

# Day 1 - Program

## BASICS of RADIOLOGY

*For Medical Students & house officers*

1 <sup>st</sup> Day – 18 May 2022				
Introduction To Imaging Modalities	10	11	Session 1	Dr. Ahmad Mokhtar
Basics of GIT Imaging	11	12		Dr. AbdelRahman Foda
Break	12	12.15		
Basics of Chest Imaging	12.15	1	Session 2	Dr. Ahmad Mokhtar
Basics of UT Imaging	1	1.30		Dr. Ebtessam AbdelBarey
Open Discussion	1.30	2.00		Dr. Ahmad Mokhtar

2 <sup>nd</sup> Day – 19 May 2022				
Basics of Brain Imaging	10	11	Session 1	Dr. Ahmad Mokhtar
Basics of MSK Imaging	11	12		Dr. Mohammed Ezzeddin
Break	12	12.15		
Imaging of Poly traumatized Patient	12.15	1	Session 2	Dr. Ahmad Mokhtar
Quiz Cases	1	1.30		Dr. Ahmad Mokhtar
Open Discussion	1.30	2		Dr. A. Mokhtar - Dr. M. Ezzeddin

Scientific coordinator

**Dr. Ahmad Mokhtar Abodahab.**

Head of Department

**Prof. Mohammed Zaki**

# IMAGING OF URINARY TRACT

By

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# Pathological conditions of UT :

**Congenital:** eg. ectopic , horseshoe .....

**Inflammatory**

**Obstructive:** Calculi ... non Calcular

**Traumatic**

**Neoplastic:** ..... Cancer U.B

# IMAGING MODALITIES

- Conventional radiography (PUT/ KUB)
- Intravenous Urogram (IVU)
- Ultrasonography (US)
- CT
- MRI
- Nuclear medicine
- Invasive techniques

# Conventional Radiography (PUT/KUB)

- First imaging modality.
- Cheap.
- Useful for radio-opaque stones.

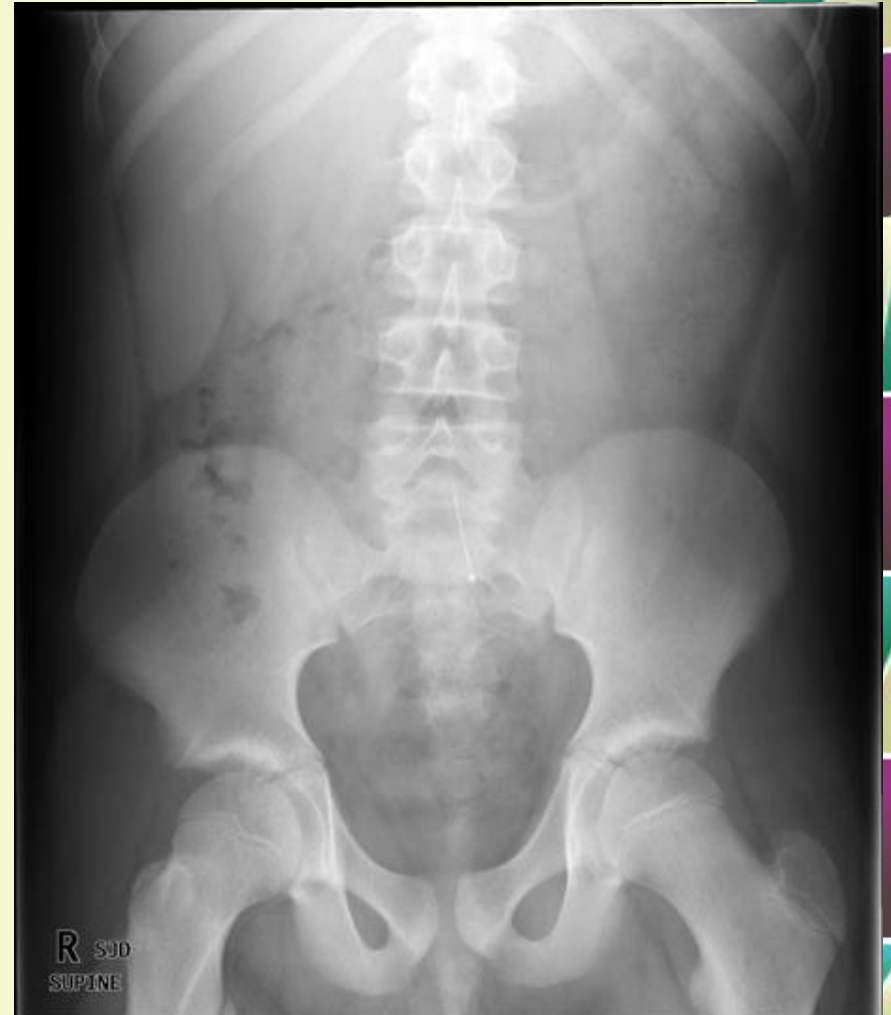


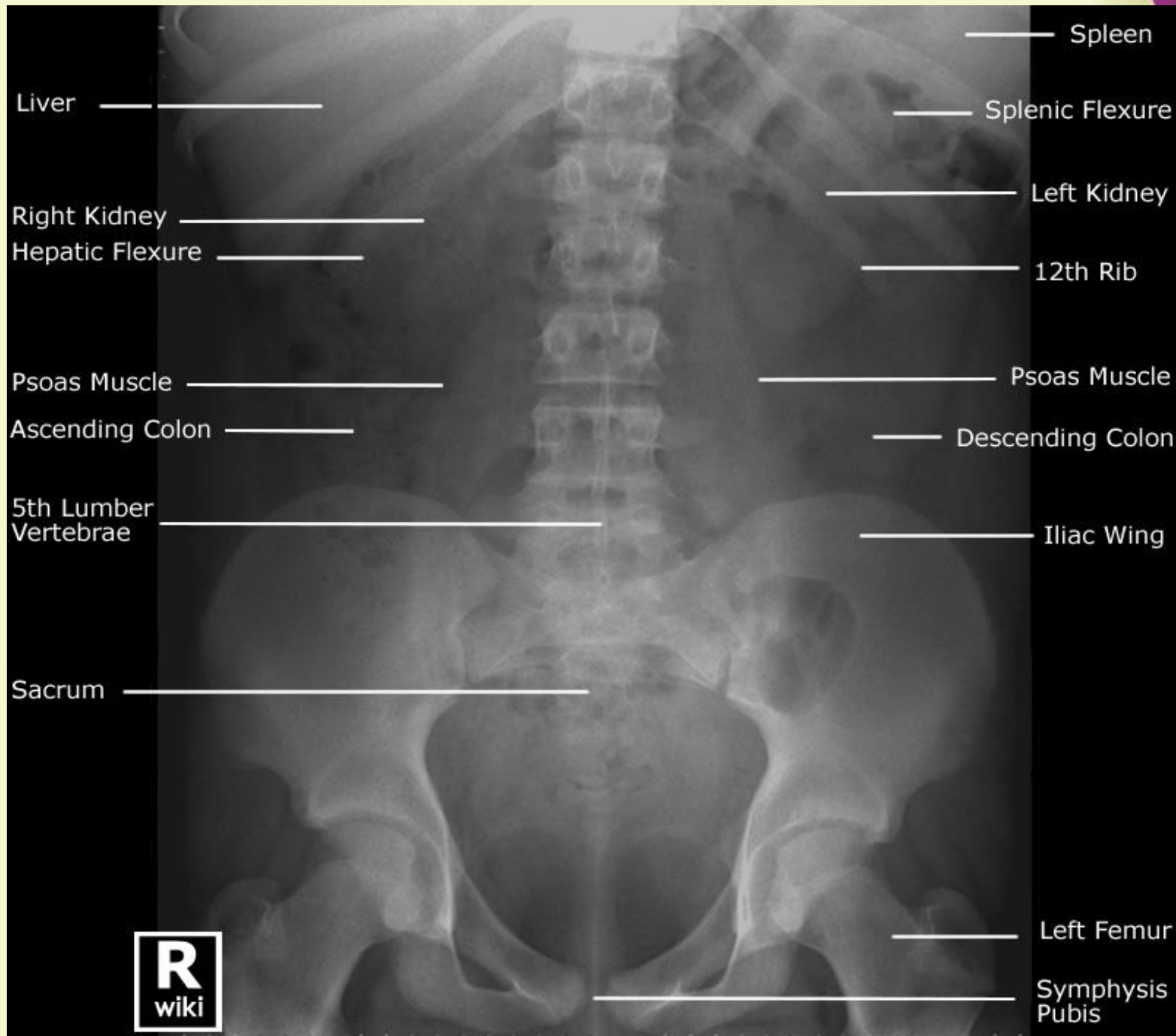


# Conventional Radiography (PUT/KUB)

## Image features:

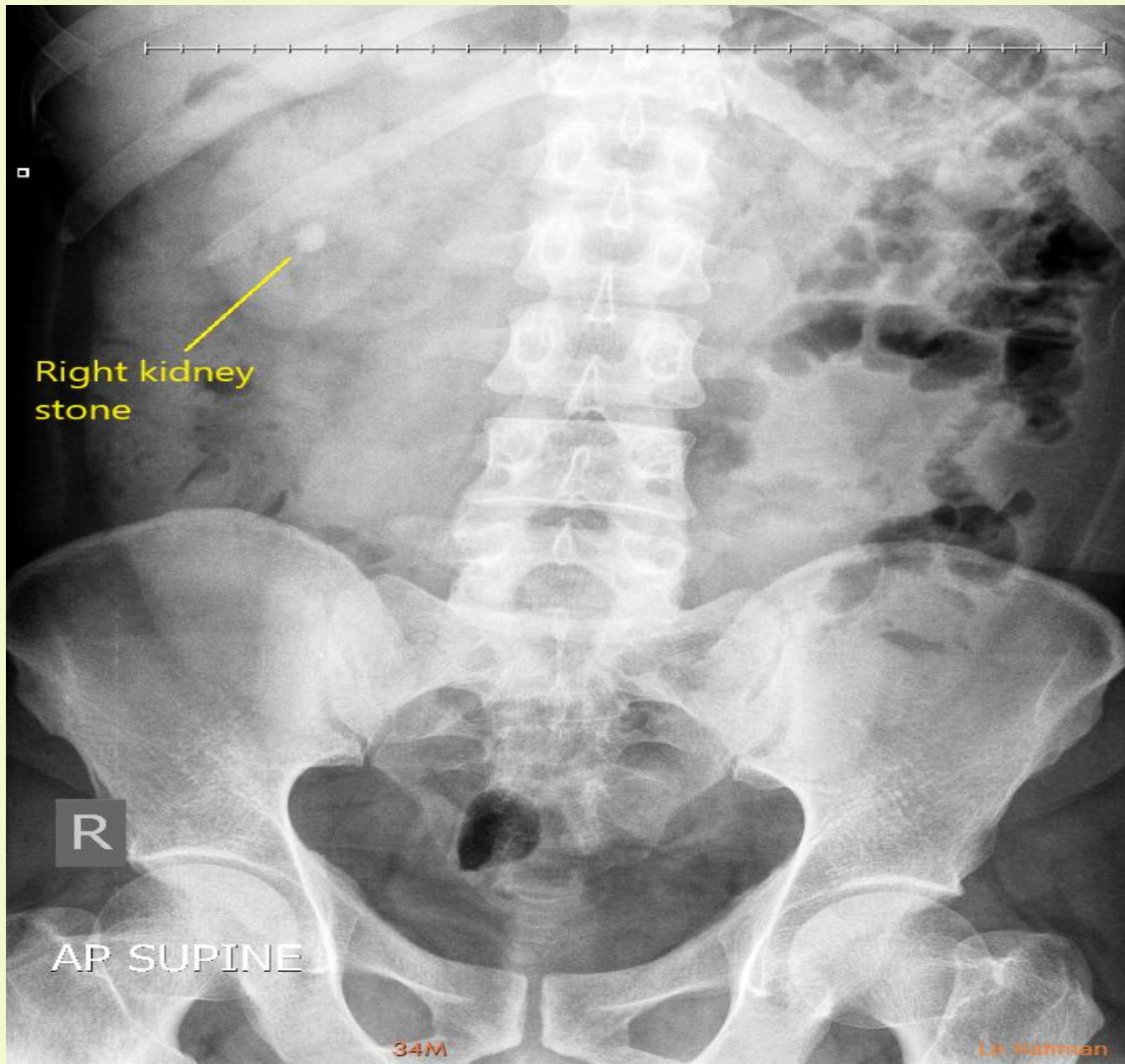
- Image contrast determined by tissue density.
- Good evaluation for radio-opaque stones.













# Intravenous Urogram (IVU)

- Conventional x-ray plus intravenous contrast.
- Cheap.
- Recently replaced by CT and MRI.



# Intravenous Urogram (IVU)

## Image features:

- Image contrast determined by tissue density and IV contrast.
- Good evaluation of collecting system and radio-opaque stones.



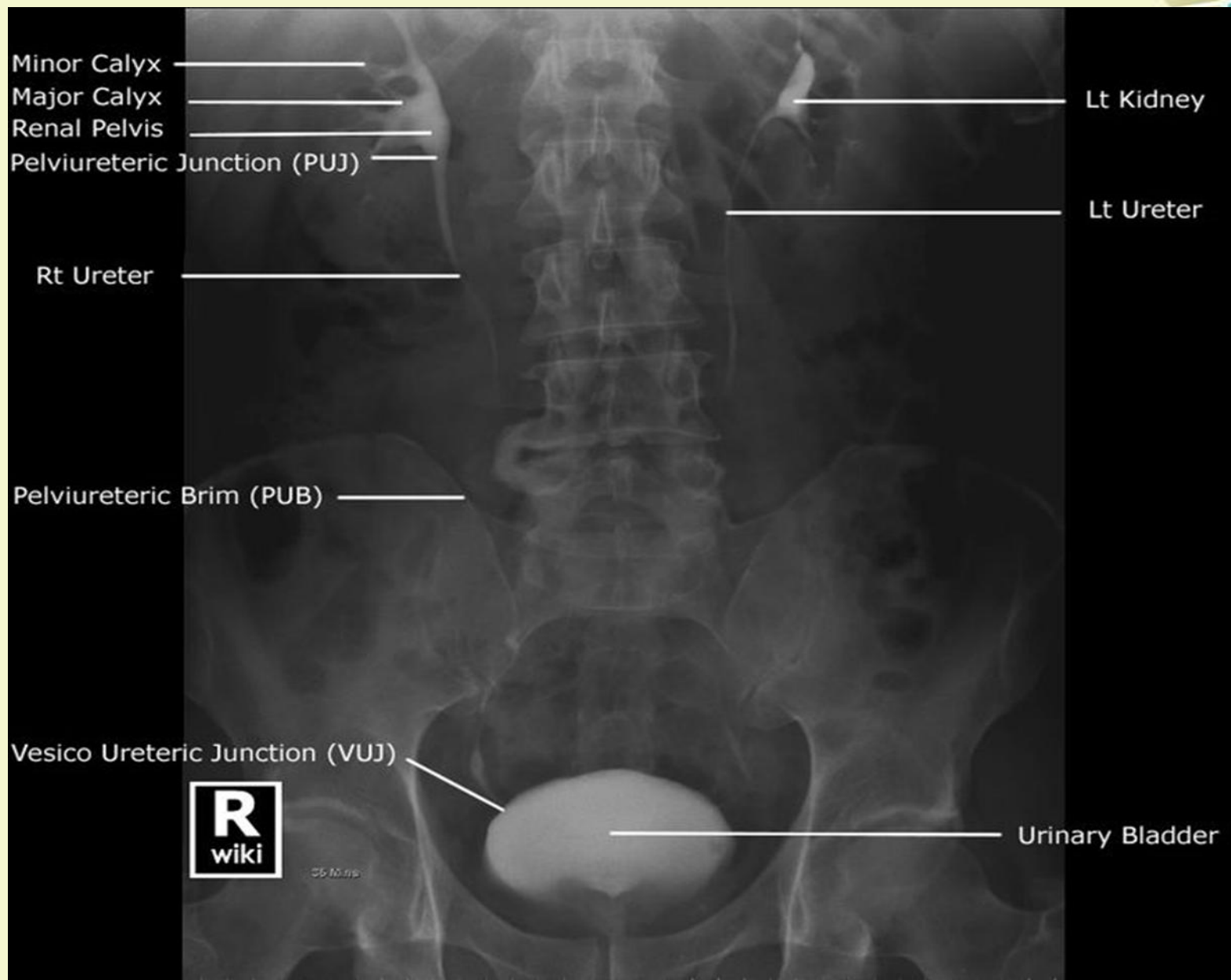


# Indications:

- ✓ Assess normal function of kidneys
- ✓ Assess the anatomical variants or congenital anomalies (e.g. [horse-shoe kidney](#))
- ✓ Detect the course of the [ureters](#)
- ✓ Detect and localize a ureteric obstruction ([urolithiasis](#))
- ✓ Assess for synchronous upper tract disease in those with [bladder transitional cell carcinoma](#) (TCC)







# IVU Sequences

- Scout images
- Nephrogram (1-2 minutes)
- Early and late images of the upper collecting system (>3 minutes)
- Tomography may be obtained, if desired
- Supine, images of the upper collecting system and proximal ureters (10-15 minutes)
- Supine image (20 minutes)
- Prone image (20 minutes)
- Lastly take a full bladder and post-void film



# Non contrast film

- **Bilateral**
- **Staghorn stone**
- **Pelvic stone**



## Kidney :

- **Site:** Normal , Ectopic, malrotated ...horse shoe
- **Size :** Normal , enlarged , Small
- **Function:** Good, delayed or Absent
- Backpressure

## UB:

- Capacity
- Wall
- Out pouching
- Filling defect



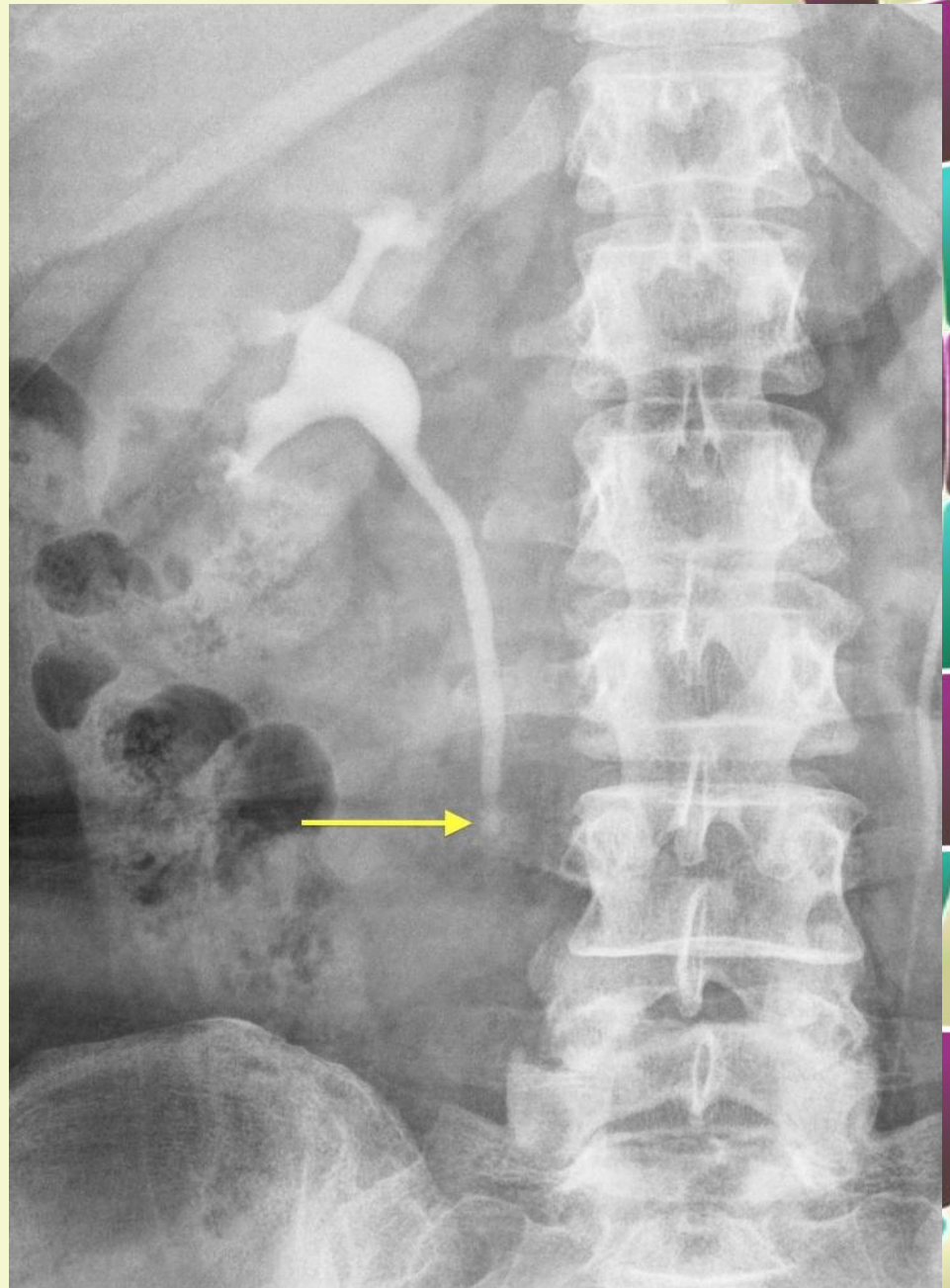
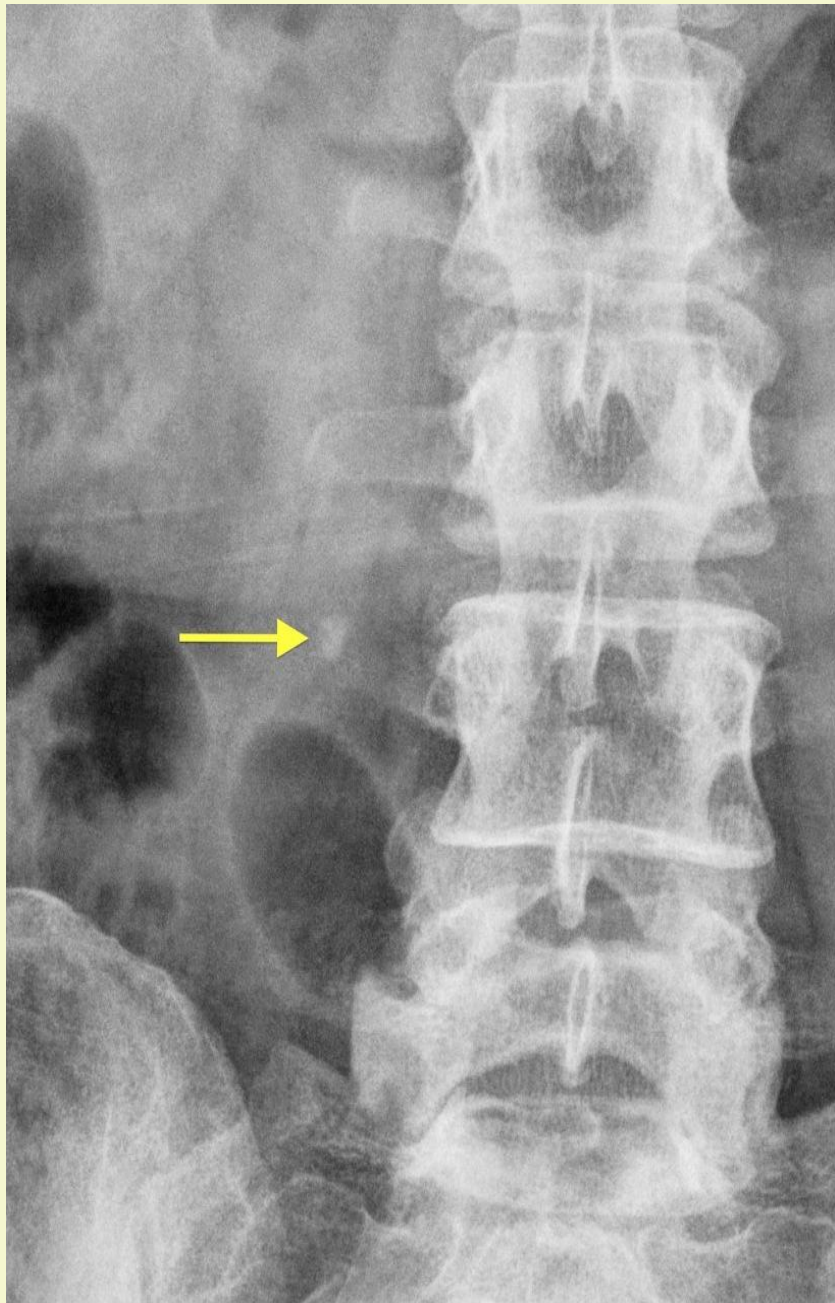


→ Loss of cupping  
→ Clubbing  
= Early backpressure



## **Marked Left Backpressure**







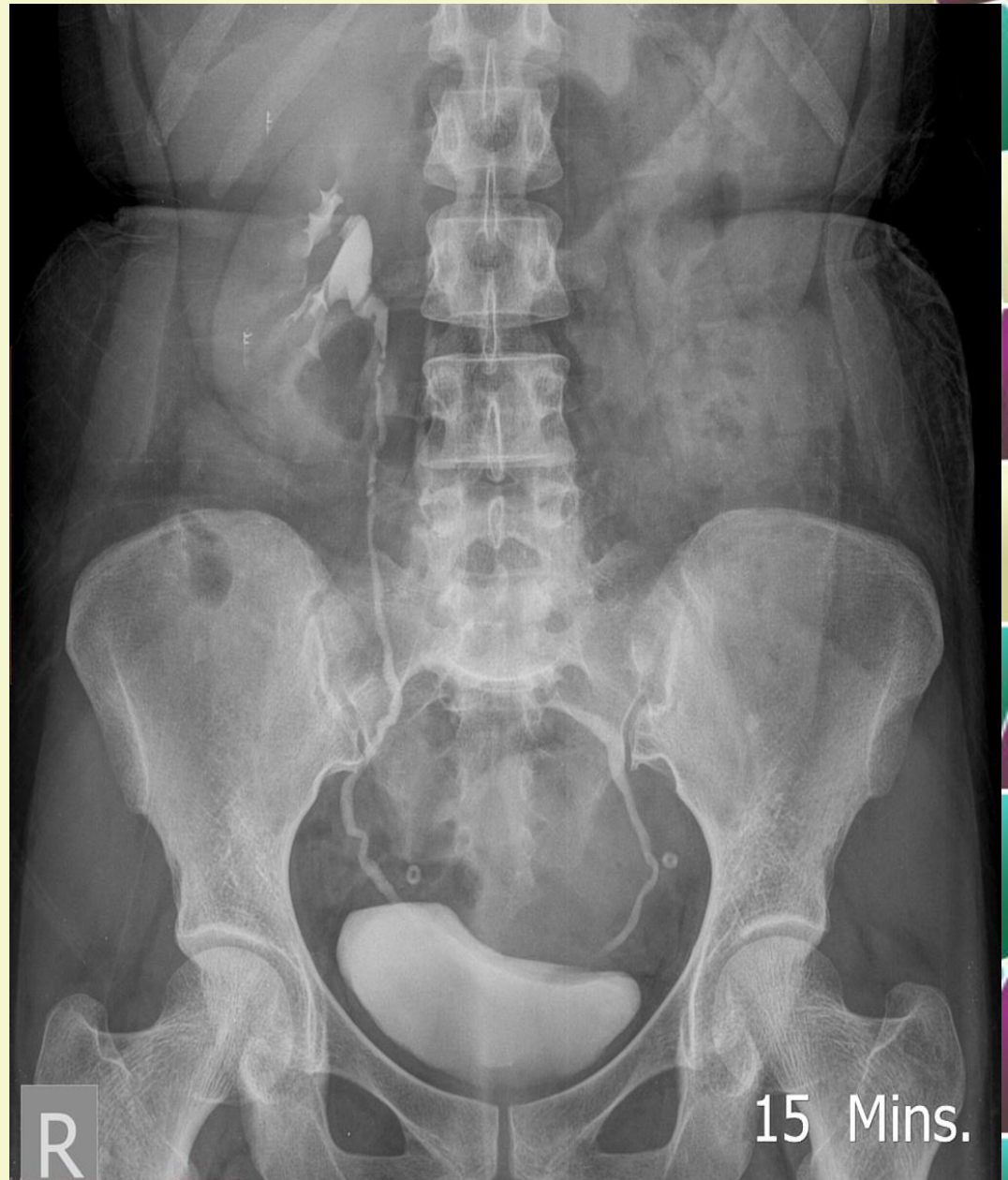
**Horseshoe kidney**



**Left Duplex kidney**



# Left Ectopic Kidney



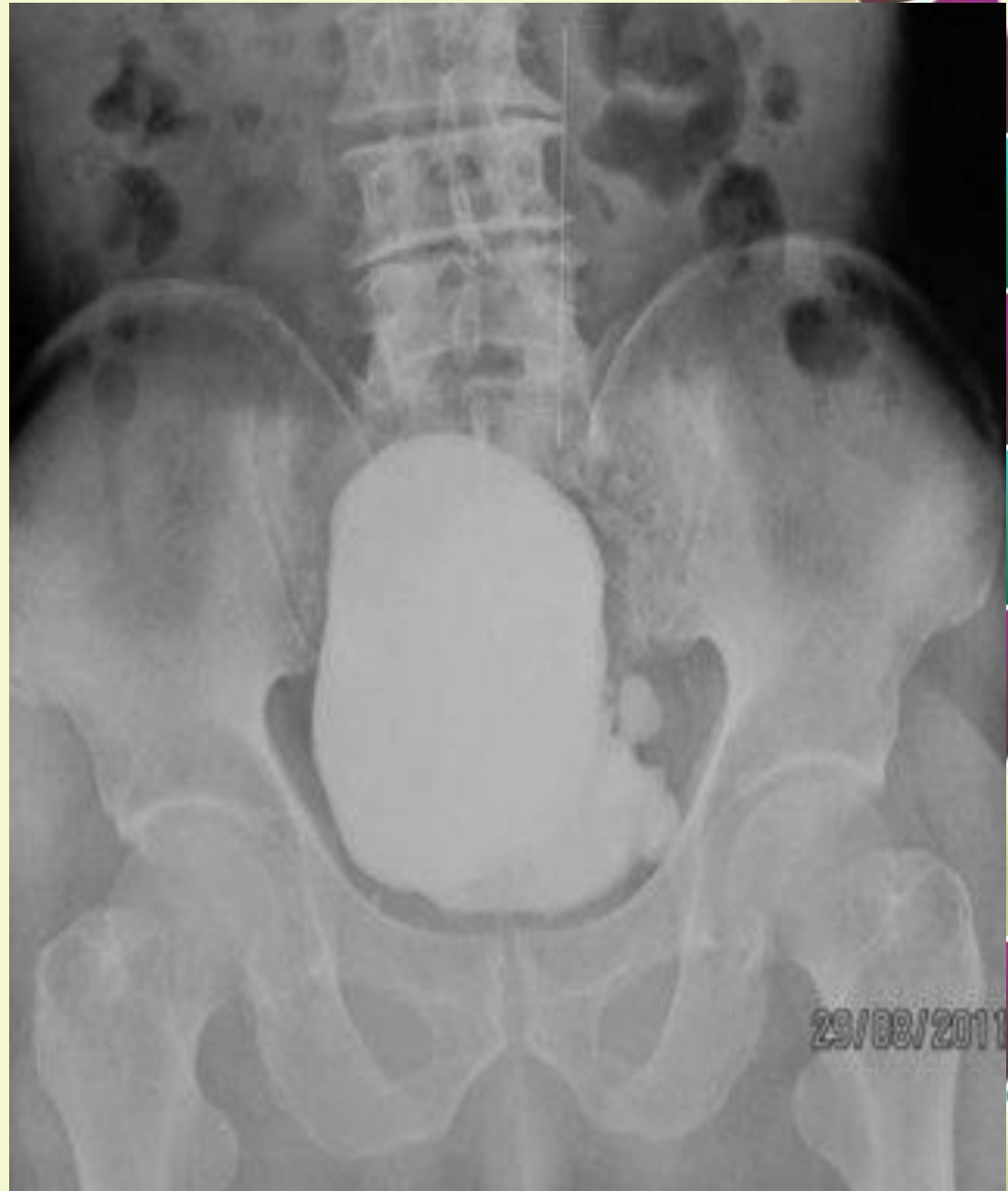
# UB Filling Defect

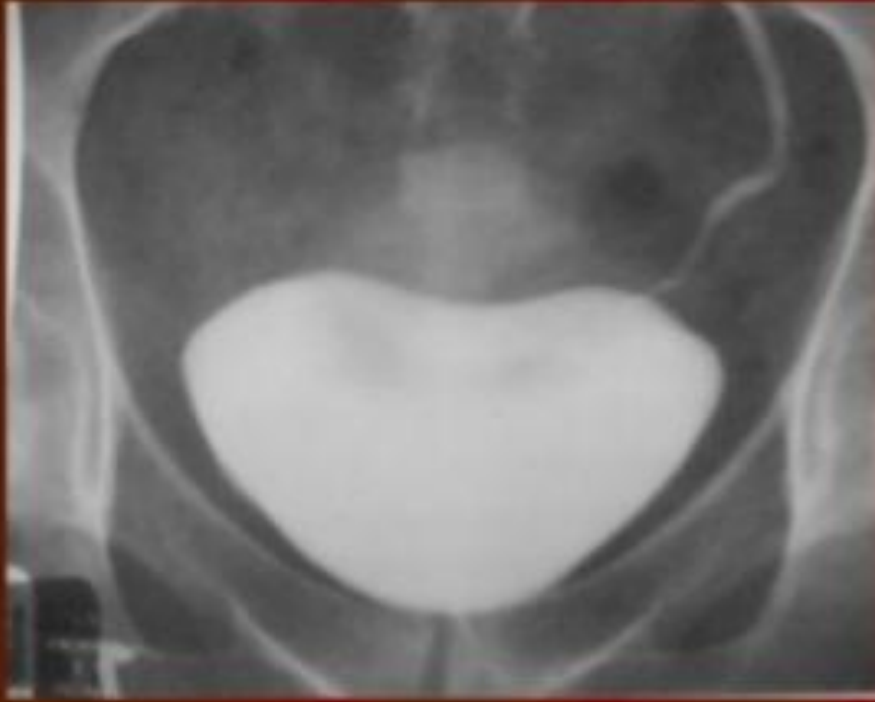
- Mass
- Lucent stone
- Hematoma
- Balloon





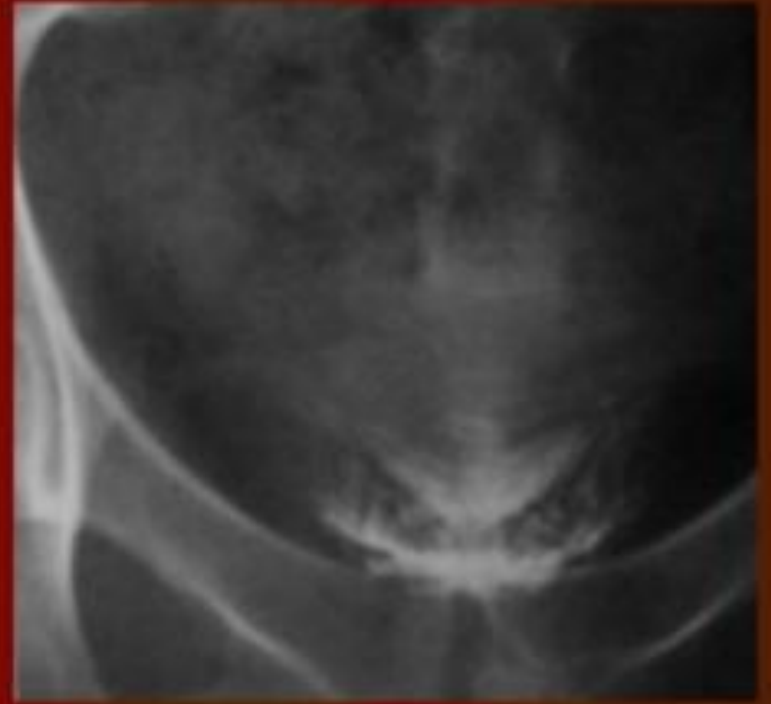
# UB Diverticula





## **Normal full Bladder**

>> Average capacity  
, Smooth outline , No  
outpouching or  
Filling defects.



## **Post evacuation Film**

>> No significant PM  
residual urine.

# Ultrasonography (US)

- Use high frequency sound wave.
- Contrast between tissue is determined by sound reflection.



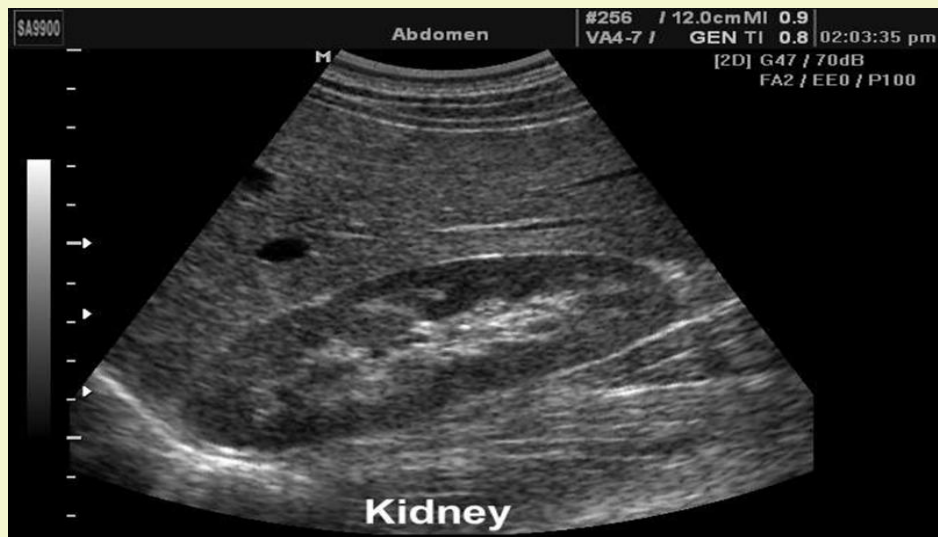
# Ultrasonography (US)

## Image features:

- Operator dependant.
- Good resolution.
- Used for stone, hydronephrosis, focal lesion.









# CTU

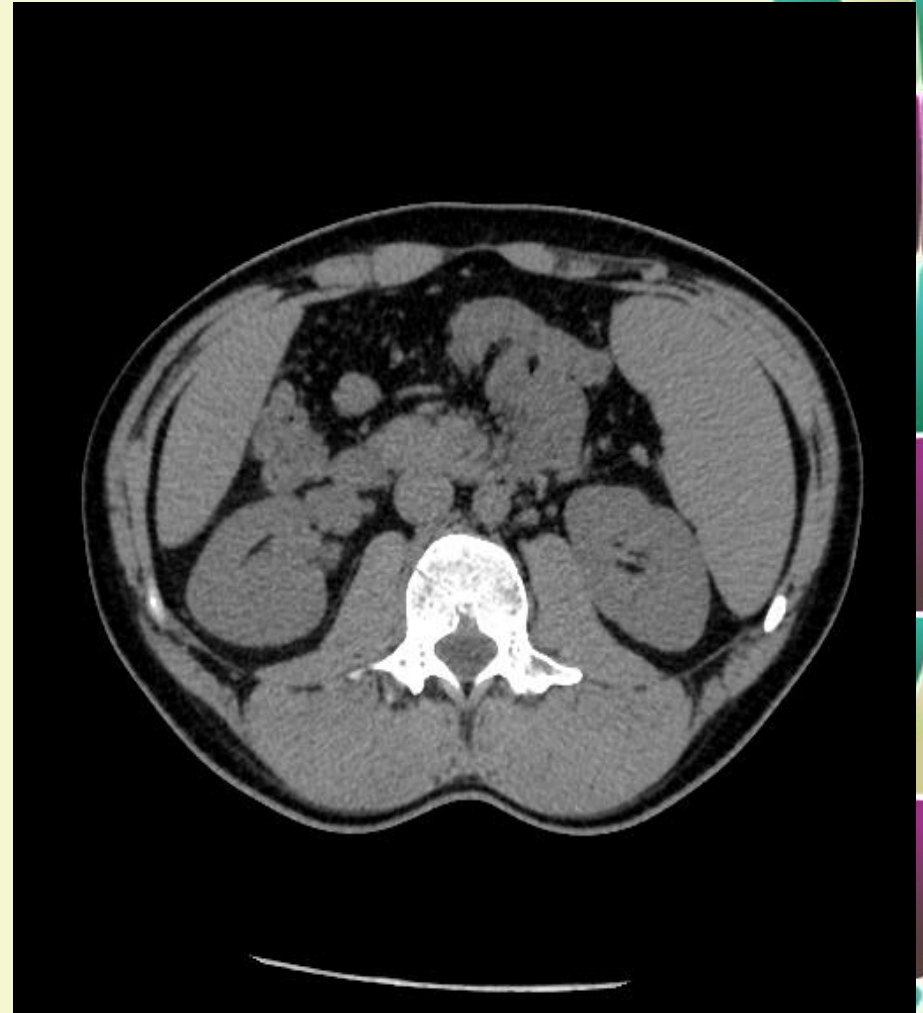
- More accurate.
- Costly.
- +/- Contrast.
- Useful for trauma, stone, tumor, infection.

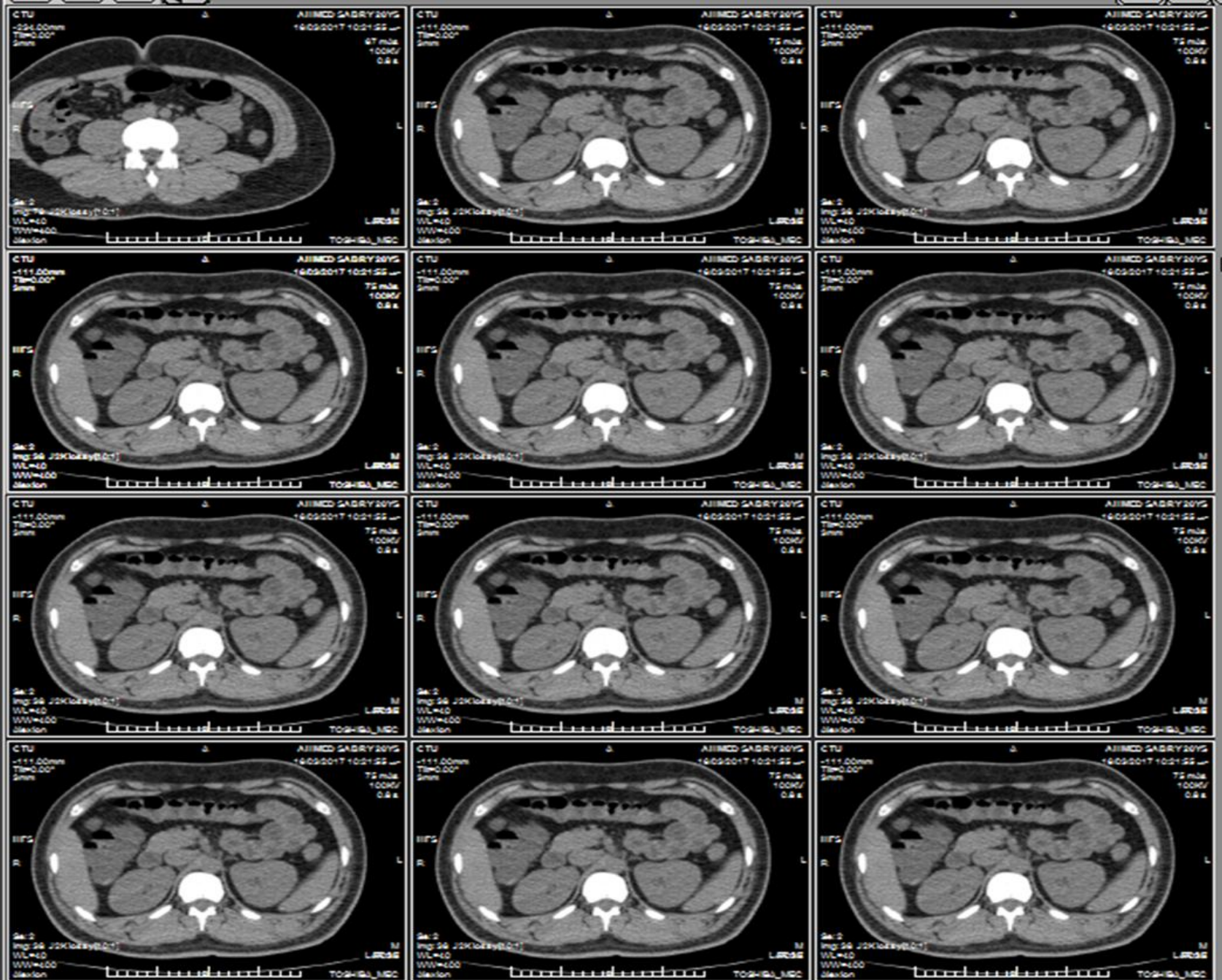


# CTU

## Image features:

- Cross sectional images.
- Image contrast determined by tissue density +/- contrast.
- Better evaluation of soft tissue.







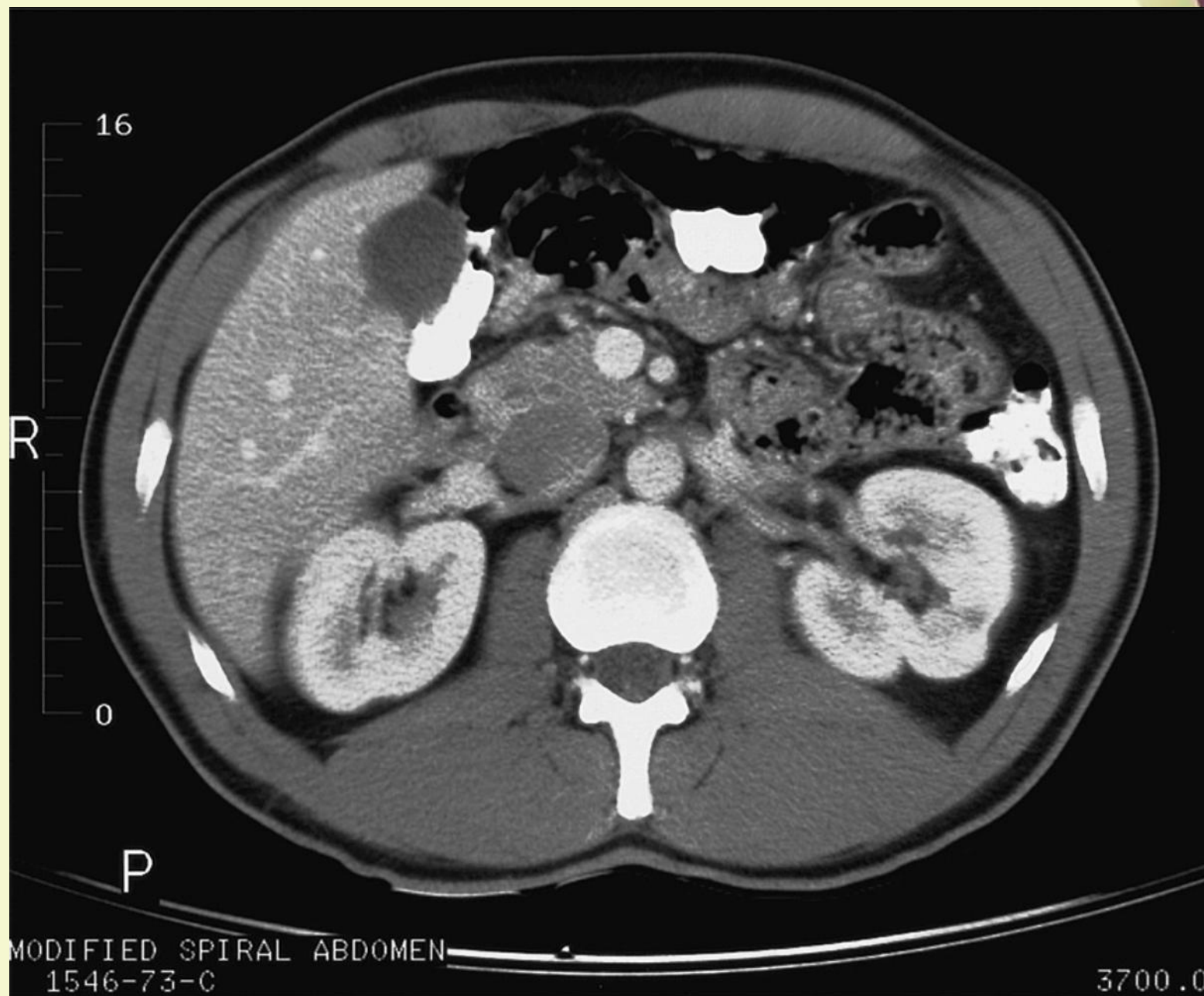


(a)



(b)





Native  
Phase

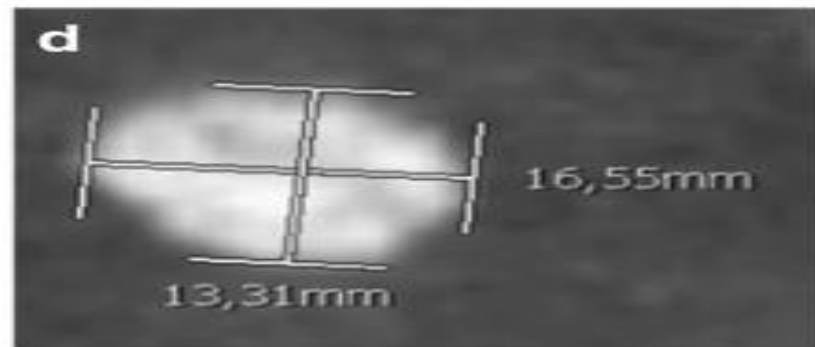
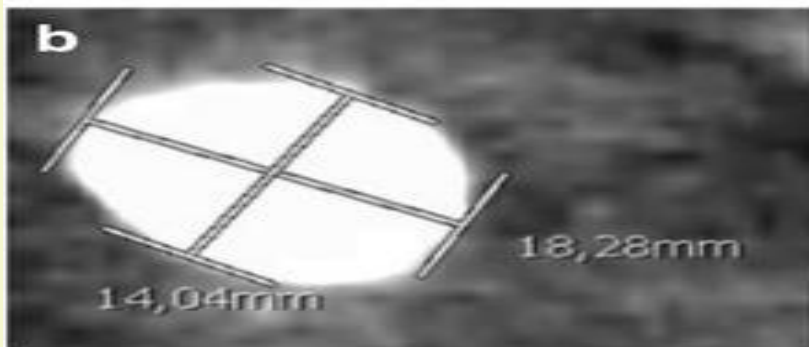
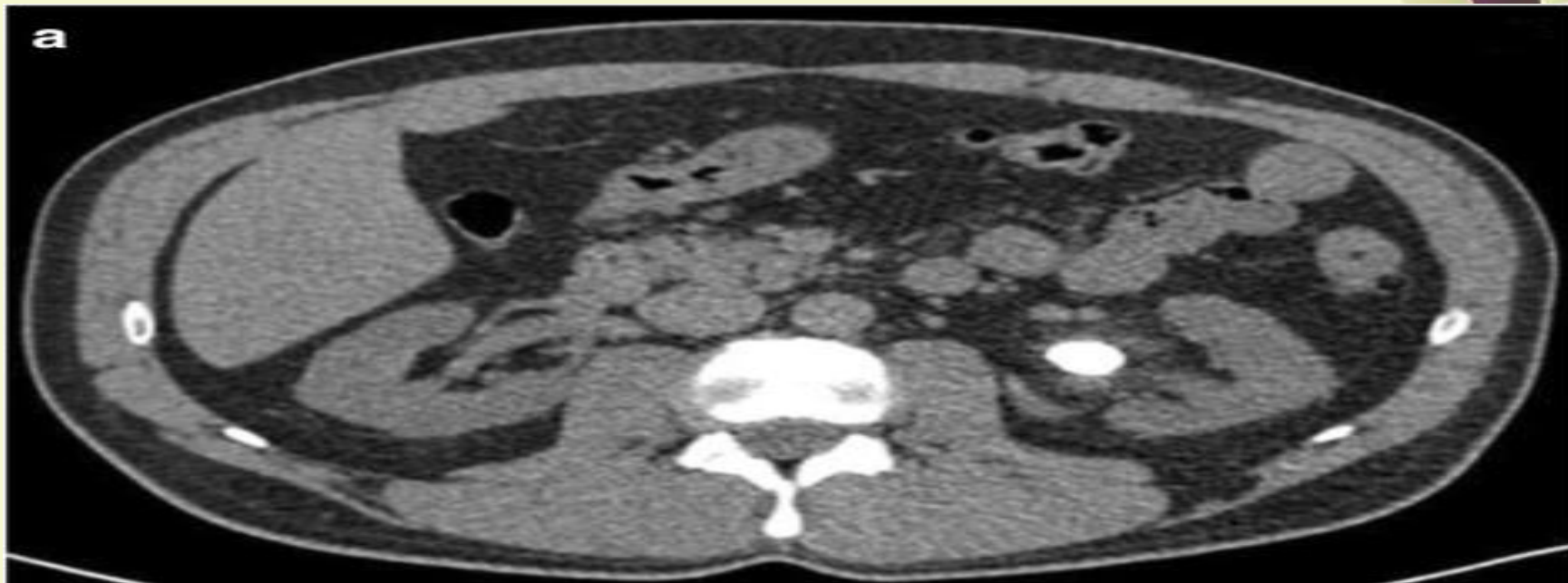


Nephrogram  
Phase



Excretory  
Phase







# MRU

- Better evaluation of soft tissue.
- Expensive.
- Useful for soft tissue pathology: tumor, infection.

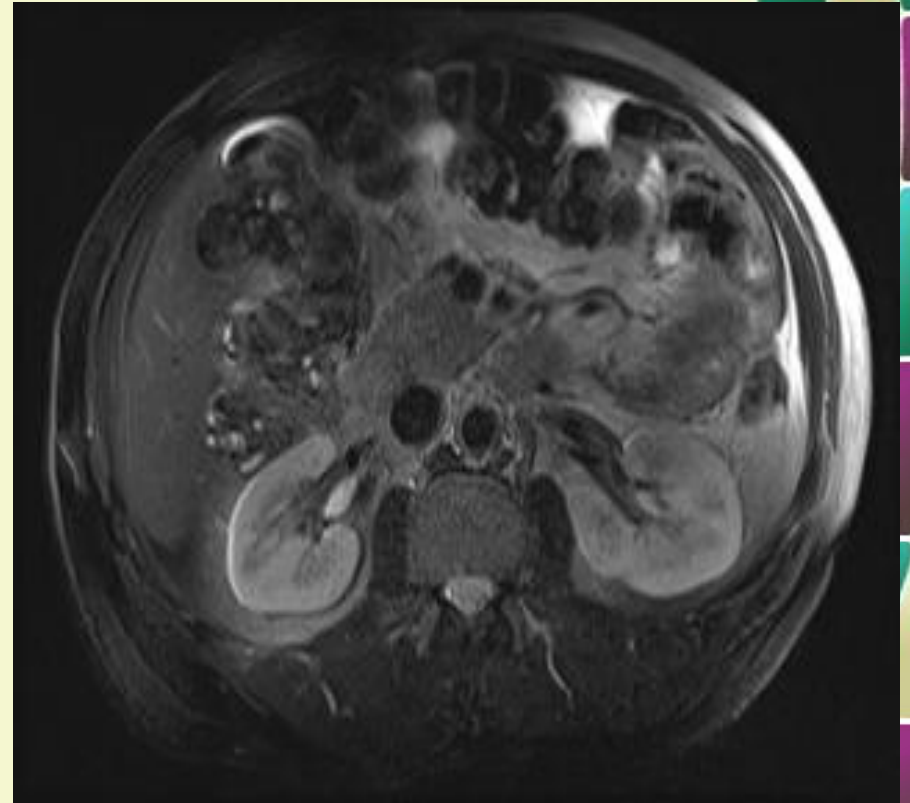




# MRU

## Image features:

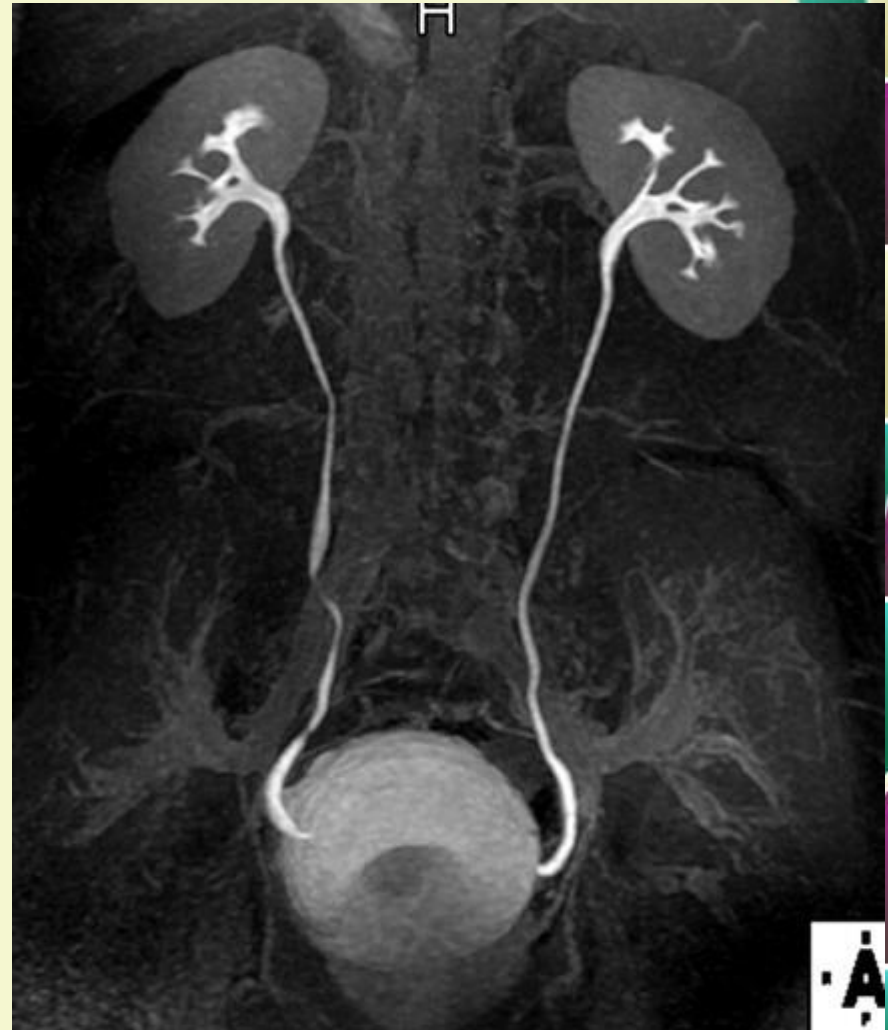
- Cross sectional images.
- Image contrast determine by tissue properties.
- Excellent for soft tissue evaluation.



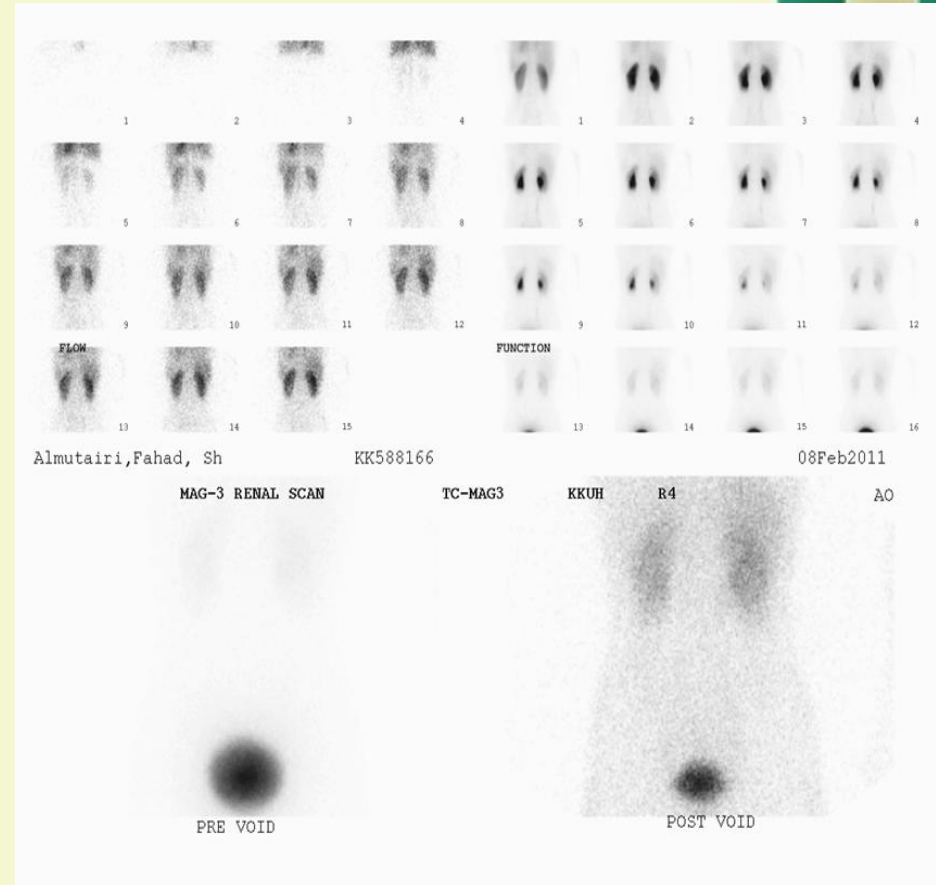
# MRU

## Advantages:

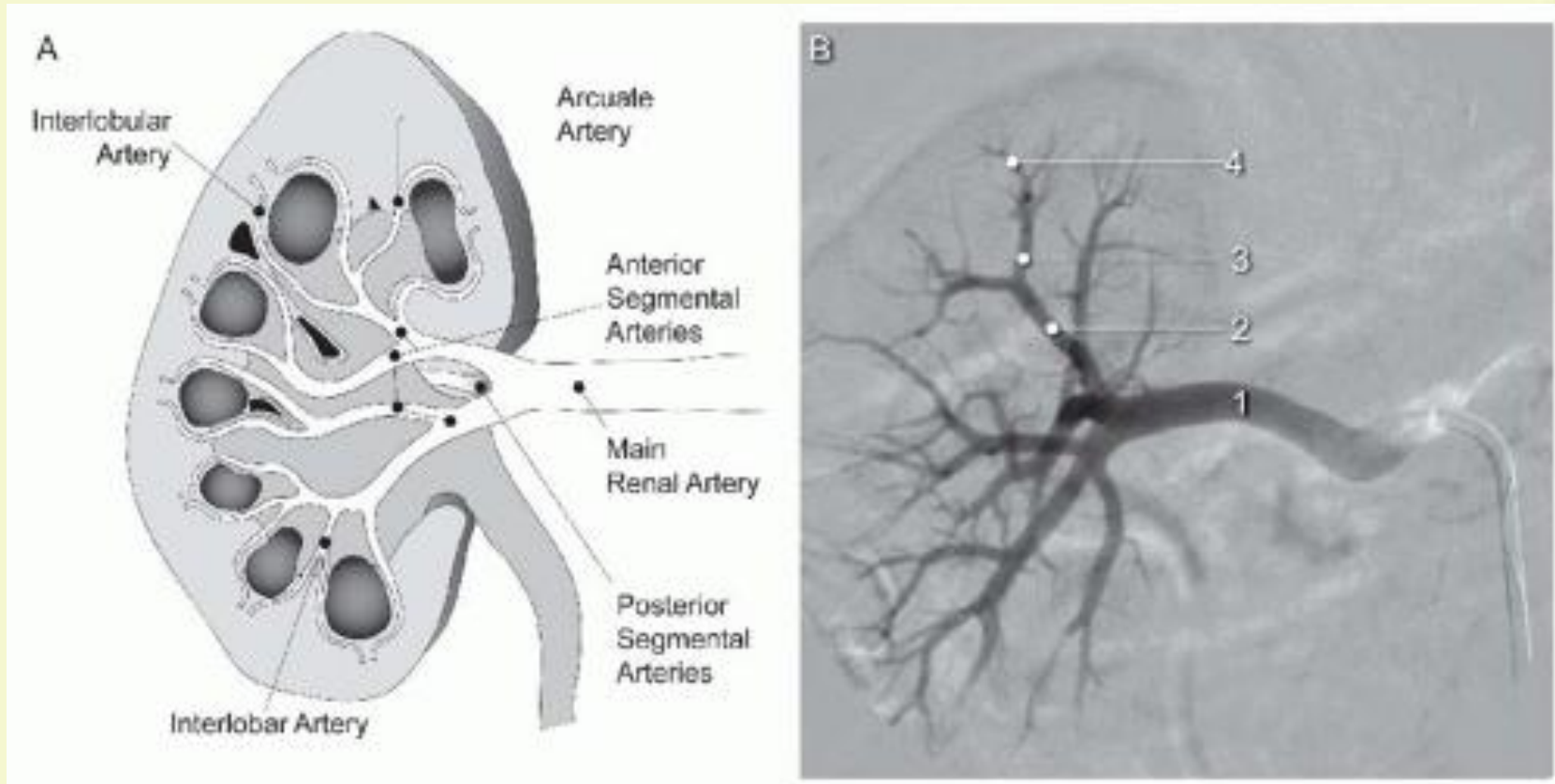
- Safe for pregnant and pediatric patients.
- For pt. with impaired renal function.
- Better to assess congenital abnormalities.



# Nuclear Medicine

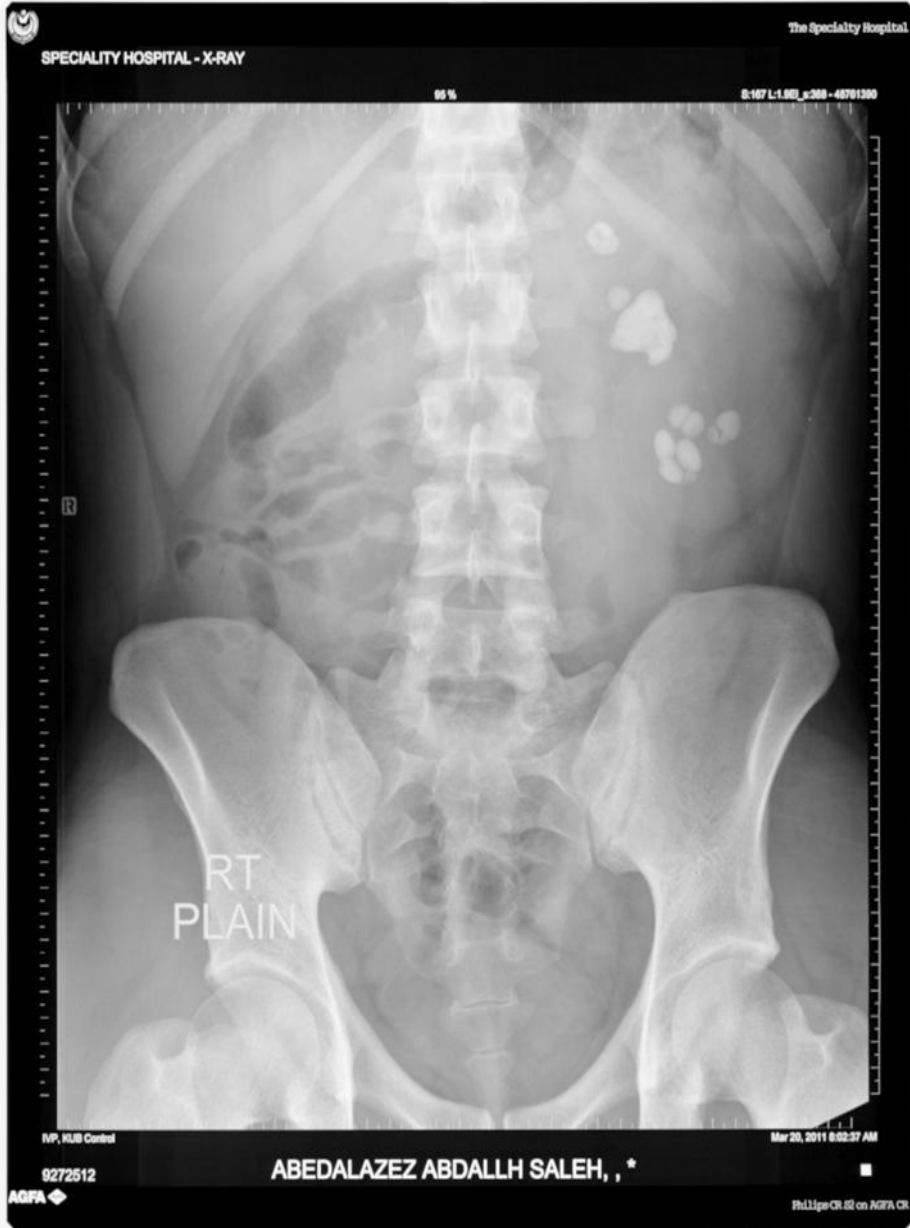


# Renal Angiography

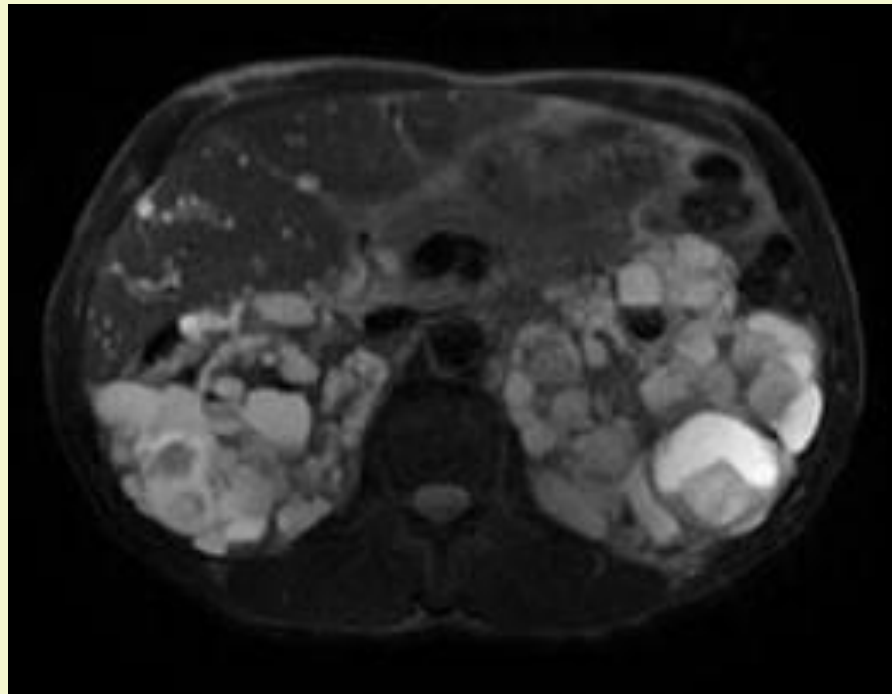




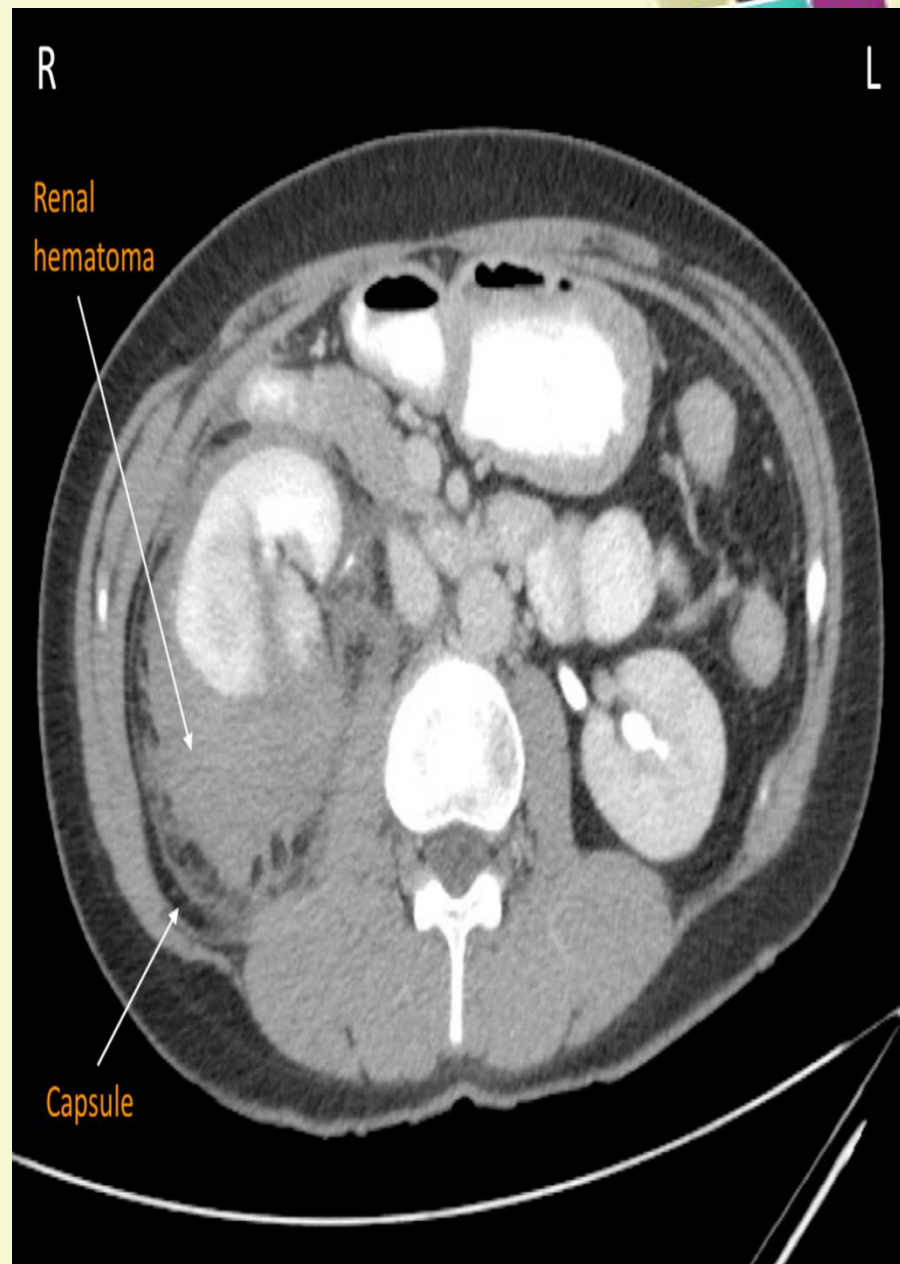
# CASES

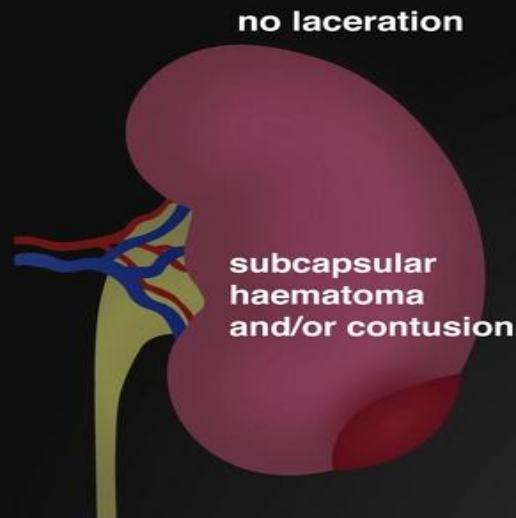




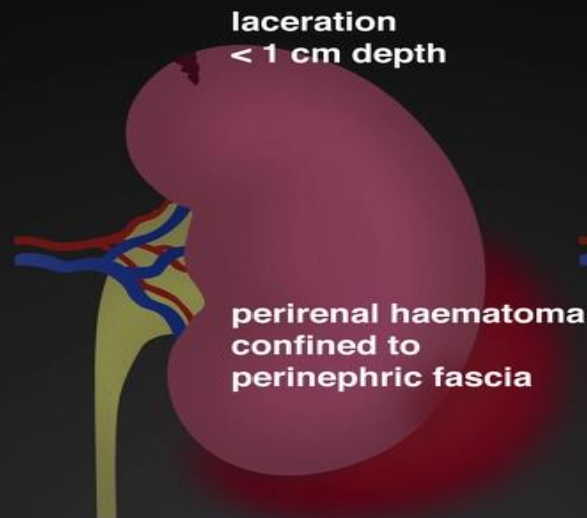




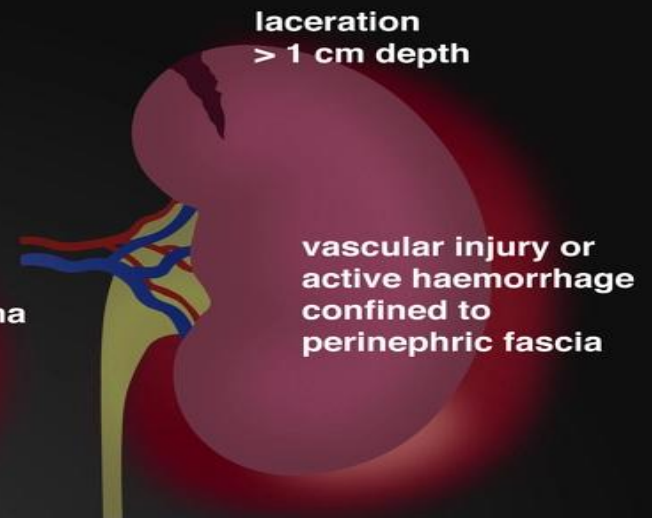




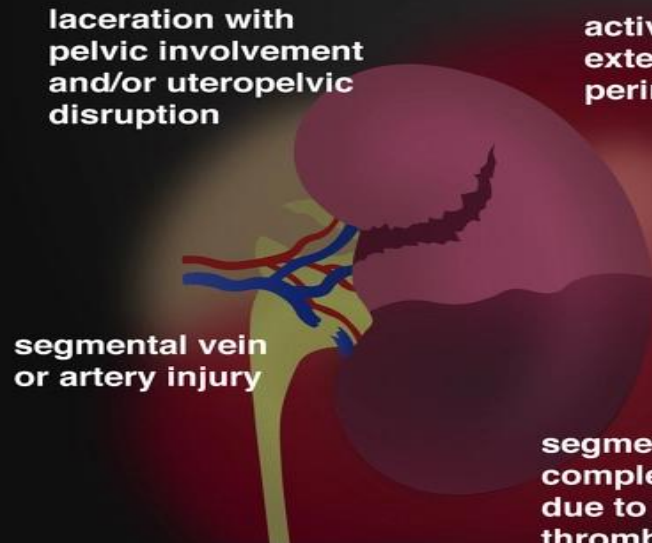
**Grade I**



**Grade II**



**Grade III**



**Grade IV**

**active bleed extending beyond perinephric fascia**

**segmental or complete infarct due to vessel thrombosis without active bleed**



**Grade V**

**\*Advance one grade for each additional injury upto grade III.**

**Thank You**