Al-Mustaqbal University
College of Health and Medical Technologies
Radiological Techniques Department

Magnetic Resonance Imaging

First Semester

Lecture 18 : MRI of chest

By

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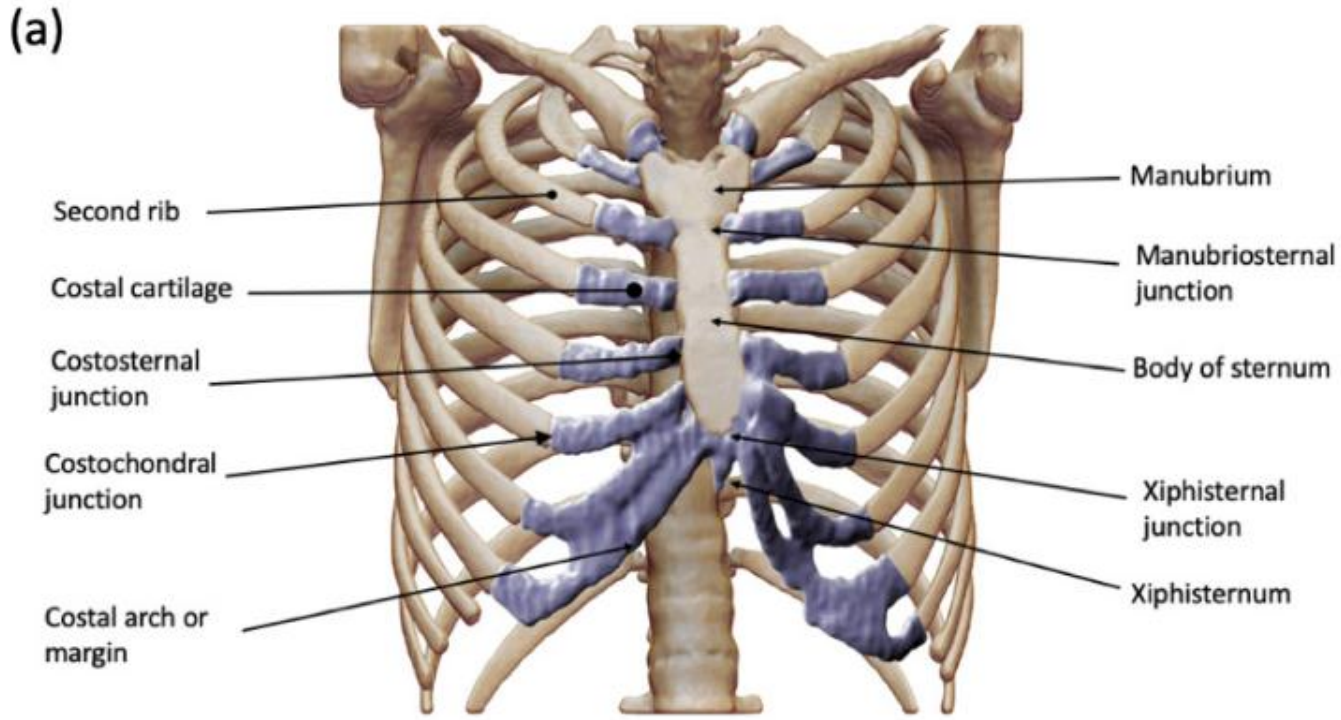
Introduction :

MRI of the chest including the **lungs and mediastinum** can be valuable in certain clinical scenarios, but it is less commonly used compared to other imaging modalities like computed tomography for this region. **MRI is particularly useful when radiation exposure needs to be minimized or when specific soft tissue characterization is required.**

•Anatomical overview:

The chest or thorax is the region of the bony thoracic cage located between **the neck and abdomen**. **The upper boundary of the chest**, the thoracic inlet, is formed by **the first thoracic vertebra**, **the first ribs**, and **the upper margin of the manubrium**. **Inferiorly, the chest** extends to the level of the thoracic outlet, marked by **the diaphragm**, which extends **between the inferior margin of the sternum and the upper lumbar vertebra**.



•Common indications:

1-Mediastinal mass, e.g. lymphoma and congenital cyst.

2-Neurogenic lesions, e.g. thoracic meningoceles and malignant nerve sheath tumors.

3-Differentiation between lymph nodes and vascular anomalies.

4-Assessment of vascular anomalies of chest (in conjunction with MRA), e.g. thoracic aortic aneurysms.

•MRI Procedure:

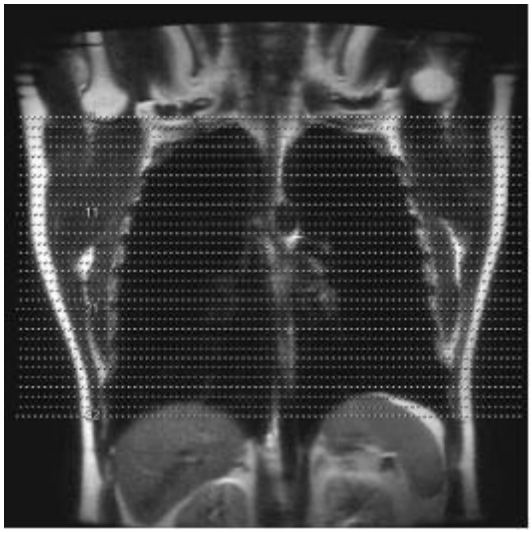
•Patient position:

1- Patient should be in **supine-position (head first)**. Patients who suffer from claustrophobia may prefer a **feet-first orientation**.

2- Set-up the coil (Torso-array coil).

•Scout slice placement:

1-Coronal localizer for axial slice



- Alignment:

True axial.

- Coverage:

A-Superior to inferior: Thoracic inlet to diaphragmatic crura.

B-Lateral to medial: Chest wall on each side.

C-Posterior to anterior: Thoracic spinous processes to sternum.

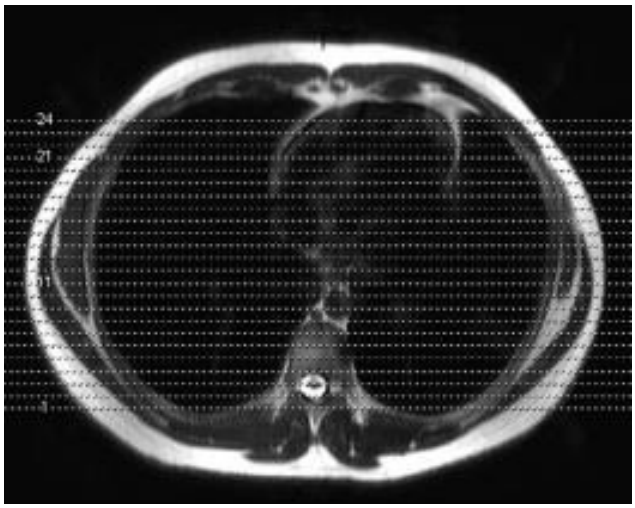
- Axial slices are used to demonstrate the following:

1-Contents of mediastinum.

2-Morphology of the great vessels and heart.

3-Lymph node location and size.

2-Axial localizer for coronal slice



-Alignment: True coronal.

- Coverage: As for axial plane.

- It is the best plane for demonstrating the costophrenic angles and lung apices.

•MRI Sequences:

1	**T1WI (FSE)**	**Axial and coronal** sections **5mm slice** thickness **Useful :** to provide **detailed anatomical information, including visualization of chest structures such as heart, main vessels and mediastinum**.
2	**T2WI (FSE)**	**Axial and coronal** sections **5mm slice** thickness **Useful :**to **demonstrate differences in tissue water content, making it useful for identifying areas of inflammation, edema, or abnormal tissue within the chest.**
3	**Fat suppression sequences**	**Useful : Distinguish between fat-containing and non-fat tissues**, aiding in the assessment of lesions and structures within the chest.
4	**DWI sequence**	With a **slice thickness of 5mm** **Useful :to assess tissue cellularity and identifying certain chest lesions.**

5	**Dyn-study+ con (GAD-based contrast)**	Evaluate tissue perfusion **slice thickness of 5mm.** **Useful : It can help in characterizing lesions based on their vascularity**, particularly useful for assessing vascular lesions and tumors.
6	**MRA**	With a slice thickness of 1-2mm **Useful : to visualize blood vessels within the chest, including the main arteries and veins**, and can be used to detect vascular abnormalities.