Pathologic Quiz Case

Giant Mediastinal Mass in a 69-Year-Old Man

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The patient was a 69-year-old man with a long-standing history of difficulty breathing and chronic productive cough; he showed no improvement with antibiotics. He did not smoke and had no known occupational exposures. An anterior-posterior chest radiograph revealed a mildly widened mediastinum with small lung volumes. A bronchoscopy revealed no masses or other abnormalities. Pulmonary function tests showed a decrease in the forced vital capacity (2.09 L, 47% predicted) and the forced expiratory volume (1.46 L, 42% predicted) with a total lung capacity of only 72%. These findings were interpreted as being consistent with mixed obstructive and restrictive lung disease. During his diagnostic evaluation, a computed tomographic scan was performed and was reported to be normal, with prominent fat deposition in the anterior mediastinum. The patient was treated with inhaled bronchodilators and inhaled steroids, with minimal improvement in his symptoms. The patient died at home, presumably of his chronic lung disease.

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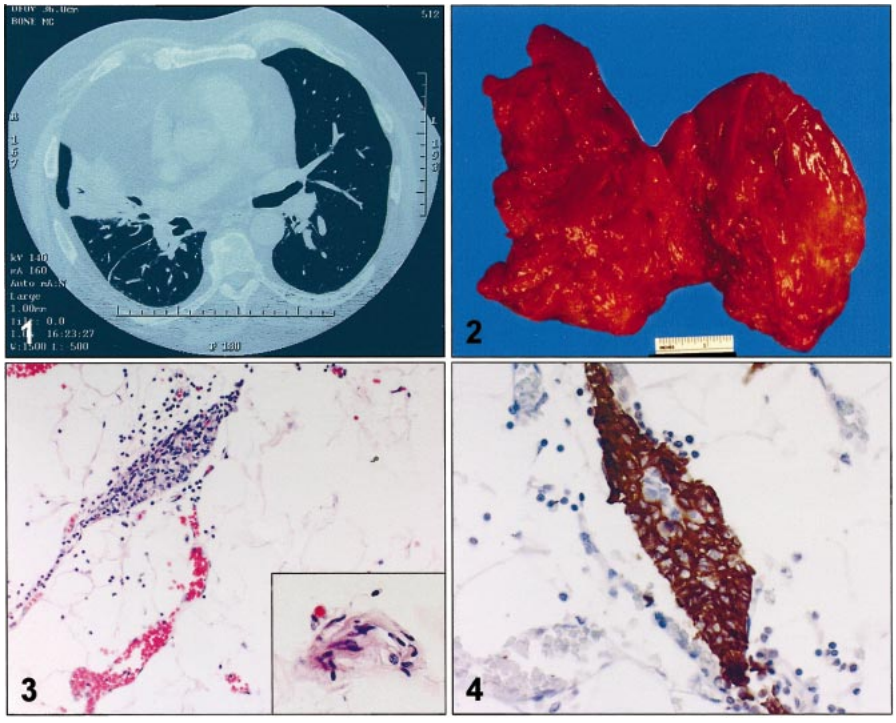
After his death, retrospective review of the computed tomographic scan of the chest revealed a large mass in the anterior mediastinum, consisting predominantly of fat with scattered linear soft tissue attenuation overlying the heart and extending into the right hemithorax (Figure 1). At autopsy, a large, encapsulated, vaguely lobulated mass weighing 570 g was found within the anterior mediastinum, which on cut section consisted primarily of mature-appearing adipose tissue with no areas of hemorrhage or necrosis (Figure 2). The mass entered into and occupied approximately 50% of the right pleural cavity, resulting in marked compression of the posterior and inferior right lung. Histologic sections of the mediastinal mass stained with hematoxylin-eosin revealed predominantly mature adipose tissue with scattered elongated aggregates and small round nodules of atrophic-appearing epithelial cells intermixed with benign-appearing lymphocytes (Figure 3). These clusters of epithelial cells were strongly reactive with keratin 903 on immunohistochemical staining (Figure 4). Histologic sections of the lung revealed prominent medial hypertrophy of the arterioles, consistent with pulmonary hypertension, with no microscopic findings of emphysema or chronic bronchitis. Other findings on autopsy included a markedly enlarged heart with a thickened right ventricle, consistent with cor pulmonale and bilateral atrophy of the adrenal cortices, which is likely related to chronic steroid therapy.

What is your diagnosis?



Pathologic Diagnosis: Thymolipoma

Thymolipomas are very rare mediastinal tumors composed of mature adipose and thymic tissue arising in the thymus gland. This tumor accounts for only a small percentage of mediastinal masses and has been a subject of several case reports[1–8] and 2 extended case series.[9,10] Clinically, most thymolipomas are identified incidentally during a diagnostic workup for other medical problems, although the following nonspecific symptoms have been identified at presentation: upper respiratory infection–type symptoms, chest pain, dyspnea, tachypnea, and chronic nonspecific chest symptoms.[9] Thymolipomas have been reported to be associated with certain autoimmune medical conditions, such as Graves disease and myasthenia gravis.[1–3] On computed tomographic scan, the most common patterns seen in thymolipomas are linear whorls of soft tissue intermixed with fat or predominantly fat with scattered linear soft tissue attenuation.[10] Radiographically, thymolipomas may be confused with more common lesions, such as mediastinal teratomas, thymic hyperplasia, lipomas, and cardiomegaly.[10] This broad radiologic differential diagnosis stresses the need for histologic evaluation in the diagnosis of anterior mediastinal masses.

Grossly, most thymolipomas are lobulated and encapsulated, range in size from 4 to 36 cm, and consist of yellow adipose tissue with no areas of hemorrhage and necrosis.[9,10] Histologically, thymolipomas have a varying proportion of mature adipose and thymic components. In this case, the thymolipoma consisted of predominantly mature adipose tissue with scattered elongated aggregates and small round nodules of atrophic thymic epithelium embedded within the fat (Figure 3). No lipoblasts were identified. Cytologically, the epithelial aggregates in this case consisted of round cells with moderate amounts of eosinophilic cytoplasm admixed with small mature lymphocytes. Scattered within the mature fat were aggregates of spindled, keratinized epithelial cells forming rosettes surrounding a central space devoid of a lumen. No mature Hassall corpuscles were identified. All of these described foci of epithelium reacted strongly with cytokeratin 903 (Figure 4). In one section of the tumor, a single cluster of 10 to 15 polygonal cells with eosinophilic striated cytoplasm, reminiscent of myoid cells, was identified within the mature fat (data not shown). Such clusters of myoid cells have been reported previously in thymolipomas.[4]

As in the case presented, some thymolipomas show predominantly mature adipose tissue with only occasional remnants of thymic tissue. However, other thymolipomas have been reported to have a greater proportion of thymic tissue than what was seen in this case.[7,9,10] Regardless of the amount of thymic tissue present, the thymic component typically consists of a mixture of benign-appearing lymphocytes and epithelial cells, with or without well-formed Hassall corpuscles. The pathogenesis of thymolipoma is still uncertain. The admixture of mature adipose and thymic tissue, both of which normally occur in the thymus, suggests a hamartomatous process.[8,9] Thymolipomas may adhere to the adjacent structures and displace organs within the chest cavity, but invasion into adjacent structures has not been documented in the literature. The encapsulated and lobular nature of thymolipomas and the lack of invasion into adjacent structures usually allow for a relatively uncomplicated surgical excision of the tumor.

The histologic differential diagnosis for thymolipomas includes lipoma, well-differentiated liposarcoma, and thymic hyperplasia.[9] The distinction between a lipoma and a predominantly fatty thymolipoma may be difficult. In the latter, extensive sectioning and immunohistochemical staining for cytokeratin may highlight thymic epithelial elements in a thymolipoma. Liposarcomas typically have scattered nuclear atypia, lipoblasts, and no thymic epithelium. Thymic hyperplasia classically has unremarkable thymic architecture without the presence of abundant adipose tissue.

Our case represents an atypical clinical presentation of a giant thymolipoma that resulted in death. Eighty percent of thymolipomas present within the first 4 decades of life, in contrast to this case, which was identified in the seventh decade of life. Thymolipomas are often asymptomatic and are identified incidentally after diagnostic evaluation for nonspecific respiratory symptoms. In this case, the patient had long-standing respiratory complaints, which appear to have been directly caused by the thymolipoma. The compression of the right lung by the thymolipoma in this case resulted in increased pulmonary vascular resistance and reduced lung volume. The reduced lung volume resulted in chronic respiratory symptoms and a primarily restrictive lung pattern unresponsive to medical therapy. The chronically increased pulmonary vascular resistance led to the development of pulmonary hypertension, cor pulmonale, heart failure, and ultimately death. This case highlights an atypical presentation of a thymolipoma, a rare, benign thymic tumor which can achieve a massive size, occasionally resulting in respiratory symptoms and death.

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