

Diagnostic Evaluation of Chronic Pelvic Pain

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KEYWORDS

- Pelvic pain • Pelvic mesh • Pelvic ultrasound • MR defecography • MR neurography
- Nerve conduction tests • Electromyography

KEY POINTS

- Chronic pelvic pain can result from intrapelvic causes related to genitourinary structures, pelvic floor weakness, previously placed synthetic material in the pelvis, and neuromuscular pain.
- Ultrasound and magnetic resonance imaging including specialized techniques, such as magnetic resonance (MR) defecography and MR neurography may be indicated for evaluation of pelvic pain depending on the suspected cause.
- Evaluation of neurogenic pelvic pain may include nerve conduction studies, testing of sacral reflexes, electromyography, and MR neurography.

INTRODUCTION

Chronic pelvic pain refers to pelvic pain that occurs continuously or intermittently for a duration of more than 6 months¹ and is estimated to affect 14.7% of reproductive-age women.² Chronic pelvic pain may stem from causes related to native pelvic organs, pelvic floor dysfunction and prolapse, synthetic material placed in the pelvis for treatment of prolapse or urinary incontinence, or neuromuscular causes. Imaging evaluation of patients presenting with chronic pelvic pain usually begins with pelvic ultrasound (US) or occasionally with computed tomography (CT), although magnetic resonance imaging (MRI), including magnetic resonance (MR) defecography or MR neurography may be indicated depending on the suspected condition. This review discusses the diagnostic workup and imaging modalities that may aid in diagnosis of the various causes of pelvic pain.

The authors have nothing to disclose.

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PELVIC ORGANS

The most common causes of chronic or recurrent pelvic pain are related to pelvic organs and include endometriosis, uterine adenomyosis, uterine fibroids, and infection of the gynecologic structures or urinary bladder. Less common causes include pelvic congestion syndrome, adnexal and/or peritoneal inclusion cysts and pelvic adhesions, urethral diverticula, and infected Gartner duct or Bartholin gland cysts. Primary or metastatic malignancies in the pelvis can also cause pain; however, this review focuses on benign causes of pelvic pain.

US evaluation of pelvic organs includes transabdominal and transvaginal techniques. Limitations of US imaging include dependence on operator skill, patient body habitus, and degree of patient tolerance to transvaginal scanning. In cases whereby transvaginal imaging is not possible, presence of bowel gas may obscure anatomy on transabdominal imaging. MRI is generally performed in the supine position using a dedicated phase-array pelvic surface coil and includes T1-weighted (T1w) and T2-weighted (T2w) sequences in multiple planes. Dynamic contrast-enhanced imaging and diffusion-weighted imaging (DWI), which is based on the principle of Brownian motion of water molecules, may add sensitivity and specificity in MR evaluation of the pelvis. Contraindications to MRI, such as certain metallic implants and pacemakers, and high cost may limit use of this modality.

Endometriosis

Endometriosis is defined as the presence of endometrial glands and stroma outside of the endometrial cavity³ and typically occurs in women of reproductive age. In addition to chronic or recurrent pelvic pain, patients may present with dysmenorrhea, dyspareunia, infertility, and abnormal uterine bleeding.^{3,4} Endometriosis is seen in up to 80% of patients with uterine adenomyosis.⁵

Three types of endometriosis implants have been described: ovarian endometriomas, superficial endometrial implants on the surface of organs or the peritoneum, and deep infiltrating endometriosis.⁴ Sites of involvement commonly include the ovaries, uterine ligaments, pouch of Douglas, bowel, fallopian tubes, and the peritoneal lining of the pelvis.^{6,7} Less commonly, endometriosis may involve the cervix, vagina, bladder, or abdominal wall scars.^{6,7} When urinary organs, such as the bladder or ureter, are involved, patients may report additional symptoms such as dysuria, hematuria, or flank pain due to urinary obstruction.

A normal clinical examination does not rule out endometriosis. Laparoscopy is the gold standard for diagnosis but is invasive and expensive. Transvaginal US (TVUS) and MRI demonstrate high sensitivity and specificity for diagnosis of ovarian endometriomas. Deep infiltrating endometriosis may also be identified on TVUS and MRI; however, accuracy for this form of endometriosis is lower.⁸ On US, an ovarian endometrioma appears cystic with homogenous low level echoes, sometimes with small echogenic foci representing hemosiderin deposits within the wall of the lesion.⁹ Less commonly, an endometrioma may demonstrate thin or thick septations, irregular walls, a fluid-fluid level, or a retractile clot (**Fig. 1**).⁷ On MRI, endometriomas are cystic lesions, however, unlike simple cysts, they demonstrate high signal intensity (SI) on T1w images. On T2w images, they typically exhibit lower SI (shading) and may demonstrate SI gradient, appearing most hypointense in the dependent portion because of the layering of internal hemorrhagic debris (**Fig. 2**).⁷ Other hemorrhage-containing ovarian lesions, such as hemorrhagic cysts, cystic neoplasms, or dermoid cysts, may mimic endometriomas. The presence of multiple cysts that are hyperintense on T1w images increases the likelihood of endometriomas.¹⁰ Implants of deep

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