

62. Thoracic Neoplasia

Metastatic tumors are the most common neoplasias involving the heart, while primary lipomas and myxomas are rarer. The latter is demonstrated in the axial cine image in Figure 62.1 A as a large moderate SI mass attached to the left atrium—the most common site of origin—and extending into the left ventricle. Detection of such an atrial attachment distinguishes a myxoma from intracardiac thrombus. Myxoma SI characteristics vary depending on the amount of blood products and calcification present. Enhancement is also variable. Intracardiac lipomas are distinguished by their high SI (due to the presence of fat) on T1WI, while malignant cardiac tumors (i.e. rhabdomyosarcomas) are rarer still and are suggested by a wide base of attachment or the concomitant presence of a hemorrhagic pericardial effusion.

Unlike those of the heart, lung malignancies are extremely common. Lung MR presents similar difficulties to that of the heart, typically requiring cardiac and respiratory gating. Other problems include intrinsically low tissue proton density and susceptibility artifact at the interface of air and soft tissue. Although alone the SI characteristics of a pulmonary lesion cannot establish malignancy and CT is generally used for the lung cancer staging, MR may be used in patients with iodinated contrast allergies and in several other scenarios. Given its superior tissue contrast and lack of bone artifact, thoracic outlet tumors (i.e. Pancoast tumors) are often better evaluated by MR. Mass effect on blood vessels or the brachial plexus may be visualized without contrast administration. The above characteristics also allow clear visualization of chest wall invasion. Irregular margins and infiltrative growth characterize malignancy, whereas lipomas—the most common primary chest wall tumor—demonstrate uniform high SI on T1WI. Surgical contraindications include vascular, brachial plexus, spinal cord, and pericardial involvement—all well-seen on MR. Postoperatively, recurrent tumor is distinguished from fibrosis by its higher SI on T2WI. Mediastinal involvement is likewise better visualized on MR than on unenhanced CT, as the low SI of blood vessels and the tracheobronchial tree appear distinct from higher SI fat and soft tissue, easily differentiating a small vessel from a pulmonary nodule or lymph node. Figure 62.1 B depicts a bronchogenic carcinoma, demonstrating moderate SI against the low SI of the air-filled lungs on HASTE T2WI. Invasion of the mediastinum with encasement of the bronchi is evident. CE MRA may also help to evaluate arterial invasion.

In primary mediastinal tumors compartmental localization is particularly important. Anterior mediastinal tumors include lymphoma, teratomas and those of the thymus, thyroid, and parathyroid. Teratomas are identified by the concurrent MR presence of fatty, calcified,

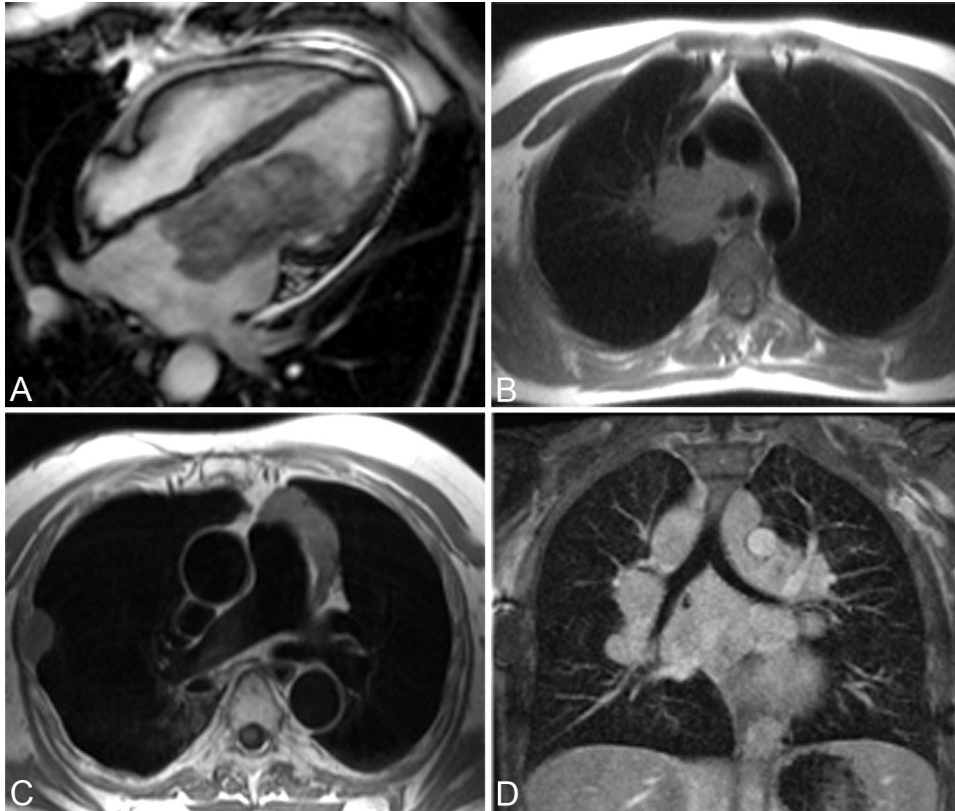


Fig. 62.1

and cystic components. The normal thyroid and parathyroid demonstrate moderate and high SI on T2WI, respectively, and both appear as low SI on T1WI. Conventional MR and CE imaging may be helpful in pre-surgical localization of the parathyroid glands. None of the above tumors can be classified as benign or malignant on conventional MR, rendering its main use to that of tumor extent delineation. For example, the thymoma to the left of the pulmonary trunk on the T1WI of Figure 62.1 C is clearly situated within the anterior mediastinum and demonstrates moderate SI on T1WI. A metastasis to the right pleural space, along the thoracic wall is also clearly visualized. Although not present here, MR SI characteristics of pleural fluid content may help elucidate its contents: chylothoraxes demonstrate high SI on T1WI, while diffusion restriction and contrast enhancement typify exudative fluid. In the middle mediastinum, tracheobronchial and esophageal cysts may occur. Pure fluid within these lesions demonstrates low and high SI on T1 and T2WI, respectively, while greater protein-content increases and decreases these SI, respectively. Lymphoma occurs throughout the mediastinum, appearing with homogenous lower SI on T2WI, although this appearance is nonspecific. Malignant lymphadenopathy from other causes may also be seen, although the MR diagnosis may be difficult, in part due to poor visualization of calcification—a marker of benign nodularity and lymphadenopathy. Malignancy is suggested by a short axis diameter exceeding 1 cm and early (within 1.5

minutes) contrast enhancement with rapid washout. Enhancement characteristics of infectious or inflammatory etiologies—other potential causes of a mediastinal mass—may be similar. Such characteristics are demonstrated in the case of sarcoidosis illustrated on the coronal CE T1WI in Figure 62.1 D, where enlarged, enhancing perihilar and mediastinal lymph nodes are present. The MR SI characteristics of infectious and inflammatory lymphadenopathy are also nonspecific. Further considerations within the posterior mediastinum include neurogenic neoplasms (see Chapter 39).