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Approach to a Mediastinal Mass

General Presentation

The mediastinum is situated within the thorax between the pleura of the lungs. It is bordered superiorly by the thoracic inlet, inferiorly by the diaphragm, anteriorly by the sternum and posteriorly by the vertebra. The mediastinum can be separated into anterior, middle, and posterior components.

Mediastinal masses in children are often symptomatic and can have a varied symptomatology and etiology. The most common symptoms at presentation are dyspnea, cough, fever, aching pain and general malaise. Children may also present with recurrent pulmonary infections. Constitutional symptoms may be associated with neoplasia or infection. Respiratory symptoms and dysphagia can occur due to bronchial and esophageal obstruction respectively. A mediastinal mass may also result in a compression of the superior vena cava (superior vena cava syndrome), Horner's syndrome, or hoarseness (due to compression of left laryngeal nerve). Many mediastinal masses are asymptomatic and are an incidental finding on chest radiographs.

Over 50% of pediatric mediastinal masses are malignant and as a result need to be investigated thoroughly. If a malignancy is suspected, a referral to an oncologist is warranted.

Questions to Ask

Mediastinal masses may be symptomatic or asymptomatic, it is necessary to ask the patient about:

- Any recent respiratory symptoms (dyspnea, cough)
- Dysphagia
- Systemic/constitutional symptoms (fever, weight loss, night sweats)
- Facial swelling

- Hoarseness of breath

History

- Past surgeries
- Known congenital defects
- Recent chest trauma
- Recent or recurrent pulmonary infections

Procedures for Investigation

A complete physical exam must be performed including growth parameters. Close attention should be paid to the patient's stability as well as examination of the chest, abdomen and lymph nodes. Note any:

- Respiratory distress or cyanosis
- Hoarseness
- Symptoms of Horner's syndrome (ptosis, miosis, decreased sweating)
- Facial/upper limb edema and venous distension in neck and upper limbs/chest
- Lymphadenopathy
- Hepatomegaly, Splenomegaly

During radiographic investigation it is important to consider the following:

Where is the lesion?

How solid is the lesion?

Is the lesion diffuse or well-circumscribed?

Investigations:

- Chest X-ray: An initial investigation and often how a mediastinal mass is first incidentally detected in the asymptomatic patient

- CT Scan: Highly effective at identifying lesions

- MRI: No radiation needed but control of breath necessary for MRI is difficult with infants

A CT scan is often sufficient for the identification of the lesion location.

Other Investigations:

- CBC and differential with peripheral smear
- Thyroid function (if mediastinal goiter present)

- Calcium, phosphate PTH
- 24 hour metanephrines and catecholamine
- Alpha fetoprotein and/or beta HCG

Once a mediastinal mass has been identified the next step is decide whether the lesion should be observed, aspirated, biopsied or excised. In cases of suspected lymphoma, germ-cell tumour or unresectable invasive malignancy, a diagnostic biopsy and not complete excision is the procedure of choice. If the mass is suspected to be a thymoma, teratoma and most benign lesions, excision of the mass is indicated.

Differential Diagnosis

Neoplasm

- Lymphoma
 - Most common pediatric mediastinal malignancy
 - Includes Hodgkin's and Non-Hodgkin's lymphoma
 - Hodgkin's lymphoma is responsible for 7% childhood cancers
 - Seen in all parts of mediastinum
- Neurogenic
 - Ganglioma, ganglioneuroblastoma, neuroblastoma, paraganglioma
 - Most common benign lesions
 - 2nd most common malignant lesions
 - Most often in posterior mediastinum
- Thymoma
 - Anterior mediastinum
- Germ Cell Neoplasms (i.e. teratomas or seminomas)
 - Benign and Malignant
- Hemangiomas
 - Rare

Non-neoplastic

- Bronchogenic or enterogenic cysts
- Congenital duplication cysts

- Thymic cysts
- Thymic hyperplasia
- Infection
- Sarcoidosis
- Vascular defects (i.e. aortic aneurysm)

Conclusion:

Childhood mediastinal masses constitute a heterogeneous group of malignant and benign lesions. Symptomatology is extremely variable from signs of airway compression to no symptoms at all. All children require a thorough investigation if suspected of having a mediastinal mass, and often require the assistance of pediatric oncology to rule out a malignant lesion.

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