

# **Urinary tract Endometriosis**

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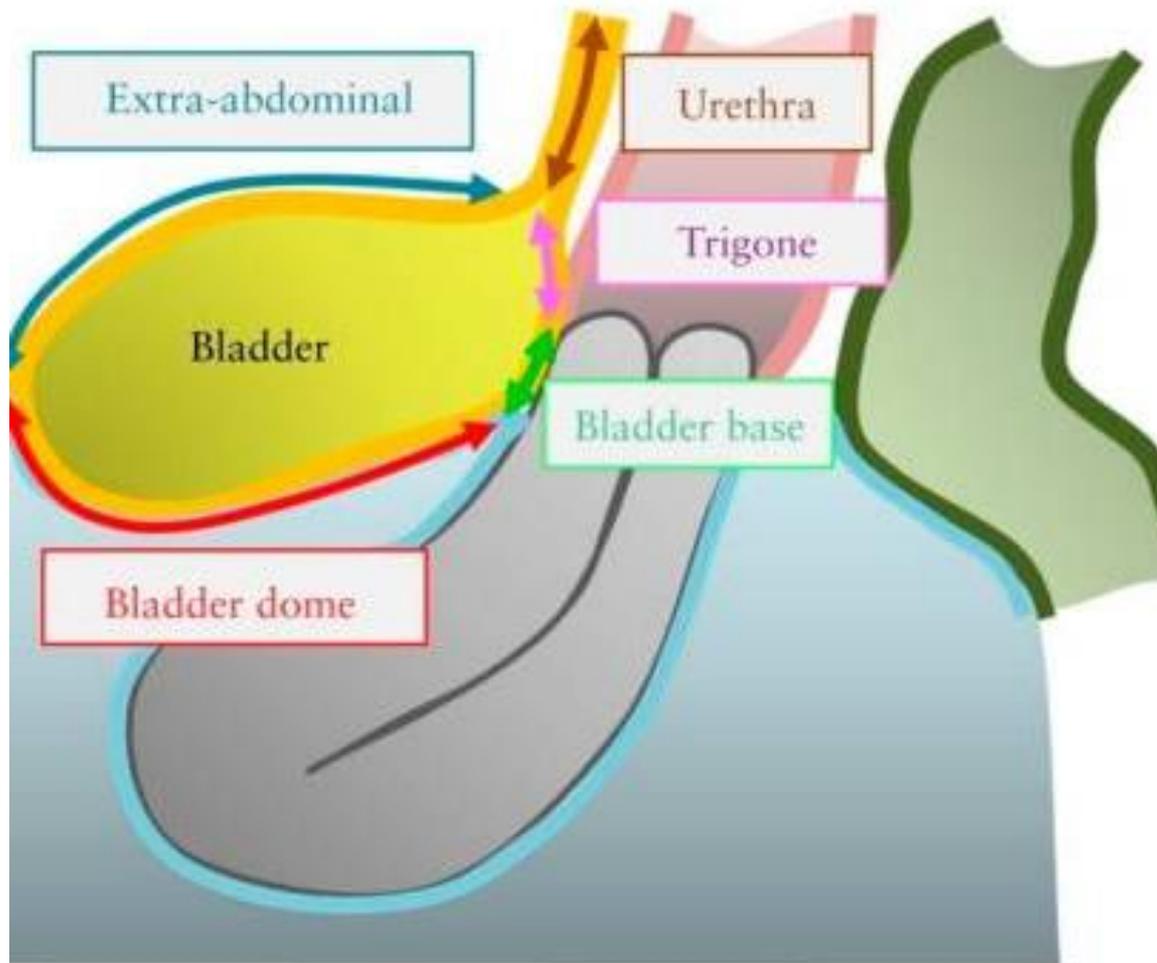
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**Kidney Transplantation Fellowship**

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# Epidemiology

- The 2<sup>nd</sup> most common site of extrapelvic endometriosis involves the urinary system
- Endometriosis has been estimated to affect the urinary tract in approximately 0.3 to 12% of cases
- Bladder and ureteral involvement are the most common sites



The four bladder zones: trigone, bladder base, bladder dome, and extra-abdominal bladder.

The demarcation point between the base and the dome of the bladder is the uterovesical pouch

# Lesions are classified as:

- A) **Extrinsic** → **70–80%** of cases + affects the external ureteral tunics through adherence to the surrounding structures or organs
- B) **Intrinsic** → **20–30%** of cases + invades muscular layer or the ureteral mucosa, sometimes with an intraluminal projection

- Often silent
- Abdominal pain is the predominant symptom, occurring in 45% of symptomatic patients

- High degree of obstruction may proceed for a long time without symptoms, leading to deterioration of renal function
- Unfortunately, ureteral endometriosis is often asymptomatic leading to silent obstructive uropathy and renal failure

- It is a common feature of patients with renal failure and accounts for 10% of cases

# Effects of Obstruction on the Kidney

- Obstruction leads to atrophy of the renal parenchyma
- The principal effect of this atrophy is borne → by the **papillae**, relatively more tubules being destroyed than glomeruli

- Because there are fewer tubules to render the urine concentrated, the hydronephrotic kidney makes a larger volume of dilute urine and the effect of any obstruction is exaggerated

- Ultimately, **entire nephrons are lost**, and there is a deterioration in the creatinine clearance from the obstructed kidney
- But for a considerable time, the obstructed kidney or idiopathic hydronephrosis remains **a useful dialyser**, and even when very thin, is still capable of sustaining life

- When the ureter was reduced by 70% to 75%  
→ GFR was ↓80% after 28 days of partial  
UUO

- Clinical findings of ureteral endometriosis are often silent→ this corresponds by the high rate of kidney loss (23–47%)

# Radiographic Imaging

- Widely used
- But proven to be inadequate in diagnosing definitely urinary tract endometriosis

- Ultrasonography → diagnosis of hydronephrosis
- Should be graded on:
  - The appearance of the calices and renal pelvis
  - The thickness of the renal parenchyma

- The grading system of hydronephrosis → by the **Society of Fetal Urology (SFU)** was devised to assess the degree of Hydronephrosis
- The most common in use + originally designed for grading neonatal and infant pelvicalyectasis
- All hydronephrosis grading systems are controversial in terms of their intra- and interobserver reliability

- **Mild**

- dilatation of the renal pelvis without dilatation of the calyces
- dilatation of the renal pelvis (mild) and calyces (pelvicalyceal pattern is retained)
- no parenchymal atrophy

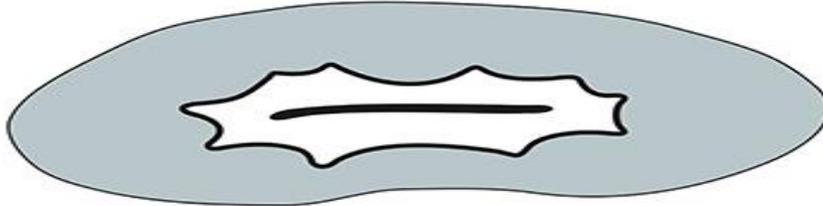
- **Moderate**

- moderate dilatation of the renal pelvis and calyces
- blunting of fornices and flattening of papillae
- mild cortical thinning may be seen

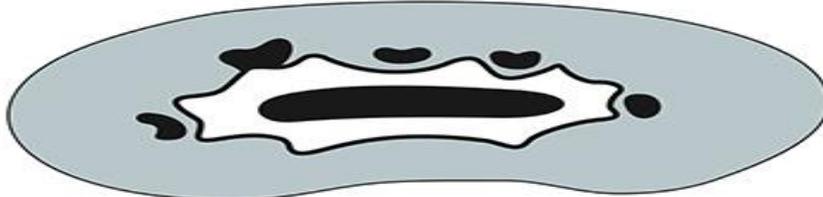
- **Severe**

- gross dilatation of the renal pelvis and calyces, which appear ballooned
- loss of borders between the renal pelvis and calyces
- renal atrophy seen as cortical thinning

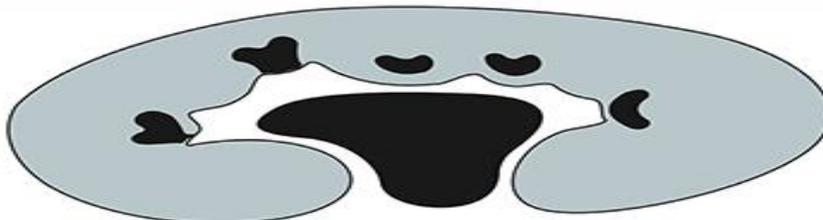
## SFU



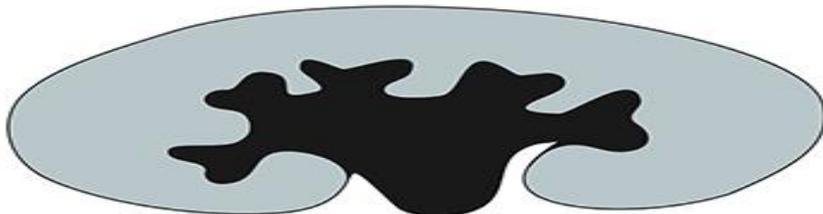
**SFU-I:**  
Sinus open



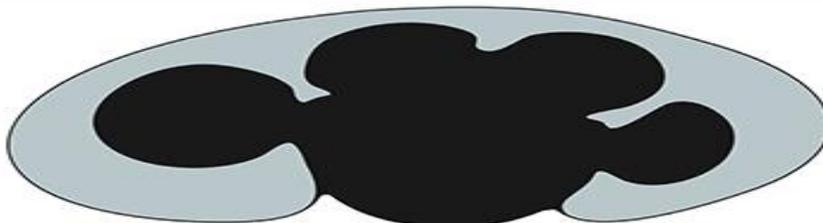
**SFU-IIa:**  
Intrarenal pelvis dilated



**SFU-IIb:**  
Extrarenal pelvis dilated  
Major calices dilated



**SFU-III:**  
Minor calices dilated



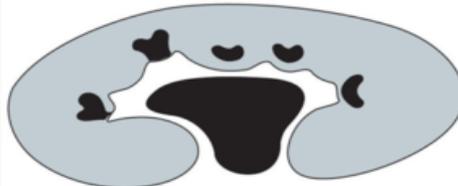
**SFU-IV:**  
Parenchyma thin

## Radiology



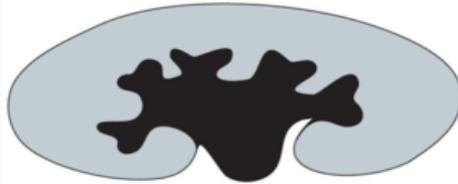
### Rad-I:

Just renal pelvis visible  
AP: 5-7 mm



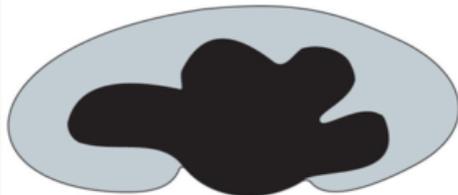
### Rad-II:

Some calices visible  
AP: 7-10 mm



### Rad-III:

Marked dilation of calices  
AP > 10 mm



### Rad-IV:

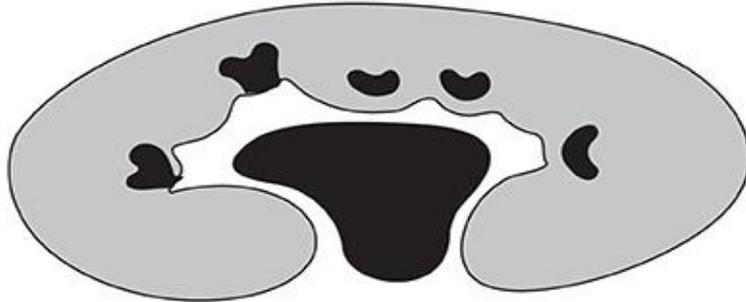
Narrowing parenchyma



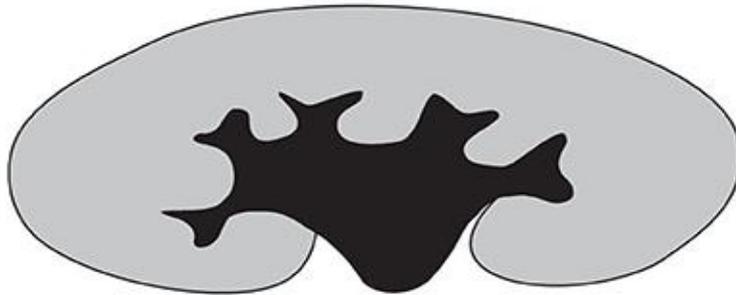
### Rad-V:

Extreme hydronephrosis with  
only a thin, membrane-like  
residual parenchymal rim

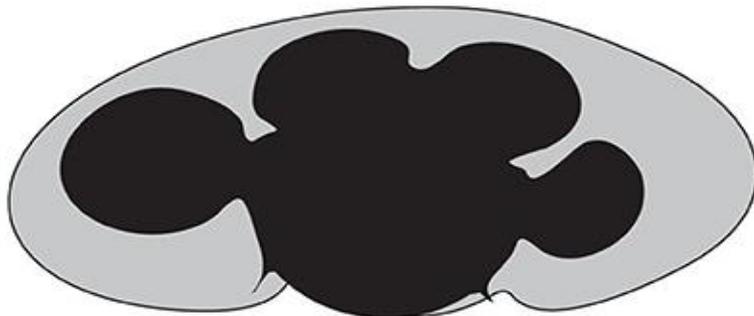
## UTD classification



**UTD-P1:**  
Pelvis dilated



**UTD-P2:**  
Central and peripheral  
caliceses dilated



**UTD-P3:**  
Parenchyma thin

- As the entire ureteral course cannot be evaluated by US→ it may be impossible to directly detect ureteral endometriotic lesions
- TVS→ to evaluate the pelvis and the periureteral area
- Identifying the pelvic segments of normal ureters and measuring their median diameter in 93%

- At TVS → pelvic ureteral dilation appears as a **tubular anechoic image** with or without movements in the parametrial tissue, very similar to a blood vessel but with negative color and power Doppler signs
- In the case of extrinsic UE without evident hydronephrosis → TVS may allow the detection of DIE adjacent to the ureter

- MRI has advantages over transvaginal ultrasound in diagnosing small endometriotic lesions
- At MRI, the involvement of the ureter appears as:
  - a nodule with low intensity signal associated with hyperintense foci at both T1- and T2- weighted sequences, while concurrent retractile adhesions appear as periureteral hypointense linear foci with angular deviation particularly in long-standing disease

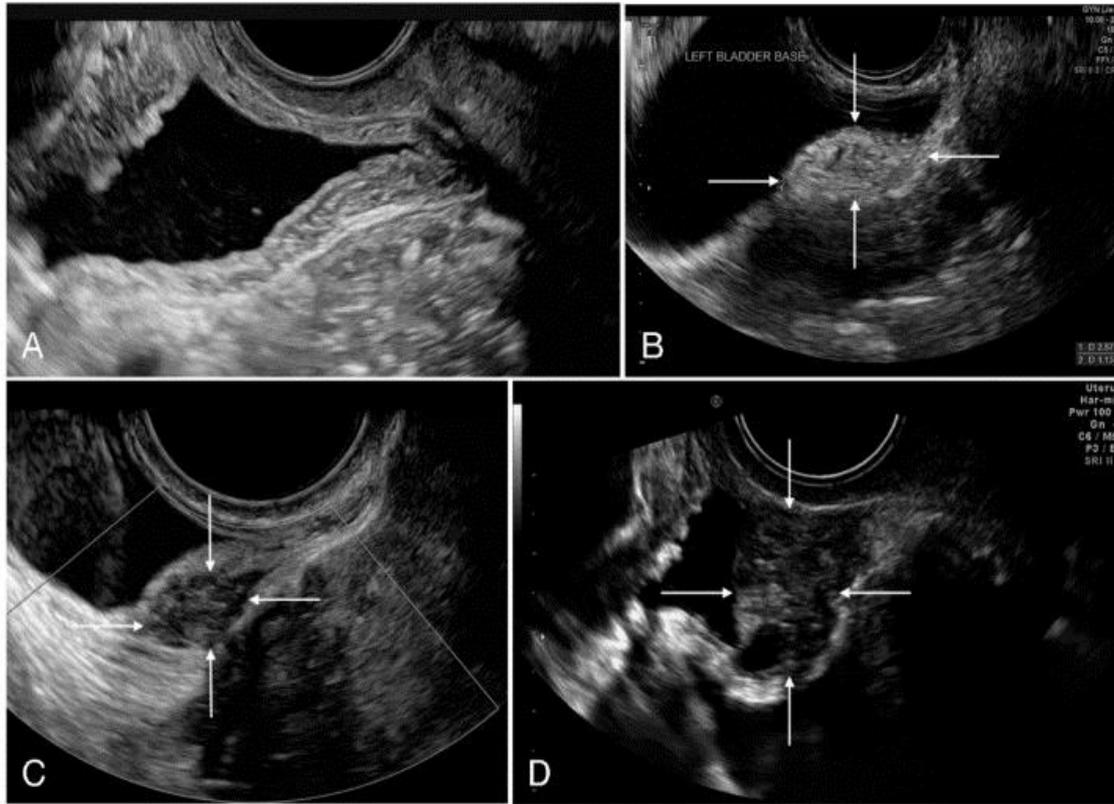
- Loss of the fatty interface between the nodule and the ureter suggests ureteral infiltration in cases of extrinsic involvement
- Accuracy of MRI in the diagnosis of vesical endometriosis has been reported to be 98%
- CT or MRI can be helpful in defining the extent of disease before surgery

- IVP is used as a diagnostic tool in patients with urinary tract symptoms
- In cases where vesical endometriosis is present, IVP is usually unremarkable
- IVP can identify ureteral obstruction and confirm renal function
- Findings are often nonspecific because the majority of ureteral obstructions are caused by extrinsic disease

- Cystoscopy: can be valuable in evaluating bladder endometriosis, and biopsy of the suspected areas can provide a definite diagnosis → as edematous bluish submucosal multilocular lesions, usually located on the bladder dome or at the bladder base

- Ureteroscopy: Ureteral endoscopy can directly visualize edematous and irregular blue nodules in contact with the ureter wall, and it allows the performance Of a biopsy of the lesion
- However, as it is invasive and it is not able to detect extrinsic UE

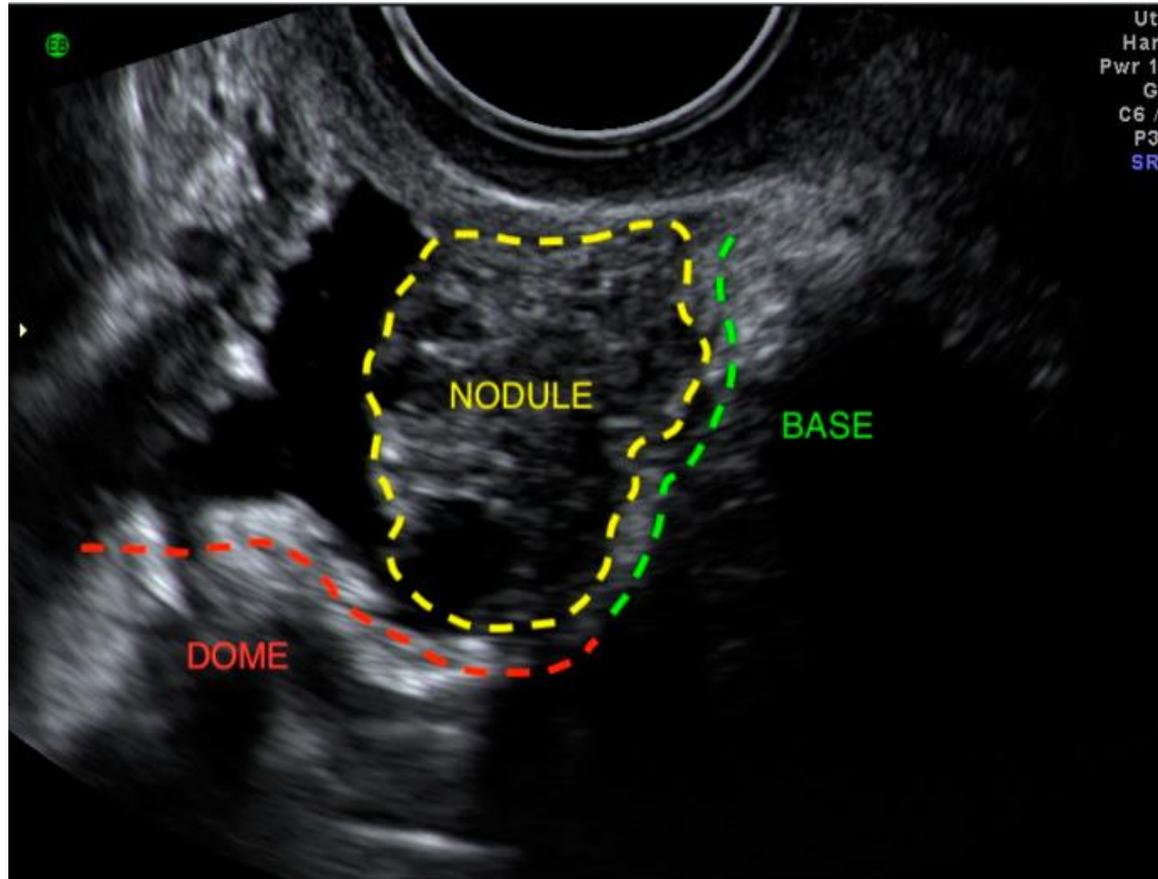
- Even a thorough diagnostic evaluation cannot make an exact diagnosis
- Many cases of bladder endometriosis and the majority of cases of ureteral endometriosis are definitely diagnosed during laparoscopy
- Laparoscopy is helpful in reaching the diagnosis and gathering information regarding the extent, the location, and size of the lesions



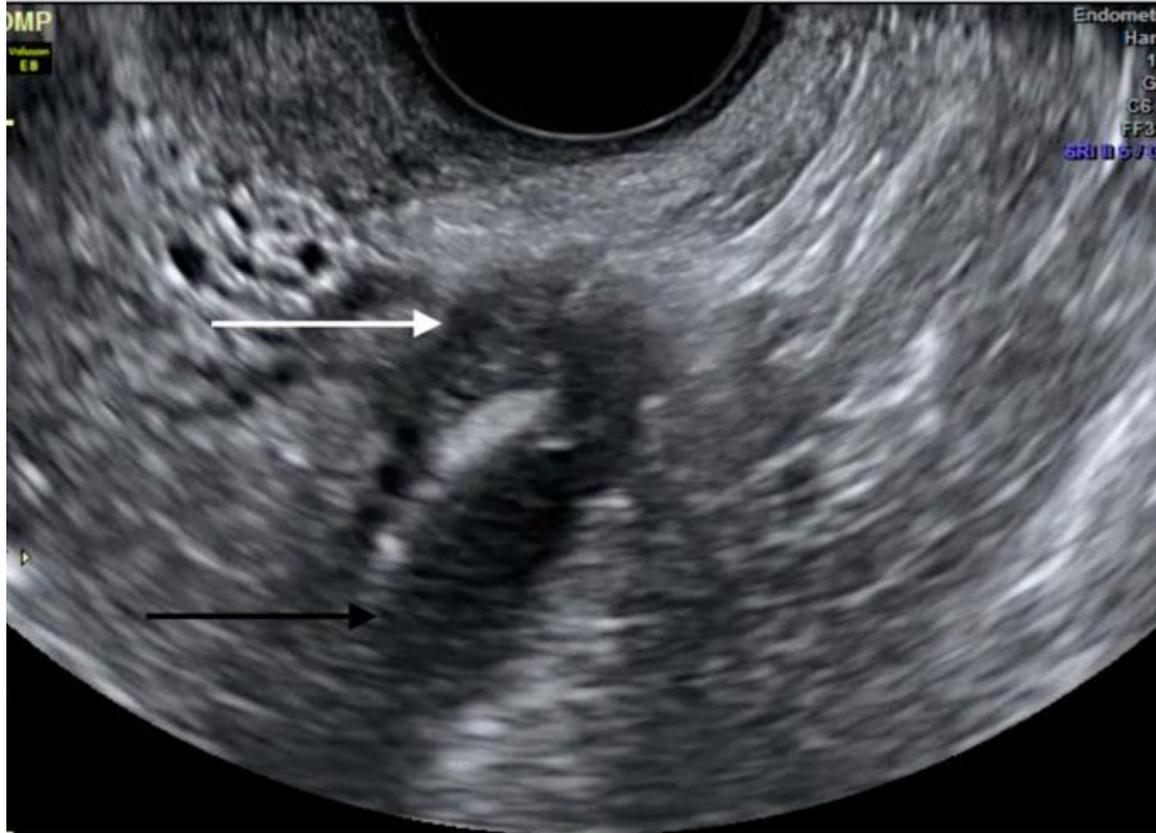
Transvaginal ultrasound depiction of the bladder.

(A) Normal bladder and

(B) (B–D) three bladder deep endometriosis nodules

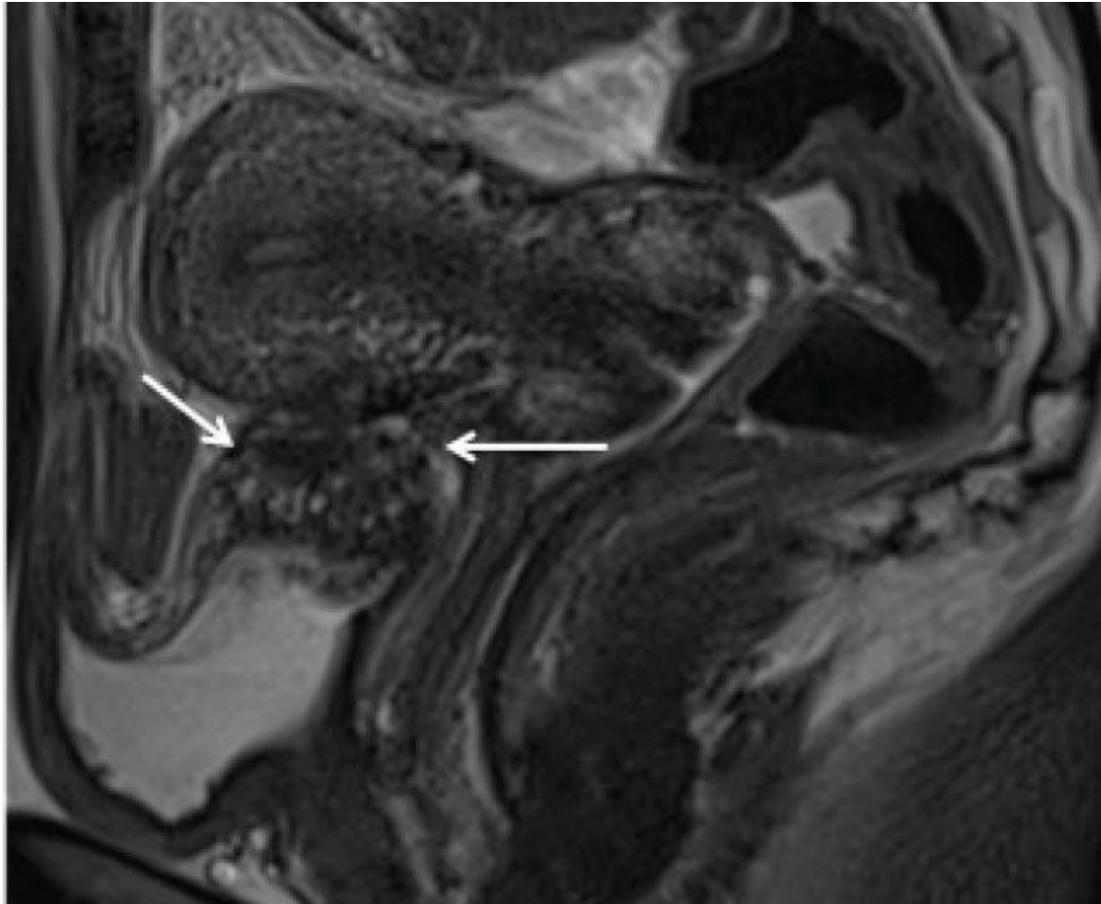


Bladder base deep endometriosis nodule encroaching on the bladder dome



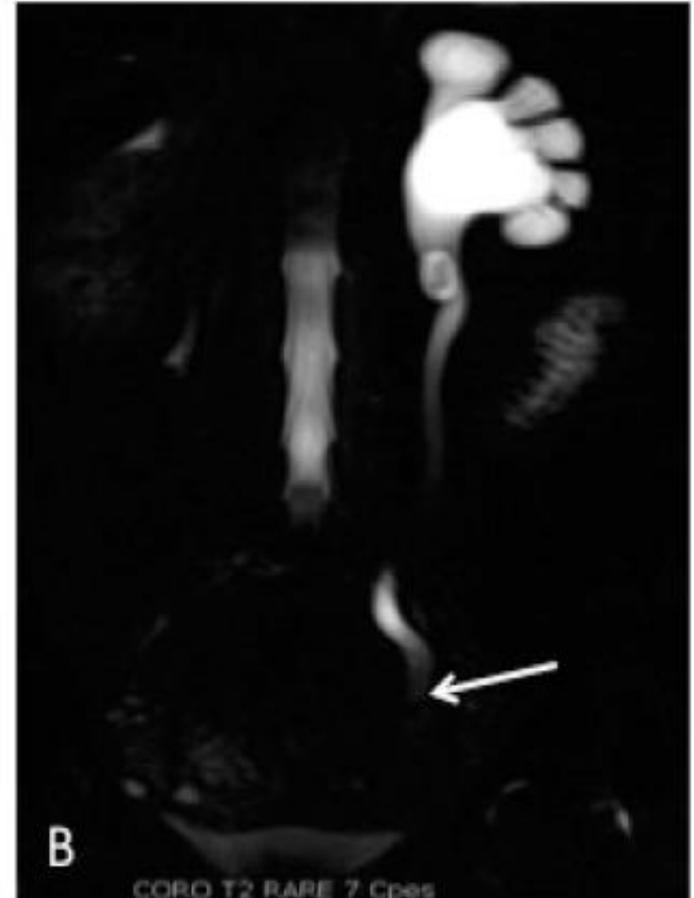
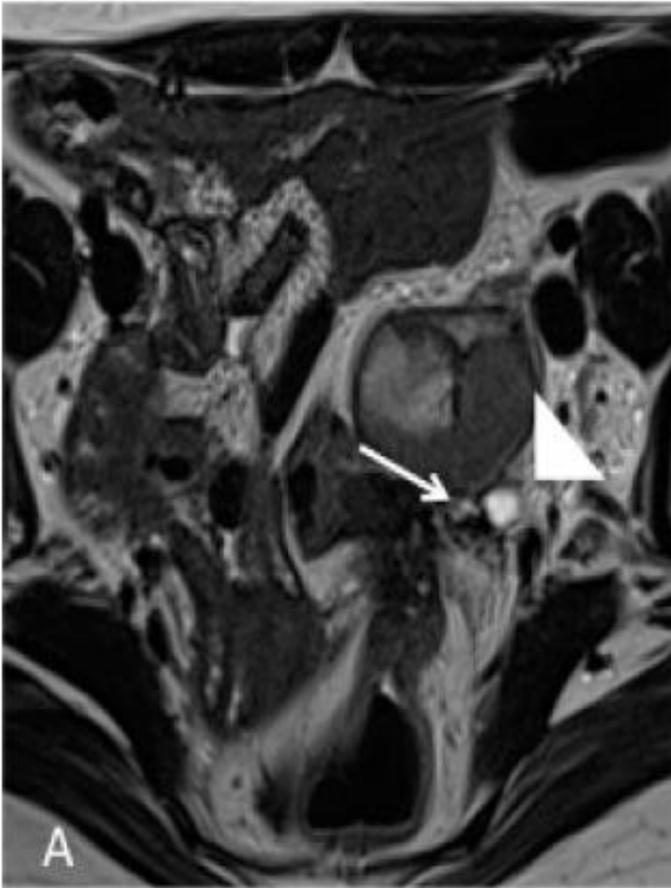
Transvaginal ultrasound depiction of ureteral deep endometriosis nodule (white arrow) and hydronephrosis (black arrow)

The nodule originates from the uterosacral ligament but infiltrates the parametrium and extrinsically compresses the ureter



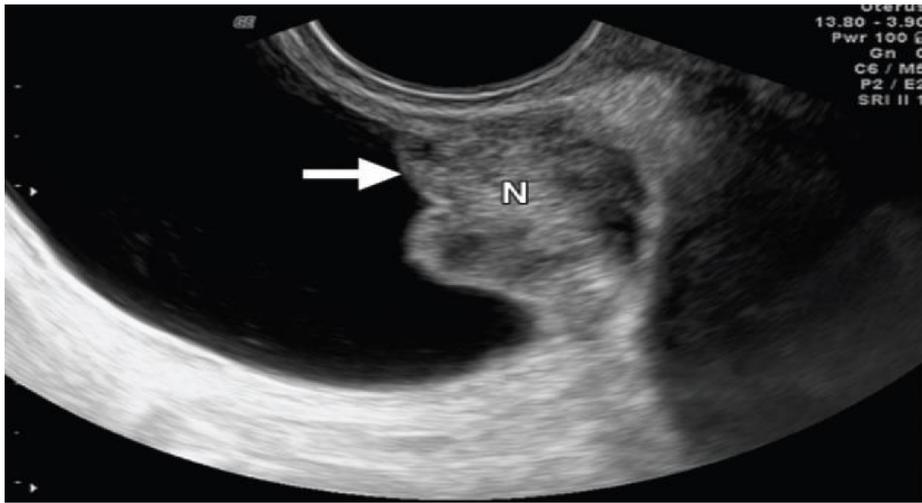
MR imaging depiction of bladder deep endometriosis.

Sagittal T2-weighted plane depicting deep endometriosis nodule in hypointense T2, which is infiltrating the detrusor muscle of the bladder (white thin arrows)

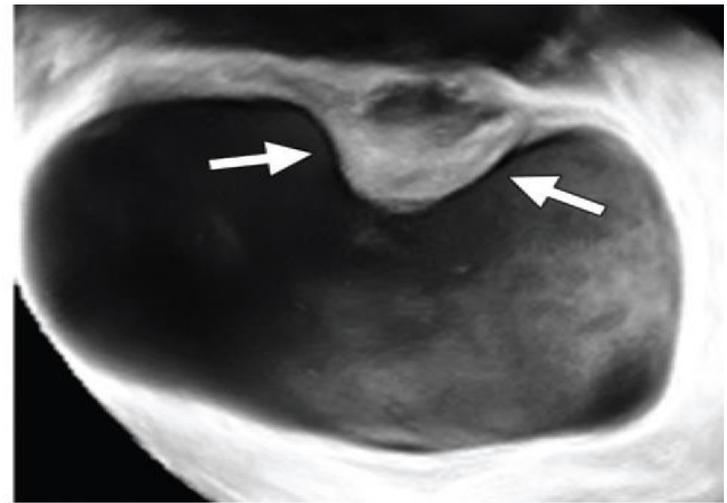


MR imaging depiction of left ureteral deep endometriosis.

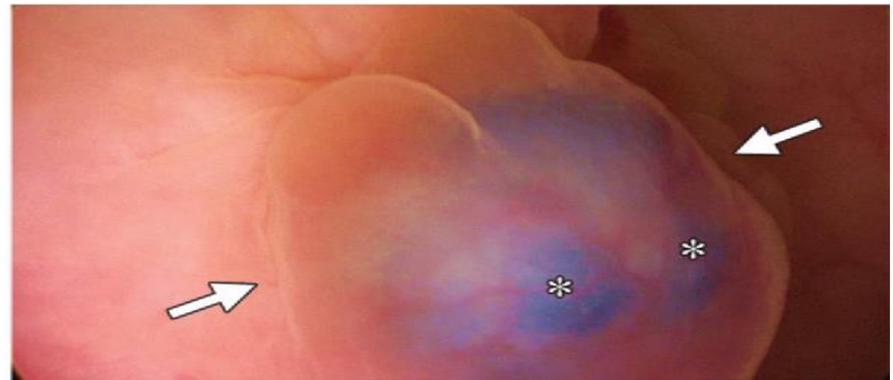
- (A) Axial T2-weighted plane depicting hypointense nodule causing stenosis of the left ureter (white arrows), which appears dilated,
- (B) and is confirmed on the (B) MR urography in the coronal HASTE T2 plane



a.



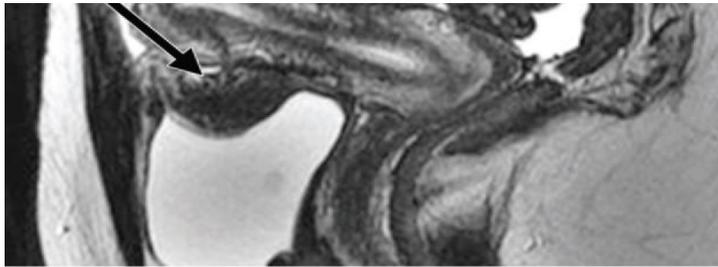
b.



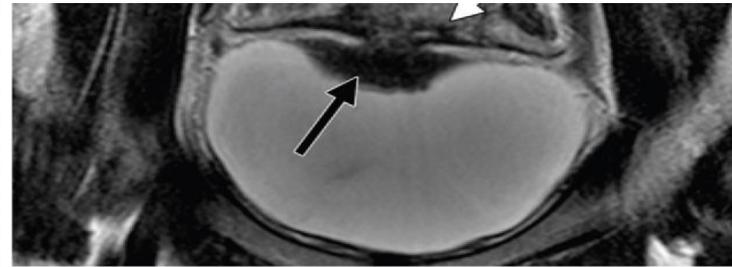
c.

Bladder endometriosis in a 28-year-old woman.

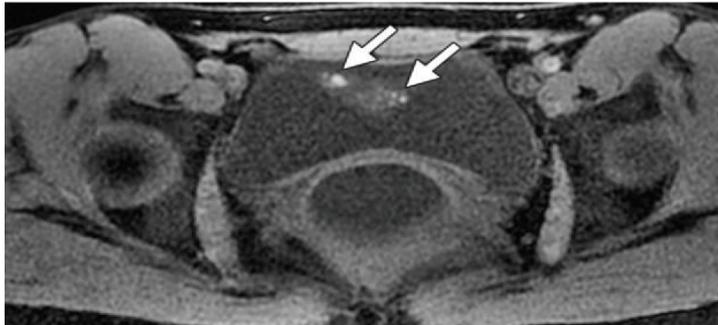
- (a) Sagittal transvaginal US image shows a hypoechoic nodule (N) attached to the bladder wall and hypoechoic endometrial tissue infiltrating the detrusor muscle (arrow).
- (b) Three-dimensional transvaginal US image shows projection of the nodule (arrows) into the bladder lumen.
- (c) Magnified cystoscopic view of the same lesion (arrows) shows bluish spots, that represent tiny hemorrhagic foci.



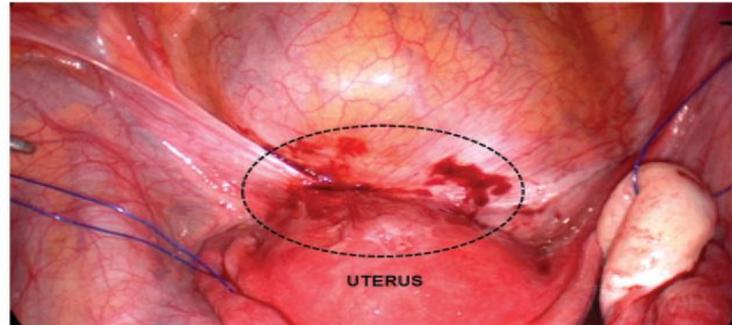
a.



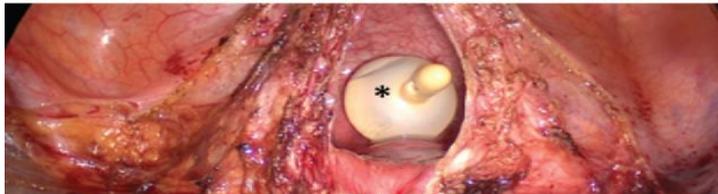
b.



c.



d.



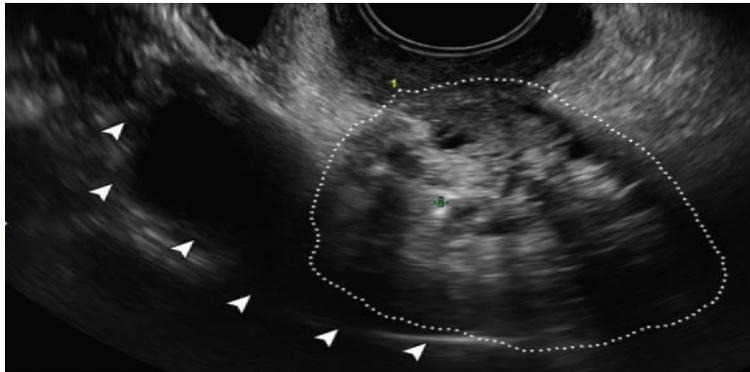
Bladder endometriosis in a 30-year-old woman with dysuria.

Sagittal (a) and coronal (b) T2- weighted MR images show a well-defined low-signal-intensity bladder wall nodule (black arrow) projecting into the lumen. Thickening of the anterior uterine serosa (white arrows in b) is also seen

c) Axial T1-weighted MR image depicts hemorrhagic foci (arrows) within the bladder lesion.

d) Laparoscopic view shows retraction and distortion in the anterior compartment of the pelvis because of adhesions between the anterior uterine serosa and the vesicouterine peritoneum (dashed oval).

e) Laparoscopic view obtained after resection shows the site of the nodule in the bladder wall (dashed oval). A catheter balloon can be seen through the opened bladder dome.



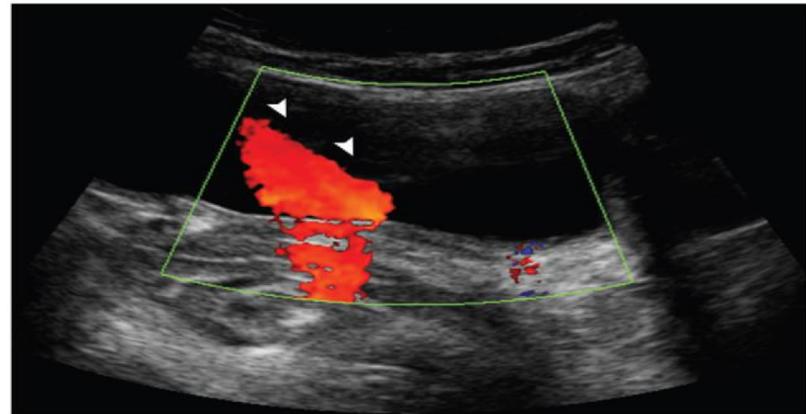
**a.**



**b.**



**c.**



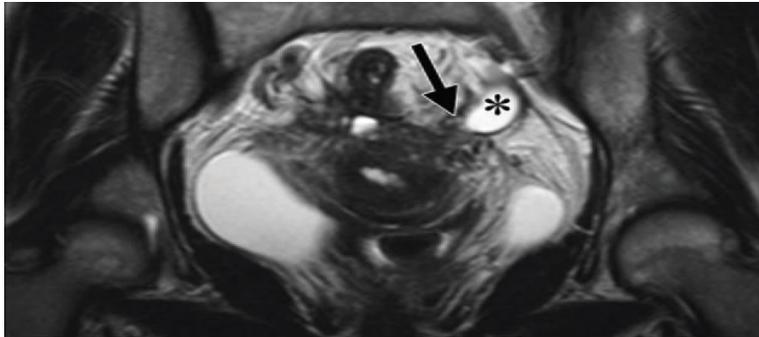
**d.**

Paracervical endometriosis with ureteral stenosis in a 35-year-old woman with infertility.

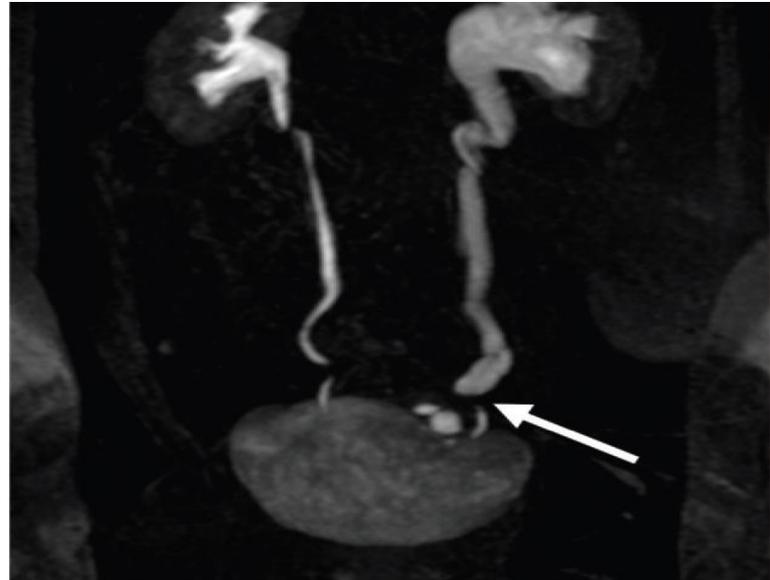
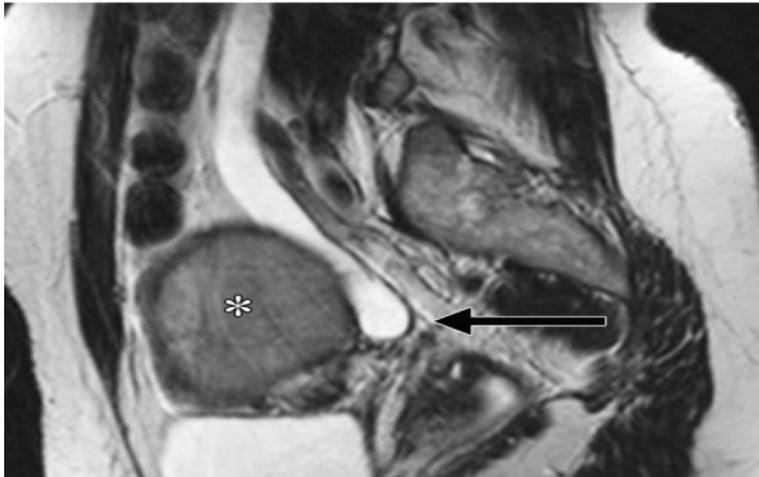
(a, b) Sagittal oblique transvaginal US images show a large heterogeneous paracervical mass (ovoid dotted line) representative of an endometriotic lesion that has surrounded the dilated left ureter (arrowheads). The lesion is best depicted in a, and the ureteral dilatation, in b.

(c) Transabdominal US image of the left kidney demonstrates moderate hydronephrosis.

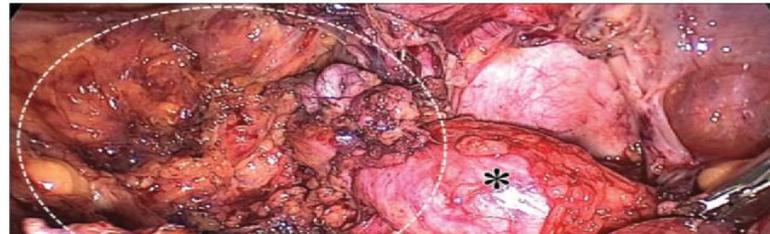
(d) Transabdominal power Doppler US image shows a left ureteral jet (arrowheads).



a.



c.



Paracervical endometriosis with ureteral stenosis.

- (a) Coronal T2-weighted MR image demonstrates left paracervical thickening (arrow) that involves the ureter(\*).
- (b) Sagittal T2-weighted MR image shows ureteral stenosis and dilatation near the lesion (arrow). There is also an endometrioma(\*) in the left ovary.
- (c) MR urogram shows an asymmetric appearance of the ureters. The entirety of the left ureter above the point of obstruction (arrow) is dilated, whereas the distal segment has a diameter similar to that of the right ureter.
- (d) Laparoscopic image shows the endometriotic mass (dashed oval) and the dilated pelvic ureter (\*).

