



Case report

Pleural amyloidosis imitating pleural malignancy



Frith Coolbear, MBChB^a, Ana-Maria Bilawich, MD^{a,*}, Jonathan Tongson, MD^b,
James Adamo, MD^{c,d}, Andrew Churg, MD^e

^a Department of Radiology, Vancouver General Hospital and University of British Columbia, Vancouver, BC, Canada

^b Preferred Associates of Pathology, Genesis HealthCare, Zanesville, OH, USA

^c Pulmonary and Critical Care Service, Genesis HealthCare, Zanesville, OH, USA

^d Department of Internal Medicine, Ohio State University, Columbus, OH, USA

^e Department of Pathology, Vancouver General Hospital and University of British Columbia, Vancouver, BC, Canada

ARTICLE INFO

Article history:

Received 20 February 2017

Accepted 3 March 2017

Keywords:

Pleura

Amyloid

Mesothelioma

ABSTRACT

CT chest performed to investigate dyspnea and malaise in an 83 year old man demonstrated bilateral circumferential pleural thickening highly suspicious for pleural mesothelioma or metastatic pleural malignancy. Histopathology of a subsequent pleural biopsy returned a diagnosis of pleural amyloid. This case identifies pleural amyloid as a rare differential consideration for diffuse pleural thickening; the difficulties in distinguishing pleural amyloid from pleural malignancy are highlighted.

© 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. History

An 83-year-old man presented to hospital with shortness of breath and generalized malaise. He denied fever or hemoptysis; however, his family did report productive cough occurring most mornings. Prior exposures included previous tobacco smoking and extensive exposure to unspecified fumes in relation to work as an exterminator.

2. Investigations

2.1. Imaging findings

CT chest with intravenous contrast was performed as part of the acute work up. This (Fig. 1) demonstrated irregular circumferential pleural thickening in the right hemithorax, including thickening of the mediastinal pleura, and mild thickening of the left mediastinal and posterior costal pleura. A small rim-enhancing loculated effusion in the right posterolateral pleural space and trace partially loculated pleural effusion were present on the left also. Additionally, there was nodular thickening of the right oblique fissure, and mild nodularity in the left oblique fissure (Fig. 2).

Compared with a prior non-contrast CT chest performed 14

months earlier, the current scan demonstrated improvement in the right pleural effusion, which was previously of moderate volume. The remaining findings were not substantially changed over the interval.

2.2. Cytology and histopathology

Multiple thoracenteses were performed, all of which were nondiagnostic for malignancy or infection. Ultimately the patient underwent surgical exploration with pleural biopsy, pericardial window biopsy and wedge biopsy of the left lung one week after initial presentation. The gross appearance of the pleura was highly suspicious for mesothelioma. However, on microscopic examination, no neoplasm was found; rather there was diffuse infiltration of the chest wall fat and subpleural lung tissue by amyloid (Fig. 3).

3. Course in hospital

Following surgery, the patient was initially extubated but developed worsening respiratory failure necessitating re-intubation. He was treated for a presumptive diagnosis of pneumonia and tracheobronchitis, but developed acute renal impairment and episodes of atrial fibrillation. He continued to deteriorate, requiring inotropic support and increasing oxygen supplementation. After discussion with the family, consultation with Palliative Medicine was sought with the eventual decision for cessation of active treatment and compassionate extubation. Permission was

* Corresponding author. Dept of Radiology, Vancouver General Hospital, 910 W 10th Ave, Vancouver, BC, V5Z 1M9, Canada.

E-mail address: AnaMaria.Bilawich@vch.ca (A.-M. Bilawich).

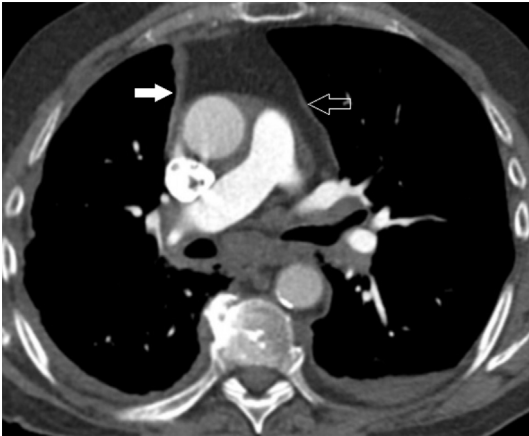


Fig. 1. Contrast enhanced transverse axial CT image of the thorax at the subcarinal level demonstrates irregular circumferential pleural thickening in the right hemithorax, including thickening of the right mediastinal pleura (solid arrow). Mild thickening of the left posterior costal and mediastinal pleura were also noted (open arrow).

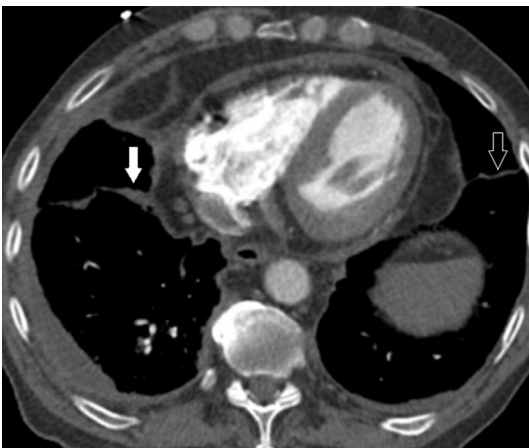


Fig. 2. Contrast enhanced transverse axial CT image of the lower thorax demonstrates small rim enhancing loculated effusion in the right posterolateral pleural space, trace left pleural effusion, circumferential right pleural thickening including nodular thickening of right oblique fissure (solid arrow) and mild thickening of the left posterior costal pleura and left oblique fissure (open arrow).

obtained from the family to report this case.

4. Discussion

Based on the imaging findings together with the patient's history, the favored clinical diagnosis was mesothelioma; this was supported initially by the gross pathological appearance at surgery until the final histological diagnosis of amyloid was returned.

Pulmonary amyloid may reflect systemic amyloidosis related to myeloma, chronic infections, connective tissue disease, chronic dialysis, or monoclonal gammopathy of uncertain significance, or may be isolated to the thorax. The most common pulmonary manifestation is amyloid deposition in small pulmonary artery branches, usually an incidental finding at autopsy in elderly patients (so-called 'senile amyloid') and generally of no clinical significance, but occasionally extensive vascular deposition is associated with pulmonary hypertension. Amyloid can also produce single or multiple nodules, which are sometimes a manifestation of an underlying myeloma; and diffuse septal amyloid, where

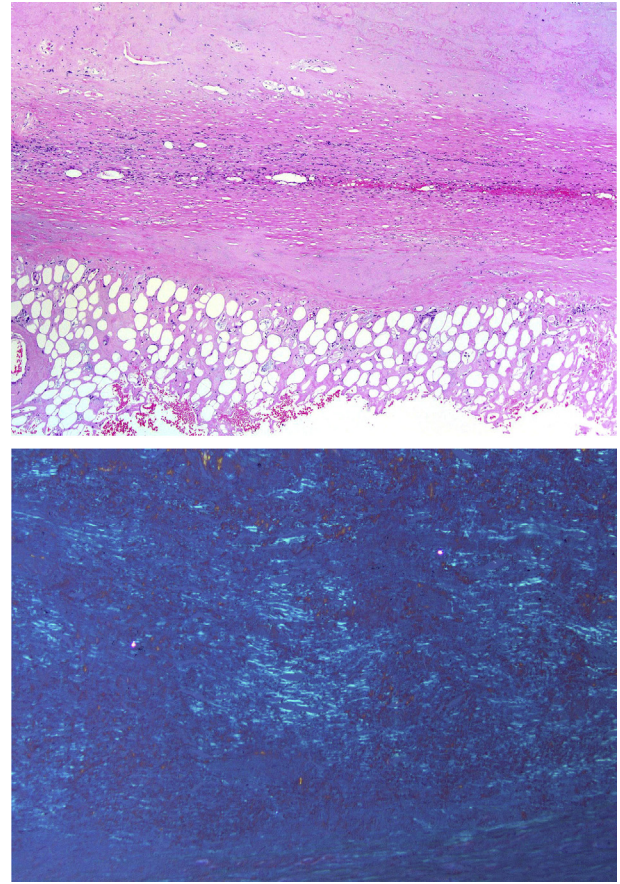


Fig. 3. A) Microscopic view of the pleural biopsy showing the typical amorphous appearance of amyloid. Amyloid infiltrates the lung (top of field) and the chest wall fat (bottom of field). B) Polarized light image of a Congo Red stained section showing typical green birefringence of amyloid (material that polarizes with an orange color is collagen).

amyloid is laid down along alveolar walls, producing a physiologic, imaging, and at first glance, pathologic impression of an interstitial lung disease [1].

Pleural amyloidosis is quite rare, estimated as occurring in only 1–2% of patients with systemic amyloid [2]. When present, pleural amyloid involvement has typically been discovered due to recurrent or persisting pleural effusions leading to eventual diagnosis via thoracoscopy and pleural biopsy [3–5]. Presentation of pleural amyloidosis as mass-forming pleural thickening detectable on imaging is very unusual, although it has been documented 3 times previously: Adams et al. reported two cases of pleural amyloidosis mimicking mesothelioma [6]; more recently Nakano et al. described a single patient presenting with asymptomatic pleural thickening highly concerning for malignancy [7]. As in those instances, the favored diagnosis for this case based on imaging findings was mesothelioma with a primary differential of metastatic pleural malignancy.

Where it causes pleural thickening to the extent that it is evident on CT, pleural amyloid appears to be difficult to distinguish radiologically from mesothelioma or other pleural malignancy. As in this case, the prior case reports document nodular or diffuse pleural thickening encasing lung, the typical radiologic appearance of mesothelioma [8]. Mesothelioma is usually unilateral, whereas amyloid as a systemic condition would be expected to be bilateral as in the reported cases. However, simultaneous bilateral mesothelioma, while uncommon, has been reported [9]. Bilateral

mesothelioma may also be seen in advanced (Stage IV) disease due to direct contralateral spread from an initially unilateral primary [8]. Metastatic pleural disease is another main differential for this appearance; pleural metastases are commonly bilateral [10]. Bilateral pleural involvement may therefore be a helpful but not definitive distinguishing feature. The presence of calcification is also unhelpful as mesothelioma may demonstrate internal calcification, either from engulfment of pre-existing pleural plaques or tumor calcification [8], and calcification has been described in pleural amyloid [11]. Additionally, Nakano reported increased FDG-uptake relative to background tissues on CT-PET similar to that expected in metabolically active malignancy, suggesting CT-PET is unlikely to be of assistance in separating malignancy and amyloid [7].

In conclusion, pleural amyloid presenting as pleural thickening which radiologically mimics mesothelioma is a very rare but documented manifestation of amyloid disease. The current case reaffirms pleural amyloid as an uncommon differential diagnostic consideration for tumorfactive pleural thickening.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

- [1] A. Koor, T.V. Colby, Amyloidosis of the lung, *Arch. Pathol. Lab. Med.* 141 (2017) 247–254.
- [2] L. Tada, H. Anjum, K. Linville, S. Surani, Recurrent pleural effusions occurring in association with primary pulmonary amyloidosis, *Case Rep. Pulmonol.* 2015 (2015) 5, <http://dx.doi.org/10.1155/2015/421201>. Article ID 421201.
- [3] F. Bontemps, I. Tillie-Leblond, M.C. Coppin, et al., Pleural amyloidosis: thoracoscopic aspects, *Eur. Respir. J.* 8 (1995) 1025–1027.
- [4] S. George, M. Ravindran, P.T. Anandan, V.N. Kiran, Primary systemic amyloidosis: a rare cause for pleural effusion, *Respir. Med. Case Rep.* 13 (2014) 39–42.
- [5] J.H. Briggs, W.G. Singleton, M.M. Burke, L.A. Hart, R.J. Parker, Amyloidosis presenting as bilateral transudative pleural effusions with normal cardiac investigations: a case report, *Cases J.* 2 (2009) 6963, <http://dx.doi.org/10.4076/1757-1626-2-6963>.
- [6] A.L. Adams, C.Y. Castro, S.P. Singh, C.A. Moran, Pleural amyloidosis mimicking mesothelioma: a clinicopathologic study of two cases, *Ann. Diagn. Pathol.* 5 (2001) 229–232.
- [7] T. Nakano, S. Endo, K. Tetsuka, N. Fukushima, Asymptomatic localized pleural amyloidosis mimicking malignant pleural mesothelioma: report of a case, *J. Thorac. Dis.* 8 (2016) E157–E160.
- [8] Z.J. Wang, G.P. Reddy, M.B. Gotway, C.B. Higgins, D.M. Jablon, M. Ramaswamy, R.A. Hawkins, W.P. Webb, Malignant pleural mesothelioma: evaluation with CT, MR imaging, and PET, *Radiographics* 24 (2004) 105–119.
- [9] Y. Fuchimota, N. Fujimoto, M. Asano, K. Kitamura, S. Ozaki, S. Hirayama, H. Nishi, K. Taguchi, T. Kishimoto, Simultaneous occurrence of bilateral malignant pleural mesothelioma, *Int. Cancer Conf. J.* 150 (2014) 3, <http://dx.doi.org/10.1007/s13691-013-0135-5>.
- [10] F. Rodríguez-Panadero, F. Borderas Naranjo, J. López Mejías, Pleural metastatic tumours and effusions. Frequency and pathogenic mechanisms in a post-mortem series, *Eur. Respir. J.* 2 (1989) 366–369.
- [11] O. Leleu, C. Clarot, H. Renaud, M. Brahimi, C. Lelarge, R. Makdassi, Amyloidosis and pleural calcification, *Rev. Mal. Respir.* 20 (2003) 618–621.