Image Diagnosis: Carcinoid Tumorlets and Pulmonary Sequestration in a Patient With Chronic Cough Without a History of Malignancy

Zhou Zhang, MD; Harleen Hayreh, MD

Perm J 2017;21:16-110

E-pub: 06/28/2017

<https://doi.org/10.7812/TPP/16-110>

CASE PRESENTATION

A 62-year-old man, a lifelong nonsmoker with a medical history of diabetes, chronic sinusitis, and hyperlipidemia, presented to our Pulmonary Clinic with more than 2 years of worsening chronic dry cough, with recent new onset of scant hemoptysis and an imaging finding of bronchiectasis. The patient had no history of cigarette smoking or pulmonary infections. His occupation included construction work with exposure to sand and wood. His laboratory work-up revealed within-normal-limit infection testing (including negative respiratory culture, acid-fast bacilli, gamma interferon, hepatitis, and human immunodeficiency virus serologies), allergy testing, immune deficiency test (with human immunodeficiency virus and immunoglobulin panel), and pulmonary function test. An x-ray of the patient's chest demonstrated bibasilar atelectasis without obvious infiltrate (Figure 1). A computed tomography scan of his sinus demonstrated chronic maxillary sinusitis. A computed tomography scan of his chest showed evidence of right lower lobe bronchiectasis and pulmonary sequestration (Figure 2). All the images were ordered by his primary care physician and obtained before his referral to the Pulmonary Clinic. The patient's chronic cough was then evaluated by an otolaryngologist who found erythema in the interarytenoid area on laryngoscope. Therefore, the patient's chronic cough was thought to be caused by postnasal drip or gastroesophageal reflux disease. In the past he had been treated with fluticasone nasal spray and omeprazole without significant improvement.

The patient's case was discussed at a regional thoracic conference with thoracic surgeons and interventional radiologists with the conclusion that surgical resection would offer both diagnosis as well as treatment of the symptomatic bronchiectasis. Soon thereafter, a right lower lobectomy was performed via video-assisted thoracoscopic surgery. The surgical pathology specimen revealed multifocal carcinoid tumorlets with focal lymphangitic spread and metastasis to regional lymph nodes (Figure 3). The patient was subsequently referred to the Oncology Department for further evaluation. An octreotide scan was performed and found to be within normal limits. Because his cough had improved and there was no evidence of distal metastasis or signs of carcinoid syndrome, the decision was made for continued close follow-up.

Figure 1. X-ray of the patient's chest showing bibasilar atelectasis without obvious infiltrate.

Figure 2. Axial-view computed tomography scan of the thorax showing right lower lobe pulmonary sequestration and demonstrating thick-walled bronchiectasis with arterial feeders from the common hepatic artery and posterior thoracic arch.

Figure 3. Hematoxylin and eosin stain (original magnification x40) of the surgical pathology specimen. The green arrow demonstrates bronchiectasis and bronchiolectasis, with follicular bronchitis, focal acute erosive bronchitis, marked peribronchial fibrosis and smooth muscle hyperplasia, and medial hypertrophy of the pleural, bronchial, and pulmonary arteries (findings consistent with pulmonary sequestration). The black arrow indicates one of the multifocal carcinoid tumorlets (multifocal nests of spindle and oval neuroendocrine cells staining for neuroendocrine markers chromogranin and synaptophysin and pankeratin) with focal lymphangitic spread and metastasis to the regional lymph node.

DISCUSSION

Pulmonary sequestration is an uncommon congenital lung disease comprising 0.15% to 6.4% of congenital pulmonary anomalies and is caused by a segment of lung separating from the tracheobronchial tree and receiving blood from a systemic artery.¹ Carcinoid tumorlets in conjunction with pulmonary sequestration is even more uncommon.^{1,2} Pulmonary carcinoid tumorlets develop from Kulchitsky cells, which are hyperplastic neuroendocrine cells in the bronchial and bronchiolar mucosa.³ These tumorlets differ from typical carcinoid tumors on the basis of diameter (≤ 5 mm vs > 5 mm, respectively)³ and are usually associated with fibrosis and bronchiectasis.^{3,4} Compared with neuroendocrine cell hyperplasia conditions such as DIPNECH (diffuse idiopathic neuroendocrine cell hyperplasia) and reactive neuroendocrine cell hyperplasia, carcinoid tumorlets extend beyond the basement membrane of the respiratory epithelia.⁵

Imaging of pulmonary tumorlets usually demonstrates nodules, interstitial fibrosis, or bronchiectasis.⁴ An analysis of surgical pathology specimen from patients who were diagnosed with pulmonary carcinoid tumorlets demonstrated patients usually are older women, often with a previously diagnosed cancer such as breast carcinoma.⁶ About half of these patients had respiratory symptoms such as a cough.⁶ Pathologically, tumorlets show fine nuclear chromatin, bland nuclear details, and a nested growth pattern.² Tumorlets stain for neuroendocrine markers chromogranin and synaptophysin.² Tumorlets may demonstrate immunoreactivity to serotonin, calcitonin, and bombesin (gastrin-secreting peptide).⁷ It is thought that tumorlet cells secrete neuropeptides that elicit peribronchial fibrotic reactions, which cause pulmonary fibrosis. D'Agati and Perzin⁷ have reported pulmonary tumorlets that may metastasize to peribronchial lymph nodes. There are only two case reports that describe pulmonary carcinoid tumorlets associated with bronchiectasis and pulmonary sequestration, both in a setting of breast cancer.^{1,2} We describe the first reported case of pulmonary sequestration and pulmonary carcinoid tumorlets in a patient without a history of malignancy or pulmonary infection. ♦

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

How to Cite this Article

Zhang Z, Hayreh H. Image diagnosis: Carcinoid tumorlets and pulmonary sequestration in a patient with chronic cough without a history of malignancy. Perm J 2017;21:16-110. DOI: <https://doi.org/10.7812/TPP/16-110>.

References

- Ye Y, Mu Z, Wu D, Xie Y. Carcinoid tumorlet in pulmonary sequestration with bronchiectasis after breast cancer: A case report. *Oncol Lett* 2013 May;5(5):1546-8. DOI: <https://doi.org/10.3892/ol.2013.1210>.
- Darvishian F, Ginsberg MS, Klimstra DS, Brogi E. Carcinoid tumorlets simulate pulmonary metastases in women with breast cancer. *Hum Pathol* 2006 Jul;37(7):839-44. DOI: <https://doi.org/10.1016/j.humpath.2006.02.005>.
- He P, Gu X, Wu Q, Lin Y, Gu Y, He J. Pulmonary carcinoid tumorlet without underlying lung disease: Analysis of its relationship to fibrosis. *J Thorac Dis* 2012 Dec;4(6):655-8.
- Ginsberg MS, Akin O, Berger DM, Zakowski MF, Panicek DM. Pulmonary tumorlets: CT findings. *AJR Am J Roentgenol* 2004 Aug;183(2):293-6. DOI: <https://doi.org/10.2214/ajr.183.2.1830293>.
- Cansız Ersöz C, Cangir AK, Dizbay Sak S. Diffuse neuroendocrine cell hyperplasia: Report of two cases. *Case Rep Pathol* 2016;2016:3419725. DOI: <https://doi.org/10.1155/2016/3419725>.
- Aubry MC, Thomas CF Jr, Jett JR, Swensen SJ, Myers JL. Significance of multiple carcinoid tumors and tumorlets in surgical lung specimens: Analysis of 28 patients. *Chest* 2007 Jun;131(6):1635-43. DOI: <https://doi.org/10.1378/chest.06-2788>.
- D'Agati VD and Perzin KH. Carcinoid tumorlets of the lung with metastasis to a peribronchial lymph node. Report of a case and review of the literature. *Cancer* 1985 May;55(10):2472-6. DOI: [https://doi.org/10.1002/1097-0142\(19850515\)55:10<2472::aid-cnrcr2820551027>3.0.co;2-y](https://doi.org/10.1002/1097-0142(19850515)55:10<2472::aid-cnrcr2820551027>3.0.co;2-y).