



Case Report

Solitary Pulmonary Nodule: Primary, Metastatic, or Both?

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ABSTRACT

The lung is the most common site for metastasis from colorectal cancer, which is among the most common neoplasms in developed countries. Simultaneous occurrence of pulmonary metastasis of colorectal origin and primary carcinoma has been reported.

We describe the case of a 65-year-old man who underwent low anterior resection for colorectal adenocarcinoma in 2007. Follow-up computed tomography revealed a pulmonary nodule that was classified as metastatic. The patient was referred to our thoracic surgery department, where the nodule was resected. The pathology confirmed that the nodule was neoplastic, and histologic and immunohistochemical examination showed the presence of colorectal metastasis and lung adenocarcinoma. Evidence of metastasis was also found in 2 of the lymph nodes analyzed, 1 with features identical to the primary pulmonary adenocarcinoma, and 1 with features identical to the colorectal metastasis.

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Nódulo pulmonar solitario: ¿primario, metastático o ambos?

RESUMEN

El cáncer colorrectal constituye una de las neoplasias más frecuentes en los países desarrollados, y es el pulmón uno de los órganos más afectados por su diseminación metastásica. Se han publicado casos donde dicha afectación metastásica pulmonar de origen colorrectal coexiste simultáneamente con un cáncer primario.

Presentamos el caso de un varón de 65 años diagnosticado de adenocarcinoma colorrectal, al que se realizó en 2007 una resección anterior baja. En una tomografía computarizada de control se detectó el crecimiento de un nódulo pulmonar catalogado como metástasis de la neoplasia. Remitido a nuestro Servicio de Cirugía Torácica, se procedió a su resección. El estudio anatomopatológico demostró que se trataba de un nódulo pulmonar neoplásico, en el que se diferenciaba tanto histológica como inmunohistoquímicamente una metástasis de adenocarcinoma de colon sobre un adenocarcinoma pulmonar. Dos de las adenopatías aisladas aparecían metastatizadas por adenocarcinoma, una con rasgos idénticos al componente enteroide y otra al componente pulmonar.

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Introduction

The lung is among the organs most commonly affected by metastatic dissemination of colorectal cancer.¹ Simultaneous, independent occurrence of primary lung cancer and a lung metastasis from colorectal cancer has been reported in the literature.²

We present the case of a 65-year-old man with a history of colon adenocarcinoma referred to our thoracic surgery department for assessment of a metastatic lung nodule.

Case Description

A 65-year-old man was diagnosed with grade II (pT3 pN1) colon adenocarcinoma and underwent low anterior resection plus segmental resection of the small intestine in December 2007, followed by FOLFOX-6 (5-fluorouracil, leucovorin, and oxaliplatin) adjuvant polychemotherapy. Following the detection of a lung nodule in a radiologic follow-up study at 9 months, the patient was referred to our thoracic surgery department.

Computed tomography revealed the presence of a cavitated nodule of heterogeneous density with a diameter of 3.8 cm in the right lower lobe. The nodule was touching the pleura, and the right paratracheal lymph nodes were enlarged, but at the upper limit of normal (Figure 1). Fiberoptic bronchoscopy showed no malignancy, but fine needle aspiration biopsy (FNAB) confirmed the presence of metastatic colon adenocarcinoma cells. Positron emission tomography showed an area with high, irregular metabolic activity, of about 3 cm in diameter, located at the periphery of the basal segment of the right lung field; diffusely increased activity in the hilar regions suggesting poorly defined inflammatory foci was also observed. The remaining uptake of fluoro-2-deoxyglucose in other areas was not pathologically significant, except for a small focus of activity in the prostate area.

In January 2009 the patient underwent right lower lobectomy via a right posterolateral thoracotomy through the fifth intercostal space. Postoperative progress was satisfactory, except for paralytic ileus, which resolved with conservative treatment. The patient was discharged 7 days after the operation.

The definitive pathology results revealed the presence of a malignant neoplasm with glandular differentiation and a clearly distinct central and peripheral area. The central area (with extensive cystic areas and necrotic foci) was composed of glands lined with clearly intestinal pseudostratified epithelium and continued through a poorly defined limit toward a peripheral tumor area. The peripheral area was composed of extensive areas of bronchioloalveolar infiltrates and pleural invasion, along with polygonal tumor cells that showed extensive eosinophilic cytoplasm, rounded nuclei, and

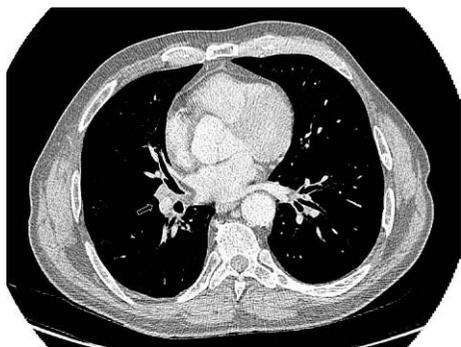


Figure 1. Preoperative computed tomography scan showing a lung nodule of heterogeneous density with a diameter of 3.8 cm in the right lower lobe; the nodule is seen to be touching the pleura.



Figure 2. Enlarged lymph node in the hilum of the right lower lobe, subsequently identified during the operation. The node may correspond to the area of increased activity observed in the positron emission tomography study.

prominent nucleoli, all features more typical of conventional lung adenocarcinoma.

From the immunohistochemical point of view, both tumor regions presented a clearly differentiated profile. The intestinal area showed a negative cytokeratin (CK) 7 and positive CK20 expression profile, and did not express thyroid transcription factor 1 (TTF-1), CK5, or P63. The lung-type area, in contrast, showed a positive CK7 and a negative CK20 profile, and expressed TTF-1.

Two of the enlarged lymph nodes isolated at the bronchial margin of the specimen appeared to be affected by metastatic adenocarcinoma, 1 with morphologic and immunohistochemical features identical to the intestinal component and 1 identical to the lung component.

In conclusion, we describe the rare finding of a neoplastic lung nodule that contained both a metastatic colon adenocarcinoma and a primary lung adenocarcinoma.

Discussion

Colorectal cancer is one of the most common neoplasms in developed countries. The American Cancer Society³ estimated that about 148 810 Americans would be diagnosed with colorectal cancer in 2008, and that around 49 960 would die of the disease.

The lung, along with the liver, is among the organs most commonly affected by colorectal cancer metastasis, which occurs in 10% to 25% of patients with this cancer.¹ The literature contains several rare cases of independent, synchronous primary lung cancer and colorectal cancer metastasis to the lung.² Our case is particularly unusual in that both types were present in a solitary nodule, a finding not previously reported.

Because the prevalence is low and such a finding is rarely suspected, preoperative diagnosis is not simple. In our patient, computed tomography showed a nodule of heterogeneous density in the right lower lobe that was diagnosed as metastatic colorectal adenocarcinoma by FNAB. Nevertheless, a review of the radiologic images showed nodular borders with sunray spiculation, suggesting a primary neoplastic process which had not been identified by FNAB; the enlarged lymph nodes found intraoperatively were also seen on review (Figure 2). The diagnostic yield of FNAB to confirm malignancy in peripheral 2-cm nodules is 80% to 90%.⁴ Nevertheless, in our patient, the biopsy result was not entirely accurate. Thus, whenever these types of neoplastic lesions are suspected, sufficient representative specimens should be taken from different areas of the lung nodule.

In our patient, the pathology report of the resected surgical specimen provided a definitive diagnosis and showed the rare finding of colon adenocarcinoma metastasis over a well-differentiated lung adenocarcinoma, as well as 2 enlarged and infiltrated lymph nodes, each with 1 of the 2 histologic types described. An

immunohistochemical study of the lesion will also help distinguish between primary and secondary lung tumors, with the resulting prognostic and therapeutic repercussions. In addition, the primary lung adenocarcinoma tends to present an immunohistochemical pattern that is CK7-positive, CK20-negative, and TTF-1-positive, whereas metastatic lung adenocarcinoma of colorectal origin is more commonly CK7-negative, CK20-positive, and TTF-1-negative.⁵⁻⁷ In our patient, both immunohistochemical phenotypes were present.

At present, the treatment of choice for solitary metastatic lung nodules is surgical resection.^{1,8-11} The procedure should preserve as much healthy lung parenchyma as possible, in case repeat operations are needed. Segmentectomy should, therefore, be considered the surgical procedure of choice in these types of secondary neoplasms. Nonetheless, because we found enlarged and infiltrated lymph nodes in the lobe hilum during the operation, we considered right lower lobectomy to be the best surgical option. The intraoperative finding of enlarged lymph nodes is adversely related to survival, although surgery appears to provide better results than chemotherapy alone.¹² The preoperative diagnosis of this type of combined neoplasm is important for treatment planning. If we had known before the operation that the nodule also contained a primary lung neoplasm, we would have chosen lobectomy rather than segmentectomy from the outset.

In conclusion, the presence of a primary lung adenocarcinoma and a metastatic lung adenocarcinoma of colorectal origin in a solitary nodule is a rare histologic finding. In view of the therapeutic and prognostic implications, an accurate preoperative diagnosis is essential.

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