Pulmonary hamartoma

Eighty-nine cases of pulmonary hamartoma were studied. There were 51 men and 38 women, with a mean age of 57.5 years (range 14 to 76 years). A histologic diagnosis from examination of the resection specimens was obtained in all patients who had operations. Moreover, transthoracic needle aspiration biopsies were performed in 40 patients, with a diagnostic result in 34 (85%). The hamartomas were equally distributed in the pulmonary lobes; mean transverse diameter at the time of diagnosis was 21.7 ± 16.2 mm. Tumor size was independent of the anatomic localization, but it correlated with the age of the patients (p < 0.01). Tumor growth was recorded in 15 of 31 patients who had follow-up (48%); mean expansion in transverse diameter was 3.2 ± 2.6 mm per year during an average observation time of 4.1 years (range 1 to 20 years). Pulmonary symptoms were present in 35 patients (39%). Seventy-five patients underwent operations as follows: enucleation (54), resection (11), lobectomy (5), pneumonectomy (4), and bronchoscopic removal (1). Since most pulmonary hamartomas are nonexpanding or slowly growing neoplasms, it is concluded that operation is necessary only when expansion is recorded in young or middle-aged patients and in patients with pulmonary symptoms. (J THORAC CARDIOVASC SURG 1992;104:674-8)

C. Palnaes Hansen, MD,a H. Holtveg, MD,a D. Francis, MD, PhD,b L. Rasch, MD,c and S. Bertelsen, MD, PhD,a Copenhagen, Denmark

Hamartomas are benign neoplasms most often found in liver and lungs. The component tissues follow the general plan of development and may reach varying degrees of maturity and functional ability. The hamartoma is the most common benign lung tumor, accounting for about 8% of pulmonary neoplasms. In the general population the prevalence at autopsy was found to be 0.25%. Because the vast majority of hamartomas are asymptomatic, they are of interest only insofar as they must be differentiated from carcinomas.

Better diagnostic methods, among others, fine needle aspiration biopsy, have gradually reduced the need for diagnostic thoracotomy. In some cases, however, tumor growth or pulmonary symptoms may necessitate removal of the lesion.

The purpose of the present study was to describe the clinical course of pulmonary hamartomas, with special reference to diagnosis, growth, and treatment.

Patients and methods

This study comprises all cases of pulmonary hamartoma diagnosed from 1963 to 1988 in our department of thoracic surgery. There were 89 patients, with a mean age of 57.5 years (range 14 to 76 years).

Medical records and files of the departments of pathology and diagnostic radiology were reviewed. Diagnosis was made from histologic examination of the resection specimens or from cytologic material obtained from transthoracic needle aspiration biopsies done under fluoroscopic control. Radiographs from all patients who had been followed up were reexamined, and tumor size was measured. All radiographs had been taken in the same department under uniform conditions.

Results are presented as mean ± standard deviation. Statistical analysis was made by the $\chi^2$ test, correlation analysis of
Results

Solitary hamartomas were found in 51 men (mean age 55.6 years) and 38 women (mean age 60.2 years) (Fig. 1). Seven hamartomas were found incidentally at operation for lung cancer, and one was found during decortication; all other hamartomas were detected on standard x-ray examination.

Mean transverse diameter of the hamartomas at discovery was 21.7 ± 16.2 mm (men 21.9 ± 12.9 mm, women 19.0 ± 11.6 mm; not significant). Tumor size and distribution among the pulmonary lobes were not significantly different (Table I), but a positive correlation between size and age of the patients was recorded (p < 0.01) (Fig. 2).

Thirty-five patients (39%) had one or more pulmonary symptoms: cough and dyspnea, 21; pneumonia, 9; hemoptysis, 8; and pain, 7.

A histologic diagnosis was made in all patients who had operations, and no hamartomas revealed signs of malignancy. A transthoracic needle aspiration biopsy was obtained from 40 patients, and the results were diagnostic in 34 (85%). Exploratory operations were done in 47 patients, including the 6 in whom needle aspiration biopsy was inconclusive.

In addition to 8 patients in whom hamartomas were found by accident during thoracic operations, 67 patients were operated on (Table II). One patient who had concomitant lung cancer died during the first postoperative month of respiratory failure after pneumonectomy. The postoperative course was uneventful in the remaining patients.

Thirty-one patients with a definite diagnosis established from transthoracic needle aspiration biopsy were initially followed up without operation. Tumor growth was observed in 15 of them (48%) during a mean observation time of 4.1 years (range 1 to 20 years). The average increase in transverse diameter was 3.2 ± 2.6 mm per year (Fig. 3).

Follow-up is still being continued for 14 patients (mean age 65.9 years) who did not have operations. Tumor expansion (9 mm in 5 years and 20 mm in 3.5 years, respectively) has been recorded in only two 73-year-old men; so far no operation is planned.

Discussion

Pulmonary hamartomas are mainly diagnosed in patients between the fourth and seventh decades, but several cases have been reported in younger persons and even in neonates. A greater prevalence of male patients with hamartomas has been found in most studies, with a variation in preponderance from 2:1 to 3:1. Whether this difference is real or due to a higher frequency of pulmonary diseases in male persons, with a discovery of the hamartoma being incidental, is not known.

Hamartomas are seen in all parts of the lung, but most often in the periphery and rarely near the hilar parts.
Endobronchial location is reported in 3% to 20% of cases. A high frequency of endobronchial hamartomas is found especially in reports based on a survey of the literature, and, therefore, the frequency reported could depend on the common occurrence of single case reports on this subject. We found only one endobronchial hamartoma, which was located in the right main bronchus.

Pulmonary hamartomas are mainly composed of cartilage and glandlike formations (Fig. 4). On gross examination the tumor is lobulated with deep septa of connective tissue extending from the periphery. There is no capsule, but the tumor is normally well demarcated, and invasion into the surrounding tissues is never found in benign cases. Malignancy is extremely rare, and only few examples have been reported.

Most patients with pulmonary hamartomas are free of symptoms, and tumor is found incidentally on chest x-ray examination. One third of our patients had pulmonary symptoms, but it is difficult to maintain that the symptoms were all due to the presence of the lesion. However, hamartomas with bronchial compression and intraluminal growth can lead to atelectasis, infections, and perhaps bleeding.

Pulmonary hamartomas may increase in size, but growth is usually slow. This has been observed in several series, but there is no information about growth rate and results of follow-up except in two reports. In one of these reports, Jensen and Schioedt found tumor growth in 9 of 11 patients, with a mean increase in transverse diameter of 1.5 mm per year. Expansion was recognizable only in cases followed up more than 3 years. In the study of Hackl, doubling time of tumor diameter was estimated to be 14 years. We recorded growth in 48% of follow-up cases, and even though tumor expansion was more pronounced our results confirm the general opinion that pulmonary hamartomas have a slow growth potential. We did not find that growth rate was related to age (see Fig. 3), and the increasing tumor diameter in patients with increasing age is more likely due to a longer period of growth than to a higher growth rate.

In symptom-free patients the main problem is distinguishing hamartomas from cancer. On x-ray examination a hamartoma usually shows up as a sharply demarcated coin lesion, often with calcifications, often with calcifications (Fig. 5), but this is not diagnostic since calcifications may appear in carcinomas and in tuberculosis as well. Bronchoscopic and sputum cytologic studies are useful only in patients with endobronchial localization.

In the past decades transthoracic needle aspiration biopsy has saved many patients from diagnostic thoracotomy. In experienced hands this method has a high sensitivity and specificity, and, although pneumothorax occurs in 20% to 30%, less than 5% need a chest tube. Needle aspiration biopsy was performed in 40 of our

### Table I. Localization and size (mean ± standard deviation) of pulmonary hamartomas in 89 patients

<table>
<thead>
<tr>
<th>Patients</th>
<th>Mean age</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>(yr)</td>
</tr>
<tr>
<td>Right upper lobe</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Right middle lobe</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Right lower lobe</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Left upper lobe</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Left lower lobe</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Right main bronchus</td>
<td>1</td>
<td>56</td>
</tr>
</tbody>
</table>

### Table II. Operation in 75 patients with pulmonary hamartomas

<table>
<thead>
<tr>
<th>No.</th>
<th>Enucleation</th>
<th>Segmental resection</th>
<th>Lobectomy</th>
<th>Pneumonectomy</th>
<th>Bronchoscopic removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>11</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Three patients had synchronous lung cancer.
†All patients had synchronous lung cancer.
patients, and none of them required a chest drain afterward. Exploratory operation was done in 47 patients; most operations were performed before the introduction of needle aspiration biopsy in our department.

The vast majority of hamartomas in this study were removed by enucleation, and only location deep in the parenchyma or a concomitant malignancy in the same lung necessitated more extensive procedures. Some authors have advocated segmental resection or lobectomy to avoid spillage if the lesion proves to be a cancer or an abscess.6 In patients with a preoperative diagnosis from needle aspiration biopsy or a perioperative diagnosis from histologic examination of frozen sections, it is our opinion that enucleation is a safe procedure. Recurrence of pulmonary hamartomas after local removal has never been reported.

The management of pulmonary hamartomas should be individualized according to the age of the patient, tumor size, and growth. Since most hamartomas can be diagnosed from needle aspiration biopsies, operation is required only in cases of continuous expansion, pulmonary symptoms, and when malignancy cannot be excluded.

In patients without symptoms our current policy is to obtain a diagnosis from needle aspiration biopsy of the tumor. Patients with large tumors or rapidly growing lesions are usually offered operation. Only young and middle-aged patients are offered operation for slow-growing hamartomas. If no tumor growth has been observed on follow-up x-ray films, the case is closed.

REFERENCES


Notice of correction

In the January 1992 issue of the JOURNAL, in the article by Dignan, Yeh, Dyke, Lee, Lutz, Ding, and Wechsler, titled “Reactivity of Gastroepiploic and Internal Mammary Arteries” (J Thorac Cardiovasc Surg 1992;103:116-23), an error was made. In the fourth to the last line of Dr. John Kennedy’s discussion, the correct wording is as follows: “GEA was found to have similar absorption of radiiodinated serum albumin (SA). . . .”