

ROLE OF IMAGING IN ENDOMETRIOSIS

Dr. Rahele mehraeen

Assistant professor of radiology

Endometriosis

- The presence of endometrial tissue (gland and stroma) outside the endometrium and myometrium
- Ectopic transplantation of endometrial tissue
- 10-15% of reproductive age
- Dysmenorrhea and infertility
- Elevation of CA-125 levels



Location of Endometriosis

<i>Common</i>	<i>Less Common</i>	<i>Rare</i>
Ovaries	Bowels	Lung, pleura
Uterine Ligaments (<i>USL, broad</i>)	Mucosa of cervix, vagina, fallopian tubes	Soft tissue, breast
Rectovaginal septum	Skin (scars, inguinal region, etc.)	Bone
Cul-de-sac	Ureter, bladder, omentum etc.	
Peritoneum of uterus, tubes, rectosigmoid, ureter, bladder		

Role of US and MRI for endometriosis

	US	MRI	Laparo scopy
Diagnosis of Endometriotic cyst	⊙	⊙	⊙
D/D with other ovarian lesions (dermoid cyst, corpus luteum, hemorrhagic cyst, malignancies)	△	⊙	△
Evaluation of Adhesion	△	○	⊙

MR imaging protocol for Evaluation of Endometriosis

- Axial T1WI
- Axial T1WI with Fat Saturation

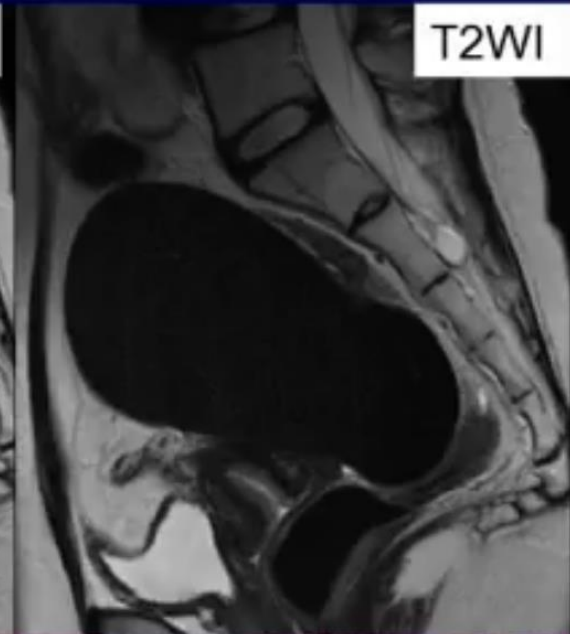
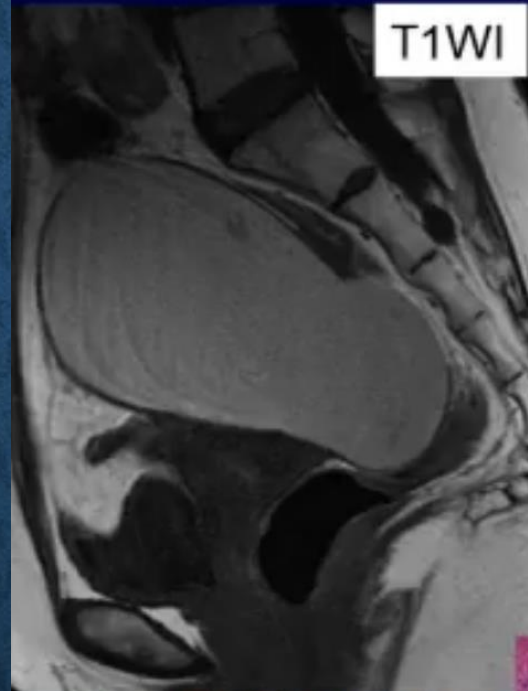
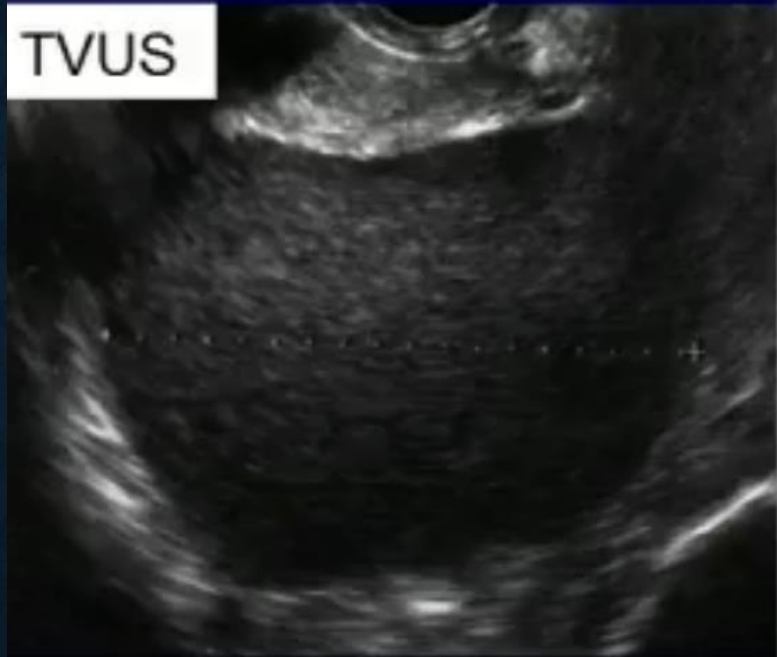
- SSFSE Coronal
- Sagittal T2WI
- Axial T2WI
- Oblique axial T2WI
 - *Improve the assessment of USL endometriosis*
» *Bazot M. et al. Human Reproduction, (2011)Vol.26,N.2,346-353*

- Axial Gd-T1WI with or w/o Fat saturation

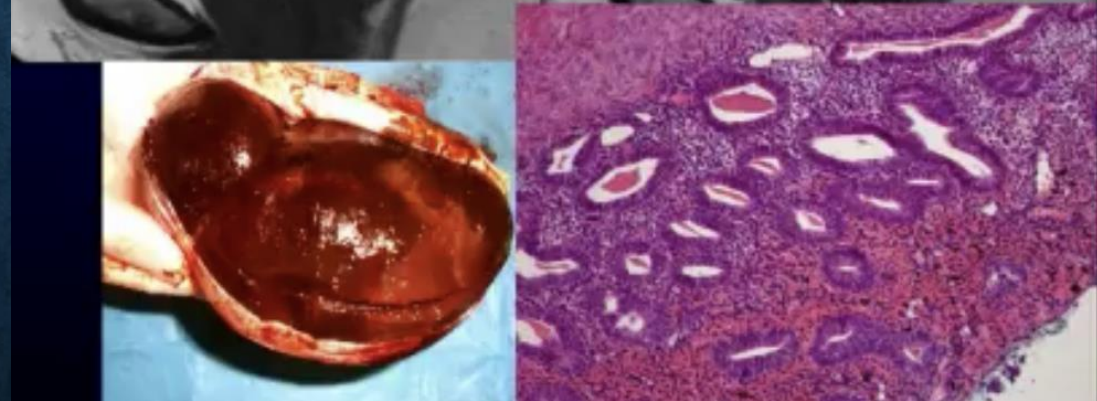
OUTLINE

- Epidemiology
- Role of imaging
- MR imaging findings:
 - Endometriotic cyst
 - Adhesion
 - DIE
 - Endometriosis of rare sites
 - Malignancies associated with endometriosis

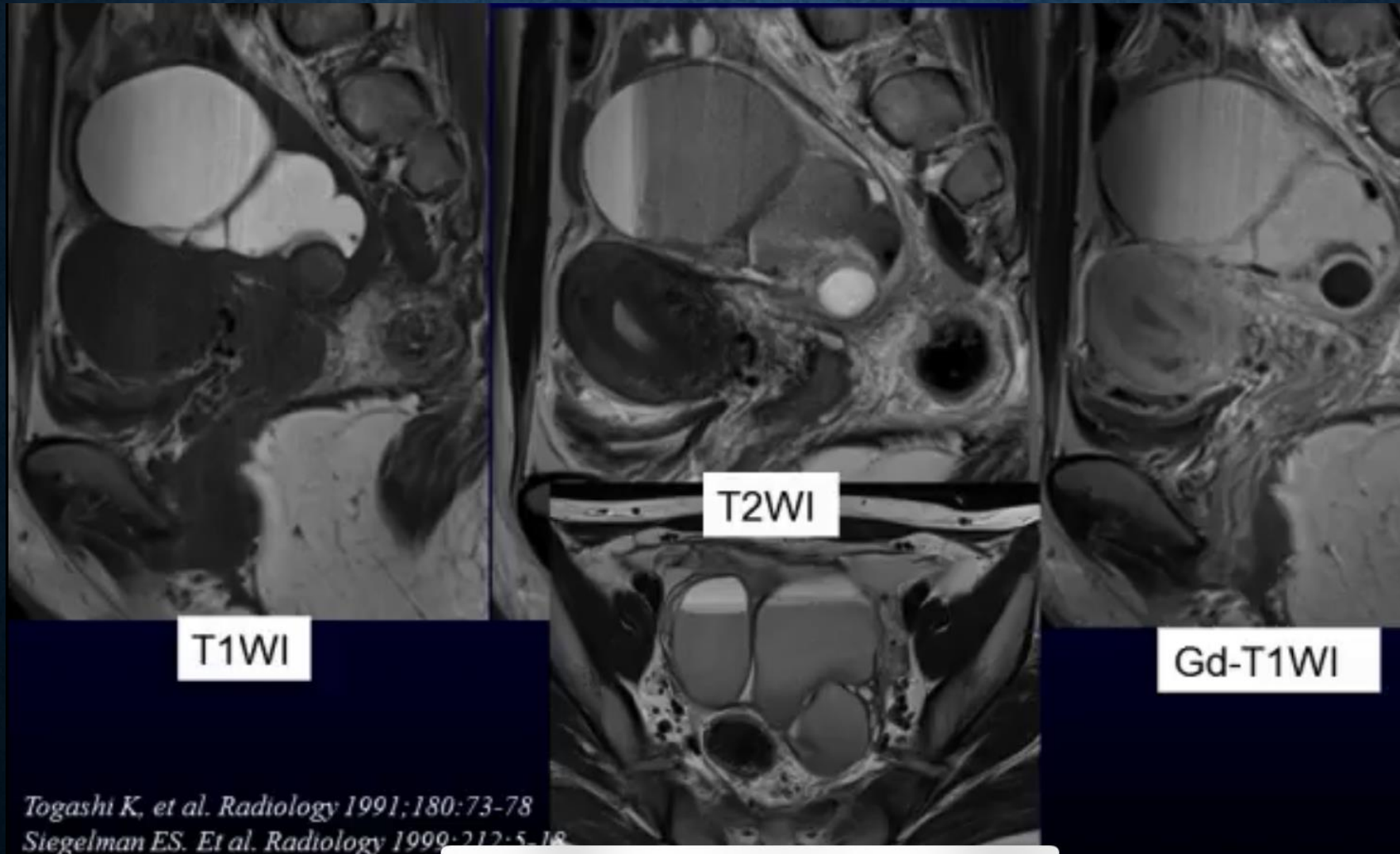
TYPICAL ENDOMETRIOTIC CYST



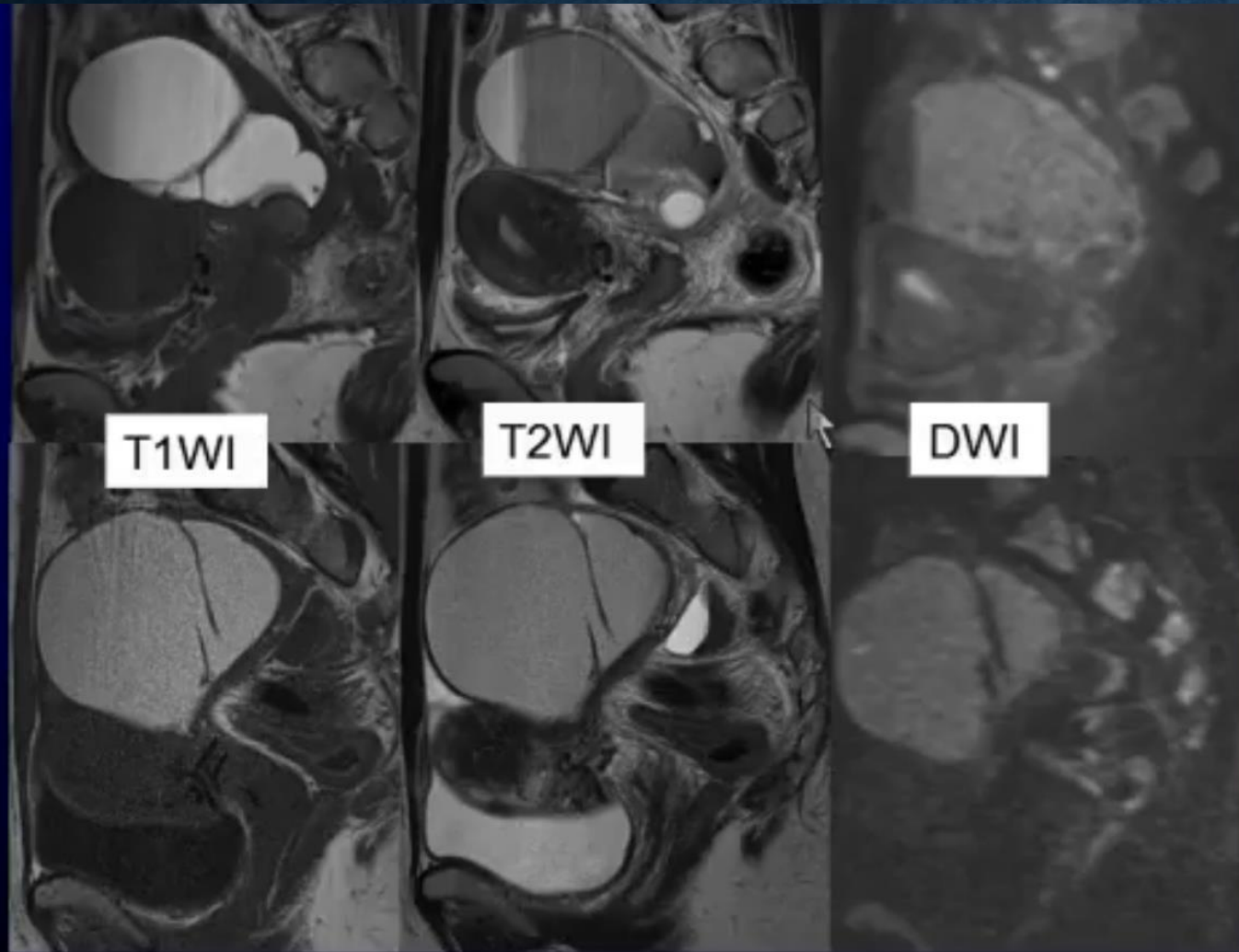
High SI on T1
Low SI on T2



Typical Endometriotic cyst characteristics:
Shading on T2, Multiplicity, Bright SI on T1



Togashi K, et al. Radiology 1991;180:73-78
Siegelman ES. Et al. Radiology 1999;212:5-18



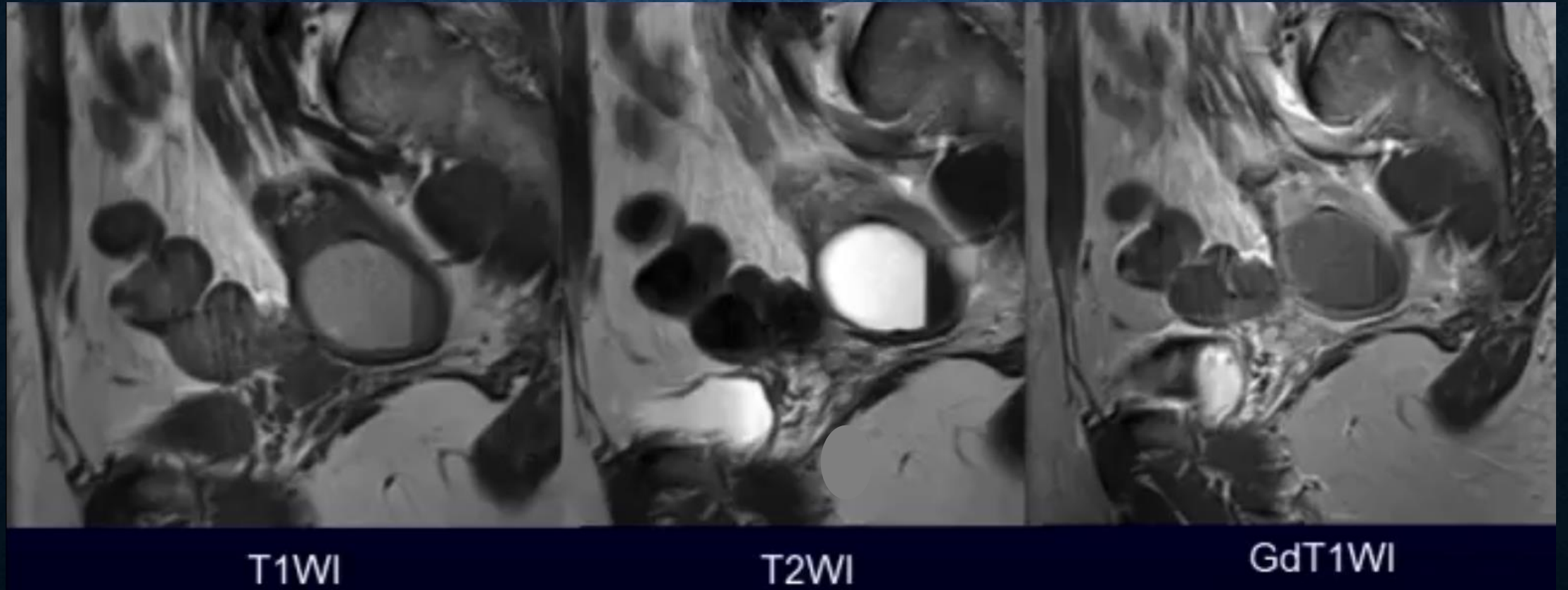
MR Imaging Features of endometrioma:

- 1- multiple high SI cysts on T1
- 2- shading on T2

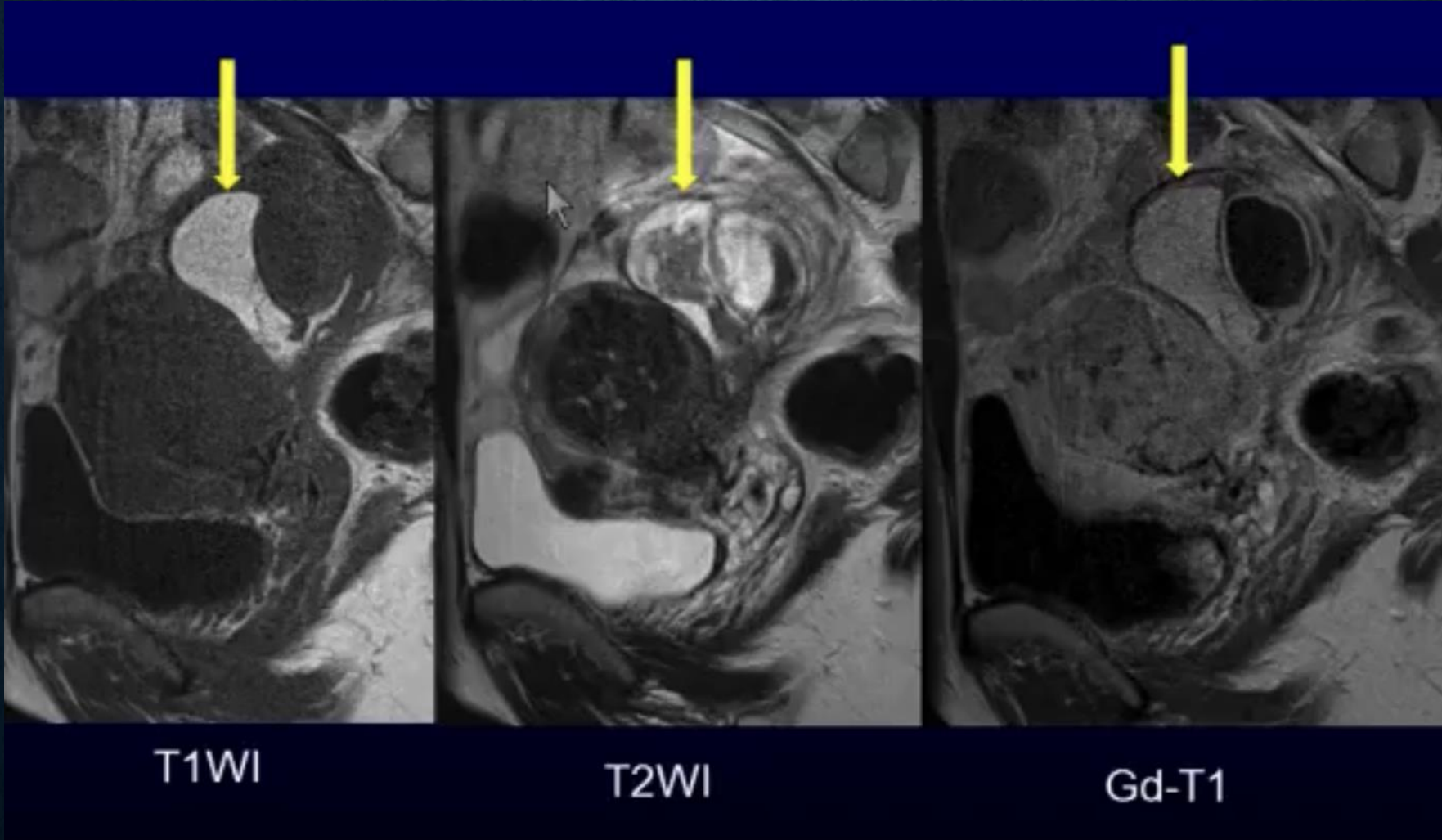
Definite MR criteria for endometrioma

-Half of the endometriotic cyst shows high signal intensity on DWI.

DDX: **hemorrhagic leuteal cyst**



Blood products in endometriotic cyst:



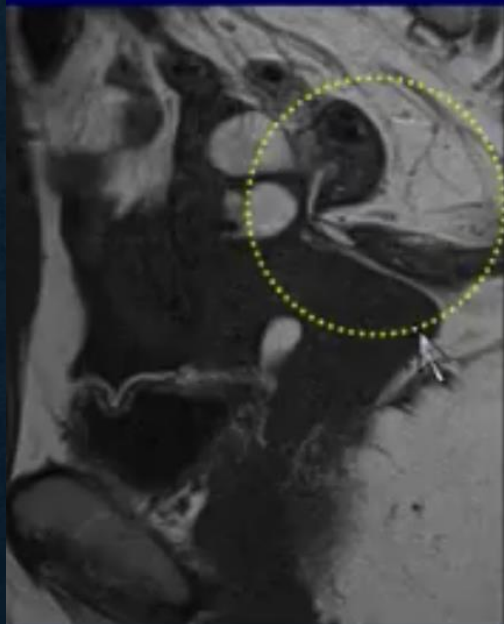
OUTLINE

- Epidemiology
- Role of imaging
- MR imaging findings:
 - Endometriotic cyst
 - Adhesion
 - DIE
 - Endometriosis of rare sites
 - Malignancies associated with endometriosis

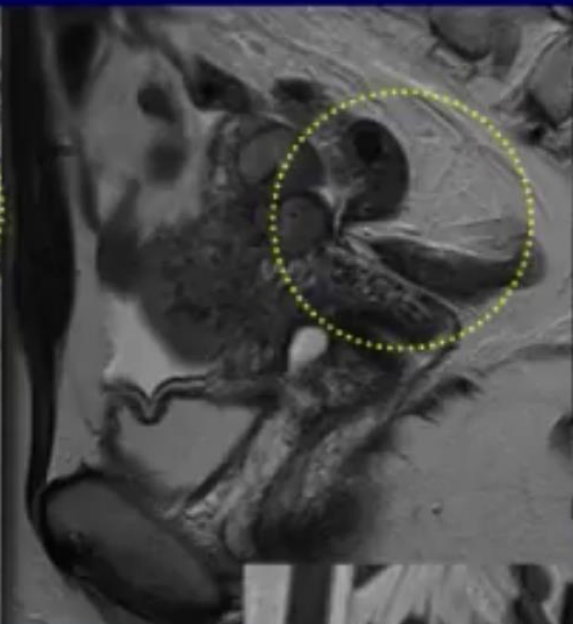
Adhesion

- Cause to block tubo-ovarian motility, ovum pick up → sub fertility
- Dx: by laparoscopy
 - The extent and severity of adhesion is difficult by US & MRI

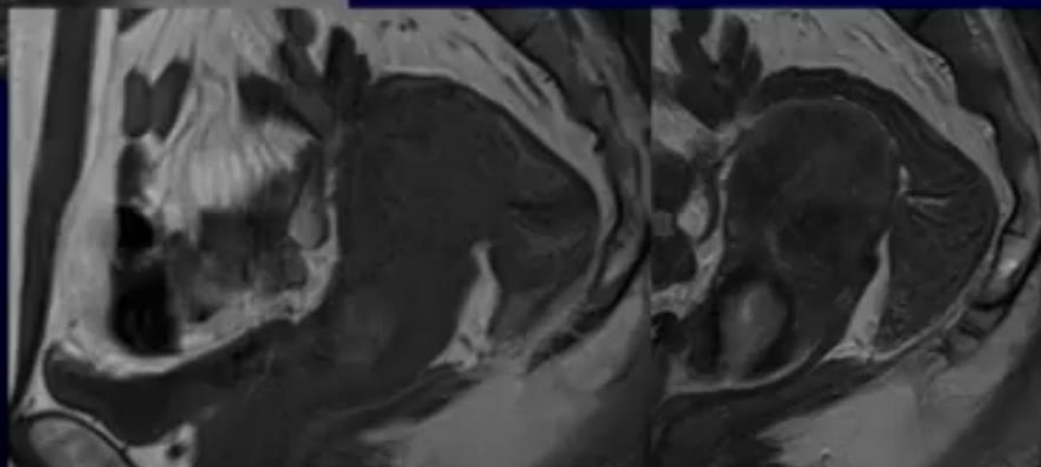
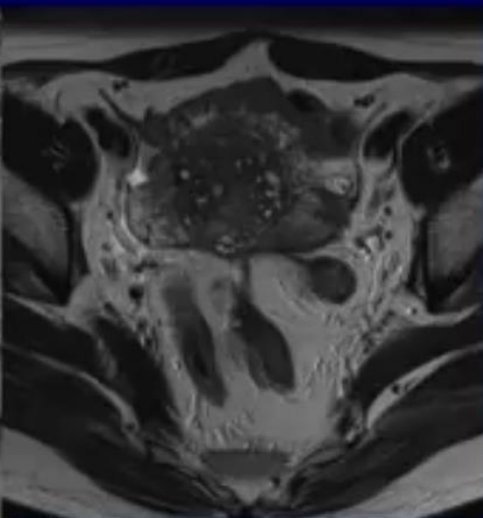
Indirect signs of Adhesions



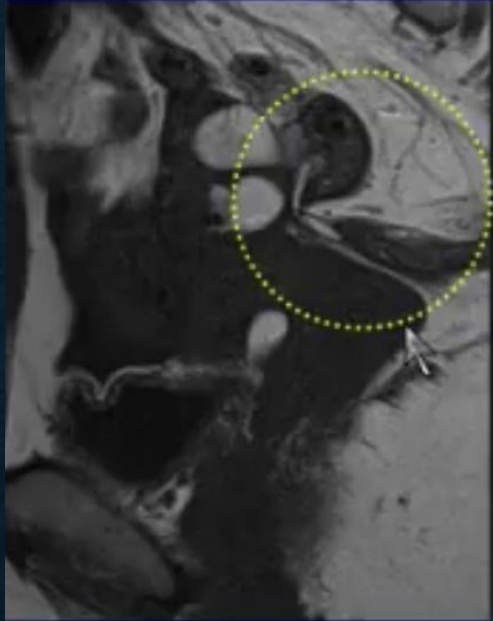
T1WI



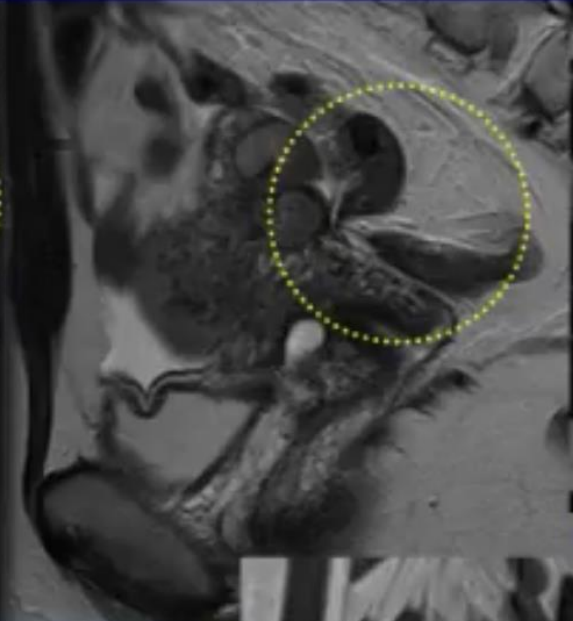
T2WI



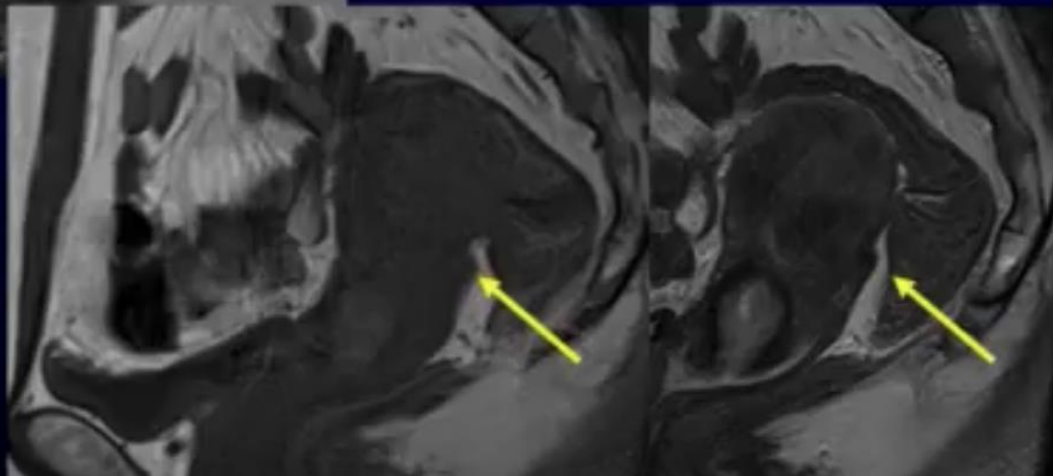
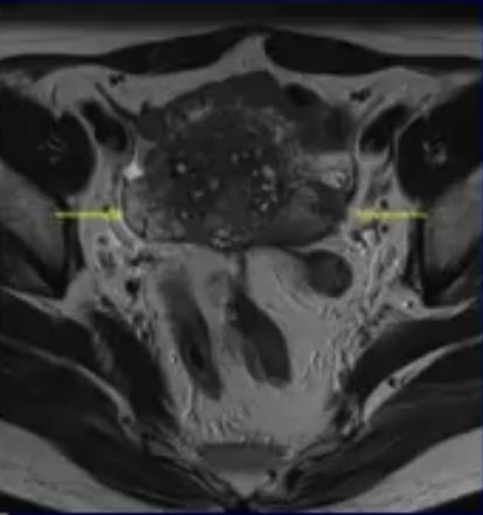
Indirect signs of Adhesions



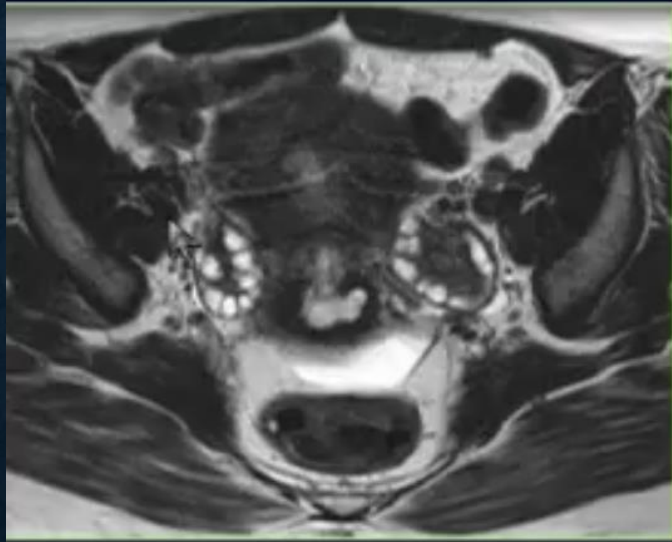
T1WI



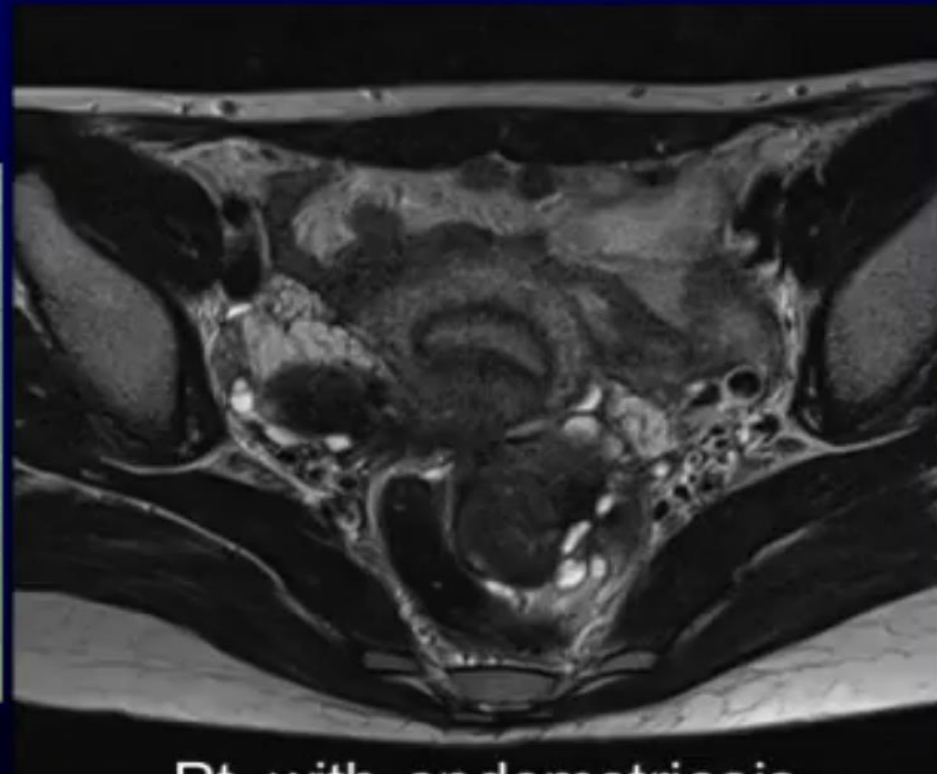
T2WI



“Kissing ovary”



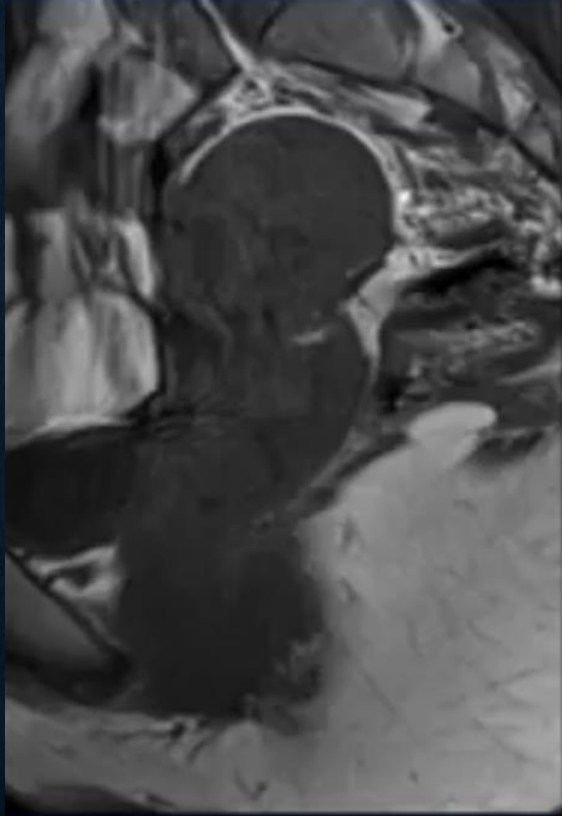
Normal



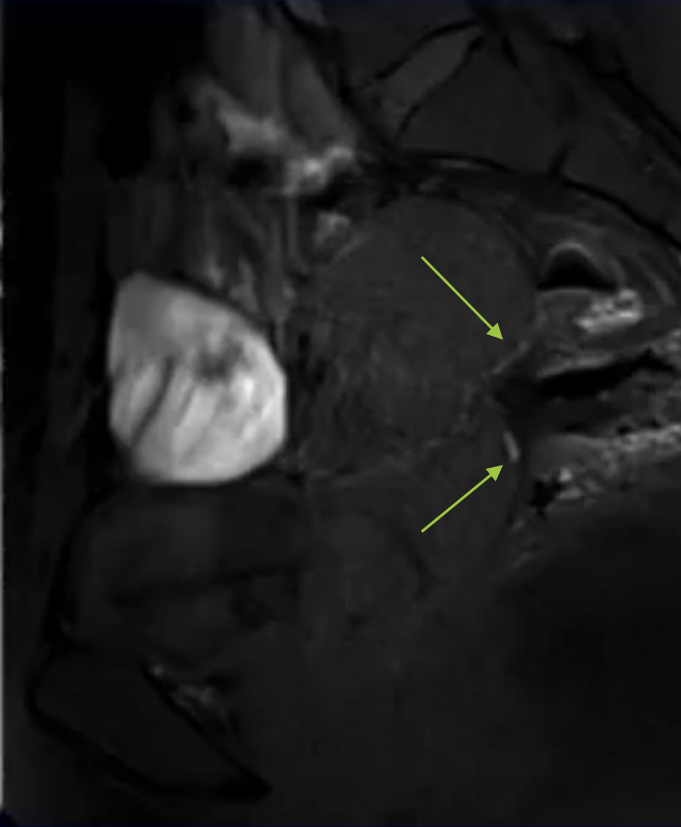
Pt. with endometriosis

T2WI

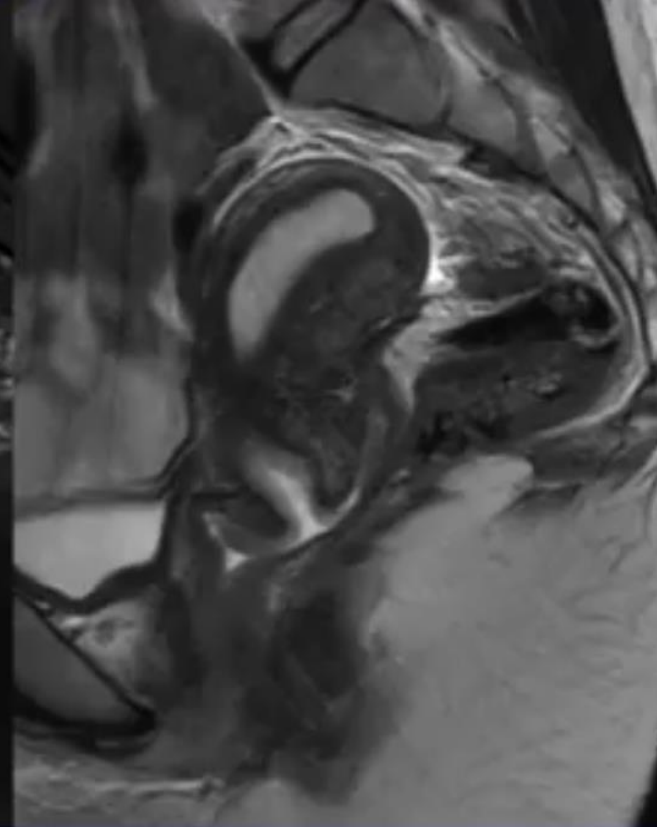
Implant of Endometriosis:



T1WI



FS-T1WI



T2WI

OUTLINE

- Epidemiology
- Role of imaging
- **MR imaging findings:**
 - Endometriotic cyst
 - Adhesion
 - **DIE**
 - Endometriosis of rare sites
 - Malignancies associated with endometriosis

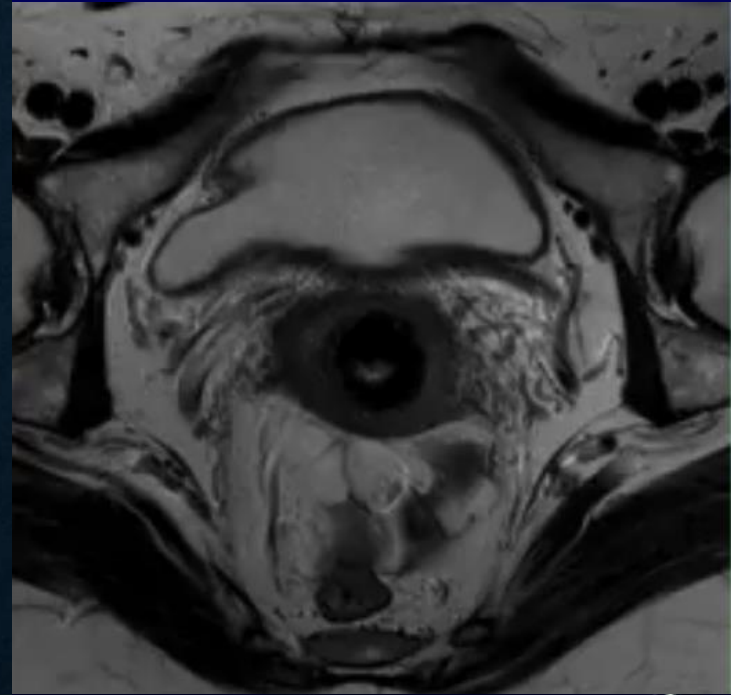
The location of DIE



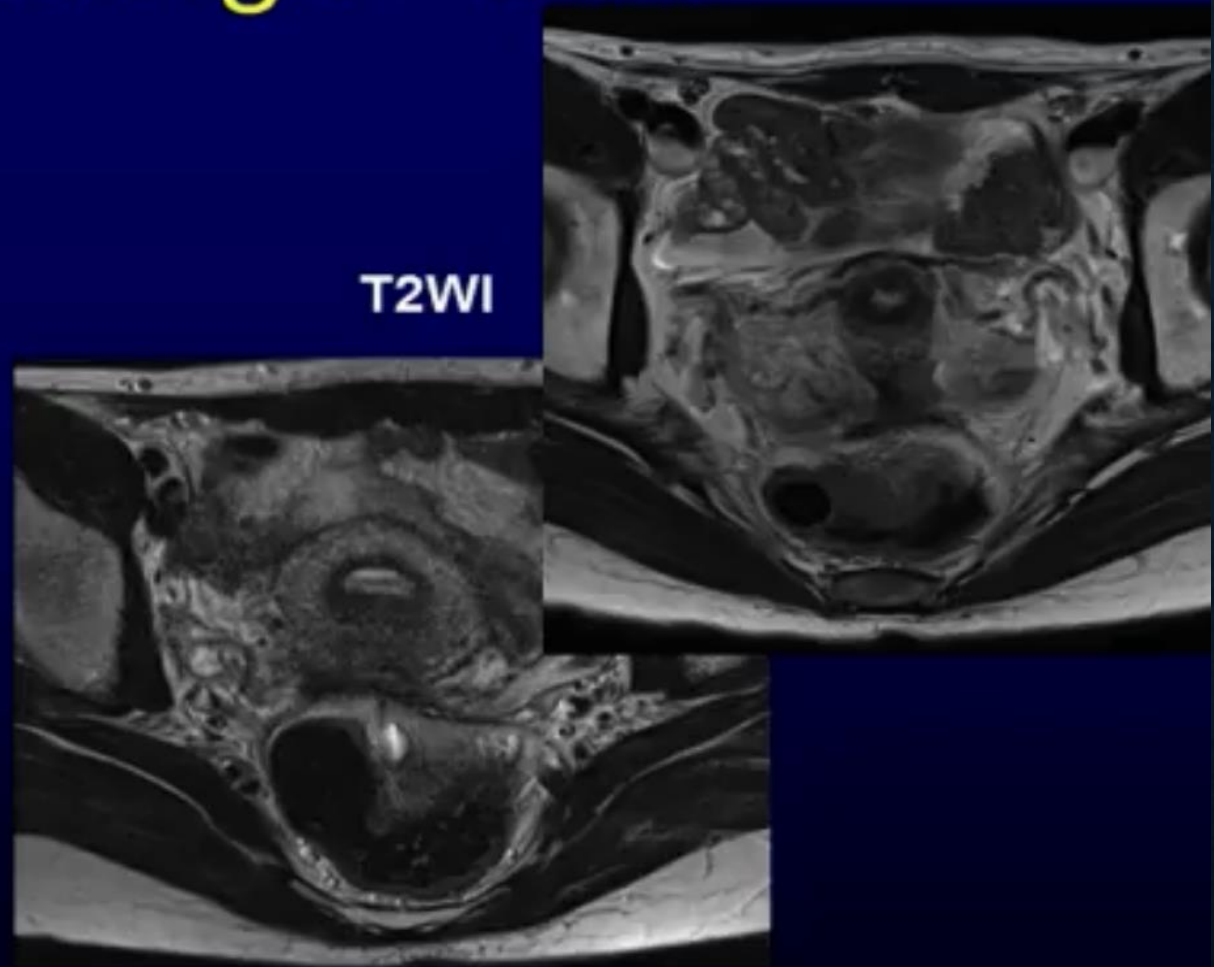
Diagnosis of DIE on MR imaging

- T2WI: Low signal thickened/nodular appearance
 - ← Fibromuscular hyperplasia and fibrosis
- High signal spot on T1WI with Fat Saturation
 - ← Small hemorrhagic implants
- Limited value
 - Contrast enhancement MR
 - “Limited additional diagnostic value” *Bazot et al. EJR 2011e331-e339*
 - DWI
 - ADC values “consistently low, but not significant”

Thickening of USL

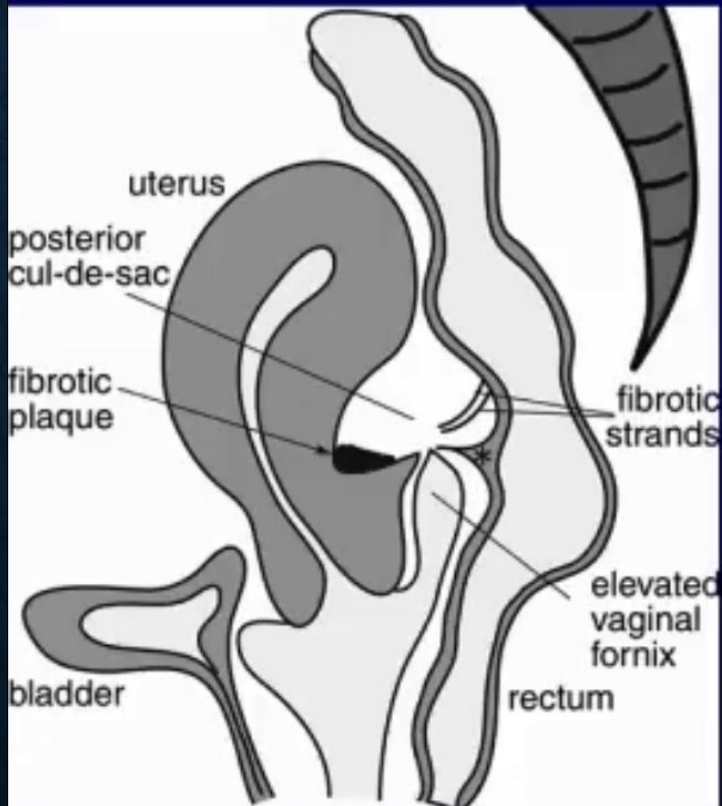


Normal
Oblique Ax T2WI

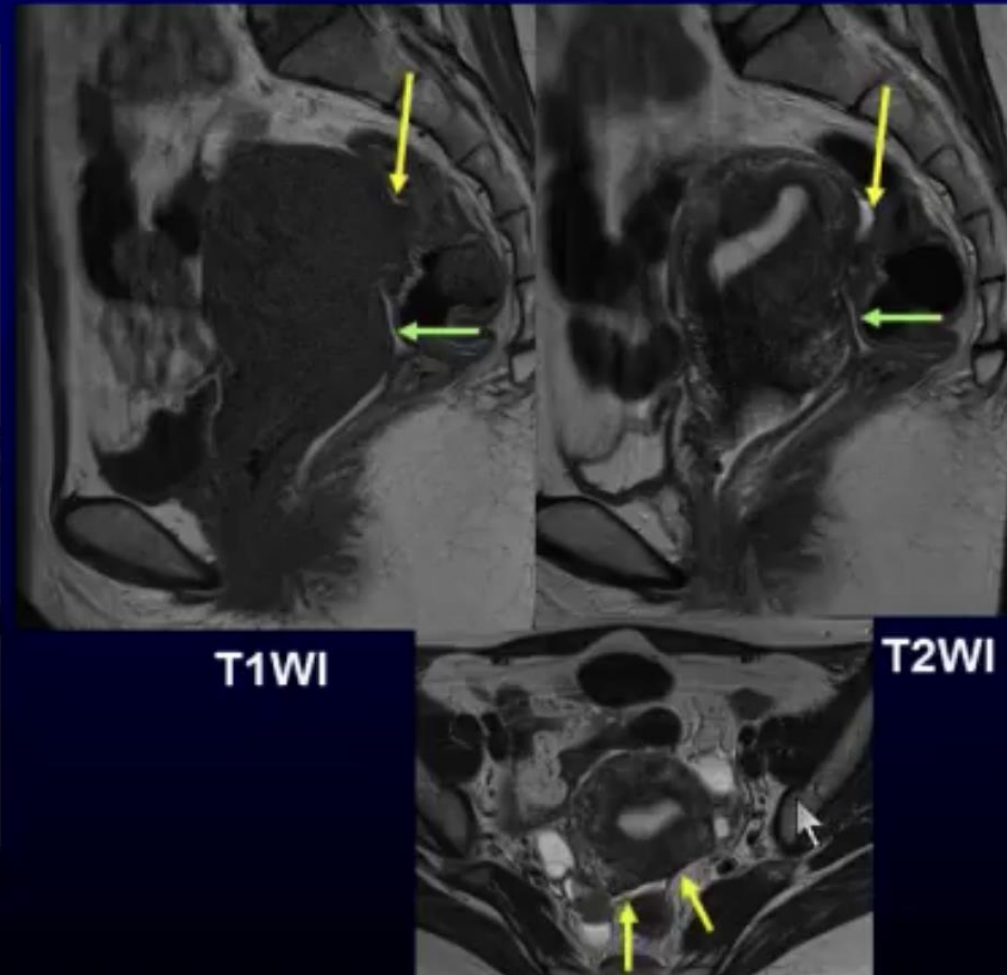


Asymmetric nodular irregularity of USL: sensitivity of USL involvement 76-86%

Typical MR imaging findings of posterior cul-de-sac obliteration

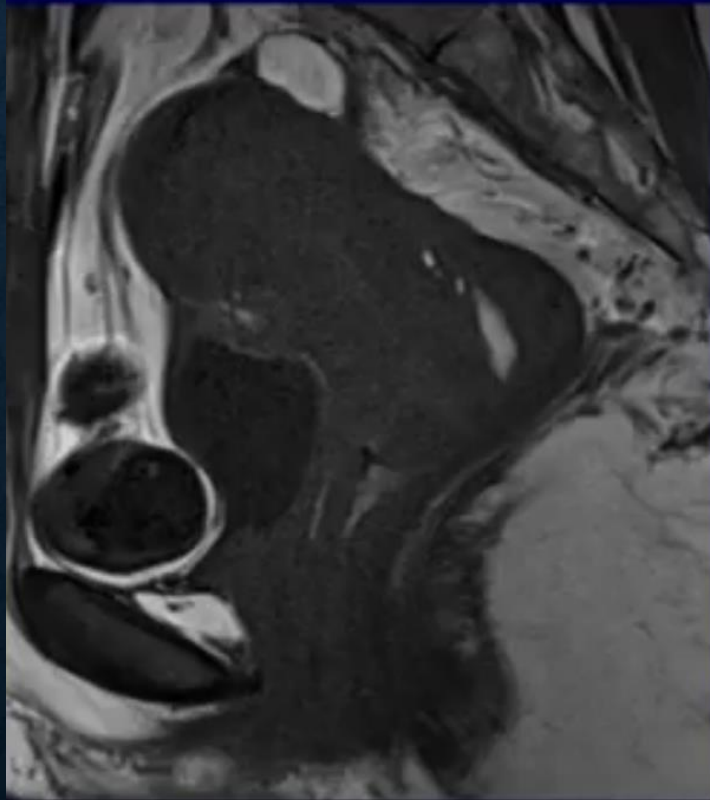


Kataoka M.L et al. Radiology 2005;234:815-823

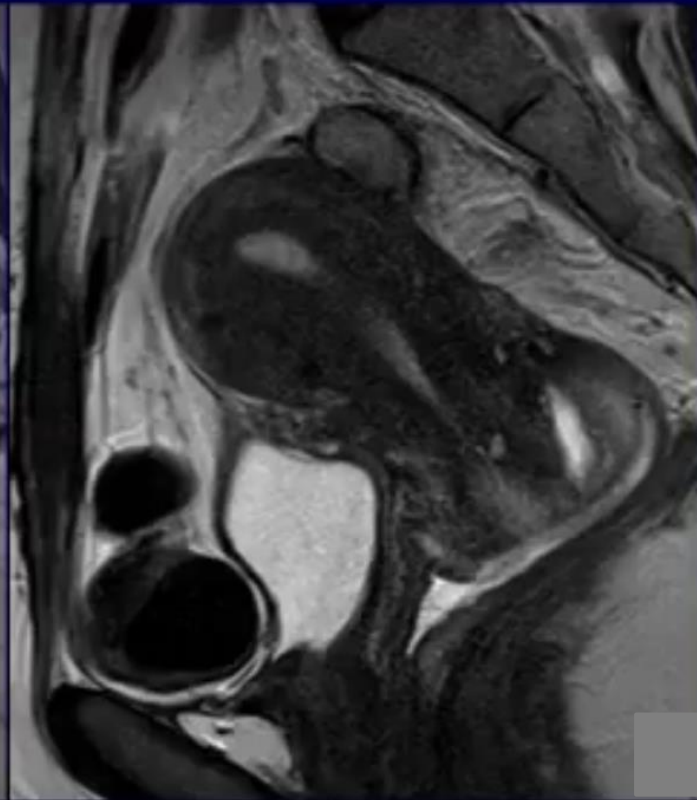


Bladder Endometriosis

- Most frequently involved in genitourinary tract
- Often confined to the serosal surface, can infiltrate the muscle.

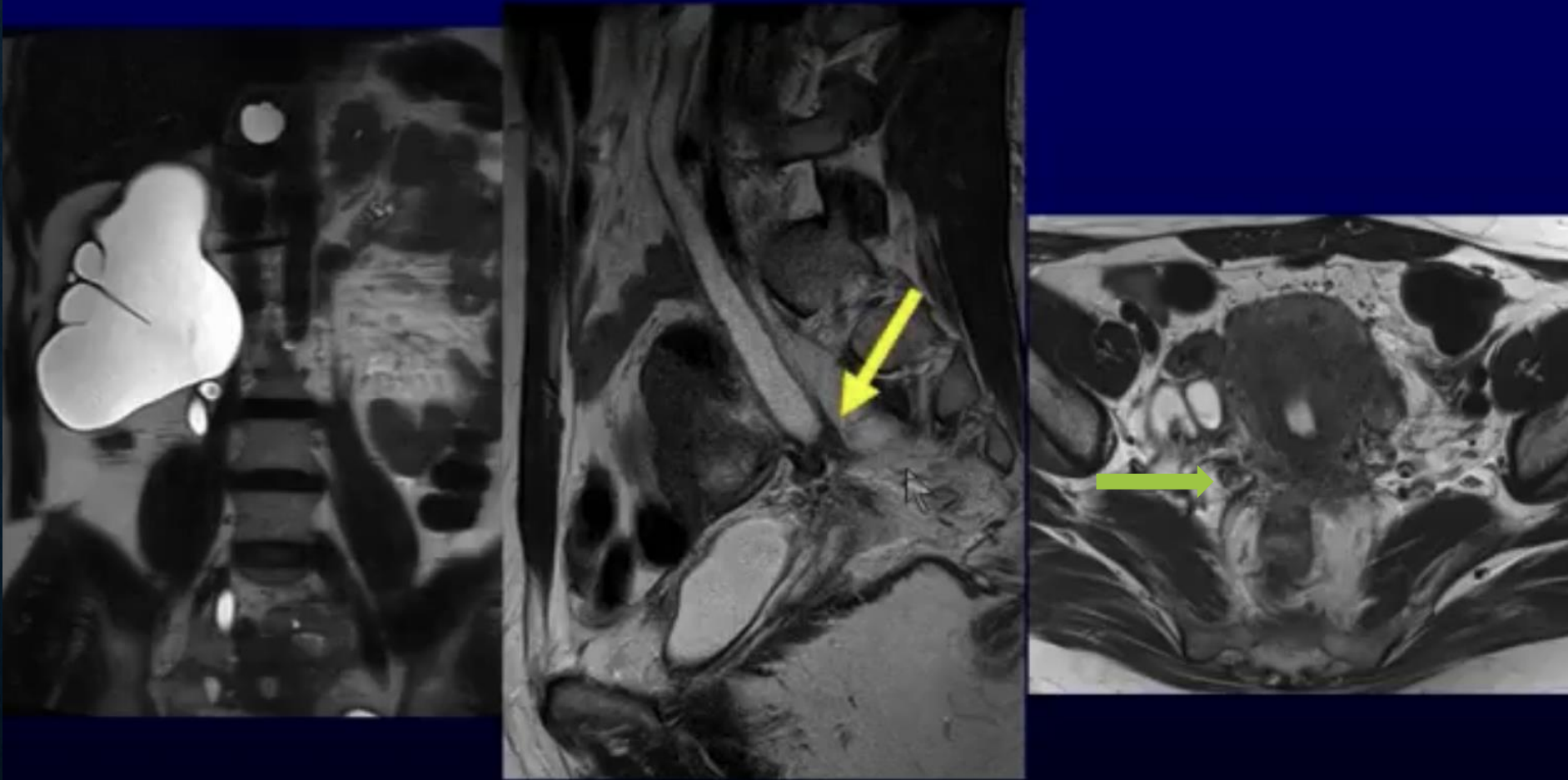


T1WI



T2WI

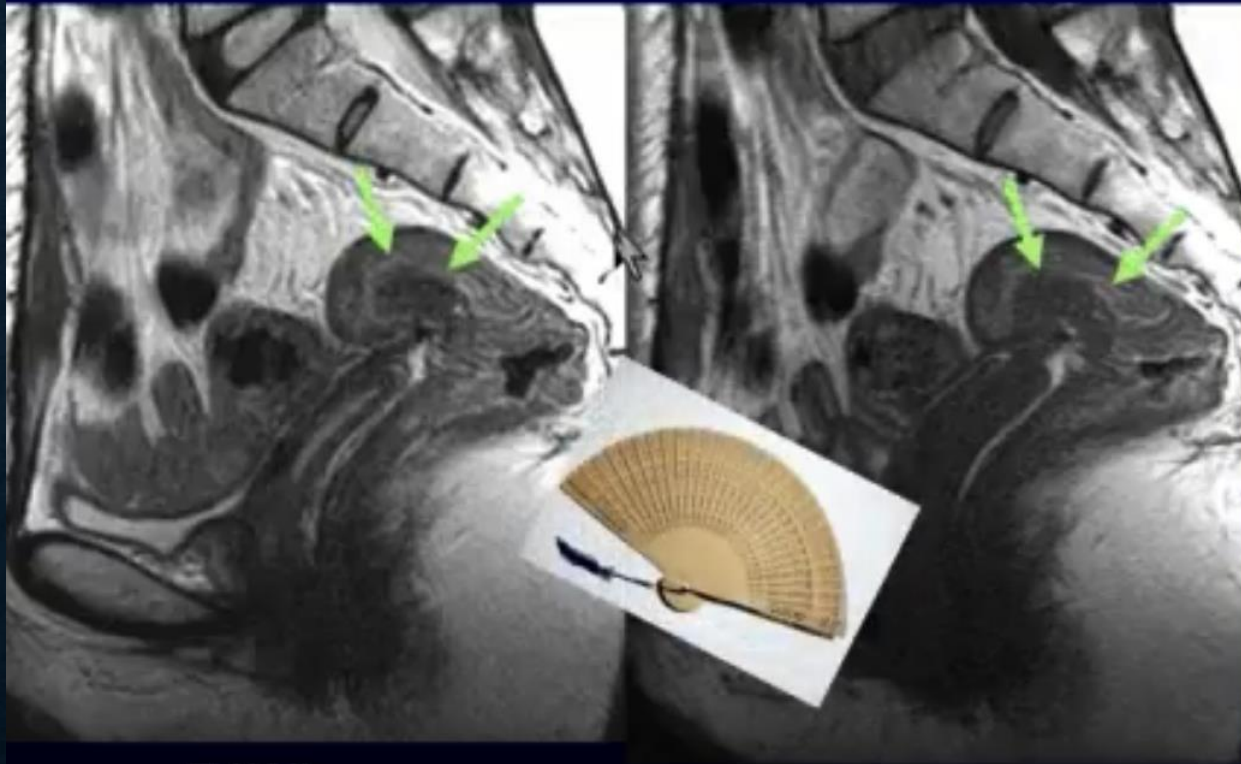
Hydronephrosis by DIE



T2WI

Rectal endometriosis

Fan shaped: thickening of muscular layer,
smooth muscle hyperplasia



T1WI

T2WI



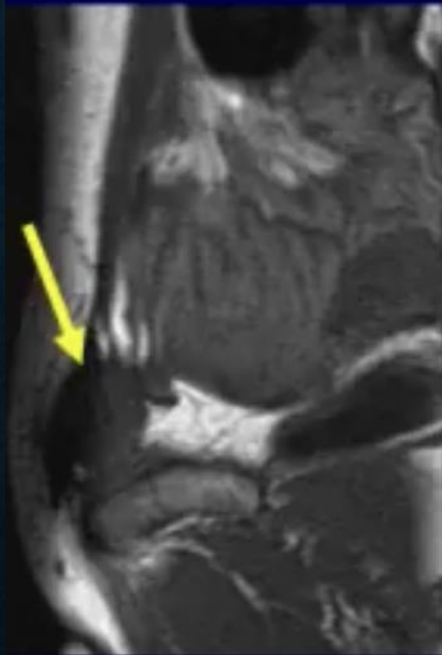
Double contrast Barium Enema

OUTLINE

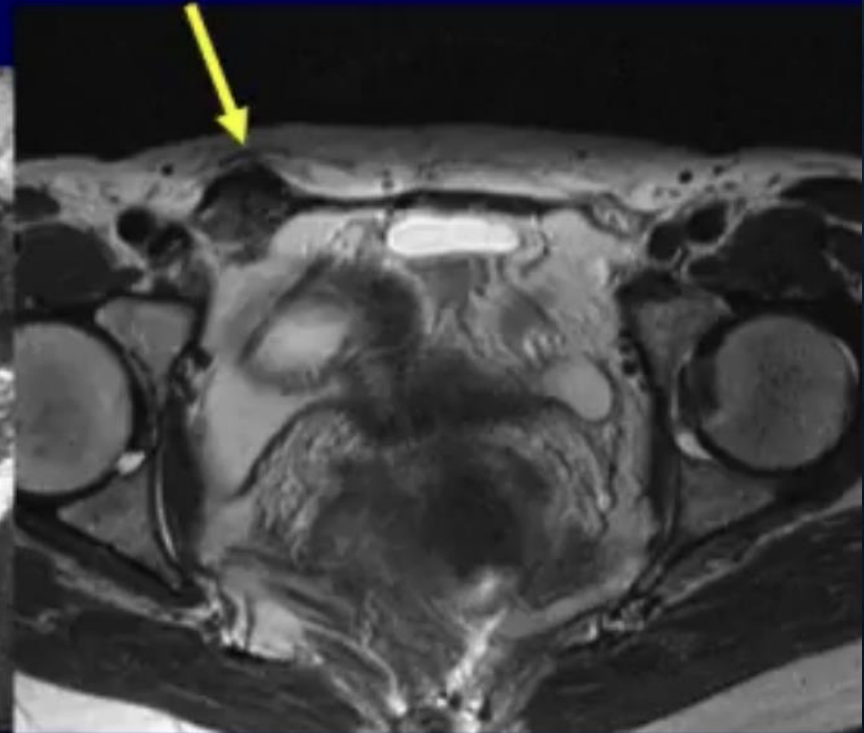
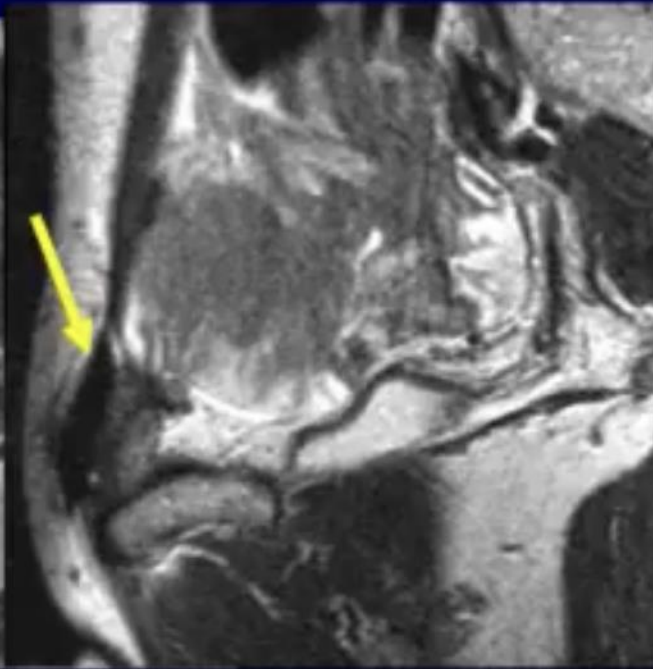
- Epidemiology
- Role of imaging
- **MR imaging findings:**
 - Endometriotic cyst
 - Adhesion
 - DIE
 - **Endometriosis of rare sites**
 - Malignancies associated with endometriosis

Inguinal Endometriosis

- Location: inguinal lesions, within surgical scars



T1WI



T2WI

OUTLINE

- Epidemiology
- Role of imaging
- **MR imaging findings:**
 - Endometriotic cyst
 - Adhesion
 - DIE
 - Endometriosis of rare sites
 - **Malignancies associated with endometriosis**

MALIGNANT TRANSFORMATION OF ENDOMETRIOSIS

- Endometriotic cyst risk for malignant transformation: **0.6- 0.8%**
- Top frequencies: **clear cell carcinoma**
endometrioid adenocarcinoma

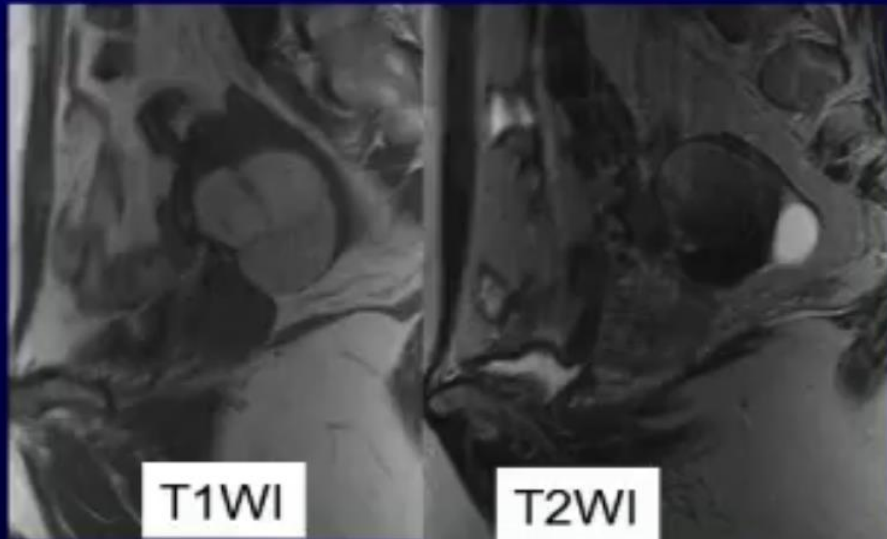
MALIGNANT TRANSFORMATION OF ENDOMETRIOSIS

- **Mural nodule signal on T1: low**
on T2 : variable

Signal and shape of mural nodule are not related to histology of ca

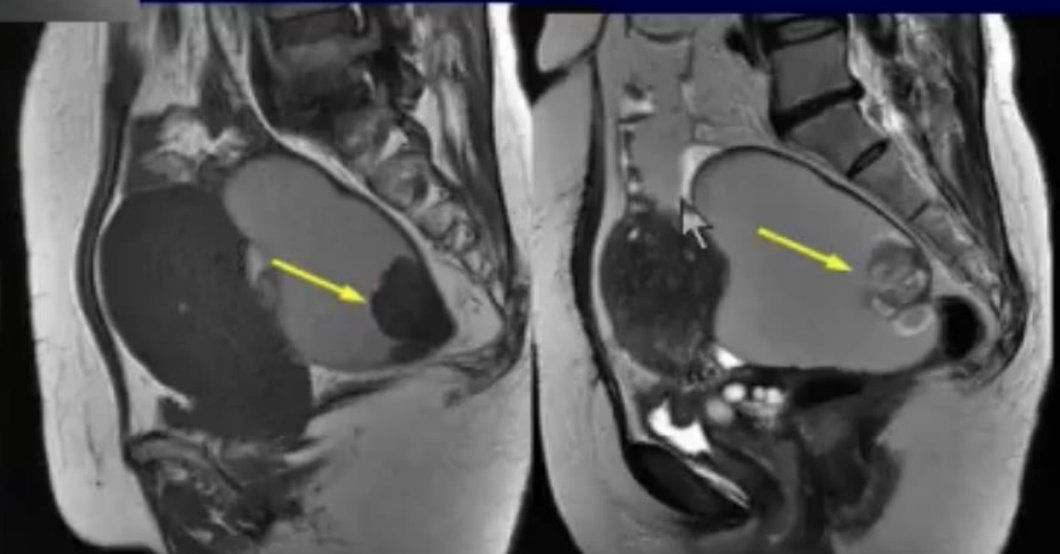
- **Cystic component : high on T1 & T2**
- **Shading on T2 : rare**

Malignancy arising from Endometriotic Cyst



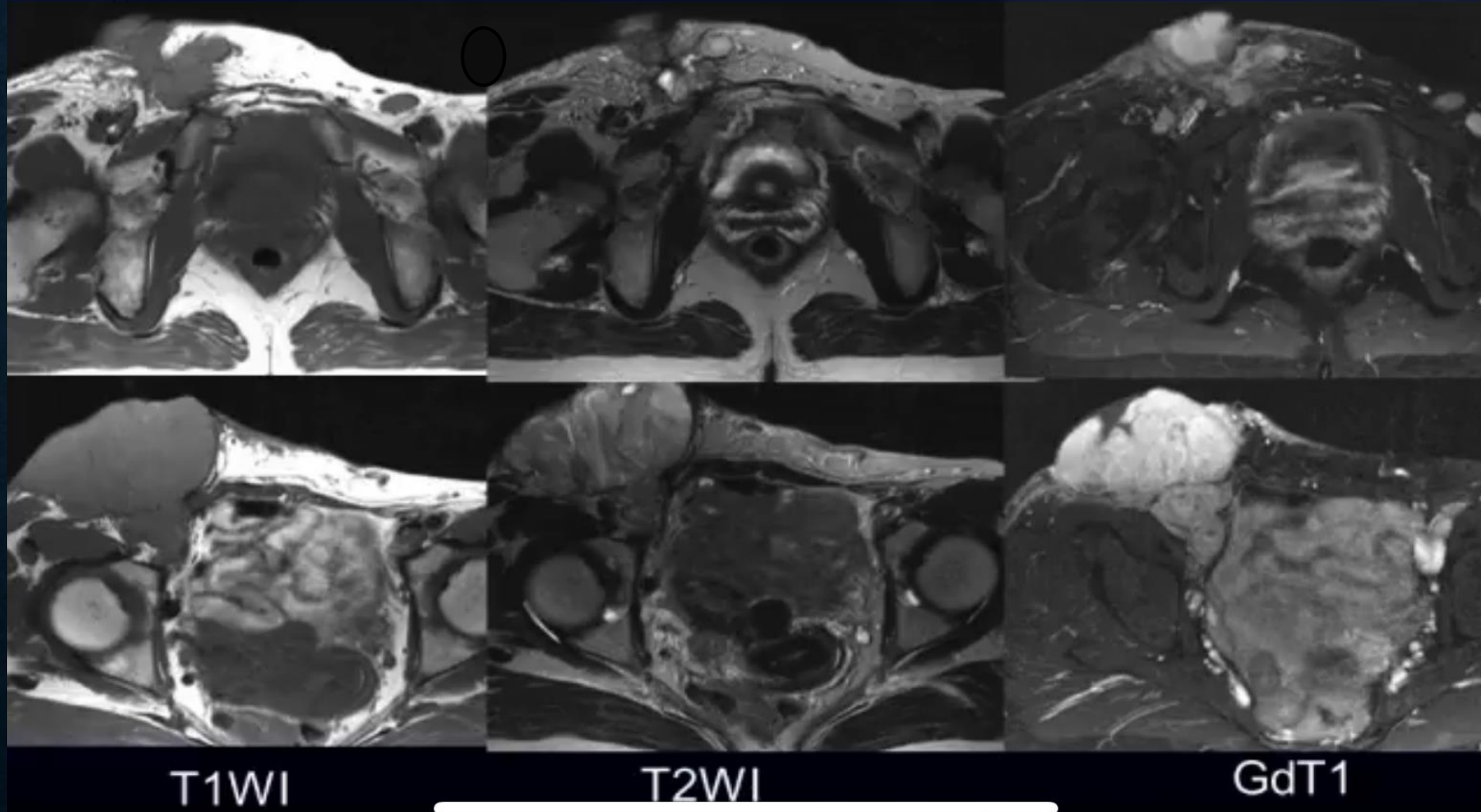
2.5 years later

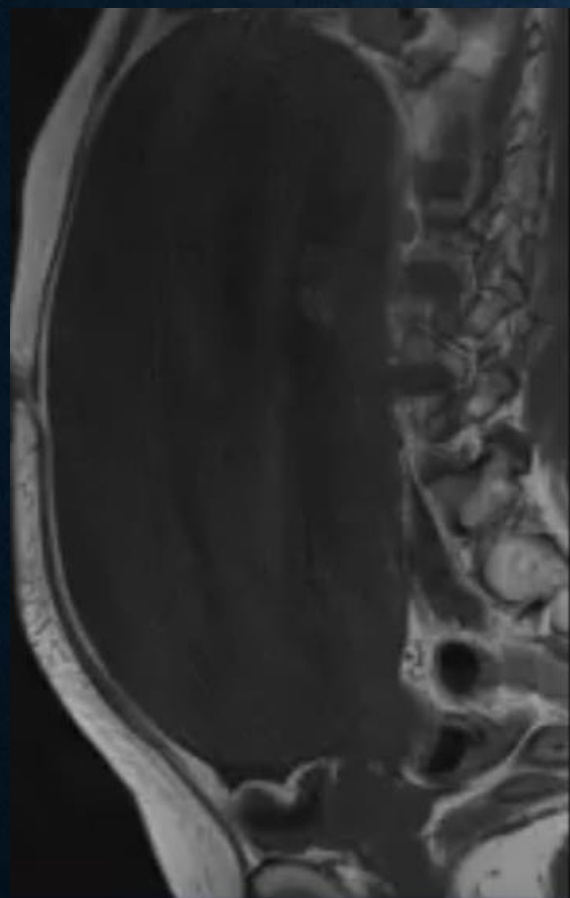
51 y.o.
Clear cell carcinoma



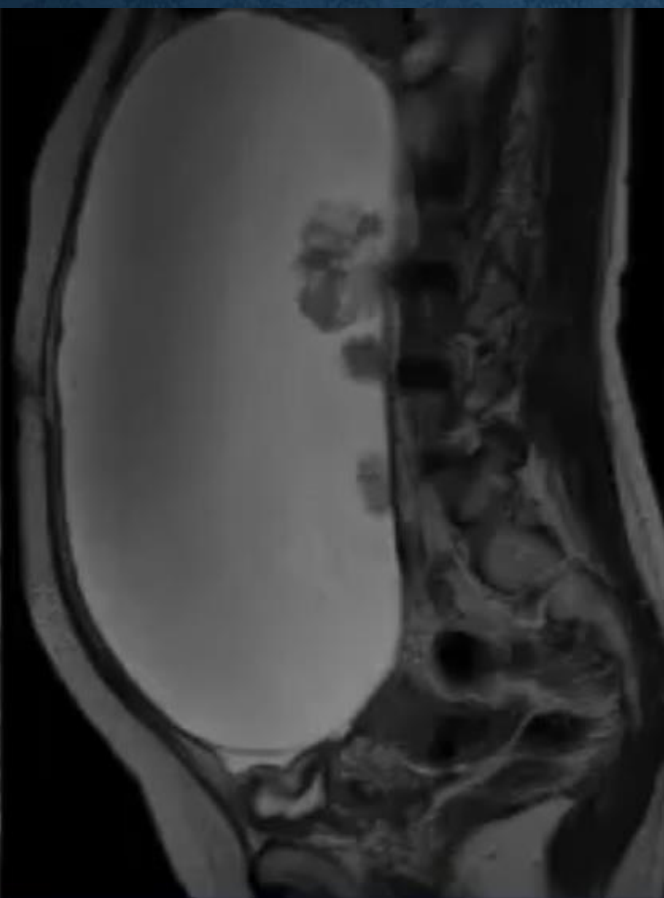
Endometrial Stromal Sarcoma arising from inguinal endometriosis

48y.o.

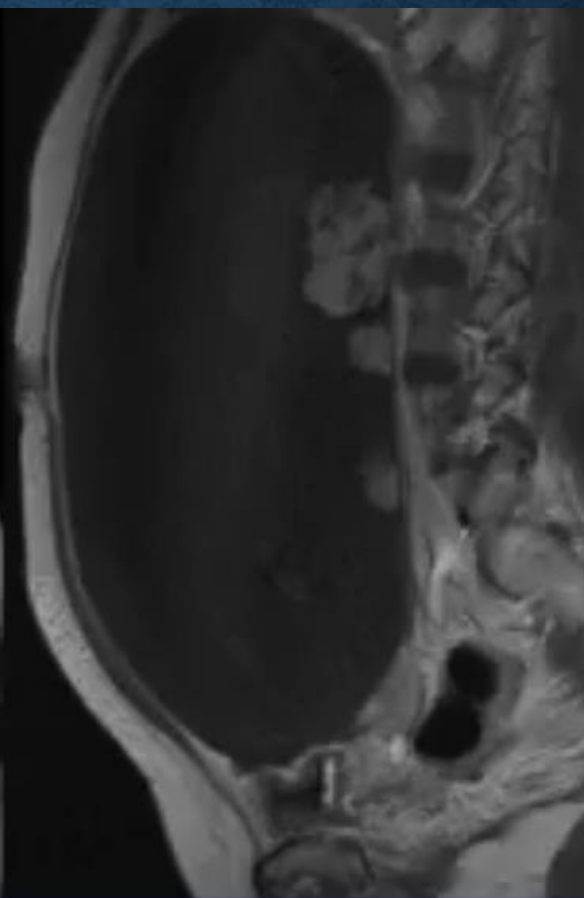




T1WI



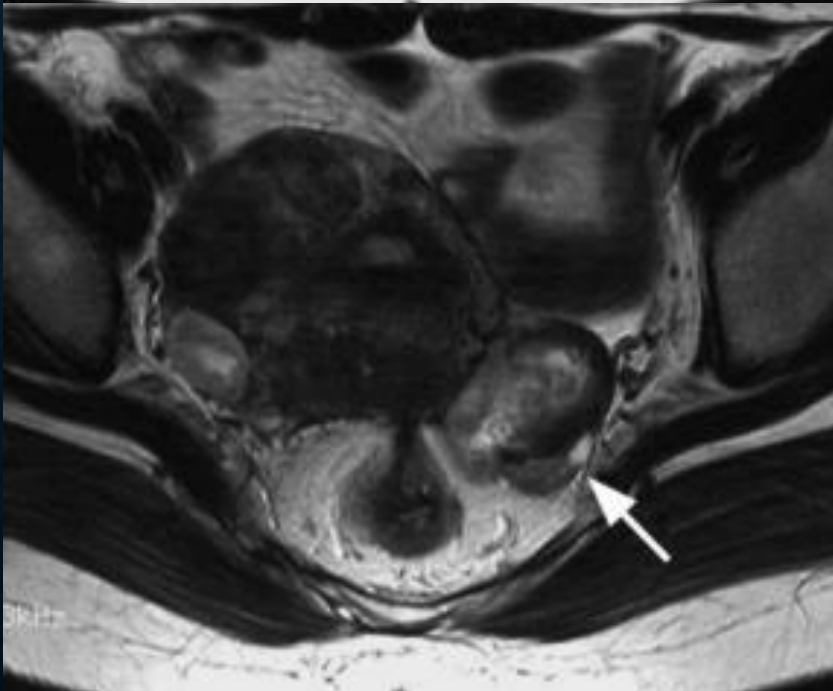
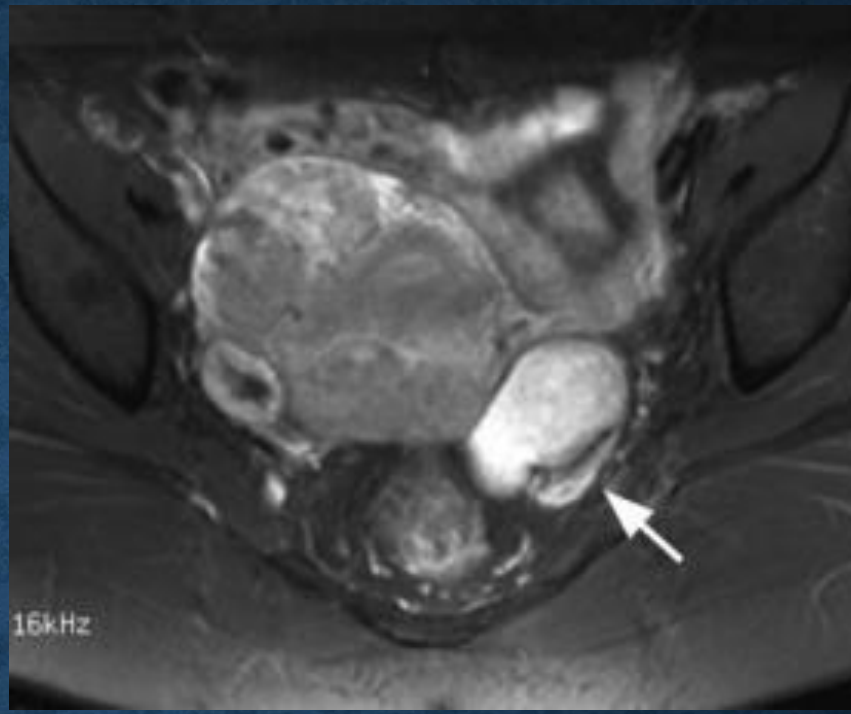
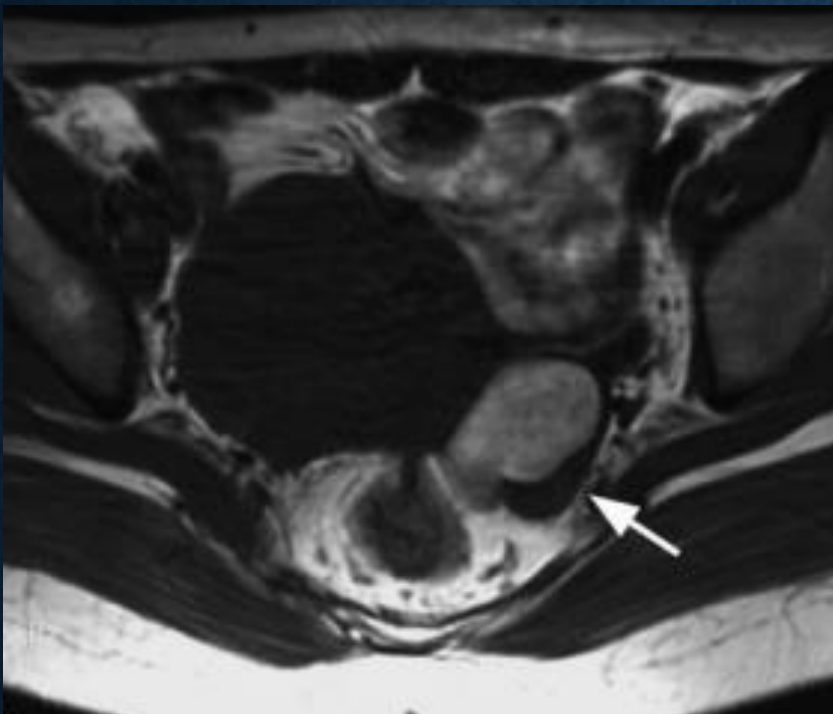
T2WI



GdT1



DWI

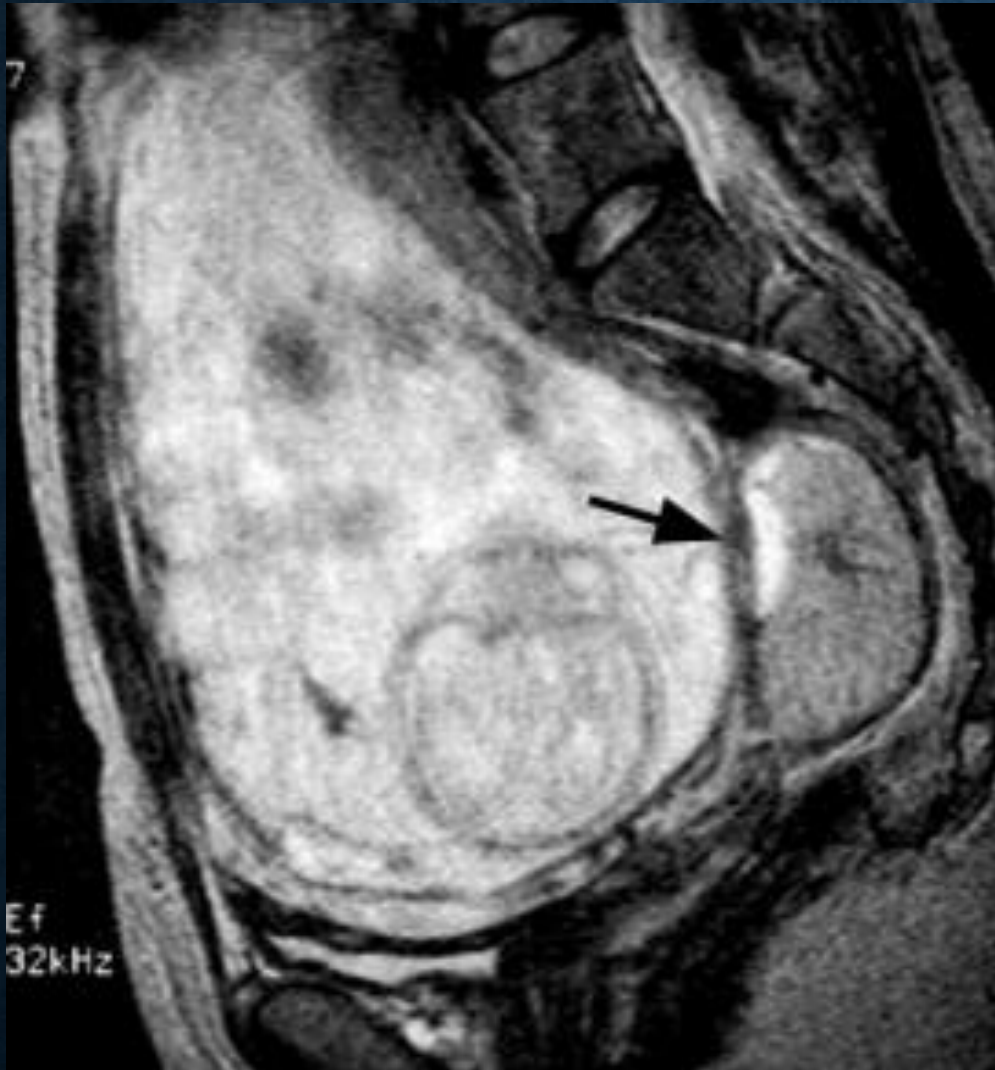


DDX of mural nodule:

Adjacent ovarian parenchyma

As:

**extra cystic crescent shape lesion
may contain follicles**



DDX of mural nodule:

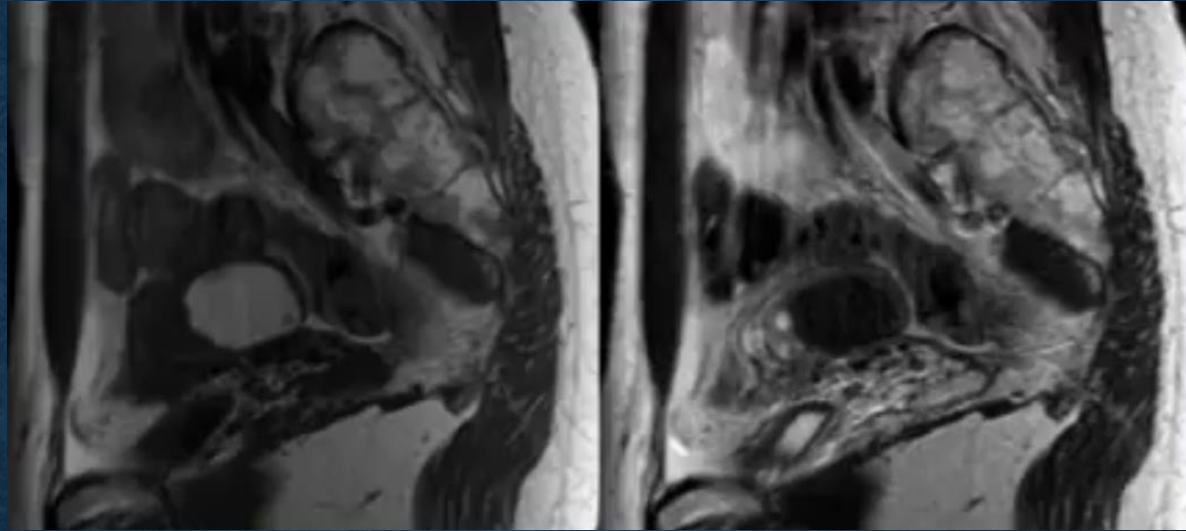
Decidual change of ectopic endometrium during pregnancy

Characteristic:

broad base high SI mural nodule on T2
closed F/U is necessary to R/O malignancy

Decidualization of the endometriotic cyst:

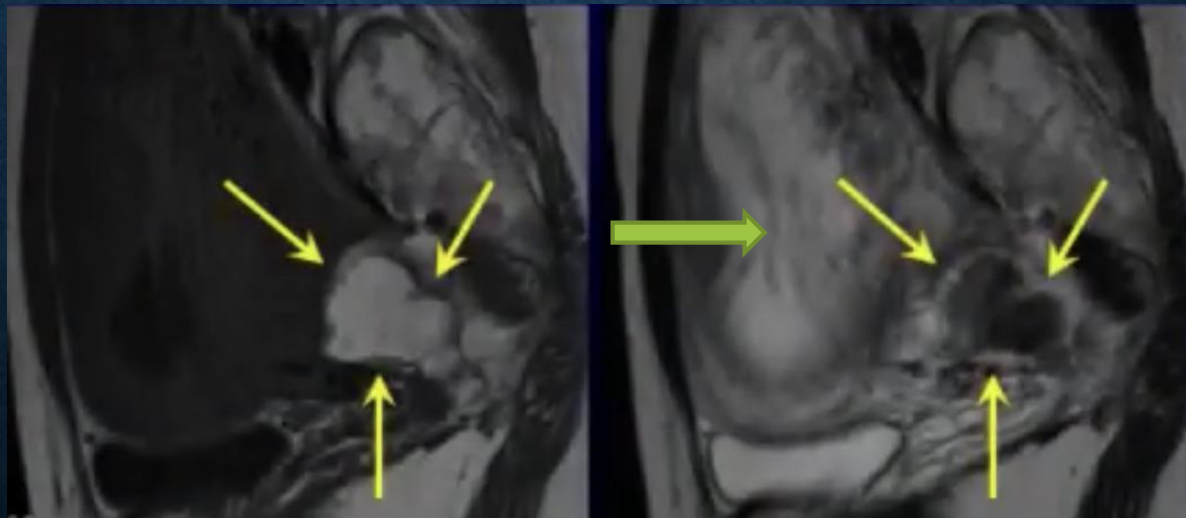
Before pregnancy

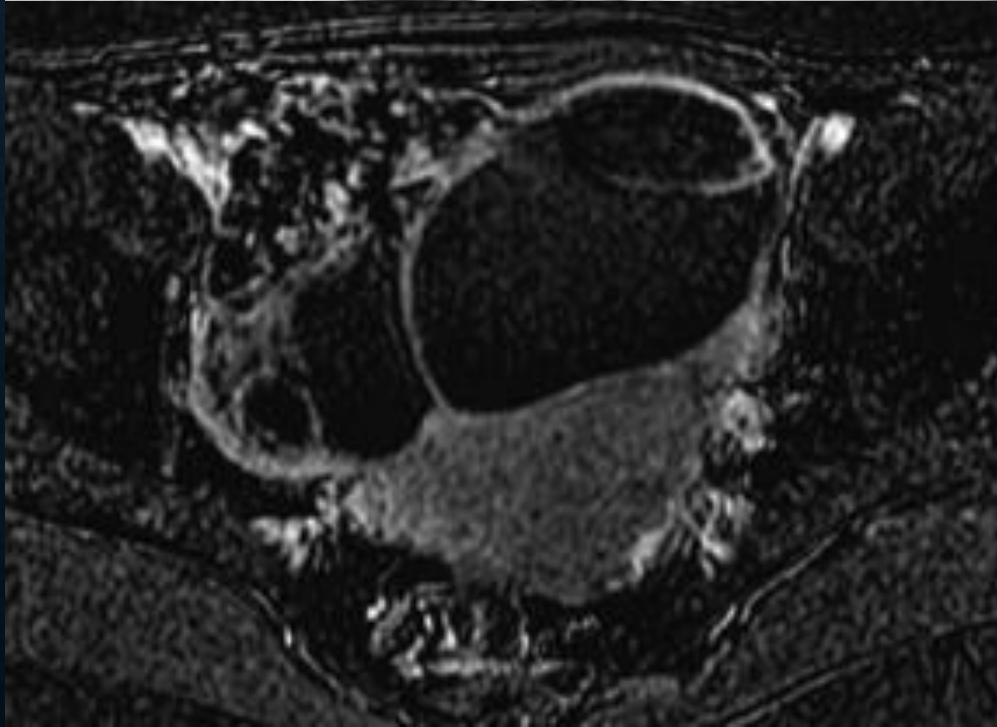
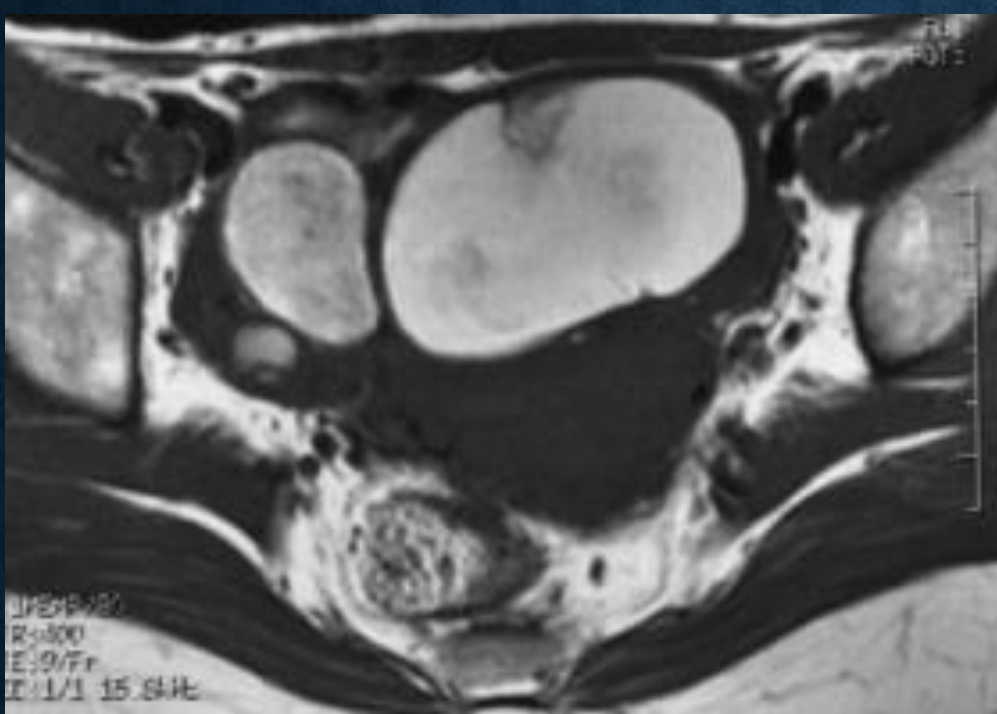


T1

T2

14 W of gestation



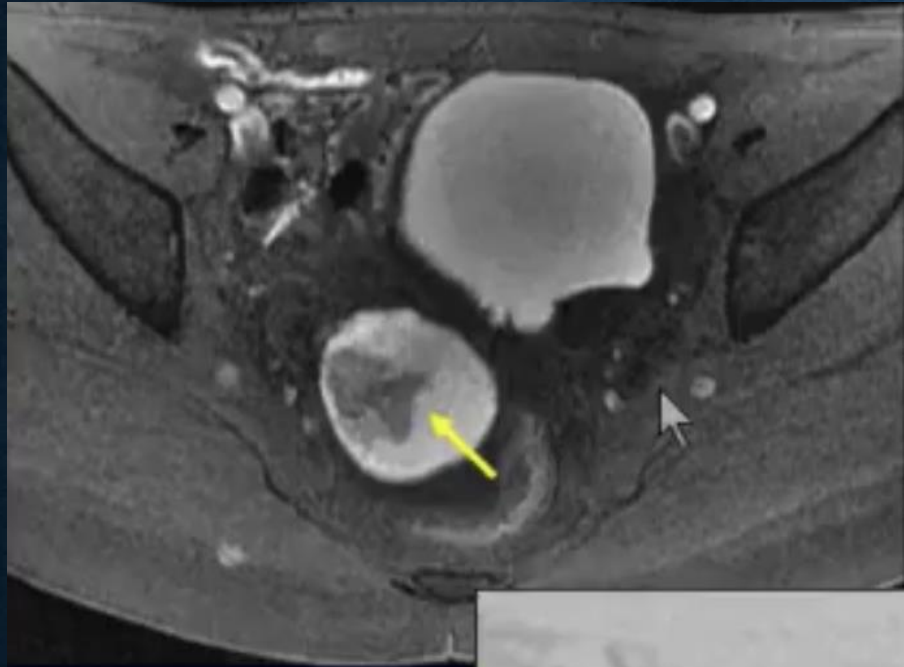


DDX of mural nodule:

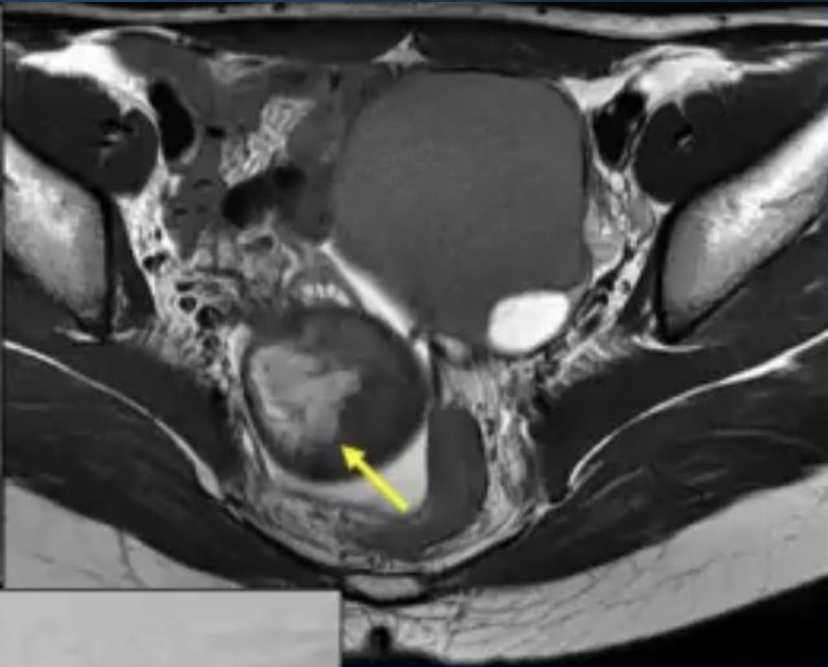
Intracystic blood clot

The clue is:

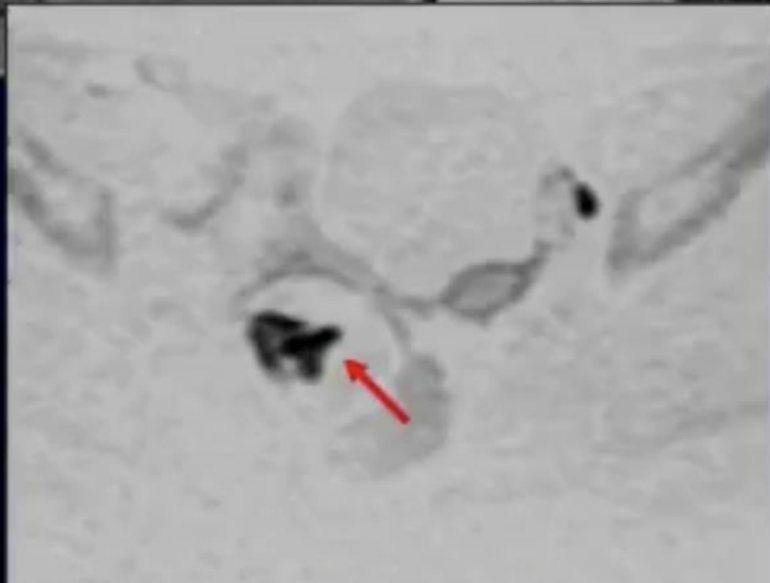
No enhancement



FS-T1WI



T2WI

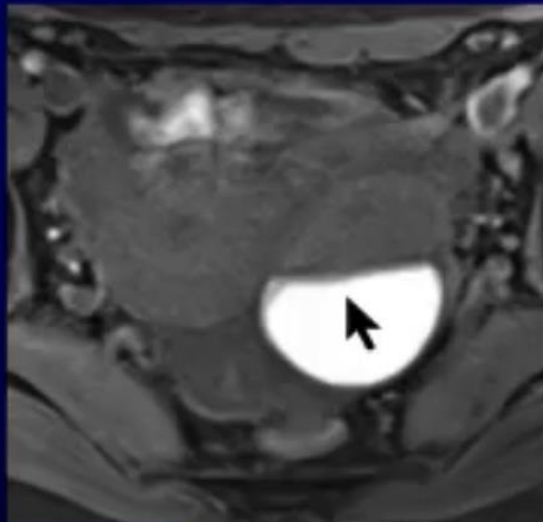


DWI

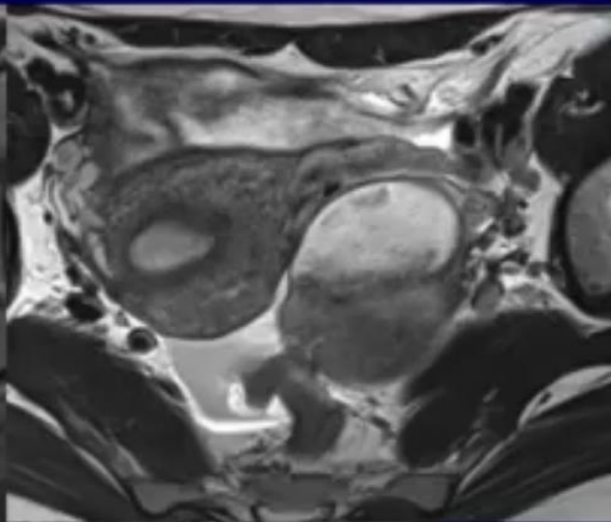
Susceptibility-weighted imaging (SWI)

- Very sensitive to deoxyhemoglobin and iron content
- hemorrhagic lesion is demonstrated as strong low signal intensity

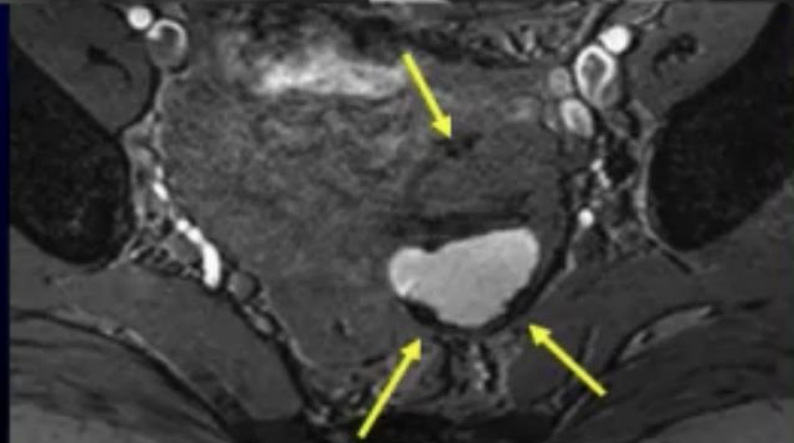
FS-T1WI



T2WI



SWI



TAKE HOME MESSAGE

- MRI represents **optimal** imaging modality for **endometriotic cysts**.
- MRI is **useful** for dx of **malignant transformation** and **DIE**.
- The most important finding for malignant change is: enhancing mural nodule(s) in a cyst
- **Enlargement of the endometrioma & disappearance of shading within the mass on T2** are suggestive of malignant transformation.
 - but may be show at **benign lesions**.

TAKE HOME MESSAGE

- Intracyclic coagulate may mimic a mural nodule
 - **Absence of enhancement** is the diagnostic clue.

- Normal desidual change of the ectopic endometrium in an endometrioma during pregnancy should be differentiated from malignant transformation:
 - **Broad based high SI mural nodule on T2** is the clue.



THANKS FOR YOUR ATTENTION