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

Magnetic Resonance Imaging

First Semester

Lecture 21 : MRI of biliary tree and pancreas

By

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Introduction :

MRI of the biliary and pancreas is typically performed using a magnetic resonance **cholangiopancreatography (MRCP) sequence. MRCP is a special type of MRI that produces images of the bile ducts and pancreatic duct.**

•Anatomical overview:

- Pancreas: - A collection of glandular tissue and it has exocrine and endocrine functions. It consists of: - Head, Body, and Tail. (fig-1-)

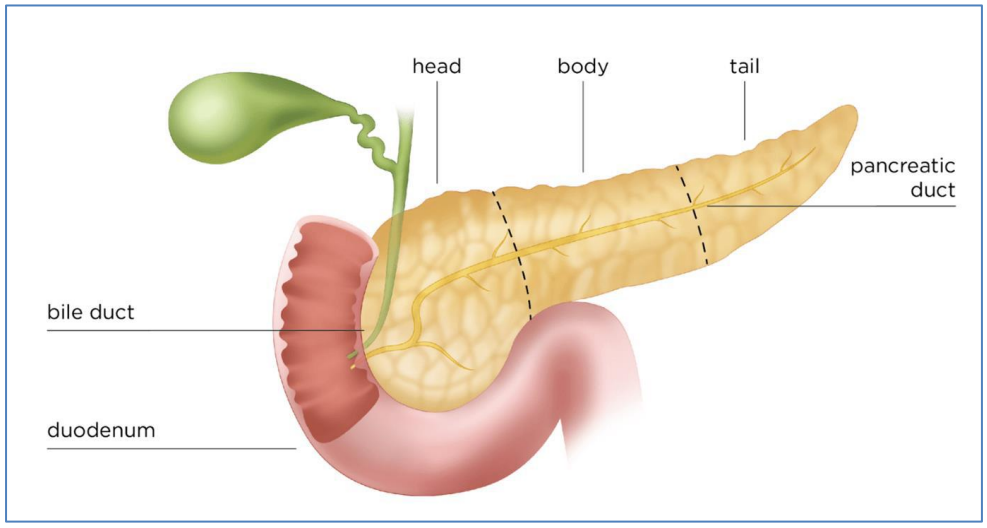


Fig.1: Pancreas

- Magnetic resonance cholangiopancreatography (MRCP) is a non-invasive imaging technique to visualize the intra and extrahepatic biliary tree and pancreatic ductal system.

- Indications: -

1-Pancreatic cancer.

2-Pancreatitis, acute or chronic.

3-Pancreas divisum.

4-Pancreatic duct stone.

5-Metastases.

6-Identification of congenital anomalies of the cystic and hepatic ducts.

7-Post-surgical biliary anatomy and complications.

8-Pancreatic cystic lesions.

9-Biliary or pancreatic trauma.

-MRI procedure:

•Patient position:

1- Patient should be in **supine-position. (head or feet first).**

(Fig.2)

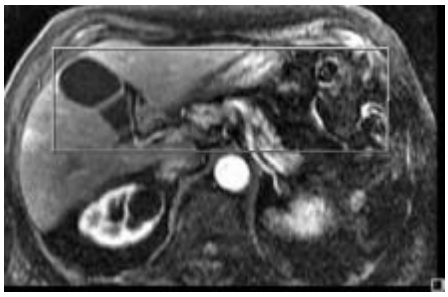
2- Set up **the torso phased array coil**.

3- Position **respiratory bellows** on the patient before starting the scan at the level of **the diaphragm.**

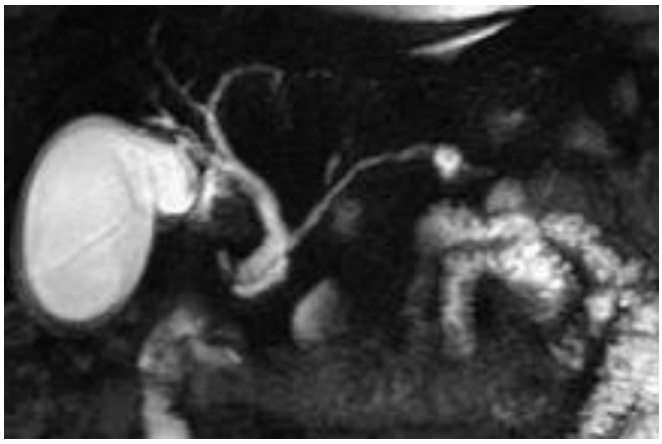
(Fig.2) Patient position (MRCP)

-Scout slice placement: -

1- Acquisition of coronal 3-D MRCP (Axial localizer of the abdomen with coronal 3D location).



Axial localizer of the abdomen with coronal 3D locations



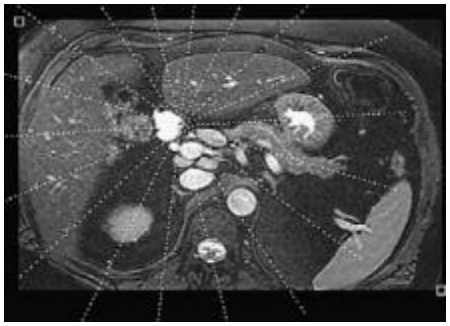
coronal image of the biliary system

-Slice Acquisition: anterior to posterior.

-Slice Alignment: straight, no angulation of slices.

-Anatomic Coverage: gallbladder to aorta including head of pancreas.

2- Acquisition of (thick slab) images for MRCP (Axial localizer of the abdomen with multiple locations through the biliary system)



Axial localizer of the abdomen with multiple locations through the biliary system.

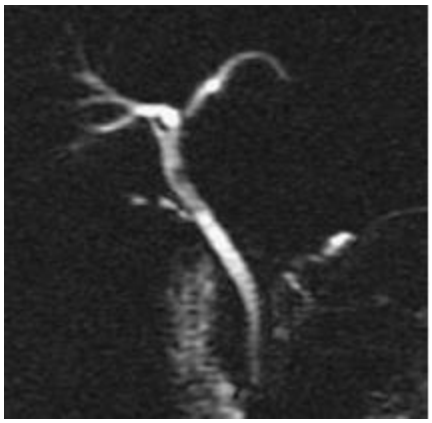


Image of the gallbladder and biliary ducts.

-Slice Alignment: Align to structures of the gallbladder and biliary system.
-Anatomic Coverage: Anterior liver to kidneys.

MRI sequences:

Sequence	TR	TE	FA	ETL	Slice thickness
Axial Fiesta (Fast imaging employing steady-state acquisition)	Min	-	70	-	4mm
Coronal Fiesta (Fast imaging employing steady-state acquisition)	Min	-	70	-	4mm
3D Coronal T2WI	1000-2000	500-1000	-	-	1.4mm
Thick-slab (MRCP) (SSFSE)	6000	1300	-	-	40 mm

Notes:

-The contrast of the images in fiesta is not simply T1-or-T2-weighted but rather is related to the T1-T2 ratio of the tissue.

Fiesta (Fast Imaging Employing Steady-State Acquisition) is a gradient echo sequence that provides rapid imaging capabilities while maintaining high image quality. It is particularly useful for imaging soft tissues and organs.

- **Thick slab techniques use 20-150 mm thickness coronal slabs in different angles parallel to the biliary tree. Every image is acquired in a few seconds.** Fluid filled structures like the stomach, small intestine, colon, collecting urinary system, medullary canal, cystic lesions might overlap the tree. The overlapping effect of the upper GI tract can be diminished using a commercially **available iron containing negative contrast.**

- Thick slab is ideal to obtain a general overview of the biliary tree. **Visualization of small lesions or ductal stones can be limited** so it is important to always **correlate with the thin slab or axial images.**

-We can obtain axial thin slice images by the using of coronal localizer.