Approach to Mediastinal Masses

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Cover Illustration by Catherine Twomey
Introduction

Mediastinal masses affect patients of all ages and can be asymptomatic. In fact, only approximately one third of mediastinal tumors cause symptoms. Consequently, a mediastinal mass is frequently first noted on a routine chest radiograph, although the plain radiograph is rarely diagnostic. When symptoms develop, patients can present with complaints related to compression of vital structures (eg, cough or wheezing from bronchial compression, dysphagia from esophageal compression, superior vena cava syndrome from compression); pain from involvement of bone, pleura, or pericardium; diaphragmatic paralysis or vocal cord paralysis due to involvement of the phrenic nerves or recurrent laryngeal nerves, respectively; limb paralysis due to involvement of the spinal column; or constitutional complaints. Both localized disorders (eg, primary tumors or cysts) and systemic diseases, including metastatic neoplasms and granulomas, can be responsible for mediastinal masses.

Although several techniques for obtaining tissue for the diagnosis of mediastinal masses are available, neither guidelines nor a standard of care approach to evaluating these masses has been developed. Due to the diversity of the structures within the mediastinum, the wide variety of histologic types of mediastinal masses, and the relative difficulty in gaining access for diagnostic examination, masses in the mediastinum can present a diagnostic and management challenge. In this manual, we review the diagnostic entities to be considered and typical diagnostic approaches used in patients who present with mediastinal masses.

Anatomic Considerations

The mediastinum is located in the center of the thorax between the 2 pleural cavities, the diaphragm and the thoracic inlet. Although various divisions of the mediastinum exist, most clinicians use Fraser et al’s classification in which the mediastinum as visualized on a lateral radiograph is divided into anterior, middle, and posterior compartments (Figure 1). The anterior mediastinal compartment is bounded anteriorly by the sternum and posteriorly by the pericardium, aorta, and brachiocephalic vessels. The compartment contains the thymus gland, branches of the internal mammary artery and vein, lymph nodes, the inferior sternopericardial ligament, and variable amounts of fat. The middle mediastinal compartment contains the pericardium and its contents, the ascending aorta and the aortic arch, the superior and inferior vena cava, the brachiocephalic (innominate) arteries and veins, the phrenic nerves and cephalad portion of the vagus nerves, the trachea and main bronchi and their regional lymph nodes, and the pulmonary arteries and veins. The posterior mediastinal compartment is bounded anteriorly by the pericardium and the vertical part of the diaphragm, laterally by the mediastinal pleura, and posteriorly by the bodies of the thoracic vertebrae. It contains the descending thoracic aorta, esophagus, thoracic duct, azygos and hemiazygos veins, autonomic nerves, fat, and lymph nodes.

When formulating the differential diagnosis of a mediastinal mass, the location of the mass should be considered because some disorders occur characteristically in certain compartments (Table 1).

Approach to Evaluation

The diagnosis of mediastinal disorders may be approached in 2 phases: noninvasive imaging techniques and invasive procedures for tissue sampling. All patients should have a detailed history and physical examination before a major work-up is initiated. Symptoms or signs of myasthenia gravis may obviate the need for preliminary biopsy, and patients with these findings can be referred for excision of the mass. A palpable superficial lymph node may suggest a metastatic disease or lymphoma, again obviating the need for sampling the mediastinal mass. A palpable thyroid may suggest mediastinal extension of a cervical goiter. A testicular examination should be done in all male patients with an anterior mediastinal mass. If there is any doubt whether a mass is present, ultrasound evaluation of the