asymptomatic, is often misdiagnosed on imaging alone, due to its resemblance to metastatic pulmonary nodules. This report highlights the significance of histologic confirmation before treatment, as a preventive measure against overtreatment.

KEYWORDS

amyloid, interstitial lung disease, metastasis, nodular pulmonary amyloidosis, pulmonary nodules

1 | INTRODUCTION

Amyloidosis is a disease caused by amyloid buildup leading to multiorgan failure.[1] Amyloid is the abnormal fibrous deposit and is created by the misfolding of autologous proteins, not normally found in the human body.[2] Depending on the type of protein, amyloidosis can manifest in different forms, with different prognostic and treatment implications.[3] Pulmonary amyloidosis is often an incidental finding that is either localized in the lung or present systemically.[4] Pulmonary amyloidosis is usually rare and often asymptomatic and thus does not require operative resection. Morphologically, it is radiologically indistinguishable from pulmonary nodules of other etiologies (the most sinister of which are metastases). It is, therefore, often misdiagnosed based on imaging alone, usually leading to further testing, invasive procedures and/or resection. However, histologically, these nodules do have distinct characteristics, such as the presence of homogenous eosinophilic material that distinguishes them from neoplasms.[4] For this reason, biopsy is an important step in the management of clinically suspected amyloid pulmonary nodules. Herein, we present a 71-year-old patient with a history of smoking and interstitial lung disease, who was diagnosed with pulmonary amyloidosis, as confirmed through histology after CT-guided percutaneous lung biopsy of a persistent suspicious pulmonary nodule, which exempted the patient from an otherwise unnecessary nodule resection.

2 | CASE REPORT

A 71-year-old Caucasian gentleman was referred to the General Thoracic Surgery Clinic due to a left upper lobe nodule. This patient is a heavy smoker and was known for a history of interstitial lung disease (ILD), which had been followed by routine CT chest for several years. There was no history or suspicion of amyloidosis in this patient. The most up-to-date CT scan showed slight enlargement of an irregular solid left upper lobe nodule, measuring 1.2 × 1.0 cm in size (Figure 1). His scan also showed peripheral reticulation in a pattern consistent with a usual interstitial pneumonia (UIP), most likely related to an idiopathic pulmonary fibrosis but overall stable from previous screening.

At the time, the patient was asymptomatic and appeared to be otherwise reasonably healthy based on physical and laboratory assessments. A subsequent PET CT scan 1 month later confirmed the presence of the nodule of concern with

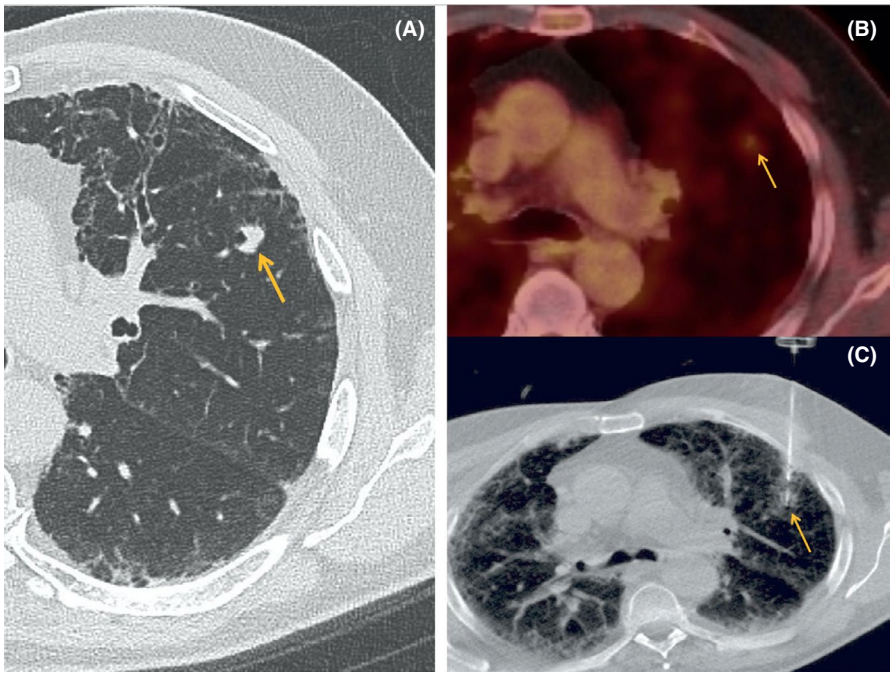

FIGURE 1 71-year-old man, with known UIP presenting with a solitary pulmonary nodule. (A) Non-contrast CT chest (lung windows) shows the 1.2-cm lobulated solid nodule. (B) The nodule was indeterminate on PET/CT scan. (C) leading to percutaneous CT-guided biopsy of the nodule

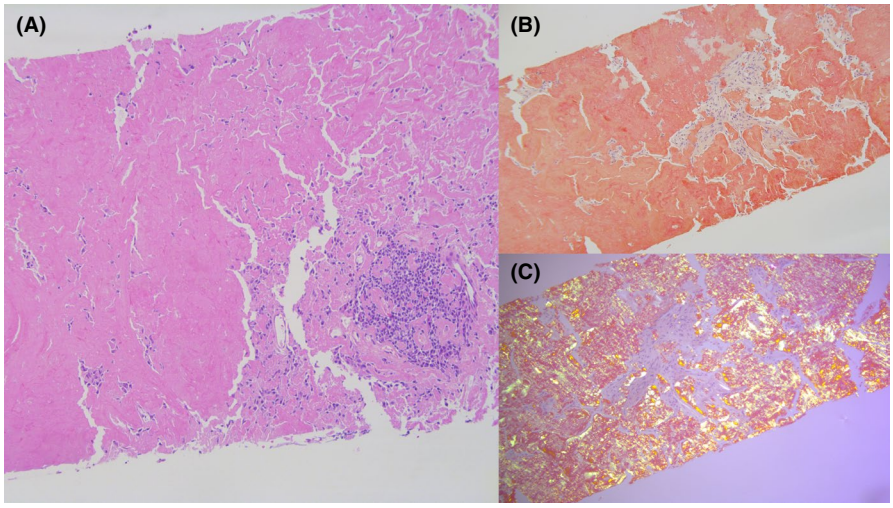

FIGURE 2 Lung biopsy under light microscopy. (A) Hematoxylin and Eosin (H&E) sections showed core fragments composed of an amorphous eosinophilic material. (B) Using Congo red special staining, the congophilic material is orange-red under light microscopy. (C) Under polarized microscopy, the congophilic material demonstrates apple-green birefringence characteristic of amyloid

indeterminate FDG uptake and other features consistent with active fibrosis.

Given the patient's age and history of ILD, he was at risk for pulmonary malignancy and a higher risk for complications from either minimally invasive resection or even stereotactic body radiation therapy (SBRT).

The pathology result was consistent with amyloidoma, a relatively rare manifestation within the lungs (Figure 2). Although there was limited lymphoid infiltrate, no definitive diagnostic evidence of lymphoma or plasma cell neoplasm was identified in the examined material of this biopsy. Since the nodule was not symptomatic, there was no need for intervention at that time and a CT-scan follow-up was ordered to monitor nodule size.

3 | DISCUSSION

Nodular pulmonary amyloidosis is a rare condition caused by the deposition of insoluble amyloid proteins in the lungs.[1] The average age of presentation is 67 years, and it is more common in male patients.[4] Pulmonary amyloidosis can either be primary or secondary, though the primary form tends to be more frequent.[5] The nodules are more commonly in the lower lobes and are either subpleural or peripheral.[4] Pleural effusion is common in systemic amyloidosis but has undetermined incidence in pulmonary amyloidosis.[4] Systemic amyloidosis has a reported incidence of approximately 10 in 1 million people, but the incidence of pulmonary amyloidosis is not known.[4] Most of the patients are asymptomatic,

but in some cases, symptoms such as wheeze, stridor, cough, and recurrent pneumonia are present.[6] The disease should be considered in patients with multiple lung nodules. In the presented case, only a single nodule was present, which is an extremely rare presentation of amyloidosis referred to as amyloidoma.[7] Amyloidoma is commonly found with calcification and cavitation, which indicates good prognosis and can help to indicate the diagnosis.[7]

Histologically, amyloidoma nodules are normally well circumscribed and are composed of homogenous eosinophilic material.[4] Aggregates of lymphocytes and plasma cells are also found within or adjacent to the nodules.[4] Histological analysis of the biopsy sample from the nodule can determine the fibril type and indicate the diagnosis.[6] In this case, the identification of amyloid light chains was consistent with localized pulmonary amyloidosis, in the absence of any symptoms implying other clinical conditions.

Nodular pulmonary amyloidosis usually has slow progression and rarely requires intervention.[4] It is often an incidental finding with no clinical consequence (apart from complications of misdiagnosis/treatment) and excellent long-term prognosis.[4] Several drugs, currently under testing, aim to stabilize amyloid precursor proteins and consequently accelerate the tissue clearance of amyloid fibrils.[4] In the presented case, no treatment was prescribed for the patient and the nodule was monitored via imaging follow-up.

The differential diagnosis for nodular pulmonary amyloidosis includes both malignant and benign primary lung neoplasms, such as bronchogenic carcinoma and mucinous adenocarcinoma.[6] The differential diagnosis could also include fungal or tubercular granulomas.[6] However, in both tumor and infection, rapid progression would be observed, which was not the case for this patient.

4 | CONCLUSION

Pulmonary nodules are challenging to adequately diagnose based on imaging findings alone. Growing nodules often raise concern for metastasis, consequently leading to invasive surgical interventions with associated morbidity risk. This is especially important for patients who have other underlying clinical conditions, for whom thoracic surgery can be particularly dangerous. This is demonstrated best in the outlined case of a high-risk patient with a growing solitary pulmonary nodule in whom further invasive management was avoided with appropriate and timely CT-guided lung biopsy.

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Published with the written consent of the patient.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

SN: prepared this manuscript. AA, MC, and PR: were involved with the clinical management of the patient and contributed to the preparation of this manuscript.

ETHICAL APPROVAL

The written informed consent was obtained from the patient for the publication of the text and images. Ethical approval was not mandatory for publication of case reports as per the institutional policy.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Sarina Nikzad https://orcid.org/0000-0002-0430-2271

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