الجامعة التقنية الوسطى

كلية التقنيات الصحية والطبية/ بغداد

قسم: تقنيات الاشعة المادة: التصوير بالرنين المغناطيسي
المرحلة: الرابعة

Title: MRI of the female pelvis **العنوان:**

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

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Target population: **الفئة المستهدفة:**

طلبه المرحلة الرابعة في قسم تقنيات الاشعة

Introduction: المقدمة:

learning about MRI of the female pelvis is essential for MRI technicians to perform MRI exams effectively, interpret MRI results accurately, ensure patient safety, understand anatomy and pathology, and collaborate with other healthcare professionals. MRI technicians can acquire this knowledge through specialized training programs, continuing education courses, and on-the-job experience.

Pretest: الاختبار القبلي:

What we need to prepare for the female pelvis exam?

Scientific Content: المحتوى العلمي:

Common indications

•• Assessment of congenital abnormalities of the urogenital tract
•• Cervical lesions
•• Uterine lesions
•• Benign uterine tumours, for example, leiomyoma and fibroids
•• Bladder lesions
•• Rectal lesions
•• Infertility

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Equipment

•• Body coil/phased array pelvic coil/multi-array coil
•• Compression bands and foam immobilization pads if using the body coil
•• Earplugs/headphones

Patient positioning

The patient lies supine on the examination couch. Foam pads and compression bands can be applied across the patient's lower pelvis to reduce respiratory and bowel motion (unless the patient cannot tolerate this). The patient is positioned so that the longitudinal alignment light lies in the midline, and the horizontal alignment light passes through a point midway between the pubis symphysis and the iliac crest. If a local rectal coil is used, it should be carefully inserted prior to the examination. Ensure that it is correctly positioned and fully inflated.

Common Female Pelvis MRI Sequences:

1. **T1-Weighted Imaging**:
   - Parameters:
     - Slice thickness: 3-5 mm
     - TR (Repetition Time): 400-800 ms
     - TE (Echo Time): 5-20 ms
   - Use: Provides detailed anatomical information and helps visualize the structures within the female pelvis, including the uterus, ovaries, bladder, and rectum.
2. **T2-Weighted Imaging**:
   - Parameters:
     - Slice thickness: 3-5 mm
     - TR: 2000-5000 ms
     - TE: 80-120 ms
   - Use: Highlights differences in tissue water content and is valuable for assessing soft tissues within the pelvis, including the pelvic organs, muscles, and ligaments.
3. **Diffusion-Weighted Imaging (DWI)**:
   - Parameters:
     - Slice thickness: 3-5 mm
     - b-values: Typically 0 and 800-1000 sec/mm²
   - Use: Measures the diffusion of water molecules in tissues and can assist in identifying and characterizing lesions within the pelvis, such as ovarian cysts or uterine fibroids.
4. **Dynamic Contrast-Enhanced Imaging**:
   - Parameters:
     - Slice thickness: 3-5 mm
     - Temporal resolution: 5-10 seconds
     - Contrast agent: Gadolinium-based contrast agent
   - Use: Evaluates perfusion and vascularity within the pelvic organs, aiding in the detection and characterization of tumors, endometriosis, and other gynecological conditions.
5. **MR Pelvic Floor Imaging**:
   - Parameters:
     - Specialized sequences for pelvic floor assessment.
   - Use: Helps evaluate pelvic floor disorders, such as pelvic organ prolapse, stress urinary incontinence, and defects in the pelvic floor musculature.
6. **MR Urography**:
   - Parameters:

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- Specific sequences for urinary tract assessment.
- Use: Visualizes the urinary tract, including the kidneys, ureters, and bladder, and helps identify conditions like hydronephrosis or urinary tract obstruction.

Specific Uses:

- **Gynecological Conditions**: MRI is commonly used to evaluate and stage gynecological conditions such as uterine fibroids, ovarian cysts, endometriosis, and adenomyosis.
- **Pelvic Pain**: MRI helps investigate the cause of chronic pelvic pain by assessing the pelvic organs and identifying abnormalities or lesions.
- **Cancer Staging**: MRI plays a crucial role in the staging of gynecological cancers, including cervical, uterine, and ovarian cancers.
- **Fertility Assessment**: MRI can assess the uterine cavity and fallopian tubes to evaluate factors that may impact fertility.
- **Pelvic Inflammatory Disease (PID)**: MRI can help detect and assess the severity of PID, an infection of the female reproductive organs.
- **Preoperative Planning**: MRI is valuable for preoperative planning before gynecological surgeries, including myomectomy or hysterectomy.

The choice of MRI sequences and parameters may vary depending on the clinical indication and the specific pelvic condition being evaluated. Consultation with a radiologist or healthcare provider is essential to determine the most appropriate MRI protocol for your specific needs.

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Posttest: الاختبار البعدي:

Why pelvic MRI valuable for preoperative exam?

References: المصادر:

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

Radiopedia