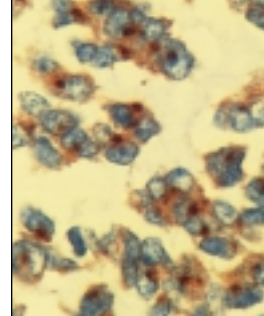


MALIGNANT LOCALIZED FIBROUS TUMOR OF THE PLEURA

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This feature presents special issues in oncologic pathology.

Introduction

Localized fibrous tumor of the pleura, also known as solitary fibrous tumor, localized (solitary) fibrous mesothelioma, and pleural fibroma, is a rare neoplasm of sub-mesothelial connective tissue origin.^{1,2} It has no age or sex predilection. Approximately 50% of the patients present with an asymptomatic, pleural-based mass discovered on a routine chest radiograph.³ If symptoms do occur, they may include cough, chest pain, dyspnea, and digital clubbing.^{3,5}

Resection of localized fibrous tumors is curative in the majority of cases.^{3,5} In approximately 20% of the cases, the tumors are clinically aggressive.^{3,5} This aggressive clinical behavior is characterized by relentless local recurrences, which usually lead to death within 5 years of the initial presentation. Distant metastases may complicate these local recurrences. However,

metastases unrelated to an aggressive clinical course have rarely been described.^{4,5} We report a case in which bilateral pulmonary metastases were discovered 17 years after the resection of a localized fibrous tumor of the pleura. The metastases were surgically removed, and the patient was disease-free 36 months later.

Case Report

A 73-year-old woman who was an ex-smoker presented with a 6-month history of fatigue on exertion. Her past medical history was remarkable for the surgical removal of a tumor from the left hemithorax 17 years prior to this presentation. Physical examination revealed a left thoracotomy scar. The right lower lung field was dull to percussion, but the lungs were clear to auscultation. Breast, cardiac, and abdominal examinations were unremarkable. There was no

lymphadenopathy, digital clubbing or cyanosis. Chest radiographs and computed tomography (CT) scans revealed intraparenchymal lung masses in the right middle and lower lobes as well as in the left upper lobe (Fig 1). There was also right-sided pleural effusion. No lesions were noted on imaging studies of the abdomen, pelvis, and skeleton. A CT-guided biopsy was performed and was followed by a right-sided thoracotomy with wedge

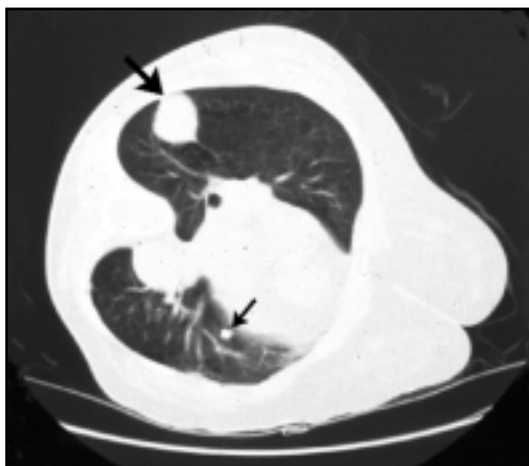


Fig 1. — Left lateral decubitus axial computer tomography image with 7-mm collimation showing a 5-cm peripheral mass in the right lower lobe (large arrow). There is also a 2-cm nodule in the left upper lobe (small arrow).

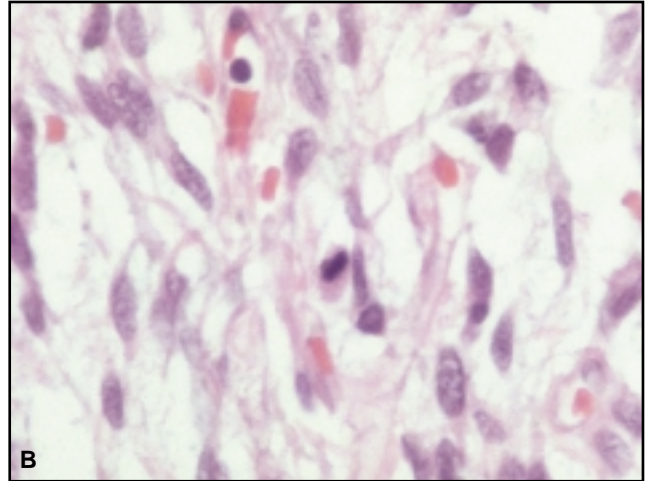
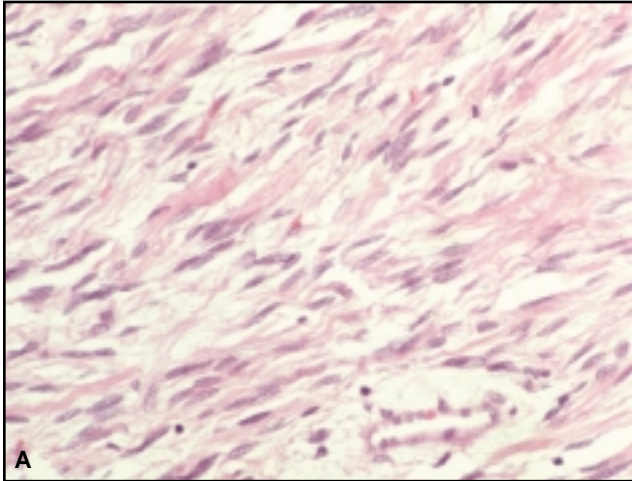


Fig 2. — Photomicrographs of the original tumor. (A) The lesion is composed of haphazardly arranged spindle cells and interspersed collagen fibers (hematoxylin-eosin, $\times 200$). (B) Cellular pleomorphism is present (hematoxylin-eosin, $\times 600$).

resection of the right lung lesions. A left thoracotomy with wedge resection of the left upper lobe lesion was performed approximately 3 months later.

According to the original pathology report, the tumor from the left hemithorax measured $28 \times 18 \times 11$ cm and weighed 2,550 g. The cut surfaces were lobulated

and showed areas of hemorrhage and necrosis. Histologic sections showed a spindle cell neoplasm composed of haphazardly arranged spindle cells and thick collagen fibers (Fig 2A). Areas of high cellularity (up to 8 mitoses per 10 high-power fields), cellular pleomorphism, and necrosis were seen (Fig 2B). In paraffin immunoperoxidase studies performed in our laborato-

ry, the neoplastic cells were reactive for vimentin and CD34 and were negative for cytokeratin (Fig 3).

The recently removed lung nodules were well-circumscribed intraparenchymal lesions with no connection to the pleural surface. They measured 1.5, 5.0 and 2.0 cm in greatest dimension. The cut surfaces were firm, gray, and lobulated. Histologically, the lesions were similar to the previous pleural-based mass and were composed of haphazardly arranged spindle cells, and interspersed thick collagen fibers (Fig 4A). Highly cellular areas and cellular pleomorphism were also present (Fig 4B). Surgical margins and samples of the regional lymph nodes were negative for tumor. Similar to the original tumor, the neoplastic cells were reactive for vimentin and CD34 and were negative for cytokeratin.

After 36 months of follow-up, the patient is alive and well and has had no further recurrence.

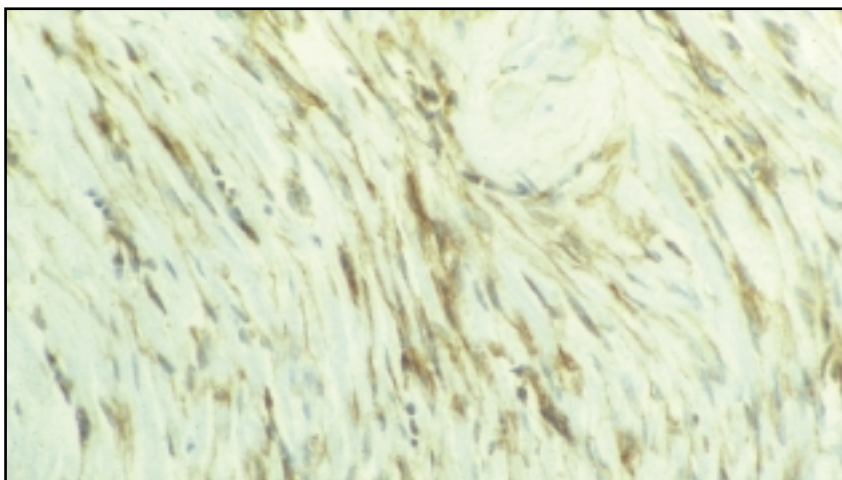


Fig 3. — Photomicrograph of the original tumor showing immunoreactivity for CD34 (original magnification $\times 200$).

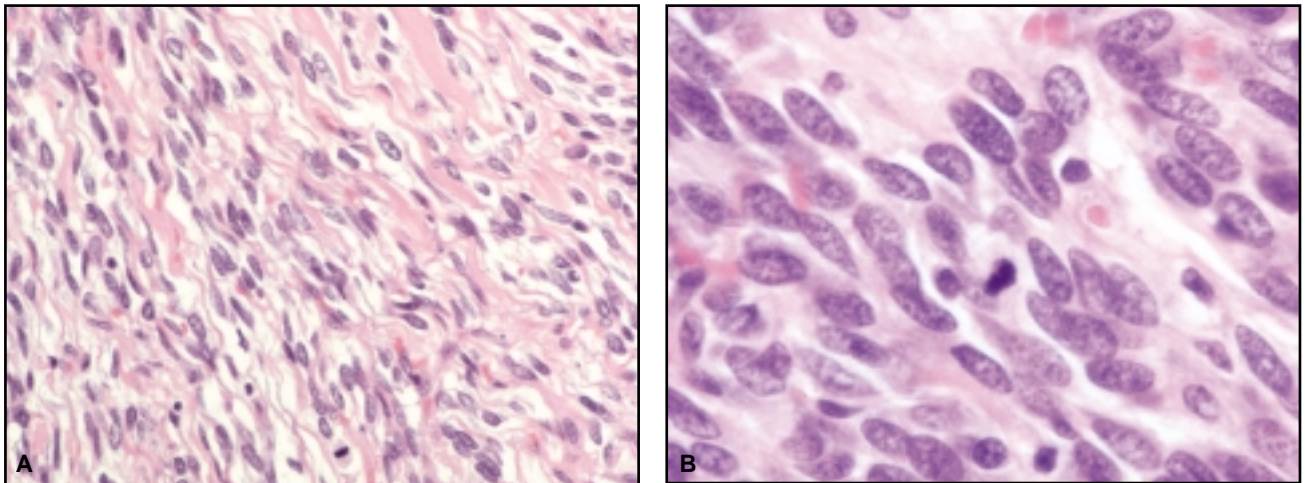


Fig 4. — Photomicrographs of the recent right lower lobe lesion. (A) Haphazardly arranged spindle cells and thick collagen fibers are seen (hematoxylin-eosin, $\times 200$). (B) High cellularity and cellular pleomorphism are also present (hematoxylin-eosin, $\times 600$).

Discussion

The histologic features of the original pleural-based mass were characteristic of a localized fibrous tumor of the pleura, and the recent lung lesions exhibited similar histologic features. Metachronous localized fibrous tumors of the pleura have been described,⁶ and intrapulmonary localized fibrous tumors unconnected to the pleura have been reported.⁷ Although it could not be completely excluded that the recent lung lesions were new primaries, the presence of multiple intrapulmonary nodules strongly favored metastatic disease.

Most localized fibrous tumors of the pleura are clinically benign and can be cured by local excision. However, approximately 20% of the patients have an aggressive clinical course, which is characterized by relentless local recurrences.^{3,5} The recurrences usually arise within 1 year, and patients with recurrent disease usually die

within 5 years of the original excision.^{2,4,5} Distant metastases can accompany the local recurrences, but metastases without a local recurrence have rarely been reported.^{4,5} Our case is unique in that the patient developed multiple pulmonary metastases after a long disease-free period and there was no local recurrence.

England et al⁵ reviewed 223 cases of localized fibrous tumor of the pleura and developed histologic criteria to separate malignant lesions from their benign counterparts. Criteria for malignancy include high cellularity, high mitotic rate (more than 4 mitoses per 10 high-power fields), pleomorphism, hemorrhage, and necrosis. Our case exhibited malignant histologic features including areas of high cellularity, more than 4 mitoses per 10 high-power fields, cellular pleomorphism, and focal necrosis.

There is apparent correlation between histology and clinical out-

come. All histologically benign tumors are clinically benign, whereas 55% of malignant localized fibrous tumors show aggressive clinical behavior.⁵ However, the best predictor of the clinical outcome is resectability. According to England et al,⁵ a lesion that is pedunculated or well circumscribed can be cured by local excision, even if it is histologically malignant. The original malignant localized fibrous tumor in our case was well circumscribed, which explains the lack of local recurrences. However, our case also suggests that malignant localized fibrous tumors can metastasize without extensive local disease. Furthermore, the metastases can appear after a long disease-free interval. Therefore, these tumors should be followed for an extended period of time.

In rare instances, recurrent localized fibrous tumors are well circumscribed and can be removed successfully by local excision.^{1,4,5}

However, the treatment of recurrences is usually not curative.^{1,4,5} To our knowledge, successful treatment of multiple metastases has not been reported previously. In the case presented here, 3 metastatic lesions were surgically excised, and the patient was clinically free of disease 36 months later.

Histologic differential diagnoses of pleural-based malignant spindle cell tumors include malignant localized fibrous tumor, spindle cell carcinoma, sarcomatoid malignant mesothelioma, and various sarcomas.^{8,9} Immunohistochemical studies are usually helpful in separating these entities. Localized fibrous tumors of the pleura are negative for keratin and are frequently reactive for CD34.¹⁰ Both spindle cell carcinomas and sarcomatoid malignant mesotheliomas are positive for keratin. Additionally, malignant mesotheliomas may also be positive for mesothelial marker calretinin.¹¹ Sarcomas are typically negative for both keratin and CD34, although positive staining for either marker may occur in rare cases.¹² The localized fibrous tumor presented here was negative for keratin and was reactive for CD34. This immunohistochemical phenotype supported the diagnosis.

In summary, our patient presented with a unique case of malignant localized fibrous tumor of the pleura, which was originally treated with local excision. There were no local recurrences, but the patient developed bilateral pulmonary metastases 17 years after the initial excision. The metastases were sur-

gically removed, and the patient was disease-free 36 months later. These data suggest that localized fibrous tumors with malignant histology should be followed for an extended period of time.

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