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Tumor-to-Tumor Metastasis: Pulmonary Carcinoid Metastasizing to Solitary Fibrous Tumor

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Female, 81
Final Diagnosis: Pulmonary carcinoid tumor • solitary fibrous tumor
Symptoms: Diaphoresis
Medication: —
Clinical Procedure: Surgery
Specialty: Oncology





Objective: Rare disease
Background: Tumor-to-tumor metastasis is an uncommon phenomenon in which a primary tumor metastasizes into another tumor.

Case Report: An 81-year-old Asian woman was referred to our hospital for evaluation and treatment of a solid mass in the right middle lung lobe that had rapidly enlarged for 1.5 years compared to that observed over the last 5 years. On computed tomography (CT), the mass was 68×60 mm, and 2 different tumors appeared to exist in the upper portion of the mass. Blood examination findings revealed high serum levels of progastrin-releasing peptide and neuron-specific enolase. Based on the radiographic course of the tumor and elevated levels of tumor markers, we suspected that a new malignant tumor, such as a neuroendocrine tumor, had developed dorsally adjacent to the benign tumor. CT-guided percutaneous needle biopsy of the lung indicated a solitary fibrous tumor (SFT), which did not lead to the diagnosis of another tumor adjacent to the original tumor. Therefore, a right middle lobectomy was performed. The resected specimen contained 2 different tumors: an SFT and a typical carcinoid without mitosis or necrosis. On microscopic examination, they were separated from each other by normal alveolar tissue. In addition, a typical carcinoid was also observed inside the SFT lesion, completely enclosed by the SFT tissue. These findings suggested that the carcinoid metastasized to the SFT in the same lung lobe.

Conclusions: To the best of our knowledge, this is the first case of a pulmonary typical carcinoid metastasizing to an intra-parenchymal SFT.

MeSH Keywords: Carcinoid Tumor • Neoplasm Metastasis • Solitary Fibrous Tumors

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/917139>

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Background

Tumor-to-tumor metastasis is an uncommon phenomenon wherein a primary tumor (i.e., the donor tumor) metastasizes into another tumor (i.e., the recipient tumor). The general pattern of tumor-to-tumor metastasis is an aggressive high-grade neoplasm metastasizing to a more indolent neoplasm. Here, we report the first case of a pulmonary carcinoid metastasizing to an intraparenchymal solitary fibrous tumor (SFT).

Case Report

An 81-year-old non-smoking Asian woman was referred to our hospital for evaluation and treatment of a solid mass in the right middle lung lobe that had been increasing in size more rapidly in the last 1.5 years than over the previous 5 years. The lesion had been followed up as a benign lesion because of its stable size and its appearance on computed tomography (CT). At presentation, the patient complained of systemic hyperhidrosis but did not have dyspnea, chest pain, cough, hemoptysis, or fatigue. She had undergone surgery for rectal carcinoma 20 years previously, and she was taking medication for hypertension, diabetes, and arterial fibrillation. Chest radiography revealed a mass shadow in contact with the right diaphragm. On CT, the mass was approximately 68×60 mm, well circumscribed, and contained diffuse calcifications (Figure 1). In the upper portion of the mass, 2 different tumors appeared to

exist (Figure 2A). Blood examination findings included high serum levels of progastrin-releasing peptide (Pro-GRP; 244 pg/mL) and neuron-specific enolase (NSE; 12.4 ng/mL). Based on the radiological course of the tumor for 5 years and the elevation in the levels of tumor markers, we suspected that a new malignant tumor, such as a neuroendocrine tumor, had developed dorsally adjacent to the benign tumor. Positron-emission tomography (PET) showed no uptake of fluorodeoxyglucose by the original tumor and low uptake of fluorodeoxyglucose by the newly developed tumor (Figure 2B). CT-guided percutaneous needle biopsy of the lung indicated SFT, which did not lead to the diagnosis of another tumor adjacent to the original tumor because it was difficult to precisely distinguish 2 tumors. Therefore, right middle lobectomy was performed. On macroscopic examination, the resected specimen was a yellowish-white solid tumor 5.7×5.5×4.8 cm in size in contact with the pleural surface and a yellowish-brown tumor 3.2×1.5×0.8 cm in size adjacent to the larger tumor. On microscopic examination, the larger tumor was characterized by a proliferation of uniform spindle cells that were arrayed haphazardly within the dense collagen stroma (Figure 3A). There were no areas of nuclear division or necrosis. Immunohistochemical examination showed that the tumor was positive for CD34 (Figure 3B) and negative for desmin, epithelial membrane antigen, and S100. The diagnosis was SFT without malignant features. The smaller tumor had round-to-oval nuclei and moderate amounts of eosinophilic cytoplasm without mitosis or necrosis. The tumor cells formed solid nests and tubular structures (Figure 4A).

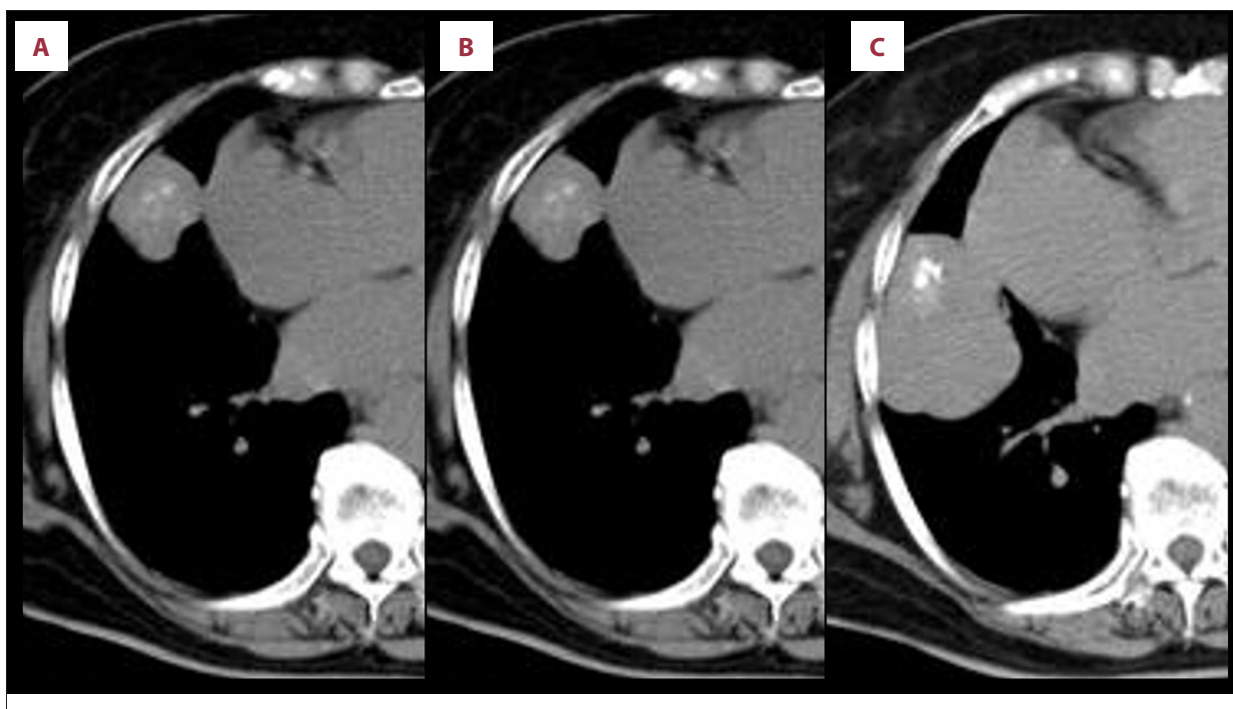


Figure 1. Computed tomographic findings of the tumor. (A) 5 years previously, (B) 1.5 years previously, and (C) immediately before middle lobe lobectomy.

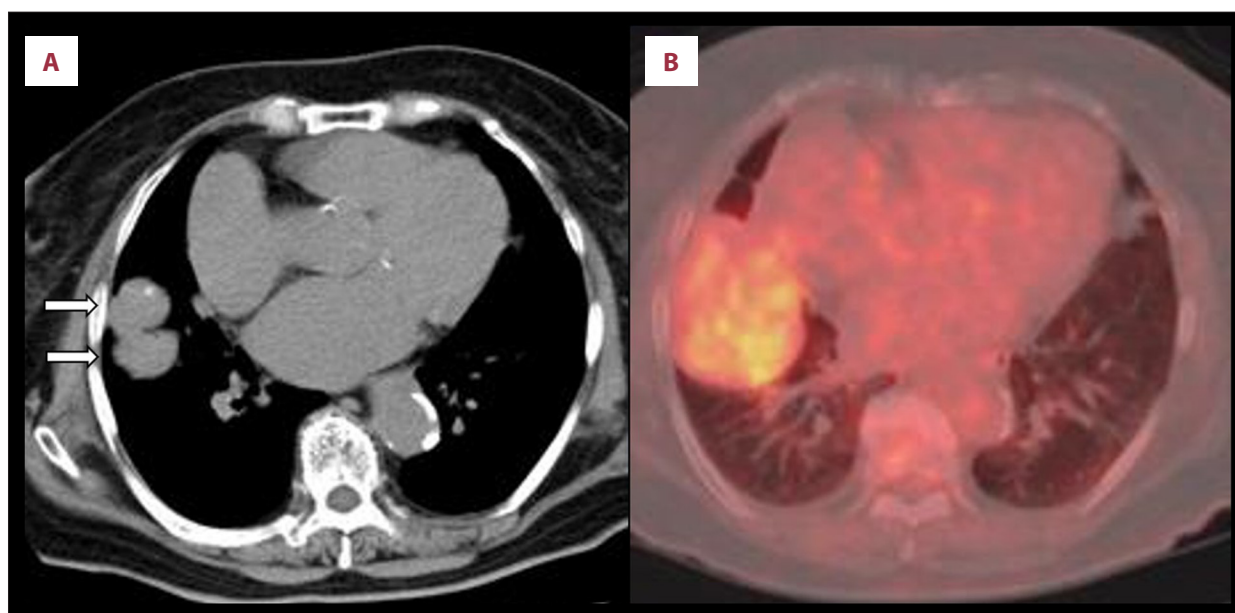


Figure 2. (A) Two different tumors appeared to exist in the upper portion of the lesion (arrow). (B) Positron-emission tomography revealed no uptake of fluorodeoxyglucose by the original tumor and low uptake by the newly developed tumor.

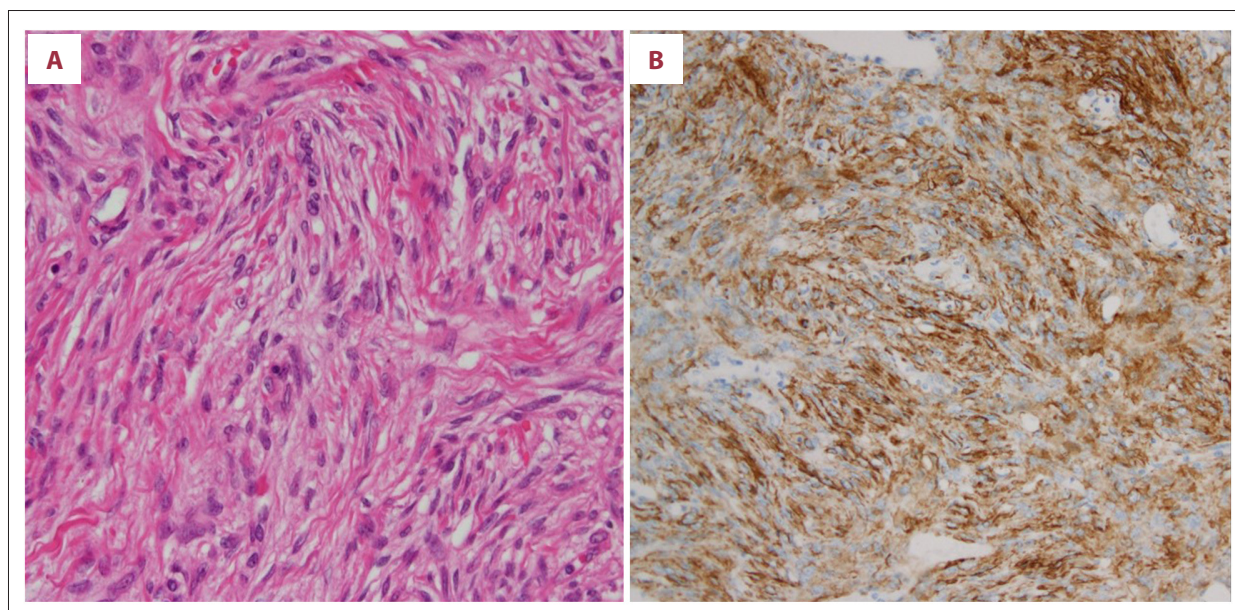


Figure 3. Microscopic examination of the solitary fibrous tumor. (A) Hematoxylin and eosin staining (400×). (B) The tumor was positive for CD34 (200×).

Immunohistochemical analysis revealed that the tumor was positive for chromogranin (Figure 4B), synaptophysin (Figure 4C), and neural cell adhesion molecule. The diagnosis was pulmonary typical carcinoid. The SFT and the typical carcinoid were separated from each other by normal alveolar tissue (Figure 5A). In addition, a typical carcinoid was also observed within the SFT lesion; it measured 8.0×7.0 mm and was completely enclosed by SFT tissue (Figure 5B). These findings suggested that the typical carcinoid metastasized to the SFT in the same lobe.

The post-operative course was uneventful, and the patient did not receive adjuvant therapy. There was no evidence of recurrence for 5 years after surgery.

Discussion

Tumor-to-tumor metastasis is a rare phenomenon, with no more than 100 cases published since Fried reported the first

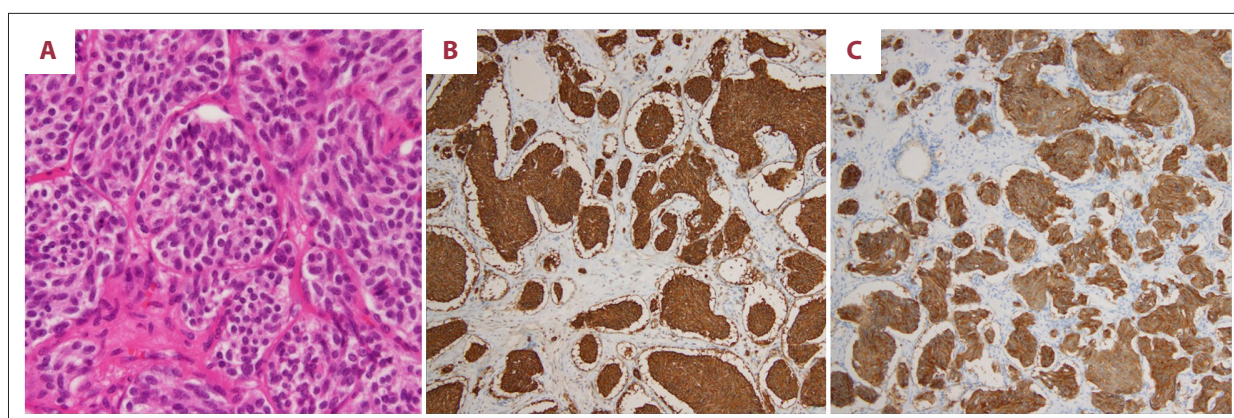


Figure 4. Microscopic examination of the typical carcinoid. (A) Hematoxylin and eosin staining (400×). (B) The tumor was positive for chromogranin (200×) (C) and for synaptophysin (200×).

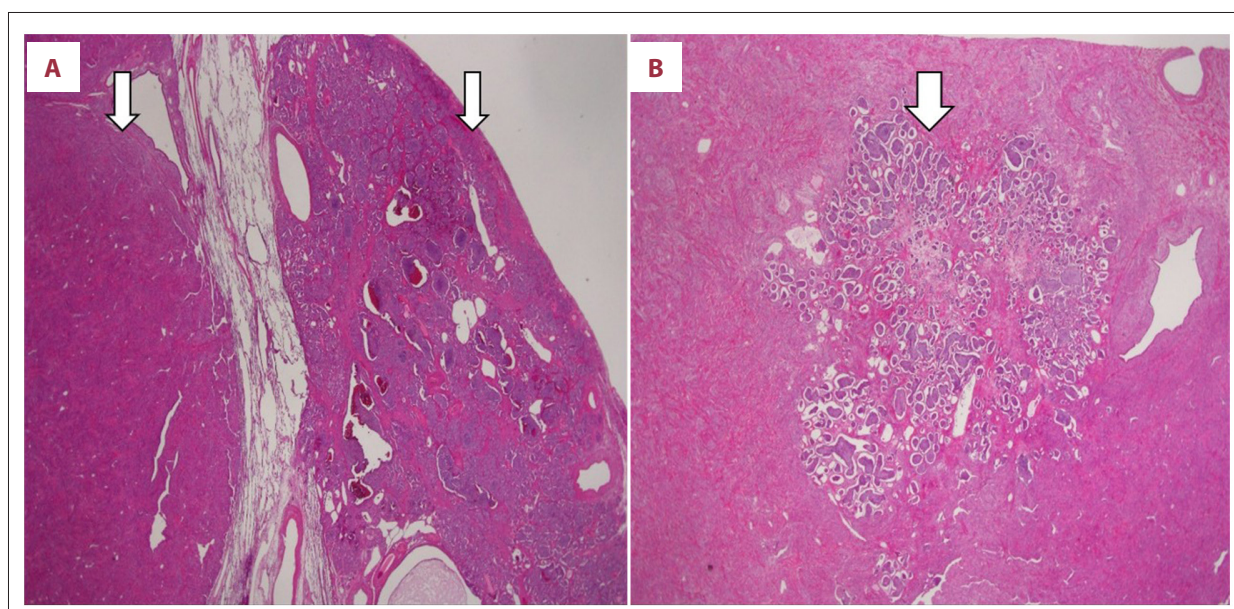


Figure 5. (A) The solitary fibrous tumor (SFT; left arrow) and typical carcinoid (right arrow) were separated by normal alveolar tissue (12.5×). (B) A typical carcinoid (arrow) inside the SFT (8.0×7.0 mm; 12.5×).

case of a bronchogenic carcinoma metastasizing to a meningioma in 1930 [1]. In 1968, Campbell et al. proposed the following basic criteria for the diagnosis of tumor-to-tumor metastasis: (i) existence of more than 1 primary tumor; (ii) the recipient tumor is a disorganized and independent neoplasm; (iii) not the result of direct contiguous spread or embolization of tumor cells; and (iv) tumors that have metastasized to the lymphatic system, which was the site of generalized lymphatic malignancy, are excluded [2]. The present case met all these criteria.

Although the most frequent donor tumor is lung carcinoma, the metastasis of pulmonary carcinoid to other neoplasms is extremely rare, with only 1 case of metastasis to meningioma being reported to date [3].

Renal cell carcinoma and meningioma are frequent recipient tumors. To the best of our knowledge, 4 cases of tumor-to-tumor metastasis to SFT of the lung have been published; they have been reviewed by Velez-Cubian et al. [4]. The mechanisms for harboring systemic metastases are uncertain, but several hypotheses have been suggested. In a case report of renal angiomyolipoma as a recipient tumor, Amin et al. hypothesized that the abundant vascularity of the tumor provides an ideal medium to harbor a metastasis from another site or receive tumor emboli from other sites [5]. Additionally, the benign nature and slow growth rate also provide a favorable environment for metastatic seeding and growth [6,7]. These characteristics are generally consistent with an SFT.

In the present case, CT-guided percutaneous needle biopsy indicated the diagnosis of SFT, presumably because of failure to obtain samples from the newly developed lesion. The serial CT findings, high serum levels of Pro-GRP and NSE, and systemic hyperhidrosis suggested that another tumor, such as a small cell lung carcinoma or carcinoid, had developed adjacent to the SFT, which had been followed up over 5 years. Finally, the newly developed tumor proved to be a typical carcinoid that had metastasized to an SFT in the same lung lobe. Because of her age, the patient did not receive adjuvant chemotherapy, and the extent to which metastasis to another tumor affects prognosis compared with metastasis to normal tissue is unknown.

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Conclusions

To the best of our knowledge, this is the first report of a pulmonary typical carcinoid metastasizing to an intraparenchymal SFT.

Conflicts of interest

None.