الجامعة التقنية الوسطى

كلية التقنيات الصحية والطبية/ بغداد

قسم: تقنيات الاشعة المادة: التصوير بالرنين المغناطيسي

المرحلة: الرابعة

العنوان: **Title: MRI of the biliary tree and pancreas.**

اسم المحاضر: **Name of the instructor:**

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الفئة المستهدفة: **Target population:**

طلبه المرحلة الرابعة في قسم تقنيات الاشعة

المقدمة: 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. MRCP images are created by using a contrast dye that is injected into the bloodstream and travels to the bile ducts and pancreatic duct.

Pretest: الاختبار القبلي:

Define the MRCP

Scientific Content: المحتوى العلمي:

Indication

• For the evaluation of biliary system in cases of obstructive jaundice
• Pancreas divisum
• For the evaluation of intrahepatic biliary ducts in the postoperative conditions
• For the evaluation of pancreatic duct abnormalities

Equipment

•• Body coil/volume torso array or multi-coil
•• RC bellows
•• Earplugs/headphones
•• Pe gating leads if required

Patient Position: Torso phased array coil

• Position the patient supine, feet first on the table.
• Place the arms at the sides or under the head.

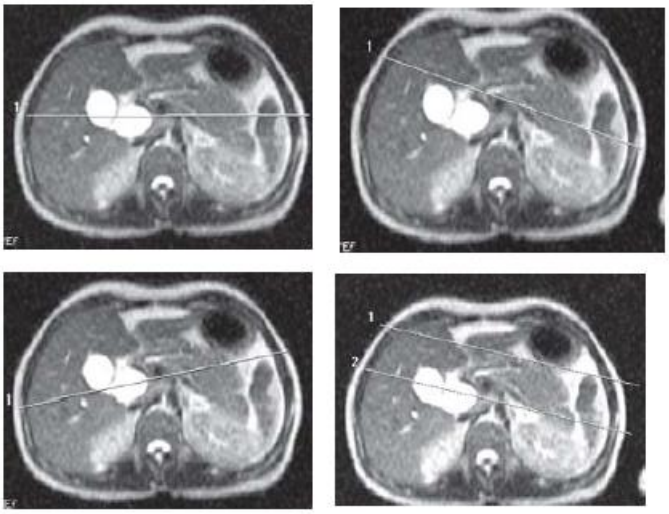
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Placement of the respiratory compensation (RC) bellows



Patient Position: Torso phased array coil



SSFSE- single shot breath hold technique

Pancreas

Common indications

•• Pancreatic tumours
•• Pancreatic duct obstruction

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Equipment

•• Body coil/multi-phased array/multi-array coil
•• RC bellows
•• Earplugs/headphones

Patient positioning

The patient lies supine on the examination couch with the RC bellows securely attached. The patient is positioned so that the longitudinal alignment light lies in the midline, and the horizontal alignment light passes through the level of the third lumbar vertebra, or the lower costal margin.

Common MRCP Sequences:

1. Single Shot Fast Spin Echo (SSFSE) Sequence:
    - Parameters:
        - Slice thickness: 2-3 mm
        - TR (Repetition Time): 2000-4000 ms
        - TE (Echo Time): 500-1000 ms
    - Use: This sequence provides high-resolution images of the biliary and pancreatic ducts. It is useful for detecting and characterizing ductal abnormalities, such as strictures, stones, and dilations.
2. 2D Thick Slab Half-Fourier Acquisition Single Shot Turbo Spin Echo (HASTE) Sequence:
    - Parameters:
        - Slice thickness: 10-15 mm (thicker slices)
        - TR: 800-2000 ms
        - TE: 60-120 ms
    - Use: This sequence is often used for acquiring a rapid overview of the biliary and pancreatic ducts, especially in cases where a larger field of view is needed.
3. 3D T2-Weighted Sequence:
    - Parameters:
        - Slice thickness: 1-2 mm (high-resolution)
        - TR: 1000-2000 ms
        - TE: 500-1000 ms
    - Use: This sequence offers excellent spatial resolution and provides detailed 3D images of the biliary and pancreatic ducts. It is particularly valuable for assessing the entire course of the ducts and identifying small abnormalities.

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Specific Uses:

- Pancreatic Duct Assessment: MRCP helps assess the pancreatic duct for conditions such as pancreatitis, ductal dilations, and tumors that may involve the pancreas.
- Preoperative Planning: MRCP is valuable for preoperative planning, especially before procedures like cholecystectomy (gallbladder removal) or pancreatic surgery, where a detailed understanding of the biliary and pancreatic anatomy is essential.
- Screening for Pancreatic and Biliary Tumors: MRCP can aid in the detection and characterization of tumors within the pancreas or biliary system.
- Diagnosis of Pancreatic and Biliary Diseases: MRCP is used to diagnose various diseases and conditions affecting the pancreas and bile ducts, including chronic pancreatitis and biliary strictures.
- Assessment of Postoperative Complications: MRCP is employed to evaluate postoperative complications, such as bile duct injury or leaks, after abdominal surgeries.

MRCP is a non-invasive and relatively safe imaging technique that provides valuable information for the diagnosis and management of conditions involving the biliary and pancreatic ducts. The choice of sequence and parameters may vary depending on the specific clinical indication and the patient's condition. Always consult with a radiologist or healthcare provider for the most appropriate MRCP protocol for your needs.

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Posttest: الاختبار البعدى:

Numerate the indication of the MRCP?

References: المصادر:

Handbook of MRI Technique Catherine Senior 5TH EDITION 2022
Step by step MRI Jaganmohan Reddy v parsed

Radiopedia