Mediastinal syndrome

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Mediastinum, anatomic recall

Space between the 2 lungs containing:

- The heart
- The big vessels (aorta, veina cava...)
- Oesophagus
- Nerves
- Nodes
Technical conditions to make a good analysis of mediastinum on a CXR:

- correct inspiration: 9 posterior rib arches visible above the diaphragm (or 6 anterior rib arches above diaphragm)
- strictly front view: spinal line in the middle of the clavicle internal limits
- Postero anterior incidence of the X ray beam
- Adequat penetration / contrast
This is a trap picture:

The first impression is that mediastinum is enlarged. It is wrong because in this case the CXR has not been made in optimal condition: old woman with cyphoscoliosis and too tired to stand up: cxr in decubitus position.

The consequence is a false enlargement of the mediastinum with overlap of the 2 hilus areas (notice that the position of the patient has been notified on the right edge of the cxr).
Is there a mediastinum enlargement?
This a trap picture: false enlargement of the mediastinum area, because non complete inspiration. (only 7 posterior ribs arches visible above the diaphragm. They should be minimum 9).

The incidence is not strictly a front view (the spinal cord line is not strictly in the middle of the clavicles internal limits) which contribute to false mediastinum enlargement.
Good quality CXR:
- correct inspiration: 9 posterior rib arches visible above the diaphragm (or 6 anterior rib arches above diaphragm)
- strictly front view: spinal line in the middle of the clavicle internal limits
Mediastinum lines

- Partatracheal line
- para-azygos line
- para-oesophagus line
- right paravertebral line
- aorto-pulmonary line
- para-aortic line
- Left paravertebral line

Drawings and illustrations from Pr Daniel Jeanbourquin
Three of them are really important.
TB adenopathy in the latero-tracheal area

Right paratracheal line

Normal CXR
Adenopathy in aorto pulmonary window

Aorto pulmonary line

Normal CXR
Bronchial cancer in contact with descending aorta (positive silhouette sign)

Para-aortic line

Normal CXR
Division of the mediastinum
The different compartments
(Felson classification)

For each compartment
Specific etiologies
ANTERIOR MEDIASTINUM: Three tiers.

Superior mediastinum

Middle mediastinum

Inferior mediastinum
ANTERIOR MEDIASTINUM

Endothoracic goitre
Lymphoma
Thymoma
germininal tumors
Ascending aortic aneurvrysm

Pleuro-pericardic cysts
trans diaphragmatic hernia
Goitre

ANTERIOR MEDIASTINUM
superior tier

Endothoracic goitre
Application of the silhouette sign: The cervico-thoracic pass sign

1: The external and superior contours of the mediastinal opacity disappear above the clavicles. This sign means that the opacity is anterior in the superior mediastinum.

2: The superior edge of the opacity is visible in the pulmonary air above the clavicles: the opacity is posterior.
intrathoracic anterior goitre
intrathoracic goitre

(compression of the trachea: main complication of intra thoracic goiter)
anterior intrathoracic goitre with tracheal compression
anterior intrathoracic goitre with tracheal compression
intrathoracic anterior goitre
intrathoracic goitre
(compression of the trachea)
Posterior goitre  Courtesy of Dr. Bellamy
Posterior goitre  Courtesy of Dr. Bellamy
ANTERIOR MEDIASTINUM
MIDDLE TIER
ANTERIOR MEDIASTINUM

Middle tier

- Lymphoma
- Thymoma
- Germinal tumours
- Ascending aorta aneurysm
Thymoma

Notice that the retro-sternal space is filled by the tumour
Thymoma
germinal tumour
Man, 21 years old, worsening condition, asthenia, 38°C fever, weight loss (-5kg in 2 months), nocturnal sweating.

Notice the silhouette sign with heart (anterior mediastinum)
And with the aortic arch (extension to the middle mediastinum)
Hodgkin’s disease
Chest x-ray after chemotherapy
Ascending aorta aneurysm
Anterior mediastinum
inferior tier
ANTERIOR MEDIASTINUM

Inferior tier

Pleuro-pericardic cysts

And trans diaphragmatic hernia
Pleuro pericardial cyst
Trans diaphragmatic hernia

(Morgani hiatus hernia)
Middle mediastinum
Middle mediastinum

- ADENOPATHIES
  - TUBERCULOSIS
  - bronchial cancer
  - lymphoma
  - sarcoïdosis

- bronchogenic cysts
- Oesophageal pathology (hiatal hernia)
- vascular lesions (aortic aneurysm)
The most frequent mediastinal mass is ADENOPATHY.

The most frequent etiology of adenopathy in countries with high incidence of TB is TB.
right hilar and mediastinal adenopathy
tuberculous adenopathy
Mediastinal enlargement suggesting adenopathies of superior mediastinum (normal x-ray image on the right)
The most frequent localisations of TB adenopathies. In this area, lateral view is very usefull for diagnosis.
Lateral view is very useful for diagnosis of mediastinal adenopathies in sub carina and inter tracheo bronchial areas.
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Right hilar adenopathy. Is there mediastinum associated adenopathies? Notice mediastinum enlargement
Lateral view, previous case: hilar and mediastinum adenopathies. On the right side normal lateral view.
Lateral view is useful to confirm hilar and mediastinum adenopathies in the carena area.
Notice partial atelectasis of the middle lobe.
Aorto-pulmonary space
Adenopathy

Normal chest x-ray
Tuberculous adenopathy. Scannographic and endoscopic views
Tuberculous adenopathies
Tuberculous adenopathy with bronchial lesions
Tuberculosis / HIV + 

Tuberculous adenopathies are very frequent in cases of AIDS, and sometimes very bulky
Here you see a CXR of TB/HIV co-infection: bulky bilateral adenopathies (associated TB intra abdominal adenopathies)
Sarcoidosis

In countries with high incidence of TB this CXR would strongly suggest TB adenopathies
Lateral view is very usefully for diagnosis of hilar and mediastinum adenopathies.
But mediastinum adenopathies are not always tuberculous
Bronchial carcinoma
Bronchial carcinoma with superior vena cava syndrome
Small cell carcinoma bronchial cancer
Bilateral adenopathies and left inferior opacity with retraction: probable left inferior atelectasis*: In adults the association of hilar adenopathies with atelectasis strongly suggests bronchial cancer.
After chemotherapy
Young woman, 19 years old, Hodgkin’s disease.
Young woman, 19 years old, Hodgkin’s disease.
Bronchial cancer with hilar adenopathies
Bronchogenic cysts

10% of mediastinal tumours

embryology
Bronchogenic cysts
Bronchogenic cyst (courtesy of Dr. Bellamy)
oesophageal diverticulum

Oesophagus pathology is not well visible on CXR

If no scanner, use baryte opacification
Mega-oesophagus
Aorta arch aneurysm
Descending aorta aneurysm
Descending aorta aneurysm
Aneurysm of aortic arch and descending aorta
Aneurysm of aortic arch and descending aorta
Hiatal hernia: round opacity, in retro-cardiac situation, with a liquid level, disappearing in decubitus position
Hiatal hernia
Posterior mediastinum

- Neurogenic tumours
- and rachis pathology
Neurogenic tumours

- Tumours of the nervous sheath (adults++):
  - Schwannoma (benign or very rarely malignant), the most common
  - Neurofibroma

- Tumours of the nervous cells:
  - neuroblastoma, ganglioneuroblastoma (children+++)
  - ganglioneuroma (adults)

- Tumours of the paraganglions:
  - paraganglioma

Malignant tumours: Adults: 1 to 4%

Children: 40 to 60%
Neurogenic tumours

Courtesy Pr Jeanbourquin France
Woman, 35 years old
systematic radiologic examination
Scanner and MRI: neurogenic tumour of the posterior mediastinum
Pott’s disease: tuberculosis of para vertebra and psoas muscles and of vertebra corpus
In cases of posterior mass, always look at the rachis and consider Pott’s disease.