

Imaging of Cervical Carcinoma



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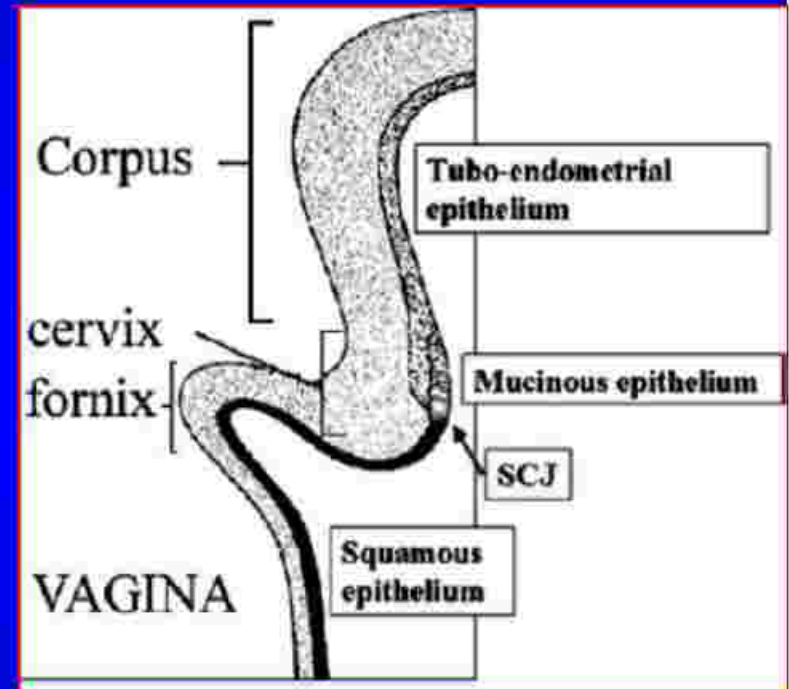
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Cervical Carcinoma

- ❖ Third most common gynecological malignancy.
- ❖ Majority of cervical carcinomas are squamous cell carcinomas arising from SCJ
- ❖ Adenocarcinomas tend to be located in cervical canal



Diagnosis of Cervical Malignancy

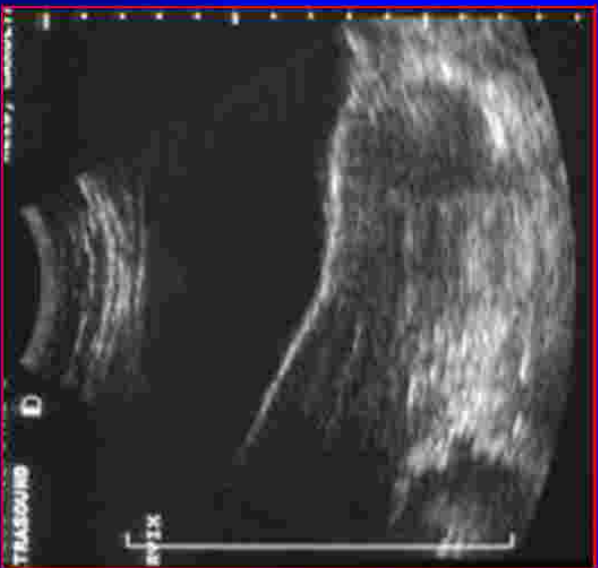
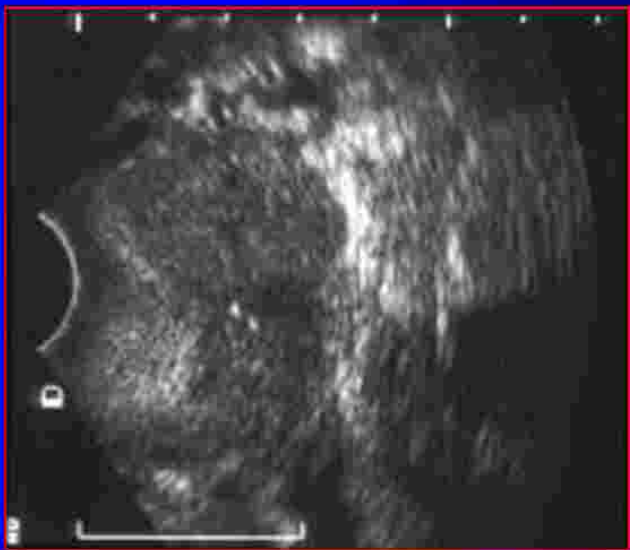
- ❖ Physical Examination
- ❖ Chest radiology
- ❖ Intravenous urography
- ❖ Cross sectional imaging (CT/MRI)

Ultrasound

- ❖ Early tumors (stage- I & II) not detected by US

Signs

- ❖ Enlargement of cervix
- ❖ Irregularity of cervical outline
- ❖ Haemato/ Pyometra
- ❖ Hydroureteronephrosis / bladder invasion







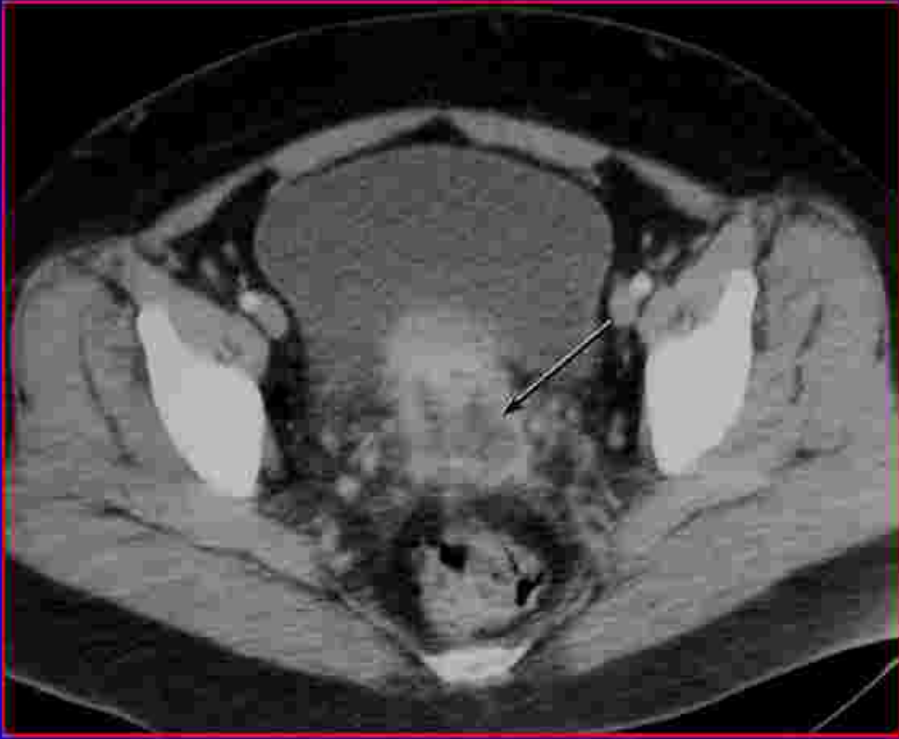
Post Hysterectomy

CT

- ❖ Visualization of small primary tumor limited.
- ❖ Currently used in staging of advanced disease (MR superior)
- ❖ Guide biopsy of nodes
- ❖ Plan RT ports

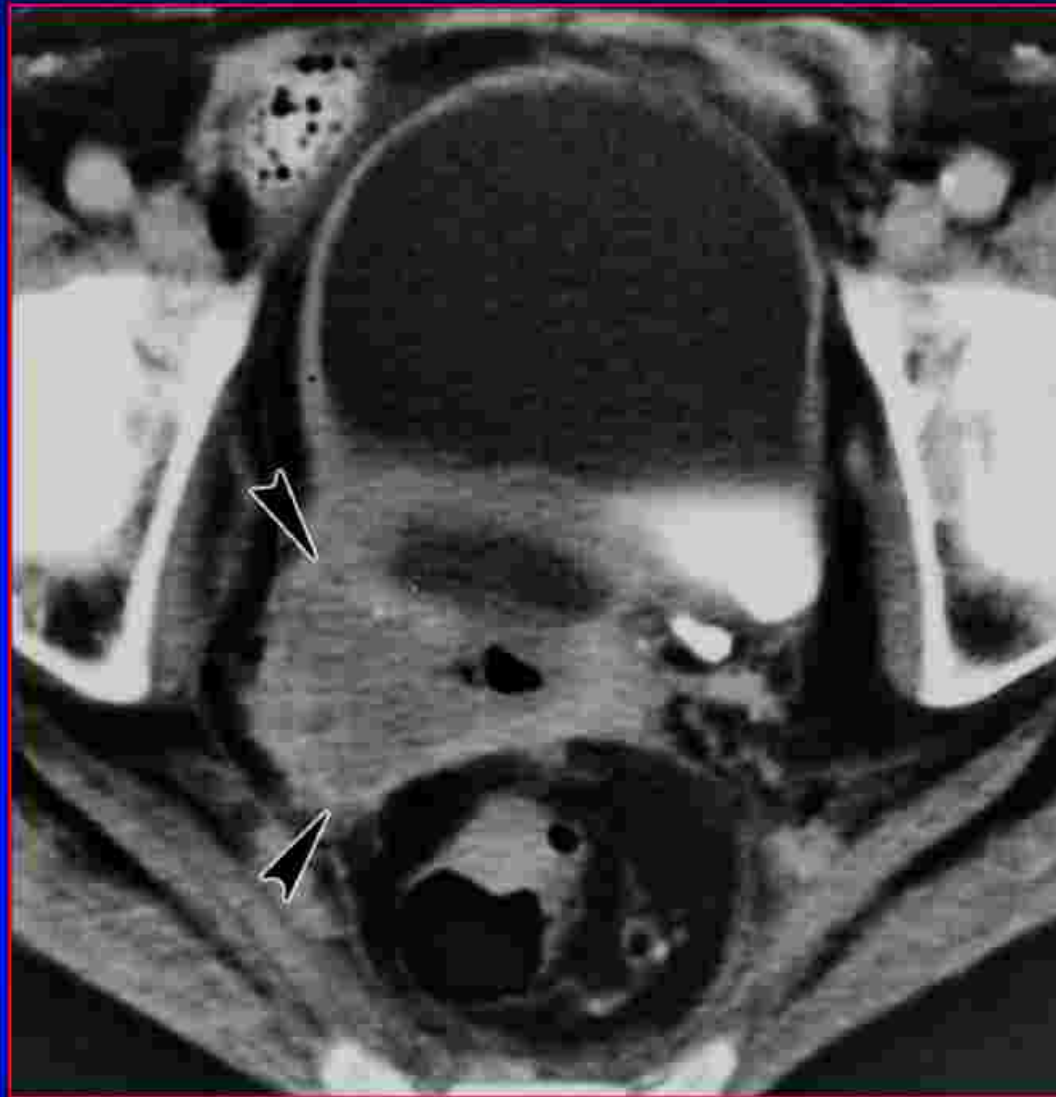
Table 1
Correlation between FIGO Staging, MR Imaging Staging, and Treatment of Cervical Carcinoma

FIGO Staging	MR Imaging Staging	Treatment
0 Carcinoma in situ	Not visible	
I Confined to cervix		
IA Microscopic		
IA-1 Stromal invasion <3 mm	No tumor visible	Surgery
IA-2 >3 mm, <5-mm invasion, <7-mm width	Small enhancing tumor may be seen	Surgery
IB Clinically visible (>5 mm)	Tumor visible, intact stromal ring surrounding tumor	Surgery
IB-1 <4 cm	...	Surgery
IB-2 >4 cm	...	Radiation therapy
II Extends beyond uterus but not to pelvic wall or lower one-third of vagina		
IIA Vaginal extension, no parametrial invasion	Disruption of low-signal-intensity vaginal wall (upper two-thirds)	Surgery (if <4 cm), radiation therapy (if >4 cm)
IIB Parametrial invasion	Complete disruption of stromal ring with tumor extending into the parametrium	Radiation therapy
III Extension to lower one-third of vagina or pelvic wall invasion with hydronephrosis		
IIIA Extension to lower one-third of vagina	Invasion of lower one-third of vagina	Radiation therapy
IIIB Pelvic wall invasion with hydronephrosis	Extension to pelvic muscles or dilated ureter	Radiation therapy
IV Located outside true pelvis		
IVA Bladder or rectal mucosa	Loss of low signal intensity in bladder or rectal wall	Radiation therapy
IVB Distant metastasis	...	Radiation therapy

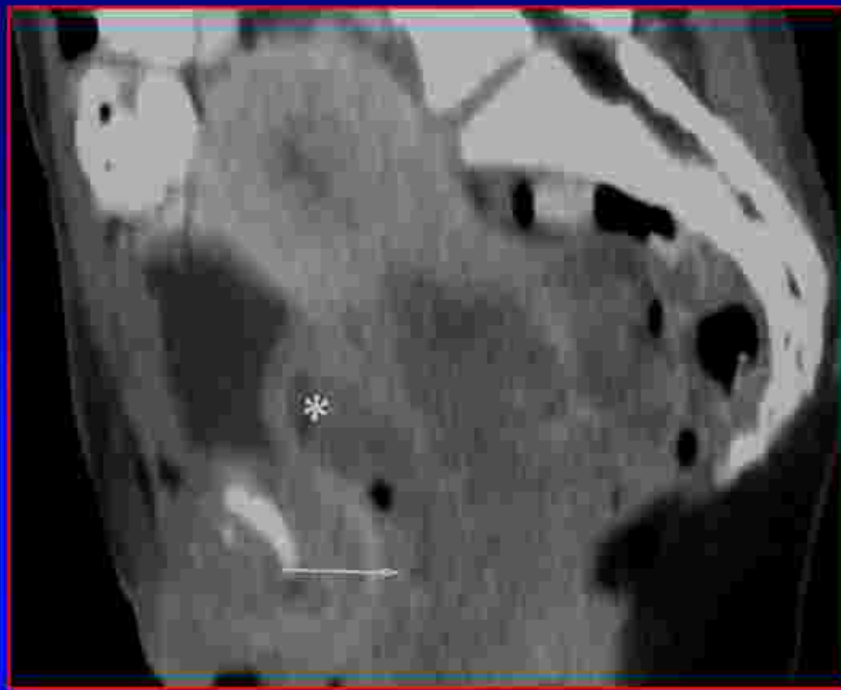


Stage- II b





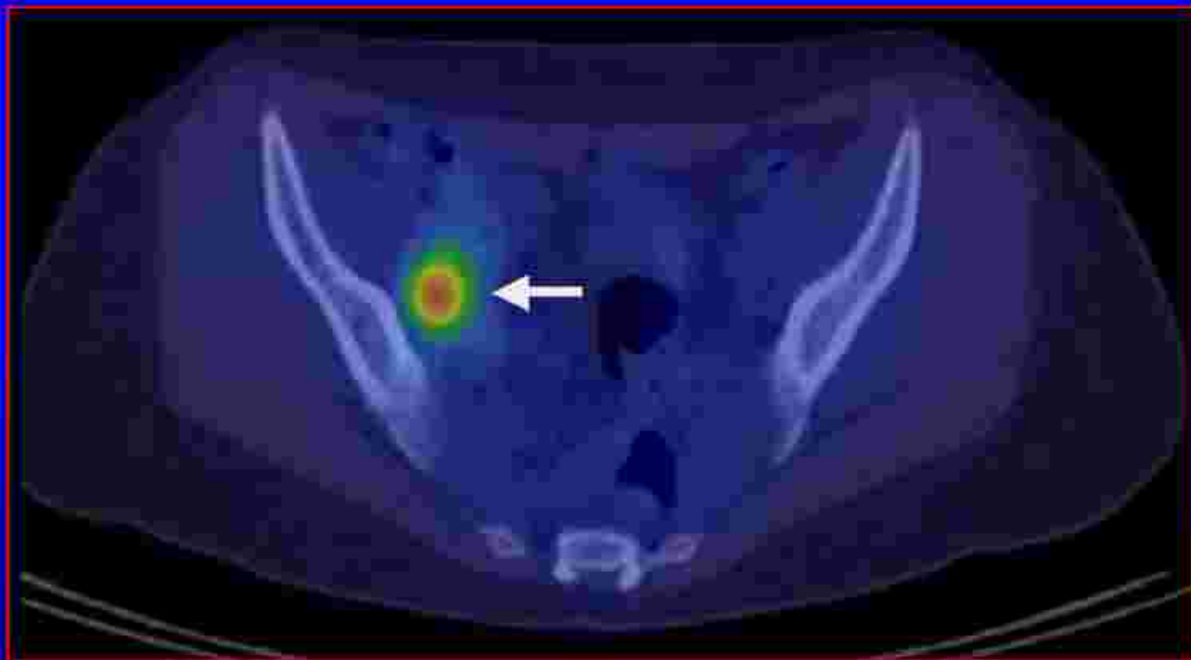
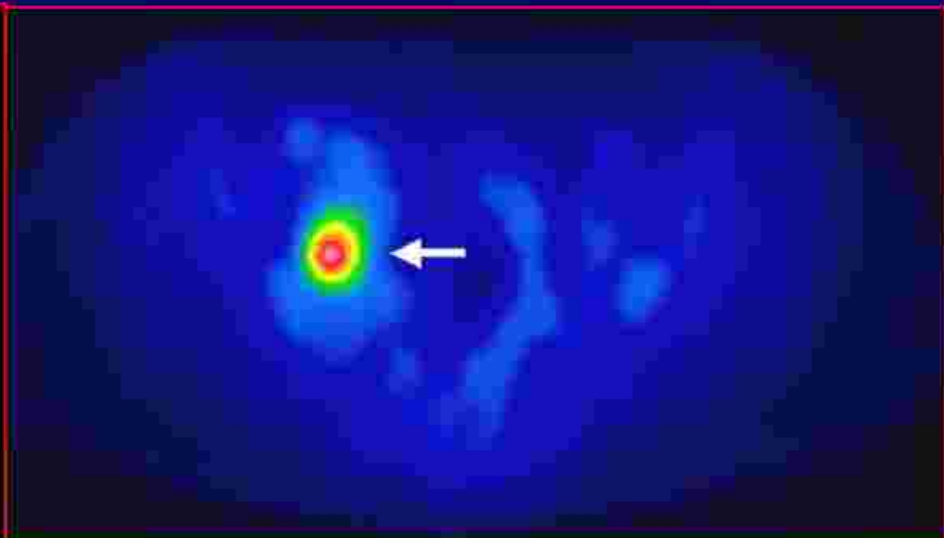
Stage II B



Stage III



Stage IV A



PET Fusion CT



PET-CT

MRI

- ❖ MRI provides highly accurate information on exact extent of tumor

- ❖ Coils

- ❖ Sequences-

 - T2W Saggital & Axial

 - TIW (SPGR / FI2d) FS

 - Dynamic Post Contrast

- ❖ Cervical cancers appear as intermediate / hyperintense masses on T2-weighted
- ❖ Staging of cervical carcinoma with MRI is based on the classification of FIGO
- ❖ Dynamic MR- Improves small tumor detection & depth of stromal and parametrial invasion

Normal Anatomy

a. Reproductive age women

Uterine Corpus : Zonal anatomy exquisitely demonstrated on T2-weighted images

Endometrium : High signal intensity
Junctional zone : Band of low signal intensity

Myometrium: Intermediate signal intensity



Normal Anatomy Cont....

Cervix : Trans-axially, cervix appears as ring or doughnut

Epithelium and mucus : Central area of high signal intensity

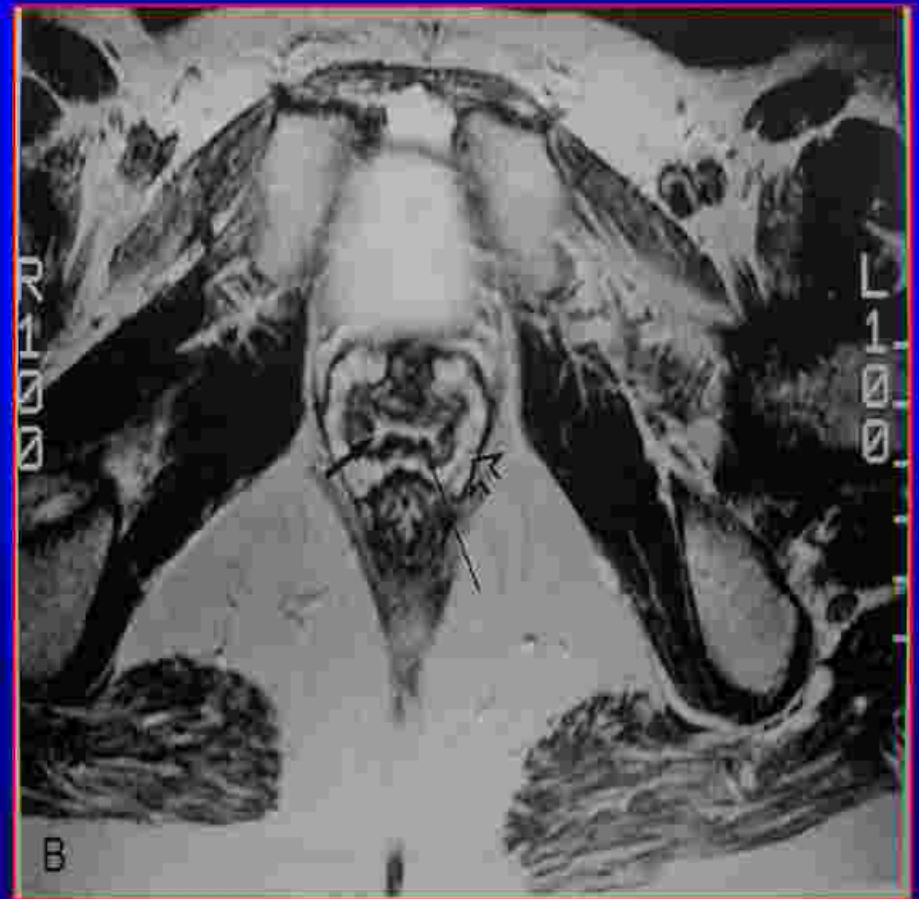
Fibrous stroma : Middle area of low signal intensity
Thickness of this zone varies from 3 to 8 mm

Smooth muscle : Outer area of intermediate signal intensity



Normal Anatomy Cont...

- ❖ In axial plane mucosa and muscular wall are seen as H shaped double layer of high and low signal intensity, respectively
- ❖ Perivaginal venous plexus lies beyond muscular wall of vagina seen as layer of high signal intensity



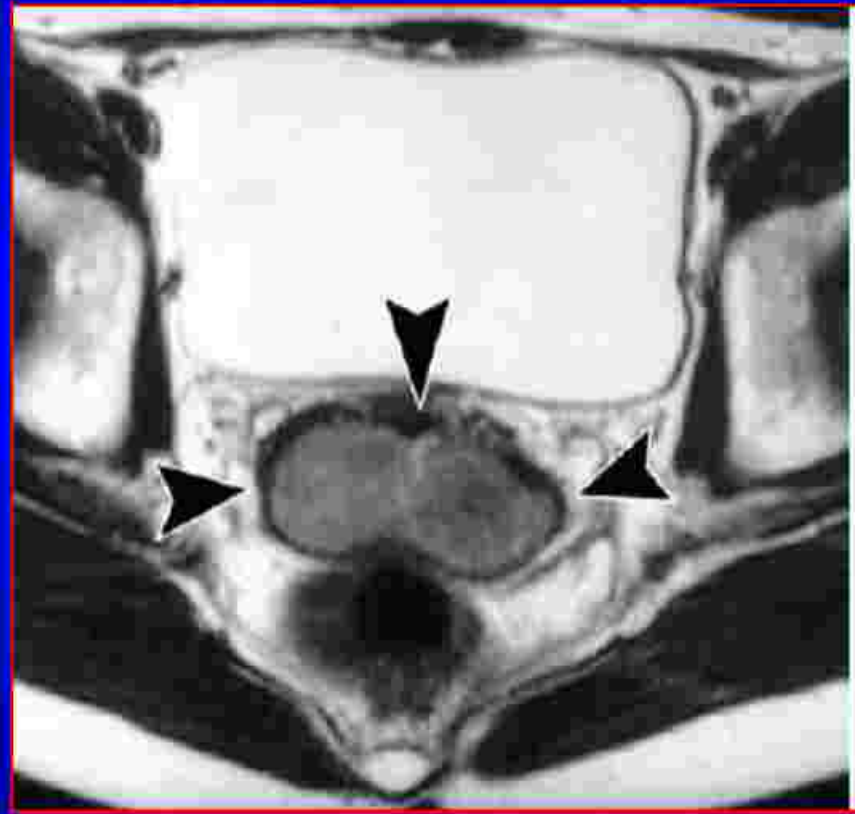
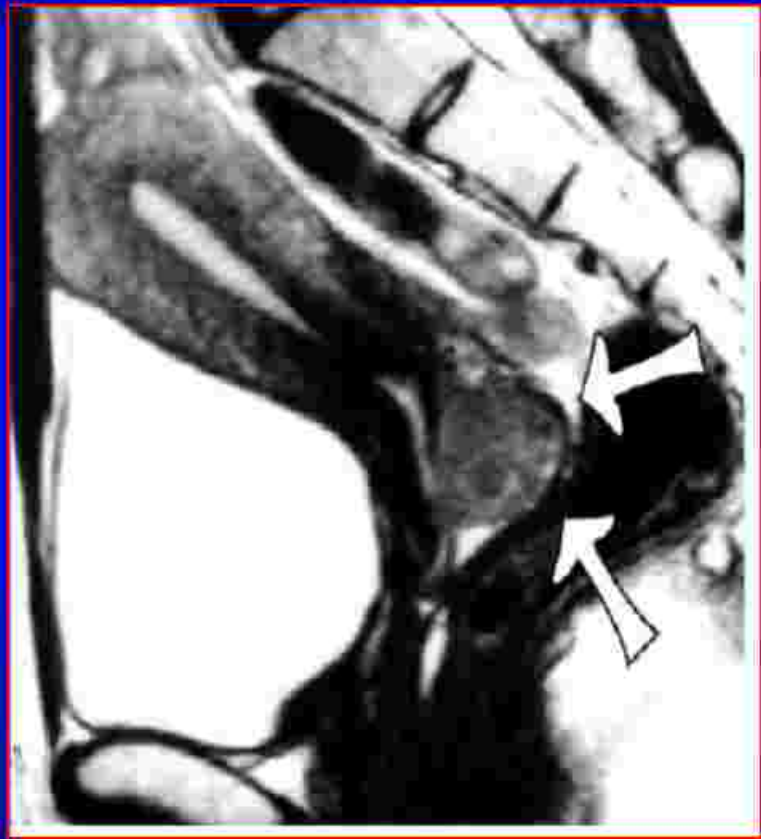
Normal Anatomy Cont...

b) Post menopausal women

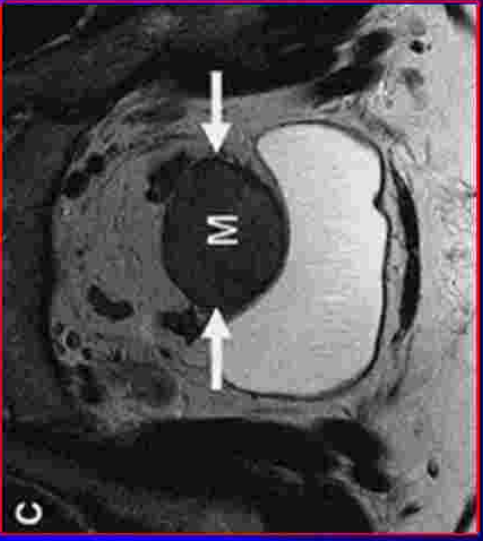
- ❖ Uterine corpus becomes smaller and approximately equal in size to cervix
- ❖ Zonal anatomy is indistinct

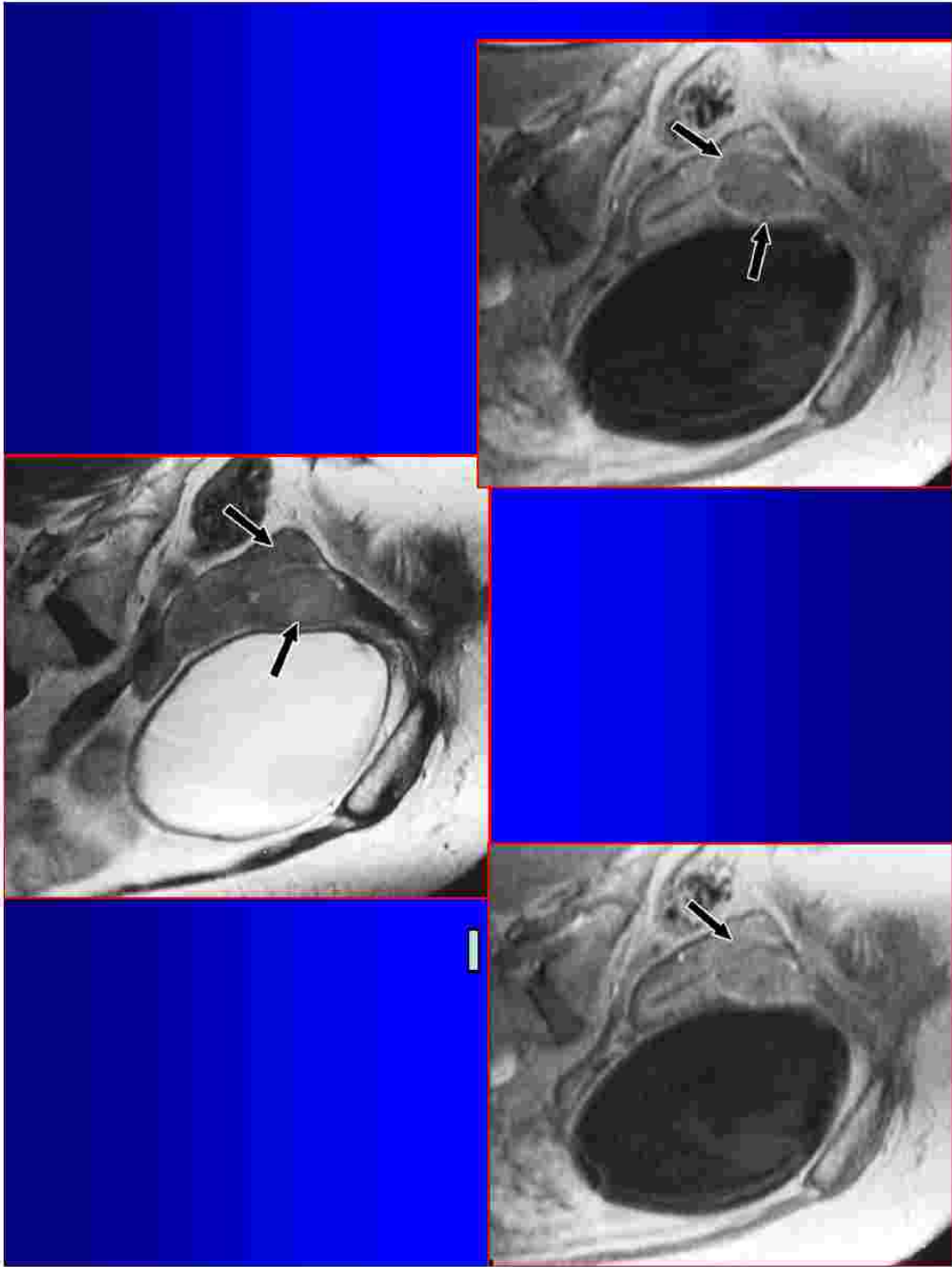


Cervical Carcinoma

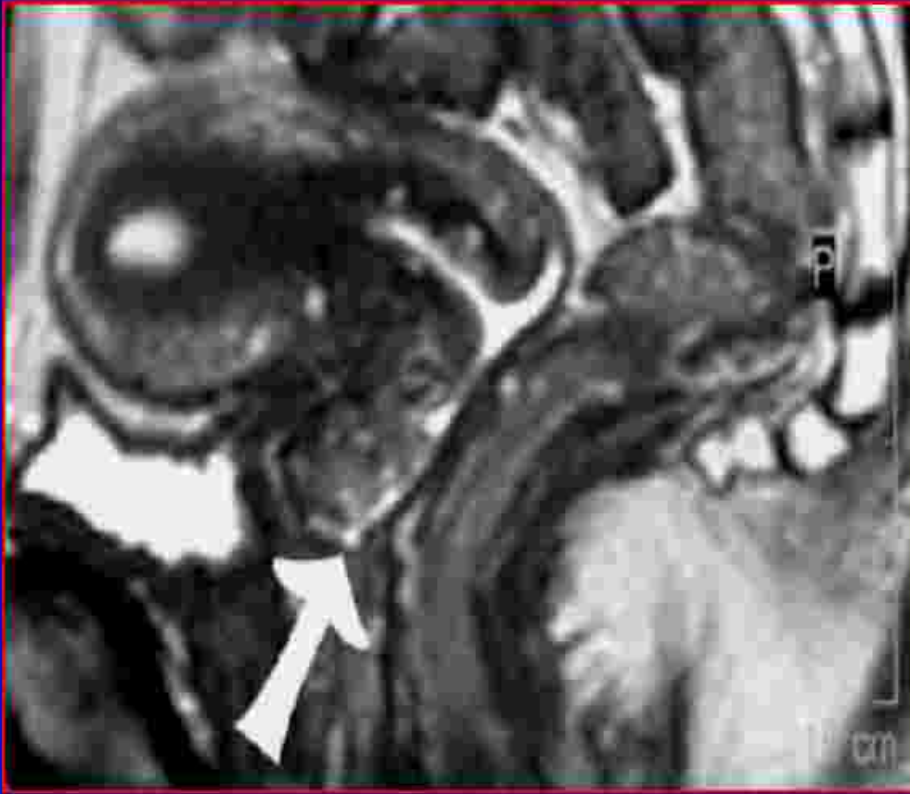


Stage 1B





Cervical Carcinoma

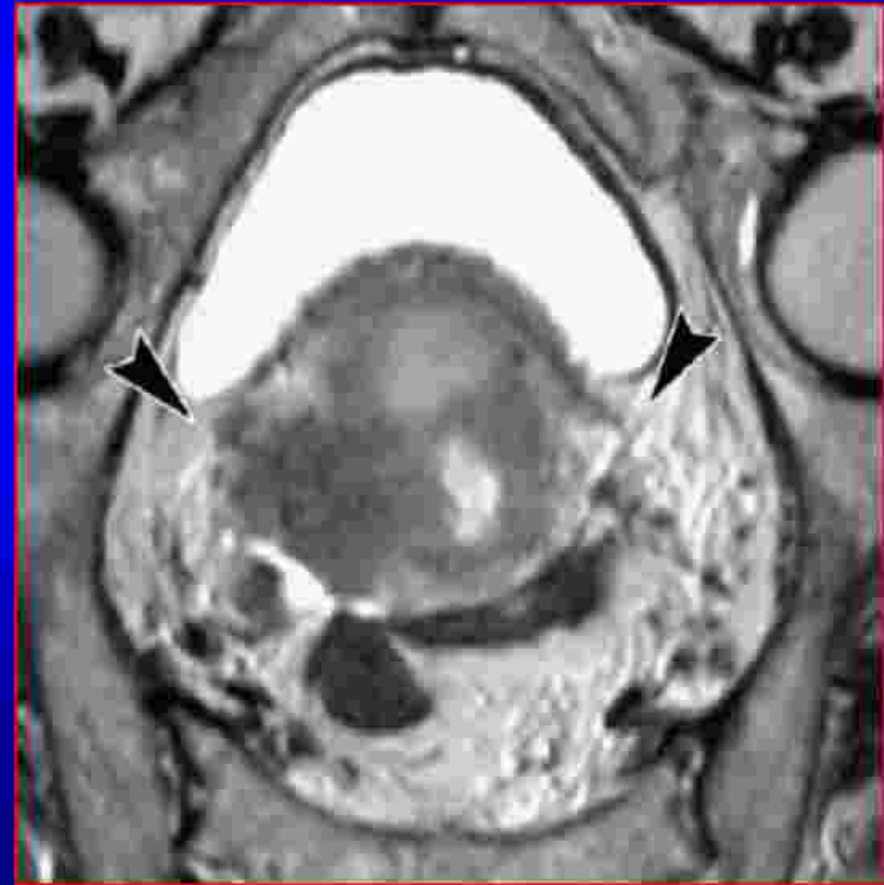


IIA

Cervical Carcinoma



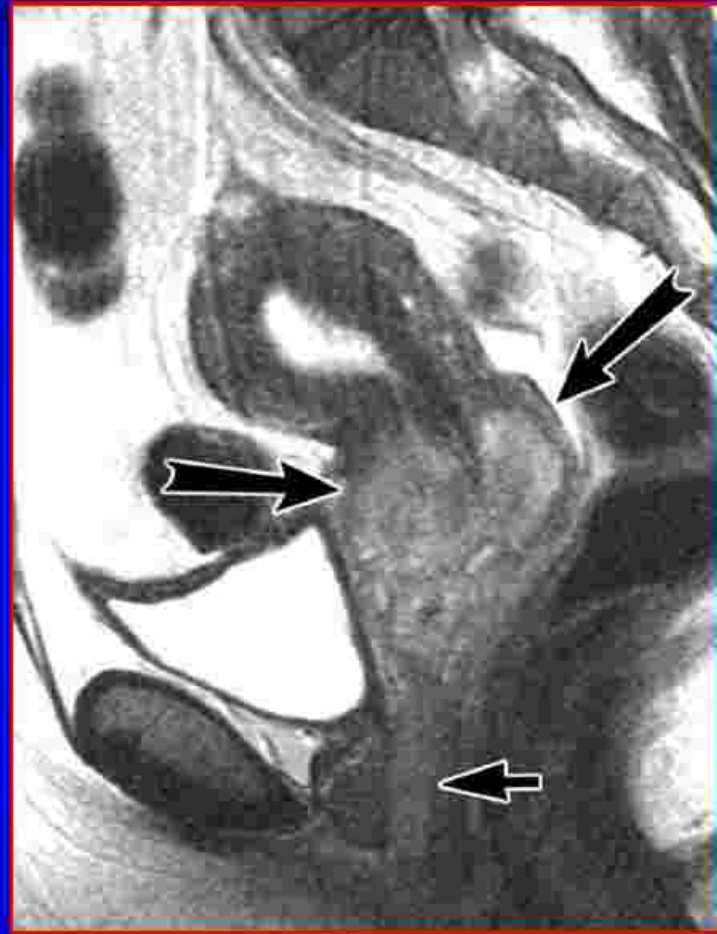
II b



Cervical Carcinoma

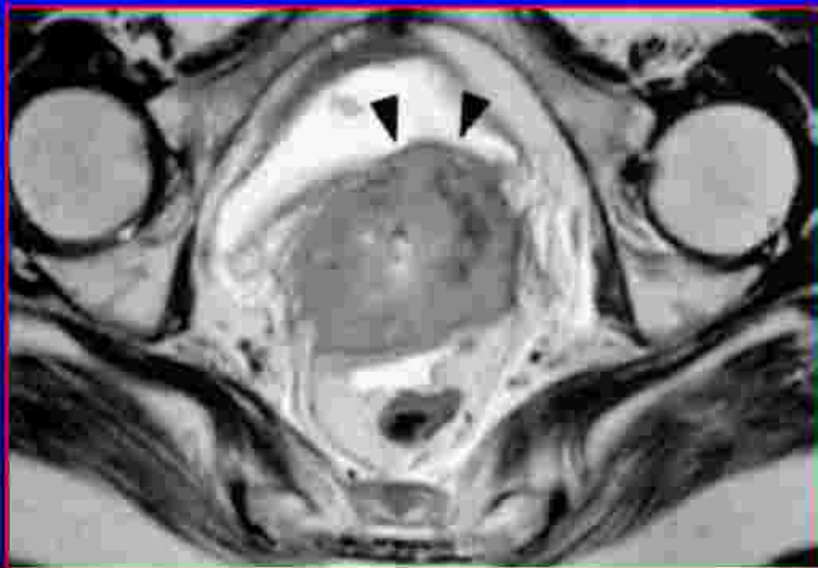
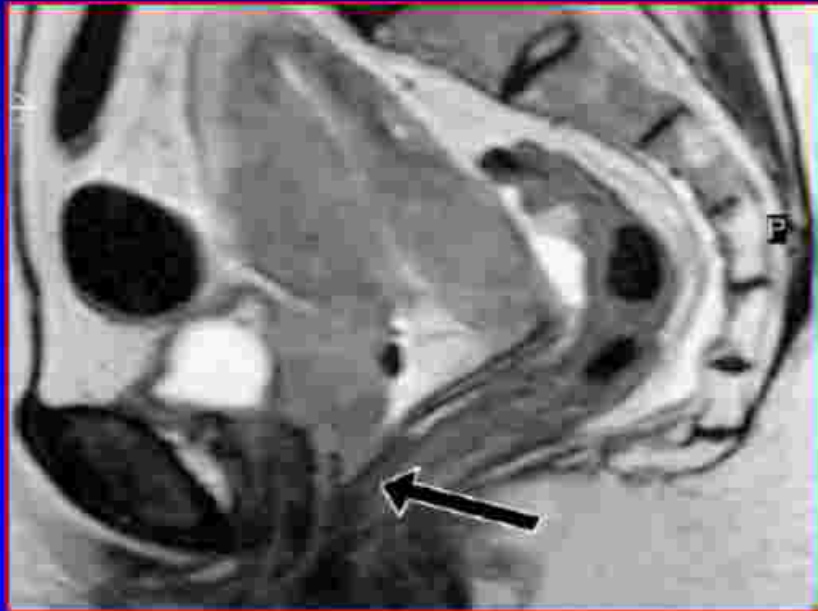


III a



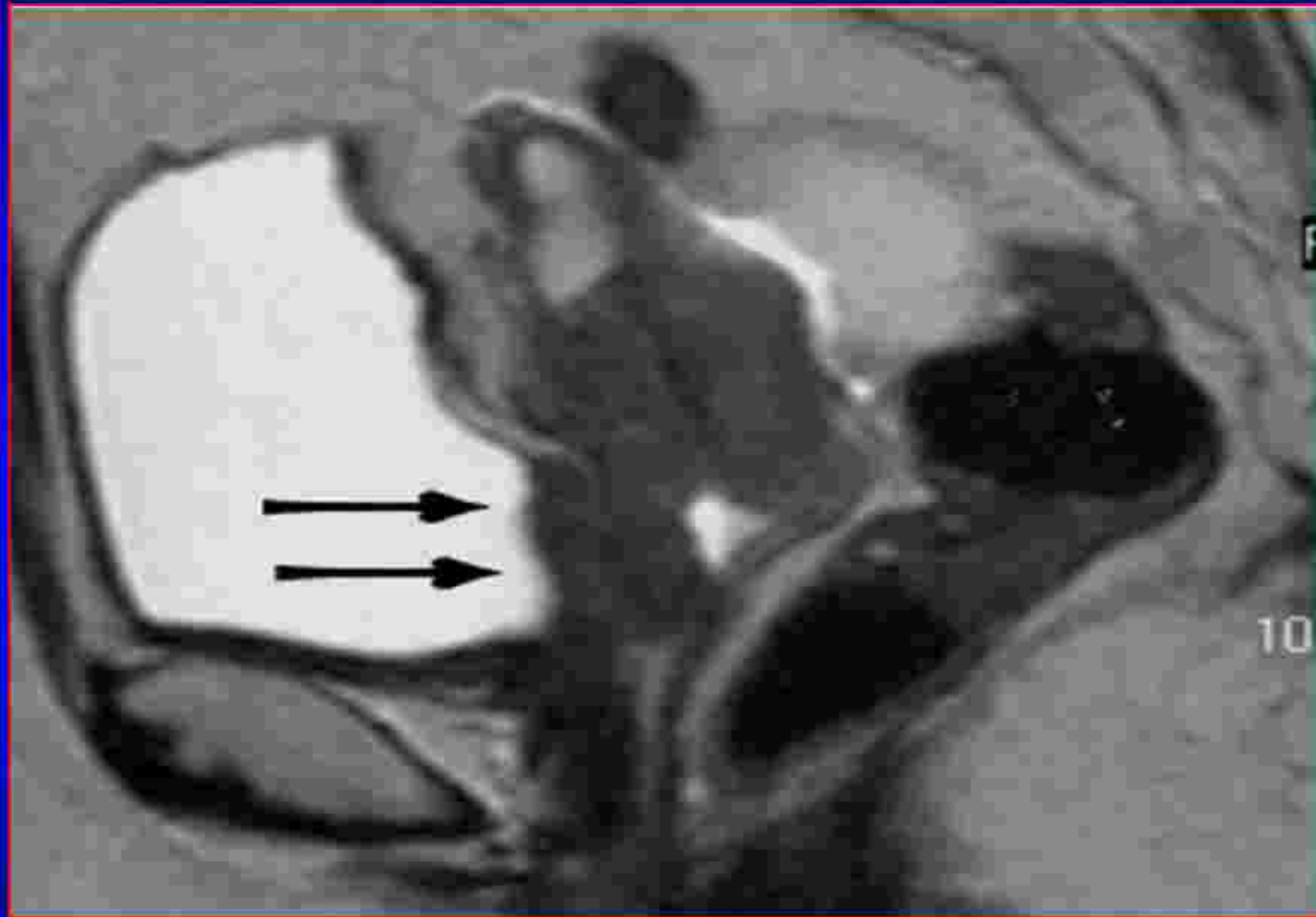
III a

Cervical Carcinoma



III b

Cervical Carcinoma



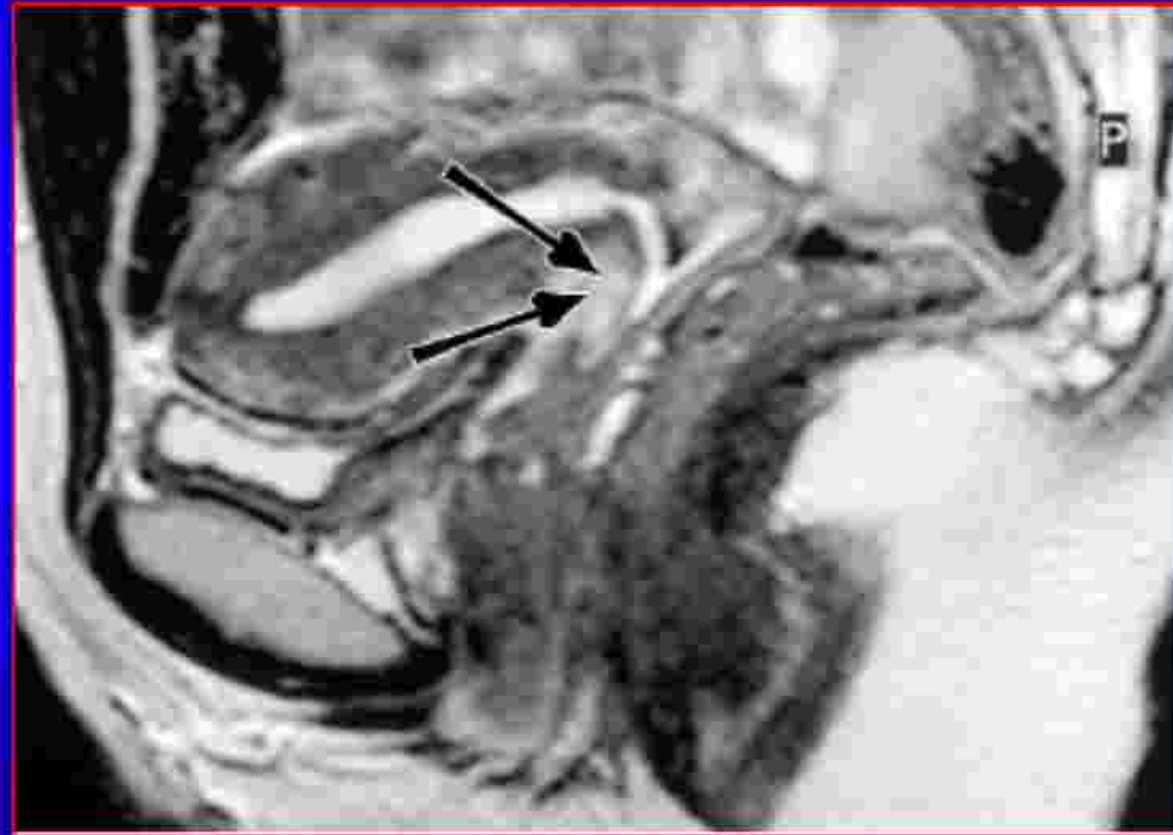
IV A

Cervical Carcinoma



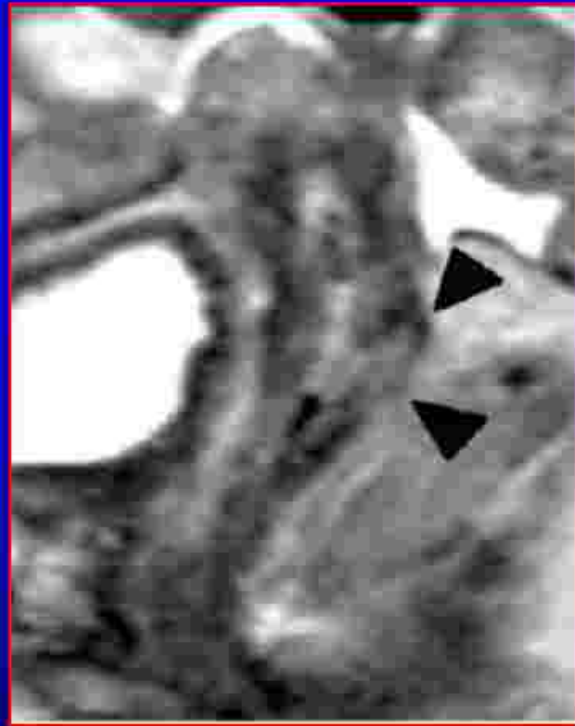
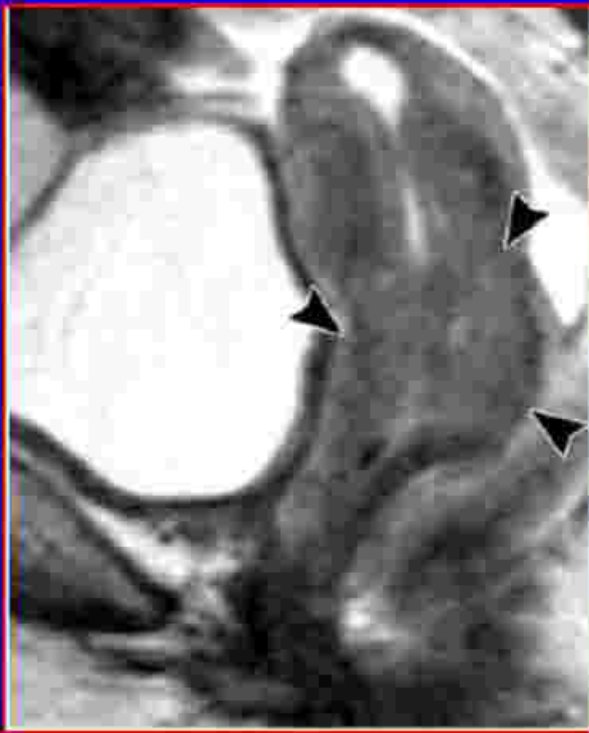
IV b

Use of MRI for evaluation of post operative care



Post Conization

Local recurrence after radiation therapy



Monitor Therapeutic Response



Post RT



Post RT

MRI may have prognostic importance in cervical carcinomas

- ❖ More the percentage of tumor volume regression, estimated on T2-weighted images, greater disease free survival after radiation therapy
- ❖ Low tumor vascularity, assessed with contrast enhanced MRI appears to correlate with higher incidence of local recurrence in patients treated with radiation therapy alone

Conclusion

- ❖ MR: Most effect modality
 - For detection & staging of primary tumor
 - Showing recurrent disease
 - Monitor therapeutic response
- ❖ CT & MR are equally effective for nodal involvement
- ❖ PET improves specificity & sensitivity of these techniques

Thank you