"Urinary tract endometriosis: Detection and evaluation of deep infiltration with MRI"

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Learning objectives

In this educational exhibit we aimed to illustrate MR imaging features of urinary tract endometriosis.
Background

Endometriosis is defined as the presence of ectopic functional endometrial tissue outside the uterine cavity with or without secondary desmoplastic reaction. It is a common cause of pelvic pain and infertility, affecting as many as 10% of premenopausal women. This condition is most prevalent in women 25 to 45 years old (1-5).

The definition of deep endometriosis includes rectovaginal lesions as well as infiltrative forms that involve vital structures such as the bowel, ureters, and bladder (1,6). According to the definition of this entity deeply infiltrating endometriosis is defined as an endometriotic lesion penetrating into the retroperitoneal space or the wall of the pelvic organs to a depth of at least 5 mm. Peritoneal, ovarian, and deep endometriosis may be diverse manifestations of a disease with a single origin (3).

The most common sites for endometrial implantation are ovaries, uterosacral ligaments, fallopian tubes, rectum and cervico-vaginal regions. The urinary tract involvement of endometriosis is uncommon and mainly involves bladder, ureter, urethra or kidneys. It represents 6.4% of all deep pelvic endometriosis (3). The bladder is most frequently affected (85%) followed by the ureter with 10% of the cases (4,7). Left ureteral lesions are more common than right ones (8).

Ureteral endometriosis is often classified into intrinsic and extrinsic types. In the extrinsic form, endometrial glands and stroma are localized in the adventitia and surrounding connective tissue of the ureter, whereas in the intrinsic variant, they are present in the lamina propria and muscular layers of the ureter. Both types can precipitate ureteral obstruction, but the extrinsic type, which occurs in about 80% of cases, is implicated most often (8).

A bladder lesion is a manifestation of the generalized pelvic disease, whereas in post-caesarian vesical endometriosis, growth of ectopic endometrium is usually limited to the bladder wall. Histologically, endometriosis occurs commonly on serosal aspect of urinary bladder but it may also be rarely seen in lamina propria and muscularis propria (7).

The clinical relevance is established by the magnitude of the involvement. The range of manifestations varies greatly, from asymptomatic to renal failure secondary to chronic ureter stenosis. Usually is associated with a wide variety of symptoms that often are commonly exaggerated during menstruation, however in many patients it is asymptomatic. Furthermore, the stage of the disease does not necessarily correlate with the seriousness of the symptoms (2).
The classical presentations are dysuria, hematuria and dyspareunia in a cyclical recurrent manner (4,5). The endometriosic bladder implants may present with variable symptoms and subtle onset, resembling recurrent cystitis. Cyclical hematuria is less common, and is present only in 20% patients with vesical endometriosis, and when it does, is suggestive of extension of endometriosis through the detrusor muscle, with mucosal involvement (7). Other uncommon presentations of ureteral endometriosis described in the literature include ureteral obstruction, anuria in a solitary kidney and cyclical ureteral obstruction (8). Hydronephrosis by ureteral obstruction or as a submucosal lesion within the bladder or ureter can also be caused (3).

Early diagnosis and treatment are necessary to avoid the loss of renal function (7). The reference standard for the diagnosis of pelvic endometriosis is laparoscopic biopsy of lesions with a suspicious appearance followed by histologic confirmation. However, it has limitations detecting extraperitoneal endometriosis. Diagnosis and evaluation of extension of deep peritoneal endometriosis is also difficult with physical examination and explorative laparoscopy. It requires palpation and opening of the subperitoneal space in order to confirm and to evaluate the extent of the lesions (3).

MRI is a non invasive method with high contrast resolution and no radiation that has a wide spectrum of vision, reported to enable the identification of hidden lesions and it provides a tremendous advantage over other methods of investigation, owing to the possibility of making a complete survey of the anterior and posterior compartments of the pelvis at one time.

The features of endometriosis in MRI depends on the type of lesions: infiltrating small implants, solid deep lesions mainly located in the posterior cul-de-sac and involving the uterosacral ligaments and torus uterinus, or visceral endometriosis involving the bladder and rectal wall (3).

Bladder endometriosis can be demonstrated at MR imaging as morphologic abnormalities, including localized or diffuse bladder wall thickening and signal intensity abnormalities. The majority of patients have spots of high signal intensity in an abnormal thickening of the bladder wall. However, the images of the bladder may be abnormal even in patients with normal cystoscopic results or without urinary symptoms (3).

At MR imaging, ureteral endometriosis usually appears as irregular hypointense nodules on T2- weighted images. Extrinsic disease may be suspected when the interface of fat between the nodule and ureter is no longer visible. However, MR imaging appears to lead to overestimation of this finding. Retractile adhesions, which are visible as periureteral hypointense lines arranged in confluent angles, may be present. Urethral endometriosis is not well described in the literature. Urethral involvement is more frequently observed.
as contiguous extension from the bladder; thus, the imaging findings are the same as those described for bladder endometriosis (9).
Findings and procedure details

We reviewed MRs of patients with endometriosis diagnosed through MR and/or laparoscopy dated 2010-2015. 187 patients were found. A 17% of the patients (n=32) had urinary tract endometriosis.

We classified these cases according to the lesion location and associated complications. The bladder and ureters were mostly affected with 75% (n=27) and 22% (n=7) respectively.

Only 3% (n=1) had urethral implant. No renal endometriosis was found.
Fig. 1: Figure 1. MRI of the pelvis (with endovaginal gel). 1a. Coronal image T2 TSE. 1b. Sagittal image T2 TSE. Hysterectomized patient with an endometriotic implant in the bladder dome with nodular and spiculated edges shown in both images.

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**Fig. 2**: MRI of the pelvis (with endovaginal gel). 2a. Coronal T2 TSE image. 2b. Sagittal T2 TSE image. Show a cesarean scar in the uterine isthmus with an endometriotic implant that infiltrates the anterior pouch and the vesical dome.

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**Fig. 3**: MRI of the pelvis. 3a. and 3b. Axial T1 FAT SAT and axial T2 images of the same patient showing transmural infiltration of the vesical wall.

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**Fig. 4:** Figure 4. MRI of the abdomen and pelvis (with endovaginal gel). 4a y 4b. Coronal image T2 TSE. A significant dilation of the left collecting system secondary to stenosis of the distal ureter in the parametrium. 4c. Axial image T2 TSE. A low signal spiculated solid nodule representing a fibrotic endometriosis implant.

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**Fig. 5:** Figure 5. MRI of the abdomen and pelvis. Urography sequence of the same patient (Figure 4).

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Conclusion

MR imaging demonstrates high sensitivity, specificity, positive and negative predictive values, and accuracy in prediction of the locations and in evaluation of the extension of lesions in patients with this disease.

It has been a useful tool to accurately identify and assess the degree of infiltration in urinary tract endometriosis that also complements the evaluation of some secondary complications such as: parietal retraction, lumen bladder deformation, ureteral displacement, hydronephrosis and kidney failure.
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References


