Intrathoracic Fatty Tumors*

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LIPOMAS ARE AMONG THE MOST COMMON soft tissue tumors in man. Liposarcoma is much less common, occurring about once for every 120 benign lipomas at the Memorial Cancer Center.†† Tumors of adipose tissue are found uncommonly in intrathoracic locations. Three such tumors form the material for this report.

CASE REPORTS

CASE 1
L.N., a 67-year-old white woman, was admitted to the Chicago State Tuberculosis Sanitarium on September 9, 1963, from the Jacksonville State Hospital, where she had been committed for schizophrenia, paranoid type, since October, 1954. Except for her mental diagnosis, the patient had always enjoyed good health. A routine chest roentgenogram in May, 1962, had revealed widening of the superior mediastinum to the right (Fig. 1A). Films a year later showed the shadow to be larger. The lateral projection demonstrated a dumbbell-shaped mass posterior to the intrathoracic trachea, which was deviated anteriorly (Figs. 1B and 1C).

Physical examination was essentially normal. Mentally, the patient seemed reasonably stable and intelligent, except for occasional paranoid ramblings. Admission blood counts, urinalysis, electrolytes, blood sugar, serum proteins, blood urea nitrogen, prothrombin time, and uric acid were all within normal limits. An electrocardiogram showed an incomplete right bundle branch block and suggested myocardial ischemia. Sputum and gastric aspirates were negative for acid-fast bacilli and fungi. Bronchoscopy revealed the trachea and main stem bronchi to be pushed anteriorly, but was otherwise unremarkable. Bronchial secretions were negative for tumor cells. A bronchogram showed the mass to be outside the confines of the tracheobronchial tree. On barium swallow, the esophagus was displaced somewhat anteriorly and to the left, but was intrinsically normal. Angiography with aorto arch visualization was normal. A right scalene node biopsy showed only chronic lymphadenitis and anthracosis.

Exploration was performed on October 23, 1963, through the bed of the resected right fifth rib. A yellowish, soft, occasionally cystic, lobulated mass was present in the superior mediastinum which extended into the thoracic inlet, and displaced the trachea anteriorly. One of the major lobulations was caused by insinuation of a portion of the tumor beneath the azygos vein. The appearance of the tumor was characteristic of a lipoma. It was possible to remove the mass completely. It measured 18 x 12 x 7 cm. although it fell into three lobular pieces during removal (Fig. 2).

Microscopically the tumor consisted of adipose tissue interlaced by thin bands of fibrous stroma. In several areas the nuclei were enlarged, irregular in shape, and hyperchromatic (Fig. 3). Mitotic figures were not seen. The diagnosis was lipofibrosarcoma, low grade malignancy.

Postoperative course was satisfactory except for some transient chest pain associated with dyspnea during the first week. Electrocardiographic T-wave changes encouraged a program of bed rest for three weeks. She was returned to Jacksonville State Hospital in good health a short time later.

CASE 2
E.D., a 60-year-old white woman, was admitted to Augustana Hospital, Chicago, in May, 1963. Chest films had shown a “coin lesion” in the right upper lung field (Fig. 4). Laminograms demonstrated the density in a lateral position, and it was best seen on the 10 cm. cut. Physical examination was unremarkable. Admission blood counts, urinalysis, basal metabolic rate, blood urea nitrogen, blood sugar, cholesterol, and electrocardiogram were normal.

Exploratory thoracotomy was performed on May 31, 1963. The right lung was entirely normal. An ovoid, extrapleural mass was found laterally over the first intercostal space. This was completely excised. Further exploration yielded a 3 mm. in diameter similar lesion located subpleurally on the right diaphragm, which was also removed. Both lesions were grossly composed of fat. The patient's postoperative course was uneventful.

The first specimen consisted of well-encapsulated yellow fatty tissue measuring 3 x 3 x 2 cm. Histologically it was a benign lipoma. The second, smaller specimen was also a small lipoma.

CASE 3
W.F., a 55-year-old white man, was admitted to the Chicago State Tuberculosis Sanitarium on
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Figure 1:
The lateral projection shows the trachea to be bowed forward by the mass.

L.N. 5/2/62

L.N. 10/4/63

The chest roentgenograms of the patient in Case 1 show a superior mediastinal mass, which had increased in size over a period of 17 months.
December 9, 1953, because of a cough and "cold," and, by chest roentgenography, infiltrative disease with probable cavitation in the left upper lobe of the lung, as well as clouding in the right lower lung field consistent with collapse of the middle lobe. Laminograms confirmed the presence of cavitation in the left upper lobe. The tuberculin skin test was positive. The patient's admission laboratory examination were within normal limits. Although tubercle bacilli were never recovered from the sputum or gastric aspirates, he was placed on streptomycin, PAS, and INH, with clinical improvement.

He was bronchosoped on January 21, 1954. The left mainstem bronchus was deviated to the left just above the level of the upper lobe bronchus, but was otherwise normal. In the right middle lobe bronchus was a polypoid tumor, covered by mucosa, gray-tan in color, and best visualized on deep inspiration. This polypoid growth was removed entirely with a cup forceps. Histologically the tumor was a submucosal lipoma (Fig. 5).

Follow-up films failed to show clearing of the right middle lobe as well as they showed persistent cavitation in the left upper lobe. Resection of both the left upper and right middle lobes was advised, but refused by the patient. He was discharged on June 2, 1954, and maintained on anti-tuberculosis chemotherapy for another 18 months. Repeat bronchoscopy has not demonstrated recurrence of the tumor. Chest roentgenograms remain essentially unchanged, the last of which was on May 14, 1963.

Figure 2: The resected specimen from Case 1 was lobulated, yellow, and grossly encapsulated and non-infiltrating. Occasional cystic areas of degenerating tissue were encountered on cross-sectioning.

Figure 3: The basic histology of the specimen from Case 1 was that of fat cells laced with strands of fibrous tissue. However, many areas contained bizarre, enlarged and hyperchromatic nuclei, which required a diagnosis of liposarcoma, low grade malignancy.
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FIGURE 4: The chest film from Case 2 shows a "coin lesion" in the lateral right upper lung field. It has a smooth outline and is of homogeneous density. It proved to be a benign subpleural lipoma of the chest wall.

DISCUSSION

Intrathoracic lipomas

Intrathoracic lipomas are unusual. The first published case report was by Fothergill in 1781. Heuer summarized 30 cases which had appeared in the literature to 1933. Keeley and Vana reviewed the literature to 1955 and found a total of 64 cases, of which 35 had been successfully removed surgically. In 1962, Krause and Ross reviewed the literature since Keeley and Vana's report, and, adding three cases of their own, brought the total to 80. In a group of 783 patients with mediastinal tumors collected from 11 reported series, 1.6 per cent were of fatty origin.

Intrathoracic lipomas may grow to enormous size. Leopold reported a mediastinal lipoma weighing 17.5 pounds. Watson and Urban reported the successful removal of a 6.8 pound mediastinal lipoma in 1944, and Crutcher and Plott wrote of one weighing eight pounds and one ounce.

Intrathoracic lipomas have been classified as follows: (1) totally intrathoracic lipomas; and (2) hour-glass type, wherein one portion of the lipoma lies within the thorax and an extension insinuates itself into the neck or through the chest wall, usually in an interspace.

The age of discovery has ranged from infancy to the seventh decade. Males predominate by a ratio of two to one.

Intrathoracic lipomas become symptomatic by virtue of size and location. Non-productive cough, dyspnea, and a feeling of heaviness or pressure in the chest are the most common presenting complaints. Approximately half of the patients reported in the literature were symptomatic. Maier reported a 17-month-old girl who had

FIGURE 5: The endobronchial lipoma from Case 3 was covered with normal respiratory epithelium (top), and seemed to merge with the submucosa. There has been no recurrence ten years following its endoscopic removal.

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difficulty walking because of insinuation of an hour-glass type lipoma intraspinaliy at T5-6. The intraspinal component was re-
moved at laminectomy, with subsequent complete neurologic recovery, and the intrathoracic component was removed at thoracotomy two weeks later.

Preoperative diagnosis has been possible in several cases by aspiration biopsy of the tumor. Diagnostic pneumothorax has been employed to delineate pleural tumor. Diagnostic pneumothorax has been*

The indications for surgical removal include the presence of symptoms, pressure on vital structures, and inability to make an accurate diagnosis of an unexplained mass.

Endobronchial lipomas

Lipomas of the tracheobronchial tree are unusual. In a recent review of the literature, Plachta and Hershey* were able to find reports of 21 cases, 18 of which were discovered at surgery, and three at necropsy. The most common location of these polypoid, submucosal tumors was on the right, although present in all of the major bronchi. Watts, Clagett and McDonald* studied the occurrence of fat in the human tracheobronchial tree and found it to be present where cartilage and bronchial glands exist. This may explain the rarity with which lipomas are found within the lung parenchyma.

Eighty-eight per cent of endobronchial lipomas have occurred in men.* The youngest recorded patient was 29 years old at the time of diagnosis, and the oldest 64. The symptoms and signs, when present, were those of bronchial obstruction and varied with the location of the tumor and the severity of secondary parenchymal changes distally. Productive cough and hemoptysis are mentioned most frequently.

Benign endobronchial tumors are important because of the secondary damage to the distal pulmonary parenchyma. Partially obstructing tumors acting in a ball-valve fashion will result in over-distention and emphysema. Complete occlusion will result in absorption of the gases distally with resultant atelectasis. Pulmonary sup-

puration with or without abscess formation is not uncommon. Bronchiectasis is frequently found on bronchography following endoscopic removal of the tumor.

Diagnosis of endobronchial tumor is suggested by chest roentgenograms and bronchograms, and confirmed by bronchoscopic visualization and biopsy. Almost all of these tumors can be seen bronchoscopically. They appear as smooth, rounded or ovoid submucosal masses, usually covered by intact mucous membrane. The color is grey to yellow.

Treatment depends on the location and size of the tumor, and particularly on the secondary suppurative effects on the distal pulmonary parenchyma. Most of the reported lipomas have been removable by endoscopic technique, but on occasion thoracotomy with excision via bronchotomy, sleeve resection, or lobectomy has been performed. Removal of lung tissue is indicated when the distal lung has become involved in irreversible suppurative and/or bronchiectatic changes. Trouble-free survival following either resectional or endoscopic removal has been quite good.

Liposarcoma

Intrathoracic liposarcoma is rare. Ama-
dor and Danzig,* and Dominy, Baskin and Campbell'' have recently reviewed the literature and between them have recorded 25 cases, including two by the former authors and one by the latter. Two other recent reports by Uner, Balim and Oktem,** and Pachter and Lattes* add three more cases. The patients' ages have ranged from 18 to 63 years. Of 23 where sex was stated, 12 have been women and 11 men. Almost all patients were symptomatic, the most common complaints being cough, chest pain, and dyspnea. Superior vena caval obstruction was present in two.** The tumors were in general quite large, most of them over 1 kg. in weight,** the largest being 5.3 kg.**

Diagnosis has usually been made at surgery or at postmortem examination, although a positive needle biopsy was achieved in at least one case.** Therapy is
confined to surgical excision and radiotherapy. Occasional excellent results have followed removal.\textsuperscript{12,31,32} However, there is often extensive local invasion of neighboring vital structures, which precludes total excision. Only occasionally are distant metastases present.\textsuperscript{14,25,26} Radiotherapy has been helpful in a few instances,\textsuperscript{11} although liposarcomas are commonly radioresistant. The well-differentiated myxoid type appears to respond more favorably than other types.

**SUMMARY**

Three cases of intrathoracic fatty tumors have been presented, representing superior mediastinal lipofibrosarcoma, subpleural lipoma, and endobronchial lipoma. Symptoms include cough, dyspnea, heaviness in the chest, and hemoptysis, and depend upon size and location of the neoplasm. Diagnosis of endobronchial lipoma is made by endoscopic biopsy. Other types are not usually diagnosed until thoracotomy or necropsy, although aspiration biopsy has been performed in a few instances. Benign lipomas may be removed with good results. Liposarcomas generally result in a poor prognosis because of extensive local invasion and frequent radio-resistance.

**RESUMEN**

Se presentan tres casos de tumores grasos intratorácicos, entre ellos un lipofibrosarcoma, un lipoma subpleural, y un lipoma endotorácico. Los síntomas incluyen tos, disnea, pesadez sobre el tórax, y hemoptisis y dependen del tamaño y ubicación del neoplasma.

El diagnóstico de lipoma endobronquial se hace por la biopsia endoscópica. Otros tipos solo se diagnostican hasta la toracotomía o la autopsia, aunque la biopsia por aspiración se ha llevado a cabo en pocos casos. Los lipomas benignos se resecan con buenos resultados. Los liposarcomas tienen mal pronóstico por la extensa invasión local y la frecuente radio resistencia.

**ZUSAMMENFASSUNG**


**THE IMPORTANCE OF DETERMINING FIBRINOGEN AND FIBRINOLYTIC ACTIVITY IN PNEUMONIA PATIENTS**

The results of investigations into the content of fibrinogen and fibrinolytic activity of the blood in 239 patients suffering from acute and chronic pneumonia is presented. The level of plasma fibrinogen concentration and blood fibrinolytic activity determination are important methods characterizing the organism's state in patients with inflammatory processes in the lungs. A rise in the plasma fibrinogen content was revealed in patients with acute pneumonia and exacerbations of chronic pulmonary inflammation. In patients with acute and chronic pneumonia during the stage of exacerbation, there was seen a retardation of the time of fibrinolysis, i.e., inhibition of the fibrinolytic activity.