Carcinoid tumors are a subgroup of neuroendocrine tumors that secrete serotonin (5-hydroxytryptamine). These tumors are relatively uncommon, with an annual incidence of 2.47 to 4.48 per 100,000 persons in the general population. The percentage of bronchial carcinoids is 25.3%. Metastasis may occur at any time, from long before until 30 years after the initial diagnosis; in 12.9% of patients, metastases were already evident at the time of diagnosis.1 We report on the case of a patient diagnosed with a single myocardial metastasis related to a bronchial carcinoid tumor that was resected 33 years previously.

## Case Report

A 56-year-old man was referred to the cardiology clinic with an 8-year history of self-limited episodes of palpitations, accompanied by epigastric discomfort and sweating. The patient reported no dyspnea, chest pain, syncope, or secretory diarrhea. Thirty-three years earlier he had undergone a lobectomy of the middle and right lower lobes related to an intrabronchial carcinoid tumor that never received follow-up tests or treatment. Physical examination showed no anomalies. The ECG showed sinus rhythm with anterolateral low-voltage negative T waves. Laboratory tests of blood and urine, including 5-hydroxyindoleacetic acid, yielded normal values. Holter monitoring was performed, which showed only low-density postventricular contractions without complex forms.

The echocardiogram revealed normal left ventricular function, with no evidence of valvular heart disease and no pericardial effusion. However, a 32x25-mm homogeneous, circumscribed, slightly hypoechoic mass was located in the apex.

Magnetic resonance imaging confirmed the presence of a mass (32x25 mm) of intermediate signal intensity in the left ventricular apex on T1-weighted images and a hypointense signal on T2-weighted short τ inversion recovery. After administration of gadolinium (0.1 mL/kg), the mass showed intense signal uptake during first pass of the contrast agent, and the late gadolinium enhancement sequences showed a peripheral ring with a heterogeneous hyperintense center (Figure 1).

A thoracoabdominal computed tomography scanning was performed that showed the existence of multiple right hilar, infracarinal, and pleural hyperintense nodular lesions with increased uptake consistent with a recurrent primary tumor. Recurrence of bronchial carcinoid tumor with a single cardiac metastasis was considered the most likely diagnostic possibility in this case because of the patient history, the presence of concomitant pleural recurrence, and the hypertensive characteristics of the lesions in the cardiac magnetic resonance study. We performed a biopsy with immunohistochemistry echobroncoscopy, which supported the diagnosis.

The patient was presented to the tumor committee, which decided to first resect the cardiac metastases and later to perform pulmonary thoracic surgery. A coronary computed tomography scanning was performed showing normal coronary arteries with the distal left anterior descending artery and the first diagonal artery providing blood circulation to the tumor (Figure 2).

The patient was advised to undergo excision of the left ventricular tumor (Figure 3). After a median sternotomy, the pericardium was incised and the metastasis was easily identified in the free wall of the left ventricle, located between the left anterior descending artery and the diagonal near the apex. The whole tumor was within the left ventricular muscle, and there was a fibrous capsule around the tumor, which was removed completely by using a combination of sharp and blunt dissection. The left ventricular cavity was not opened. Pathology confirmed the pathologic and immunohistochemical diagnosis of metastatic, well-differentiated (G1) carcinoid tumor with a very low estimated tumor proliferation index (Ki-67<1%). Immunohistochemically, tumor cells were positive for neuroendocrine markers including chromogranin and synaptophysin (Figure 4). The patient was released from the hospital without further complications or symptoms. He is now awaiting the pulmonary operation.

### Discussion

Carcinoid tumors are neuroendocrine tumors that originate in the digestive tract, lungs, or, less commonly, the kidneys or ovaries. Carcinoid tumors are like any endobronchial tumor with local symptoms, such as cough, hemoptysis, or pneumonia.2 Rarely, bronchial carcinoid patients show symptoms related to peptide hormone production by the tumor (1% to 3%).3 Clinical syndromes may include carcinoid syndrome, Cushing’s syndrome, and acromegaly. In bronchial carcinoid tumors, metastases are usually seen within the intrathoracic...
lymph nodes, but distal metastases to the liver, skeleton, central nervous system, skin, and mammary glands sometimes occur. Carcinoid metastasis to the heart is very rare. In 2002, Pandya et al described 11 patients with metastatic cardiac carcinoid tumors. All of the patients had carcinoid syndrome. The average time from the diagnosis of carcinoid syndrome to the diagnosis of metastatic cardiac carcinoid was 5.6±3.9 years. All of the metastases were intramyocardial in location. There was cardiac valvular involvement in most of the patients (73%).

In our case, our patient presented no cardiac valvular involvement and no carcinoid syndrome after being diagnosed with the primary tumor 30 years before. A review of the literature indicates that this is only the third reported case of pleural recurrence after previous complete resection of a typical pulmonary carcinoid tumor. This case is even more unusual in that the recurrence presented so long after surgery and associated with cardiac involvement. Also, we think this is the first published case of an intramyocardial metastatic mass derived from a bronchial carcinoid tumor without carcinoid syndrome or valvular heart disease.

Disclosures

None.

References


Figure 1. A and B, Cine-T1 weighted (BFFE Philips). A, Five-chamber and (B) 2-chamber views showing the mass with intermediate signal intensity. C, Two-chamber view showing peripheral mass enhancement and the inner heterogeneity in late gadolinium enhancement sequences. D, Mass hyperintensity in short T inversion recovery sequences.
Figure 2. Coronary vasculature that supplies blood to the apical mass. A, Angiographic view and (B) volume rendering reconstruction from 128-detector multisecti

tor multisector computed tomography images. The tumor vasculature depends on the distal branches of the left anterior descending artery and the first diagonal coronary artery.

Figure 3. A, View of the apical cardiac metastases before resection. B, Apical cardiac metastases after surgical resection.

Figure 4. Immunohistochemically, tumor cells were positive for neuroendocrine markers including (A) chromogranin and (B) synaptophysin.
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