and 75%), she has shown only a mild degree of obstruction to airflow for the last 2 years (pulmonary function tests at 48 months posttransplantation are FVC, 3.2 L; FEV₁, 1.8 L; FEV₁/FVC, vital capacity ratio, 58.2%; total lung capacity, 4.7 L; PaO₂, 84.75 mm Hg).

DISCUSSION

Bronchioloalveolar carcinoma is a rare form of adenocarcinoma accounting for 1 to 5% of lung cancers. Different presentations include the solitary nodule, lobar pneumonia type, and diffuse nodules or consolidated areas or both, which have been seen in 6 to 50% of patients. Despite various attempts, including chemotherapy or biological response modifiers or both, no systemic treatment has so far proved effective.

The incidence of lymph node involvement and extrathoracic metastasis is still a matter of controversy, being low in some studies but high in others (up to one half of the patients with positive lymph nodes and one third with metastasis). No study has specifically addressed this question with respect to the diffuse form of the disease. Pleural extension is rare or absent. The present case had diffuse disease with major clinical impairment, had no metastases or pleural or lymph node involvement, and could thus be considered for transplantation. Although complications occurred, the overall result of this double-lung transplantation is good and, 5.5 years later, there is no evidence of cancer relapse.

In conclusion, double-lung transplantation may be proposed as an efficient treatment in selected cases of diffuse bronchioloalveolar carcinoma confined to the lung. Extreme care should be taken with the evaluation of tissue obtained prior to transplantation and using a specimen from previous lung surgery or open-lung biopsy; an extrapulmonary metastatic adenocarcinoma may mimick bronchioloalveolar carcinoma both histologically and clinically, and primary lung cancer requires careful exclusion since the subtyping of adenocarcinoma is difficult.

REFERENCES


Solitary Fibrous Tumor of the Pleura*

A Report of Five Cases Diagnosed by Transthoracic Cutting Needle Biopsy

Birgit Weynand, MD; Henri Noël, MD; Louis Goncette, MD; Philippe Noirhomme, MD; and Philippe Collard, MD

Five patients had a solitary fibrous tumor of the pleura; a well-known but rare entity. In all cases,
biopsy by a transthoracic cutting needle (Tru-Cut; Travenol; Deerfield, IL) yielded specimens adequate for histologic analysis and gave the clue to the diagnosis. In four patients, surgical resection confirmed the diagnosis. The opportunity for and interest in diagnosing these tumors by transthoracic cutting needle biopsy before surgery are discussed. An accurate diagnosis of solitary fibrous tumors of the pleura can be made by a minimally invasive procedure; this allows for a more informed allocation of surgical resources. (CHEST 1997; 112:1424-28)

Key words: pleura; solitary fibrous tumor; transthoracic cutting needle biopsy

Abbreviations: CXR = chest x-ray film

Solitary fibrous tumor of the pleura is a rare entity, and it is also known as benign localized mesothelioma, submesothelioma, or subserosal fibroma. This tumor arises usually from the visceral pleura (in 80% of the cases), but it can also derive from the parietal pleura and other serosal membranes, such as the peritoneum, and the pericardium. It can even occur in nonserosal sites, such as the pulmonary parenchyma, the mediastinum, the nose, and the paranasal sinuses. Its histogenesis is still a matter of debate, but this tumor usually is considered to be derived from a mesenchymal cell. In five patients, the diagnosis was made from a biopsy by transthoracic cutting needle (Tru-Cut; Travenol; Deerfield, IL). This technique is routinely used at Université Catholique de Louvain to obtain material for histologic and immunohistochemical analysis of parietal, pleural, or peripheral lung lesions with pleural contact.

MATERIALS AND METHODS

Five patients underwent a fluoroscopically guided transthoracic needle biopsy with the use of a 22G Rotex II screw needle instrument (Ursus Konsult AB; Stockholm, Sweden), which was immediately followed by a 14G cutting needle biopsy in order to provide material for cytologic and histologic studies, respectively. Cytologic smears were stained with the classic Papanicolaou method, whereas the Allen-Bouin-fixed and paraffin-embedded biopsy specimens were stained with hematoxylin-eosin or prepared for immunohistochemical analysis. The following antibodies were applied: mouse monoclonal anti-low molecular weight cytokeratin (clone CAM 5.2; Becton Dickinson; Erembodegem, Belgium), a marker of epithelial cells; mouse monoclonal antivimentin (Dakopatts; Glostrup, Denmark), a mesenchymal marker; mouse monoclonal anti-actin (Enzo Diagnostics; New York); and rabbit polyclonal anti-desmin (Dakopatts; Glostrup, Denmark), both specific for smooth muscle and muscle monoclonal anti-CD34 (clone QBEND10; Novocastra Laboratories; Newcastle upon Tyne, England), whose specificity and utility will be detailed in the discussion.

When surgically obtained specimens were available, the tumors were fixed in formaldehyde and further treated in the same way as the biopsy specimens.

RESULTS

Clinical Features

The patients were four men between 59 and 69 years old and one woman of 73 years in age. In four patients, the tumor was an incidental finding on a routine chest x-ray film (CXR). The fifth patient had digital clubbing. All the tumors were located in the posteroinferior aspect of the thorax; three were right-sided and two, left-sided. Three patients had functional impairment consistent with previous smoking habits. Only one patient had a history of possible asbestos exposure. Percutaneous biopsies were performed with the patient under local anesthesia and with fluoroscopic guidance (Fig 1). Fine screw needle and large-bore cutting needle biopsies were done in sequence. There were no complications with the procedure. Four patients underwent a thoracotomy, whereas the fifth patient declined surgery.

Pathological Features

The cytologic smears were not considered diagnostic but pointed to the possibility of a mesenchymal tumor in three out of five cases.

The five biopsy specimens, measuring between 2 and 10 mm long, showed a consistent microscopic picture (Fig 2). Small spindle cells characterized by elongated, bland nuclei were interspersed between thick collagen fibers arranged in parallel bands or in a more haphazard fashion. In the four patients who underwent surgery, the tumors were pedunculated and attached to the visceral pleura. They appeared polylobulated with a smooth and glistening surface, weighed from 144 to 1,550 g, and measured from 65×40×30 to 190×150×130 mm. On cut section, the tumors showed a whorled, fleshy appearance, sometimes alternating with more myoid areas. Focal necrosis and hemorrhagic zones were found in two cases. On light microscopy, all the tumors reproduced the classic picture of solitary fibrous tumor of the pleura. Four cases exhibited only rare mitoses and no cytologic abnormalities. One case was focally characterized by a mitotic count in excess of four mitoses per ten high-power fields.

By immunohistochemical analysis, all tumors (biopsy specimens and macroscopic specimens) showed a positivity for vimentin and no expression of low molecular weight cytokeratin and desmin. In two cases, the spindle cells were focally positive for muscle-specific actin. The expression of CD 34 depended on the fixative. All formaldehyde-fixed fragments showed a clear-cut positivity, whereas the Allen-Bouin-fixed tissues were mostly negative.

DISCUSSION

Solitary fibrous tumor of the pleura is rarely diagnosed before surgical resection because cytology obtained by
transthoracic needle aspiration is usually considered non-specific. Therefore, it is generally held that a thoracotomy is required for the diagnosis. We had the opportunity to study five cases by cytologic and histologic analysis of material obtained by transthoracic fine needle aspiration and Tru-Cut biopsy, respectively. This sampling method is routinely used at our institution to establish the diagnosis of parietal, pleural, or peripheral lung lesions with pleural contact. In the present report, we demonstrate that a confident preoperative diagnosis can be made with such a large-bore Tru-Cut needle biopsy. This is a minimally invasive procedure performed with the patient under local

Figure 1. Lateral radiographic view of the cutting needle brought into contact with a tumor located in the posteroinferior aspect of the thorax.

Figure 2. Biopsy specimen of 4×1 mm obtained with a cutting needle. Classic aspect of a solitary fibrous tumor with haphazardly oriented collagen strands interspersed with small spindle cells (hematoxylin-eosin, original ×47).
anesthesia. When carried out under fluoroscopic guidance, the procedure is fast (usually less than 10 min long overall). Because one performs Tru-Cut needle biopsies only when the lesion is abutting on the chest wall and the needle is not going through aerated lung parenchyma, one should not anticipate the occurrence of pneumothorax. According to Weymand and others, there has been no pneumothorax or other major complication of the procedure after 194 Tru-Cut needle biopsies in such circumstances (unpublished data). Since the procedure can be performed on an outpatient basis, its cost is very low (less than 200 USD in Belgium, including the cost of a CXR and pathologic analysis).

Obtaining a biopsy specimen is very helpful because the tumoral architecture is more readily appreciated and the differential diagnosis can be largely narrowed by immunohistochemistry. In particular, the anti-CD34 antibody has been claimed to be specific for solitary fibrous tumors.10,11 Although CD34 is expressed by various cell types, such as hematopoietic progenitor cells, endothelial cells, and mesenchymal tumor cells, its detection together with that of vimentin but not of cytokeratin in cells from a pleural tumor allows one to exclude the diagnosis of mesothelioma and of most other pleural tumors, such as carcinomas, fibrous histiocytomas, fibromatoses, fibrosarcomas, and synovial sarcomas.10,12

Solitary fibrous tumors represent 5% of all pleural neoplasms. They can occur at any age with no sex predilection, and have not been associated with smoking habits or previous exposure to asbestos. They are often asymptomatic, but they can manifest themselves by nonspecific respiratory symptoms; rarely, they may be responsible for hypoglycemia or hypertrophic osteoarthropathy. CT or MRI, or both, usually show a well-delimited tumor with smooth contours; its content is sometimes heterogeneous.13-15

An important matter of discussion is the malignant potential of this tumor because it may recur locally and even metastasize to distant sites. England et al.15 have defined criteria for malignancy in a large study of 223 cases. These criteria include abundant cellularity, more than four mitoses per ten high-power fields, cytoplasmic atypia, large necrotic or hemorrhagic areas, an associated pleural effusion, atypical location, and invasion of adjacent structures. Using these criteria, 12 to 33% of solitary fibrous tumors of pleura were considered as malignant. The most important feature for a good prognosis was the presence of a pedicle and the possibility of complete surgical resection.15,16 A long follow-up of such patients is warranted because recurrence can occur as late as 31 years after initial resection.17

The natural history of this tumor is not well-known. Because excluding a malignant lesion on imagery alone is difficult, surgical exploration of a solitary pleural tumor usually is carried out shortly after discovery. In the patient in this study who refused surgery, the natural evolution of the tumor was followed by serial CXR. The tumor remained clinically silent but its volume (estimated by planimetry on CXR) increased from 65 to 550 cm³ over a period of 22 months. This may seem like a fast enlargement, but as far as is known there are no reports about growth rate of solitary fibrous tumors of the pleura, and size of tumor alone is not considered a criteria for malignancy.15 Finally, in the reported case, there is no clinical or radiological sign of local invasion or distant metastasis.

A preoperative diagnosis of solitary fibrous tumors of the pleura by transthoracic cutting needle biopsy allows for histologic analysis and immunohistochemistry to narrow down the differential diagnosis. This minimally invasive diagnostic approach may prevent an unnecessary diagnostic thoracotomy and may help to direct proper treatment. When a solitary fibrous tumor of the pleura is diagnosed, surgical removal usually is straightforward, and resection of functional lung tissue is avoided because the tumor often is pedunculated. The complication rate and the functional consequences of this type of surgery are expected to be much lower than when extensive lung resection is contemplated because of possible lung carcinoma, for instance. This is particularly relevant when the preoperative functional or general status of the patient is impaired. When an alternative diagnosis is made with the Tru-Cut needle biopsy, surgery may not be the best therapeutic approach. This will prove to be the case for the majority of malignant mesotheliomas and some cases of peripheral lung cancer, for example.

A confident preoperative diagnosis of fibrous tumor of the pleura can be made by histologic and immunohistochemical analysis of material obtained by transthoracic Tru-Cut needle biopsy.

**References**

and immunohistochemical spectrum of benign and malignant variants presenting at different sites. Hum Pathol 1995; 26:440-49


12 Flint A, Weiss SW. CD-34 and keratin expression distinguishes solitary fibrous tumor (fibrous mesothelioma) of pleura from desmoplastic mesothelioma. Hum Pathol 1995; 26:428-31


Mycoplasma hominis
Pneumonia Complicating Bilateral Lung Transplantation*

Case Report and Review of the Literature

G. Marshall Lyon, MD; J. Andrew Alspaugh, MD;
Fran T. Meredith, MD; Lizzie J. Harrell, PhD; Victor Tapson, MD;
R. Duane Davis, MD; and Souha S. Kanj, MD

Mycoplasma hominis is a commensal organism of the genitourinary tract. Its role as a pathogen is typically limited to the associated structures of this system, but it can occasionally cause nongenitourinary tract infections1-3 including sternal wound infections, septic arthritis,4 bacteremia,3 and pneumonia5 with or without pleural effusion. Extraneginal infections usually occur after urogenital manipulations or in immunocompromised patients.5 Pneumonia caused by M hominis is rare.

As best as can be determined, this is the first case of M hominis pneumonia in a patient to cause diffuse alveolar damage closely following bilateral lung transplantation. Current literature on extragenital M hominis infections associated with organ transplantation also is reviewed.

CASE REPORT

A 34-year-old man with antiphospholipid antibody syndrome with chronic pulmonary emboli resulting in pulmonary hypertension underwent bilateral lung transplantation in May 1996. Cultures of intraoperative samples from the donor bronchi grew methicillin sodium-susceptible Staphylococcus aureus. Postoperatively, he received prophylactic treatment with the antimicrobial agents vancomycin, cefazolin sodium, and ganciclovir. His immunosuppressive regimen consisted of cyclosporine (cyclosporin A), azathioprine, and prednisone. Following surgery, he was afebrile for 4 days but required increasing ventilatory support. On postoperative day 5, he developed fever, with a temperature of 39.1°C. Imipenem was added empirically. Chest radiographs demonstrated diffuse bilateral infiltrates and pleural effusions. Multiple cultures of blood, BAL fluid, pleural fluid, and endotracheal tube aspirates were negative for bacterial, fungal, or viral growth.

The patient remained febrile and required increasing oxygen support. On day 10, he received 1 g of methylprednisolone sodium succinate (Solu-Medrol) for empirical treatment of rejection. On day 11, bronchoscopy and an endobronchial biopsy were performed; the biopsy specimen revealed a necrotic bronchial wall with fibrinopurulent debris, but no organisms were identified by special stains. A thoracentesis was performed that revealed an exudative fluid with negative stains and routine bacterial and fungal cultures. On day 14, because of persistent fever and hypoxia, despite broad-spectrum antimicrobial coverage, an open-lung biopsy was performed. Pathologic examination revealed subacute diffuse alveolar damage with early organizing fibrosis. All special stains for bacterial, fungal, and viral organisms as well as acid-fast bacilli were negative. The patient was placed on the list for retransplantation since his condition was thought to be otherwise preterminal.

On day 19, both the pleural fluid and the bronchial brush specimen obtained on day 11 showed growth of M hominis on the anaerobic culture plates. Lung tissue obtained through transbronchial biopsy on day 12 revealed growth of the same organism both from anaerobic plates and from Shepard’s 10 B broth for isolation of Mycoplasma. Therapy with doxycycline, 100 mg twice daily, was started, and all other antibacterial agents were discon-