

Malignant pulmonary and mediastinal tumors in children: differential diagnoses

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Abstract

Conventional chest radiography is the most common imaging procedure in children. When a chest mass is discovered, cross-sectional imaging is often required to accurately localize and characterize the lesion in order to narrow the differential diagnosis. Knowledge of the differential diagnostic possibilities for chest tumors in children is important for both the pediatric and general radiologist because they differ from adults. The more common pediatric, malignant, mediastinal and pulmonary tumors and the characteristic imaging and clinical features that are useful in distinguishing between them are discussed in this review.

Keywords: *Pleuropulmonary blastoma; lymphoma; germ cell tumor; neuroblastoma; Askin tumor; sarcoma.*

Malignant mediastinal tumors

Tumors in the mediastinum are best characterized by the compartment in which they arise. Malignant tumors arising in the anterior mediastinum are most commonly due to lymphoma or leukemia followed by germ cell tumors. Malignant tumors of the middle mediastinum are usually due to adenopathy from leukemia or lymphoma. Middle mediastinal tumors are usually seen in association with anterior mediastinal disease. They are rarely seen in isolation. Tumors of the posterior mediastinum are usually of neurogenic origin with neuroblastoma being most common.

Lymphoma and leukemia

Lymphoma accounts for approximately 13% of all childhood cancers and is the most common cause of a mediastinal mass in children. Sixty percent of all lymphomas in this age group are non-Hodgkin lymphomas and Hodgkin lymphomas make up the remainder. Although non-Hodgkin lymphoma is more common, about half of the children with non-Hodgkin lymphoma and two-thirds of those with Hodgkin lymphoma present with an anterior mediastinal mass. Therefore, most anterior mediastinal masses in children are due to Hodgkin

lymphoma^[1,2]. In most cases the anterior mediastinal mass is due to infiltration of the thymus, although enlarged mediastinal nodes are often present. The thymus and nodes are often very necrotic^[3]. Direct invasion of the pericardium can lead to pericardial effusion, a well-known phenomenon in Hodgkin lymphoma. Direct invasion of the chest wall may also occur. The size of the mediastinal mass and the mediastinal/thoracic ratio, measured on a posterior–anterior radiograph, have implications for prognosis and risk stratification in children with Hodgkin disease. The mediastinal mass may compress and compromise the trachea and superior vena cava. When the trachea is compressed to <50% of its normal diameter, patients should not be sedated or anesthetized because of the risk of airway obstruction^[4,5]. Associated pulmonary nodules and pleural effusions occur in only about 5% of patients with Hodgkin lymphoma, whereas effusions occur in 50–75% of those with lymphoblastic lymphoma (Fig. 1)^[1,2]. T-cell leukemia and lymphoblastic lymphoma are closely related and patients with T-cell leukemia may present with an anterior mediastinal mass and pleural effusions. The distinction between the two is arbitrarily based on the degree of bone marrow involvement such that patients with $\geq 25\%$ marrow blasts are designated as having leukemia^[6].