Introduction

Several tumors of various origin can occur in the mediastinum. Tumors that occur in this area of the chest can present in many different ways clinically and can produce many different pathologic processes. An understanding of the embryology of this area and of the anatomic relationships of the normal structures within the mediastinum is essential in the proper determination of the exact nature of a mass or tumor located in this area[(9)].

Traditionally, the mediastinum is artificially subdivided into 3 compartments for better descriptive localization of specific lesions. When the location or origin of specific masses or neoplasms is discussed, the compartments or spaces are most commonly defined as anterior, middle, and posterior[(9)].

The anterior compartment extends from the posterior surface of the sternum to the anterior surface of the pericardium and great vessels. The anterior compartment normally contains the thymus gland, adipose tissue, and lymph nodes[(9)].

The middle compartment, or middle mediastinum, is located between the posterior limit of the anterior compartment and the anterior longitudinal spinal ligament. This area contains the heart, pericardium, ascending and transverse portions of the aorta, brachiocephalic vessels, main pulmonary arteries and veins, superior and inferior vena cavae, trachea and mainstem bronchi, numerous lymph nodes, and various neural structures such as the phrenic nerves[(9)].

The posterior mediastinum is the area posterior to the heart and trachea and includes the paravertebral sulci. It contains the descending thoracic aorta and ligamentum arteriosum, esophagus, thoracic duct, azygos vein, and numerous neural structures (including autonomic ganglion and nerves, lymph nodes, and adipose tissue). Almost all tumors of neurogenic origin occupy this portion of the mediastinum[(9)].

Common anterior mediastinal tumors include thymomas, lymphomas, germ cell tumors, and mesenchymal tumors. Benign conditions include goiters and lymphangiomas. Most anterior mediastinal tumors are thymomas[(3)].

While neoplasms of the middle mediastinum are most commonly of lymphatic origin, neurogenic tumors also may occasionally occur in this area. Another significant group of masses identified in this compartment is cystic structures associated with a developmental abnormality of the primitive foregut or the precursors of the pericardium or pleura.

Neurogenic tumors are, by far, the most common neoplasm of the posterior mediastinum. Tumors originating from lymphatic, vascular, or mesenchymal tissues can also be found in this compartment[(10)].

Symptoms associated with the respiratory tract predominate in pediatric patients because airway compression is more likely. This occurs because of the significant malleability of the airway structures and the small size of the chest cavity in infants and children. Symptoms most often observed include persistent cough, dyspnea, and stridor. If the location and size of the mass produces partial or complete obstruction, obstructive pneumonia can also occur. Infectious symptomatology, and even signs of sepsis, can occur if a mediastinal cyst becomes infected[(8)].

Clinical findings associated with these malignant properties include cough, dyspnea, stridor, dysphagia, and even more dramatic findings such as superior vena cava syndrome. Invasion of the chest wall or pleura by a malignant neoplasm can produce persistent pleural effusions and a significant amount of local pain. Invasion of nearby nerves within the thorax can produce local and referred pain and a variety of other findings such as hoarseness from recurrent nerve paralysis, diaphragmatic paralysis from phrenic nerve paralysis, Horner syndrome from autonomic nerve invasion, and even motor paralysis from direct spinal cord involvement. Pain in the shoulder or upper extremity can occur from invasion of the ipsilateral brachial plexus. Systemic findings such as weight loss, fever, and malaise also occur[(5)].

Mediastinal tumors can be diagnosed as following:

- **Chest radiography:**
    - Posteroanterior (PA) radiograph of the chest is the usual means by which an asymptomatic mediastinal mass in identified[(4)].
    - Lateral chest radiograph findings are very helpful for determining the compartment of the mediastinum involved[(4)].
- **CT scan of the chest and mediastinum:**
    - CT scan images can greatly assist in determining the exact location of the mediastinal tumor and in determining its relationship to adjacent structures. CT scan is also useful in differentiating masses that originate in the mediastinum from those that encroach on the mediastinum from the lung or other structures[(4)].
- **Magnetic resonance imaging:**
    - MRI is superior to CT scan for the evaluation of masses located at the thoracic inlet or at the thoracoabdominal level[(4)].
- **Echocardiography and ultrasonography:**
    - Ultrasonographic methods have been used to help differentiate solid from cystic mediastinal masses and to assist in determining a connection between a mass and adjacent structures[(5)].
- **Cervical mediastinoscopy:**
    - Cervical mediastinoscopy is a commonly used surgical diagnostic procedure in the evaluation of the retrovascular, pretracheal area of the middle mediastinum[(5)].

- **Mediastinotomy:**
    - This procedure can afford access to areas of the anterior and middle mediastinum, but it is ill-suited as an approach to masses or structures of the posterior mediastinum[(3)].
- **Video-assisted thoracoscopic surgery:**
    - VATS techniques have been used successfully for biopsy of various mediastinal masses and are often used for the sampling of perihilar lymph nodes[(1)].
- **Sternotomy and thoracotomy:**
    - In some cases, standard sternotomy or thoracotomy may be the safest method available to obtain adequate tissue for diagnosis[(3)].

In cases of benign neoplasms, complete excision of the lesion itself is generally sufficient [(8)] . All benign neoplasms that are encapsulated should be resected without violation of the capsule[(3)]. VATS resection is now commonplace for these benign tumors. Shorter hospital stay and more rapid return to work have been demonstrated with this method[(1)].

When surgical resection of malignant neoplasms of the mediastinum is the primary treatment, bloc resection of the tumor should be performed whenever possible[(3)] . Regional lymphadenectomy should accompany surgical resection of operable neoplasms[(7)].