CASE REPORTS

Localized Fibrous Tumors of the Pleura: Experience With 7 Recent Cases

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\textbf{OBJECTIVE}: Localized fibrous tumors of the pleura are rare. We report 7 cases and review the literature in order to define the range of clinical characteristics of these tumors, treatment options, and prognosis.

\textbf{METHODS}: A retrospective review of 7 cases treated between 1997 and 2003, focusing on clinical presentation, diagnostic tests, and treatment. The tumor was removed surgically in all cases, by thoracotomy in 6 cases and by video-assisted thoracoscopic surgery in 1 patient.

\textbf{RESULTS}: All patients recovered fully after surgery, with no postoperative complications. One patient experienced recurrence twice, 33 and 67 months after the initial resection. All are alive at the time of writing, after a mean follow up period of 19 months (range 1 month to 5 years and 10 months).

\textbf{CONCLUSIONS}: The treatment of choice for a fibrous tumor of the pleura is full resection and follow up to detect possible late recurrence.

\textbf{Key words}: Pleural neoplasm. Solitary fibrous tumor. Pleura.

Introduction

Solitary fibrous tumors account for 10% of neoplasms that arise in the pleura.\textsuperscript{1} Unlike pleural mesothelioma, in which asbestos plays an important role, solitary tumors of the pleura have not been clearly linked to a particular etiological factor. Another difference between solitary tumors and pleural mesothelioma is that most solitary tumors are benign, only 12% proving malignant.\textsuperscript{2}

Solitary fibrous tumors were once thought to arise from mesothelial pleural cells,\textsuperscript{3} but thanks to immunohistochemistry we now know them to be mesenchymal, with positive CD34 and vimentin expression and negative expression of cytokeratins and other epithelial antigens—a profile that is the opposite of the one seen for malignant mesothelioma.\textsuperscript{2}

We describe 7 patients with solitary fibrous tumors of the pleura treated in our hospital in order to analyze the role of surgery.

Case Description

Seven patients were treated between 1997 and 2003 in a total of 9 operations. Three were women and 4 men (Table 1). Ages ranged from 25 to 63 years (mean, 52.5 years).

Three patients were asymptomatic at the time of diagnosis. The most relevant symptoms were hypoglycemia and acropachy, lower extremity edema and coughing, ipsilateral arm edema, and moderate pain on the side where the mass was located (Table 1).
All patients had computed tomography (CT) scans of the chest (Figure 1) showing a mass with well-defined borders. Pleural effusion was present in 3 cases. The lesion was biopsied before resection in 4 cases and the results were consistent with a diagnosis of localized fibrous tumor of the pleura in 3 and adenocarcinoma in 1. Mean tumor size measured at the widest point was 9.8 cm (range, 2.5 to 15 cm).

The treatment of choice was complete surgical resection of the mass by thoracotomy in 6 cases and video-assisted thoracoscopy in 1 case (Figure 2). No complementary treatments were given (Table 1).

Histology of the excised tissue confirmed the diagnosis of localized fibrous tumor of the pleura in all cases. Cell polymorphism and a high number of mitoses in 1 patient suggested the possibility of malignant progression. The most representative results of antigen marker studies in the patients for whom they were ordered were positive vimentin and Bcl-2 expression and negative cytokeratin expression in all patients and CD34 positivity in 66% (Table 2).

One patient experienced recurrence even though histology suggested the tumor was benign. The first recurrence was 33 months after resection of the first tumor and the second recurrence occurred 33 months after the second tumor resection. Both recurrences were treated by surgical resection.

**Discussion**

Localized fibrous tumors of the pleura are fairly rare. Although they have been reported in patients as young as 5 years of age and as old as 87 years, most appear in the sixth and seventh decades of life, with fairly equal frequency in men and women. Clinical presentation varies and diagnosis is fortuitous in 50% of cases. Three of our 7 patients were asymptomatic at the time of diagnosis. Symptoms arise mainly because local spread of the mass causes coughing (33%), chest pain

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**TABLE 1**

**Clinical Findings**

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex/Age, Years</th>
<th>Signs/Symptoms</th>
<th>Computed Tomography</th>
<th>Size, cm</th>
<th>Biopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male/63</td>
<td>Asymptomatic</td>
<td>Mass, left lower quadrant Microcalcifications Pleural effusion</td>
<td>15×9×8</td>
<td>Consistent with SFTP</td>
</tr>
<tr>
<td>2</td>
<td>Female/25</td>
<td>Edema, upper left arm</td>
<td>Mass, left upper quadrant</td>
<td>13×12×10</td>
<td>Consistent with SFTP and benign pleural tumor</td>
</tr>
<tr>
<td>3</td>
<td>Male/63</td>
<td>Asymptomatic</td>
<td>Calcifications, cystic areas Nodule, right upper lobe Pleural effusion</td>
<td>2.5×2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Female/50</td>
<td>Moderate pain, right side</td>
<td>Mass, right lower quadrant</td>
<td>11×10×5,5</td>
<td>Adenocarcinoma</td>
</tr>
<tr>
<td>5</td>
<td>Male/52</td>
<td>Edema, lower extremities; cough</td>
<td>Mass, right lower quadrant</td>
<td>7.5×7×3,5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Male/58</td>
<td>Asymptomatic</td>
<td>Mass, juxtadiaphragmatic, left</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Female/57</td>
<td>Hypoglycemia</td>
<td>Mass, left lower quadrant Pleural effusion</td>
<td>15×15×10</td>
<td>Consistent with SFTP</td>
</tr>
</tbody>
</table>

*SFTP indicates solitary fibrous tumor of the pleura.*

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TORRE W, ET AL. LOCALIZED FIBROUS TUMORS OF THE PLEURA: EXPERIENCE WITH 7 RECENT CASES
The diagnostic process remains complex. Simple radiographs will reveal an intrathoracic tumor that is round, homogeneous, solitary, and that has well-defined borders. Such findings are not specific to the diagnosis, however. A CT scan will reveal a lobulated mass with heterogeneity that varies according to the grade of necrosis and the presence or not of calcifications. Magnetic resonance imaging is used to establish the borders between the lesion and adjacent structures and to confirm the intrathoracic location.

The role of positron emission tomography is being used to determine the alterations that are responsible for the tumor’s greater or lesser capacity to invade surrounding tissue; among the markers suggested, p53 and Ki-67 have been found to be particularly important. The importance of differentiating between benign and malignant localized fibrous tumors lies in the difference in recurrence rates for the 2 types. Only 2% of benign tumors recur locally, although recurrence has been reported as long as 17 years after resection of the primary tumor. Metastasis is very rare. However, the tumor’s behavior does not always correlate with histology, given that a lesion may degenerate as time passes, to become malignant. In one of the cases we report, in which histology suggested that the mass would not behave aggressively, it nevertheless recurred twice. A recent study6 described tumor size, the presence or absence of necrosis in the excised tissue, cell polymorphism, the number of mitoses, and resectability as being useful prognostic factors, although the growth pattern may be the most important predictor, even stronger than histologic features. Egland et al affirmed that whether the tumor could be fully resected or not is the factor that indicates magnitude of risk. De Perrot et al reviewed 185 cases and proposed a system of staging based on morphologic and histologic features of the tumor, divided in 5 stages (0 to IV), each with a distinct prognosis.

The consensus is that full resection of the tumor is the treatment of choice in all cases and, if possible, with a margin of safety of 1 to 2 cm. Adjuvant treatment with chemo- and radiotherapy is controversial, partly because experience is still limited. Chemo- and radiotherapy have been reported as prolonging survival in patients whose tumor was not fully resectable at presentation. De Perrot et al established a treatment

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TABLE 2
Interventions and Clinical Course*

<table>
<thead>
<tr>
<th>Case</th>
<th>Approach</th>
<th>Immunohistochemistry</th>
<th>Clinical Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left posterolateral thoracotomy</td>
<td>Vimentin +, CD34 –, S100 –, LCA–, cytokeratin –</td>
<td>Local recurrence, 2.8 years; second local recurrence, 5.6 years</td>
</tr>
<tr>
<td>2</td>
<td>Left, extended axillary thoracotomy</td>
<td>Vimentin +, S100 +, CD34 –, pancytokeratin –</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>3</td>
<td>Right posterolateral thoracotomy</td>
<td>CD34 +, S100 –, CD68 –, keratin –, actin –</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>4</td>
<td>Right posterolateral thoracotomy</td>
<td>Vimentin +, CD99 +, Bcl-2 +, CD68+, CAM 5.2 –</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>5</td>
<td>Right posterolateral thoracotomy</td>
<td>Vimentin +, CD34 +</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>6</td>
<td>Left video-assisted thoracoscopy</td>
<td>Bcl-2 +, CD34 +, cytokeratin AE3/AE1 –</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>7</td>
<td>Left posterolateral thoracotomy</td>
<td>Ki-67 (10%), CD34 +, Bcl-2 +, thrombomodulin +, calretinin –, MOC31 –, carcinoembryonic antigen–, TTF1 –</td>
<td>Asymptomatic</td>
</tr>
</tbody>
</table>

*LCA indicates leukocyte common antigen; CAM, cell adhesion molecule. TTF, thyroid transcription factor.
algorithm based on the aforementioned 5-stage criteria, with indications that complementary treatments may be beneficial for the patient after resection of malignant and sessile tumors. Based on our experience, we have concluded that the treatment of choice for these tumors at present is surgery and that more evidence is needed before more precise conclusions can be reached regarding complementary treatments.

REFERENCES