Incidental findings in the mediastinum on chest radiography and CT

Poster No.: C-0170
Congress: ECR 2013
Type: Educational Exhibit
Authors: T. González de la Huebra Labrador, C. Santos Montón, P. A. Chaparro García, A. Herrero Hernandez, D. García Casado; Salamanca/ES
Keywords: Mediastinum
DOI: 10.1594/ecr2013/C-0170

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method ist strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org
Learning objectives

To describe the most common variants of normal in the mediastinum, incidentally detected on conventional radiography and chest CT.
**Background**

The normal mediastinal structures identified at CT and at conventional radiography are the following:

- the heart and blood vessels
- the major airways
- the oesophagus

All of these are surrounded by connective tissue, largely fat, within which lie: lymph nodes, the thymus, the thoracic duct, and the phrenic and laryngeal nerves.

Some variants of normal may be mistaken for lymphadenopathy or mediastinal masses if they are not correctly known and identified.

**HEART AND BLOOD VESSELS:**

The aorta artery leaves the left ventricle and rises anterior by the right bending over the trunk of the pulmonary artery. The aortic arch passes over the left pulmonary artery and left main bronchus becoming posterior from right to left. It narrows as the supraaortic arterial trunks come from their surface. These three vessels are positioned on a curve before the trachea, from right to left they are: the brachiocephalic arterial trunk (which will fork into the right common carotid and right subclavian arteries), the left common carotid and the left subclavian. The left brachiocephalic veincrosses them anteriorly to join the superior vena cava.

**Arteries:**

- **Aberrant right subclavian artery** (Figs. 1 and 2):

  The right subclavian artery comes as a fourth branch of the aortic arch and crosses from left to right posterior to the oesophagus. Its origin is often dilated (diverticulum of Kommerell). There is no a brachiocephalic artery but in its place the right common carotid artery comes directly from the aortic arch.

- **Right aortic arch** (Figs. 3 and 4):

  In this case the aortic arch passes to the right of the trachea and descends down the right posterior mediastinum. Most of them have an aberrant left subclavian artery
coming out as a fourth branch of the aortic arch (it may originate from an embryological remainder of the left arch, diverticulum of Kommerell) and passing behind the esophagus towards the left side. Others present supraaortic trunks output as a mirror imaging (left brachiocephalic, right carotid and right subclavian arteries).

- **Double aortic arch** (Figs. 5 and 6):

  Both aortic arches pass on either side of the trachea and merge posteriorly to oesophagus and trachea (the right arch is usually higher and larger than the left). Each arch gives rise to its respective common carotid and subclavian arteries. The descending aorta goes most commonly by the midline.

- **Pseudocoarctation of the aorta** (Fig. 7):

  The aorta is kinked at the level of the ligamentum arteriosum. The ascending portion is typically more vertical in orientation, the arch higher, and the curve of the arch tighter than normal. Absence of significant collateral vessels (as opposed to true coarctation).

Veins:

- **Left superior vena cava** (Fig 8):

  There is a failure of obliteration of the left common cardinal vein during fetal development, resulting in a persistent left superior vena cava. It arises from the junction of the left jugular and subclavian veins and travels vertically through the left mediastinum, passing anterior to the left main bronchus before joining the coronary sinus on the back of the heart (right atrium). A right superior vena cava (on a similar plane) and an interconnecting brachiocephalic vein are also present in most cases (absence of left brachiocephalic vein).

- **Azygos lobe** (Fig. 9):

  The azygos vein form an accessory fissure traversing the upper lobe of the right lung to its usual position in the tracheobronchial angle before entering the superior vena cava. It may have an increased density and simulate a right mediastinal mass on plain radiographs.

- **"Aortic nipple"** (seen on some PA radiographs) (Fig. 9):

  It corresponds to the left superior intercostal vein, which may cause a small bulge on the lateral margin of the aortic arch. This vein runs below the left brachiocephalic vein to join it, arching anterior and around the aorta.

- **Azygos continuation of the inferior vena cava** (Figs. 10, 11 and 12):

  The inferior vena cava does not develop correctly being interrupted above the renal veins (absence of the intrahepatic segment of the inferior vena cava). Instead of it, a dilated
azygos vein carries venous return towards the heart. Hepatic veins drain directly into the right atrium.

The first centimeters of the ascending aorta and the pulmonary trunk are surrounded by a common pericardium sheath.

**Pericardial recesses** (Fig. 13): consisting of small amounts of fluid in the pericardial reflections around and between the great vessels.

**MAJOR AIRWAYS:**

**Tracheal diverticulum** (Fig. 14):

It is a congenital or acquired anomaly consisting of a mucosal herniation through the tracheal wall. It may be visualized as a small rounded air-filled cyst (less than 2 cm in diameter) in the right posterior paratracheal region. Rarely the tracheal communication is identified because of being narrow.

**ESOPHAGUS:**

**Hiatal hernia** (Figs. 15 and 16):

It consists of the protrusion of a part of the stomach through the oesophageal hiatus of the diaphragm. It may be sliding (most common) or paraesophageal. It is seen as an air-containing retrocardiac mass.

**THYMUS:**

Before puberty, the thymus occupies most of the mediastinum in front of the great vessels (anterior to the aortic arch, inferior to the left brachiocephalic vein and superior to the level of the horizontal portion of the right pulmonary artery). In children its density is homogeneous and similar to muscle. After puberty the thymic follicles atrophy and fatty replacement occurs (density reduces) until eventually little or no residual thymic tissue can be seen. In individuals older than 40 years, the thymus may have an attenuation value identical to that of fat.
As a response to chemotherapy, the thymus of adults can regain its preadolescent size, being hyperthrophic (Fig. 17).
Images for this section:

**Fig. 1:** Aberrant right subclavian artery (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 2: Aberrant right subclavian artery (PA radiograph)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 3: Right aortic arch (with mirror imaging branching) (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 4: Right aortic arch (PA radiograph)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 5: Double aortic arch (contrast-enhanced CT and tridimensional reconstruction)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 6: Double aortic arch (PA radiograph)

© Complejo Asistencial de Salamanca - Salamanca/ES
**Fig. 7:** Pseudocoarctation of the aorta (PA radiograph, contrast-enhanced CT and tridimensional reconstruction)

© Complejo Asistencial de Salamanca - Salamanca/ES

**Fig. 8:** Left superior vena cava (contrast-enhanced CT and PA radiograph) A right superior vena cava is also present with an electrode inside and pacemaker electrode introduced by left subclavian artery
Fig. 9: Azygos lobe and left superior intercostal vein (PA radiograph and contrast-enhanced CT)
Fig. 10: Azygos continuation of the inferior vena cava (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 11: Azygos continuation of the inferior vena cava (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 12: Azygos continuation of the inferior vena cava (PA radiograph)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 13: Pericardial recesses (contrast-enhanced CT) Note the relationship with the right inferior pulmonary vein

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 14: Tracheal diverticulum (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 15: Hiatal hernia (CT with oral and intravenous contrast)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 16: Hiatal hernia (PA and lateral radiograph)

© Complejo Asistencial de Salamanca - Salamanca/ES
Fig. 17: Thymus hypertrophy (contrast-enhanced CT)

© Complejo Asistencial de Salamanca - Salamanca/ES
Imaging findings OR Procedure details

Conventional radiography and Computed Tomography (CT) are the techniques used to perform the exams.
Conclusion

In daily radiological activity we face numerous variants of normal mediastinal structures, not pathological, and other incidental findings. To recognize these features is important to avoid mistakes in diagnosis.
References

- David M Hansell. Imaging of diseases of the chest
- Jud W. Gurney, MD, FACR. Diagnostic imaging chest
- Stephanie Ryan. Anatomy for diagnostic imaging.