



ROLE OF CHEST X-RAY IN EVALUATION OF A MEDIASTINAL MASS

Pulmonary Medicine

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ABSTRACT

Chest X-Ray is one of the widely available and affordable radiological imaging in diagnosing a mediastinal mass. Various mediastinal reflections help in the interpretation of mediastinal abnormalities. We are presenting a case of a young adult male with lymphoblastic lymphoma in whom conventional Chest X ray helped to locate the lesion in the anterior mediastinum.

KEYWORDS

mediastinal reflection, cervicothoracic, aortopulmonary window, paratracheal stripe, azygoesophageal recess.

INTRODUCTION:

Chest X-Ray (CXR) is a basic investigation that is easily available and a part of routine investigation. A number of mediastinal reflections are visible at conventional radiography that represent points of contact between the mediastinum and adjacent lung. The presence or distortion of these reflections is the key to the detection and interpretation of mediastinal abnormalities. Mediastinal masses may be an incidental finding on chest radiograph or during evaluation of chest symptoms.

CASE REPORT:

A 34 year old male came to our OPD with complaints of dry cough, swelling in his left neck and intermittent fever for the past 1 month. He denied history of sputum production, loss of appetite and loss of weight. There was no history suggestive of immunodeficiency, connective tissue disorder, malignancies or intake of anti tubercular drugs. No history of similar illness among family members. He is not a smoker or an alcoholic. General examination revealed an enlarged lymph node of size 7*5cm in the left supraclavicular region which was freely mobile and non tender. He also had dilated veins over his left lateral chest wall. Systemic examinations were normal. CXR revealed widened mediastinum. Computed tomography (CT) thorax showed a well defined mass of size 7*9*10cm with irregular border in the prevascular area with moderate enhancement with contrast, with enlargement of bilateral supraclavicular and paratracheal nodes. Left supraclavicular lymph node was excised. Histopathological examination showed lymph node with loss of architecture, diffuse proliferation of lymphoblast like cells admixed with focal areas of inflammatory cells and several mitotic figures suggestive of non Hodgkins lymphoma probably high grade lymphoblastic. Immunohistochemistry was positive for CD3, CD8 and TdT suggestive of T cell lymphoblastic lymphoma. He was treated with both chemotherapy and radiotherapy.

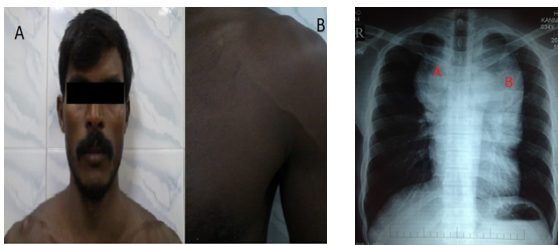


Figure 1:
A: Left supraclavicular lymph node enlargement
B: Dilated veins in left lateral chest wall

Figure 2:
A: Cervicothoracic sign
B: Hilum overlay sign

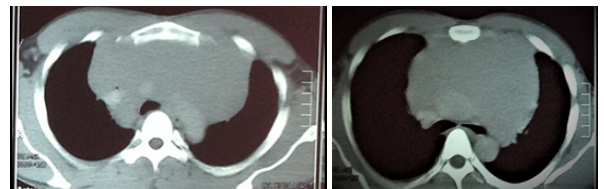


Figure 3&4: Widening of mediastinum with enlargement of prevascular, paratracheal nodes.

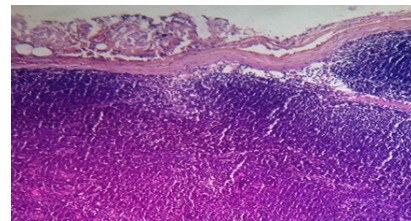


Figure 5: Cross section of lymph node showing loss of architecture, diffuse proliferation of lymphoblast like cells admixed with focal areas of inflammatory cells with several mitotic figures.

DISCUSSION:

The radiological division of mediastinum is different from anatomical division. In lateral CXR an imaginary line along the back of the heart and front of the trachea divides anterior from middle mediastinum. A second imaginary vertical line connects a point on each of the thoracic vertebrae 1 cm behind its anterior margin. This divides the middle from the posterior mediastinum.

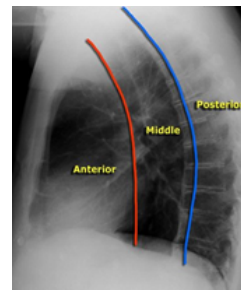


Figure 7: Lateral CXR

ANTERIOR MEDIASTINUM:

Usual masses would be the four T's – thymic mass, thyroid mass, teratoma, terrible lymphoma. The anterior junction line is formed by the anterior apposition of the lungs and consists of the four layers of pleura. Anterior mediastinal masses in the prevascular region can

obliterate the anterior junction line. The hilum overlay sign is present when the normal hilar structures project through a mass, such that the mass can be understood as being either anterior or posterior to the hilum.

If the lateral border of the mass disappears under clavicle the mass is in the anterior mediastinum. Conversely if the border is clearly visible above clavicle the mass is in the posterior mediastinum (posterior mediastinum higher than anterior mediastinum). This sign is called as Cervico thoracic sign. Normal thymus is susceptible for indentation hence there can be a wavy margin of Mulvey. Sail sign (triangular shadow abutting minor fissure) also denotes normal thymus. Thymoma presents as biconvex mass as it is hard to get indented. Specks of calcification can help in identifying teratoma.

MIDDLE MEDIASTINUM:

Lymphadenopathy, aortic arch aneurysm, foregut duplication cysts, enlarged pulmonary artery are the common middle mediastinal masses. The Aortopulmonary (AP) window reflection extends from the aortic knob to the left pulmonary artery and has a normal concave appearance. A convex border between the AP window and the lung is considered abnormal. The right paratracheal stripe is seen projecting through the SVC. It is formed by the trachea, mediastinal connective tissue, and paratracheal pleura and is visible due to the air-soft tissue interfaces on either side. A right paratracheal stripe 5 mm or more in width is considered widened.

POSTERIOR MEDIASTINUM:

Paraspinal abscess, neurogenic tumours, foregut duplication cysts, descending aortic aneurysm arise in posterior mediastinum. The azygoesophageal recess is the interface between the right lung and the mediastinal reflection inferior to the arch of the azygos vein. It is disrupted by prevertebral disease. The posterior junction line is a posterior mediastinal line that is seen above the level of the azygos vein and aorta and that is formed by the apposition of the lungs posterior to the esophagus and anterior to the vertebral bodies. Prevertebral disease superior to the level of the aortic arch may obliterate the posterior junction line. The paraspinal lines are created by the interface between lung and the pleural reflections over the vertebral bodies. The paraspinal lines are disrupted by paravertebral disease—which commonly includes diseases originating in the intervertebral disks and vertebrae—and by neurogenic tumors.

CONCLUSION:

By assessing the mediastinal reflections and distortions in conventional radiograph we can select an appropriate investigation modality.

Anterior mediastinal masses can be identified when the hilum overlay sign is present and the posterior mediastinal lines are preserved.

Middle mediastinal masses are identified by widening of the right paratracheal stripe and convexity relative to the aortopulmonary window reflection.

Posterior mediastinal masses are suspected when there are disruptions of the azygoesophageal recess and Paraspinal line.

For example, in suspected neurogenic tumours Magnetic Resonance Imaging (MRI) is better than a CT scan. We can also predict mortality to some extent by locating the compartment of the mass. 40 % of anterior compartment masses are malignant whereas it is 3 % in posterior compartment masses.

Conventional radiography is still at its best though advanced modality of investigations arrived.

We report this case to emphasize the importance of various mediastinal reflections in chest X ray in suspecting a mediastinal mass and identifying its location.

REFERENCES:

1. Felson, B. (1969). The mediastinum. *Seminars in Roentgenology*, 4(1), 41–58. doi:10.1016/0037-198x(69)90016-9.
2. Proto, A. V. (1987). Mediastinal anatomy. *Journal of Thoracic Imaging*, 2(1), 1–48. doi:10.1097/0005382-198701000-00002.
3. Ravenel, J. G., & Erasmus, J. J. (2002). Azygoesophageal Recess. *Journal of Thoracic Imaging*, 17(3), 219–226. doi:10.1097/0005382-200207000-00007.
4. Cohen, A. J., Thompson, L., Edwards, F. H., & Bellamy, R. F. (1991). Primary cysts and tumors of the mediastinum. *The Annals of thoracic surgery*, 51(3), 378–386.

5. Whitten, C. R., Khan, S., Munneke, G. J., & Grubnic, S. (2007). A diagnostic approach to mediastinal abnormalities. *Radiographics*, 27(3), 657–671.