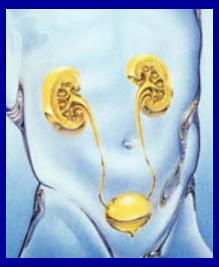
Collecting System: CTU & IVP



William H. Bush, MD, FACR

Radiological evaluation - CT

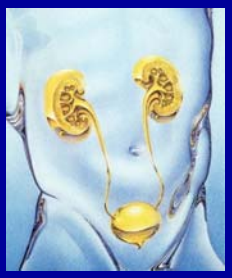
- CT Urography (CTU) – comprehensive exam to evaluate the entire urinary system
- Advantages –
  - ✓ Shorter examination time and greater accuracy for detecting urothelial lesions
  - ✓ Detailed evaluation of renal parenchyma and perirenal tissues
  - ✓ Better evaluation of obstructed collecting systems
- Combined CTU and conventional overhead radiography can also be performed.
- Protocols are our institution depend on patient's age and illustrated.

Courtesy of Dr. Puneet Bhargava

Split Bolus technique	Three phase CT (>50yrs old)

• Pre contrast
  • Top of kidneys to base of bladder
• First I.V. contrast injection
  • 80cc Omni 300, at 2 cc/sec; 25cc saline chaser.
• IV hydration between injections
  • 150cc 0.9% saline infusion @0.5cc/sec
• Second IV contrast injection
  • 60cc Omni 300 @ 2cc/sec; 25cc saline chaser scan after 120sec diaphragm to base of bladder
	• Pre contrast
	  • diaphragm to base of bladder
	• Contrast injection
	  • 150cc omnipaque 300, 3cc/sec
	• 90sec delay
	  • diaphragm to ischial tuberosities
	• 10min delay
	  • diaphragm to ischial tuberosities

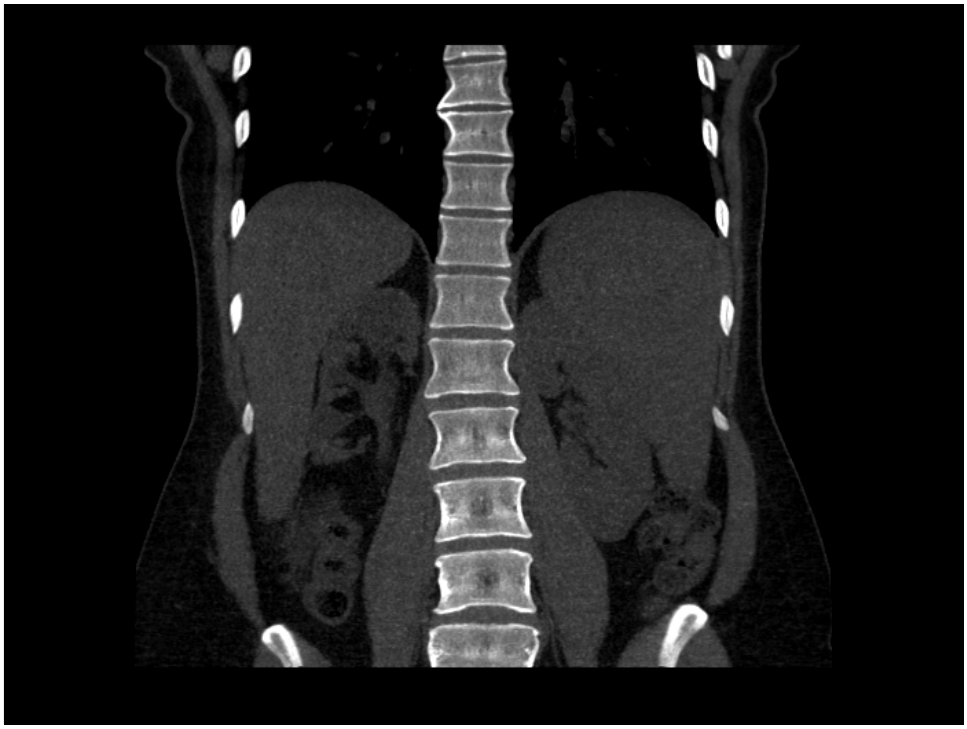
The Collecting System & Ureter

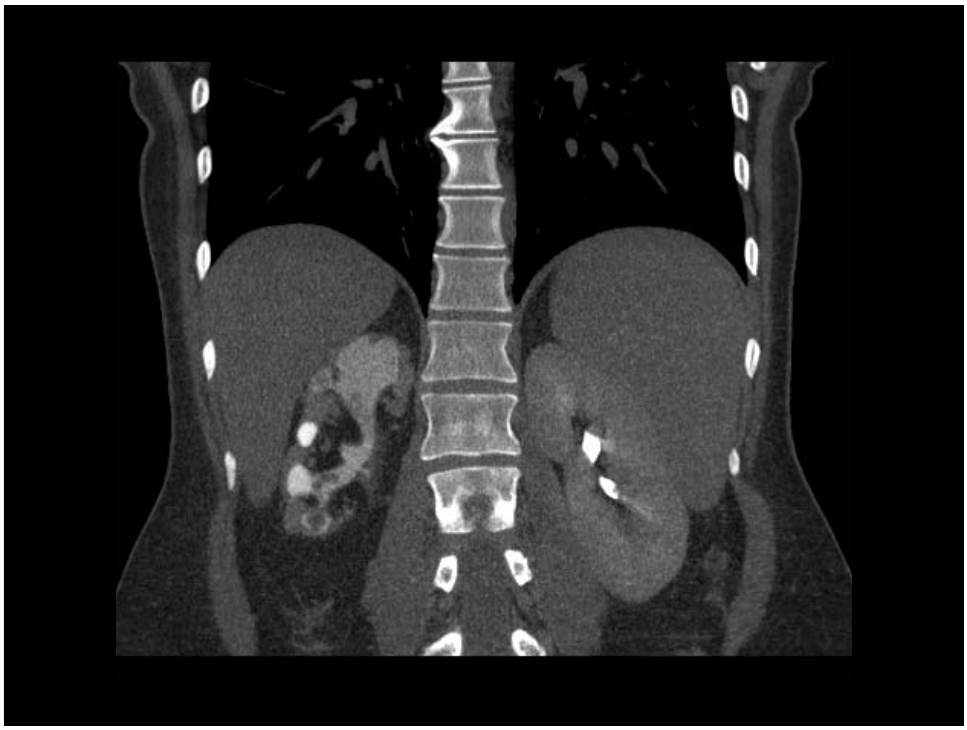


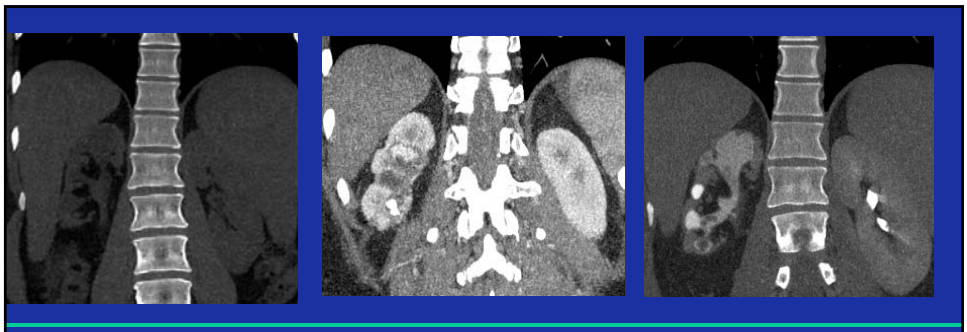
Collecting System: Case 1

57 year female with RBC's on urinalysis

(3 images)

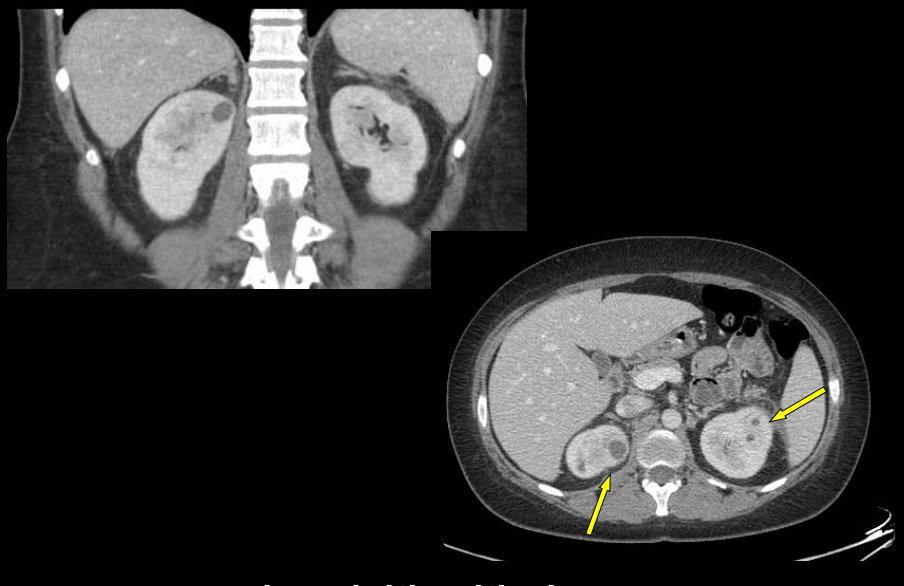




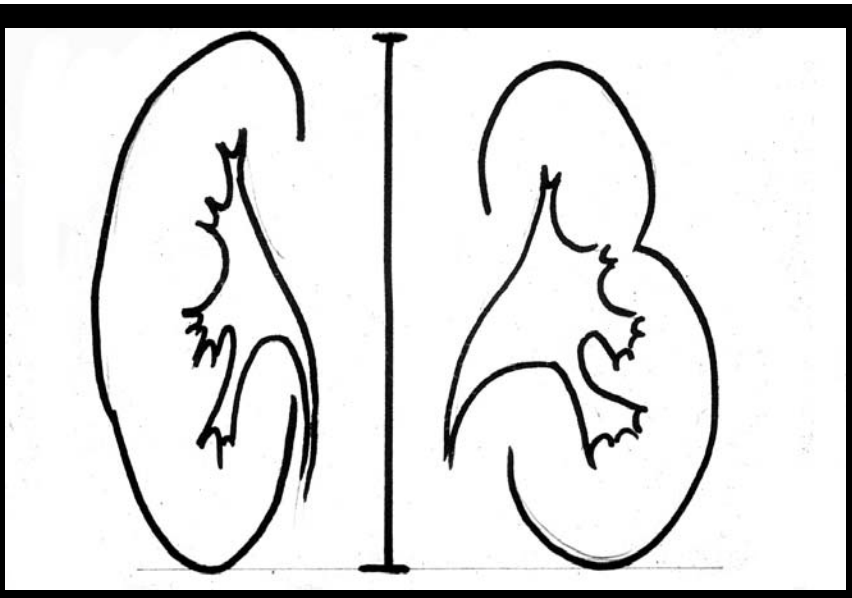


1. Chronic atrophic pyelonephritis
2. Transitional cell carcinoma
3. Ureteritis cystica
4. Malakaplakia

PYELONEPHRITIS

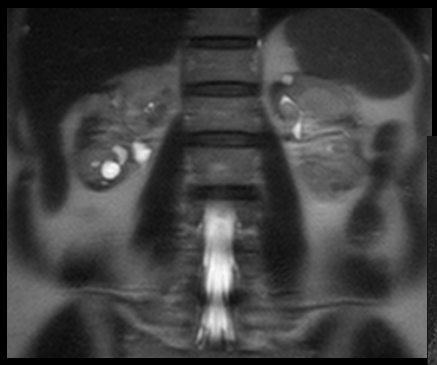


pyelonephritis with abscesses

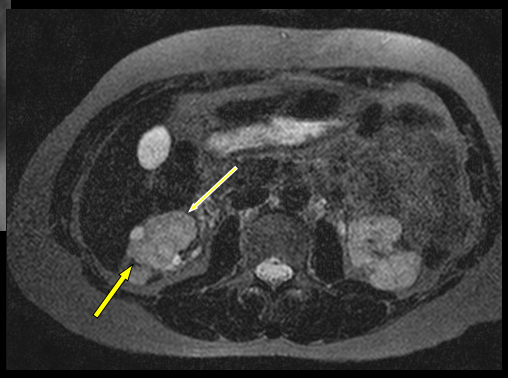


Pyelonephritic scarring

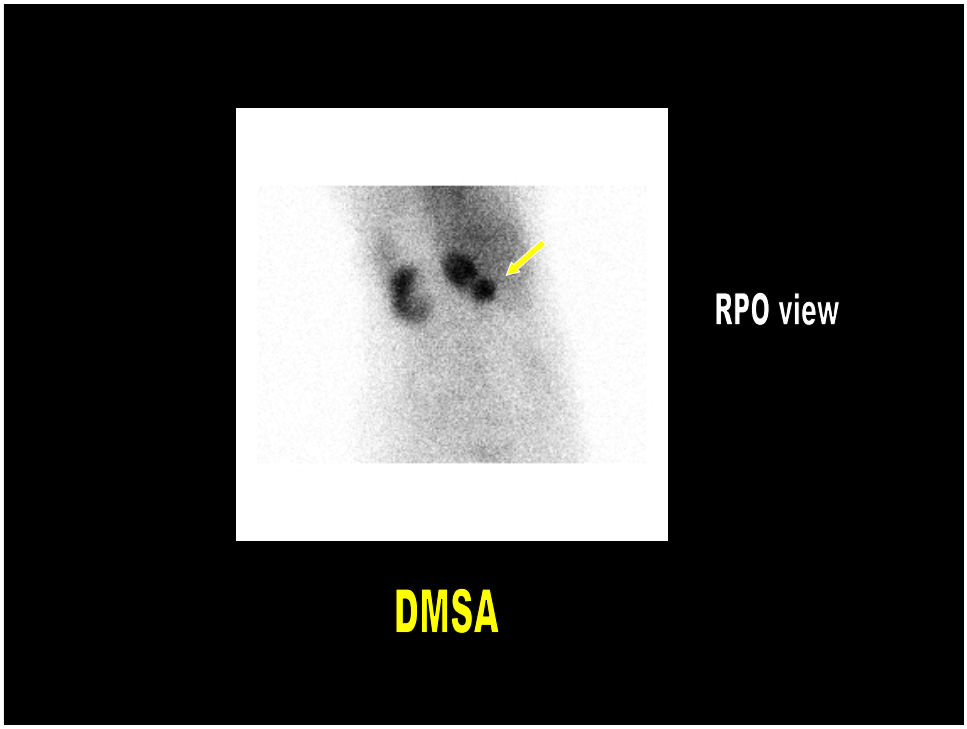
Lower Right Kidney Mass



Chronic R.F.



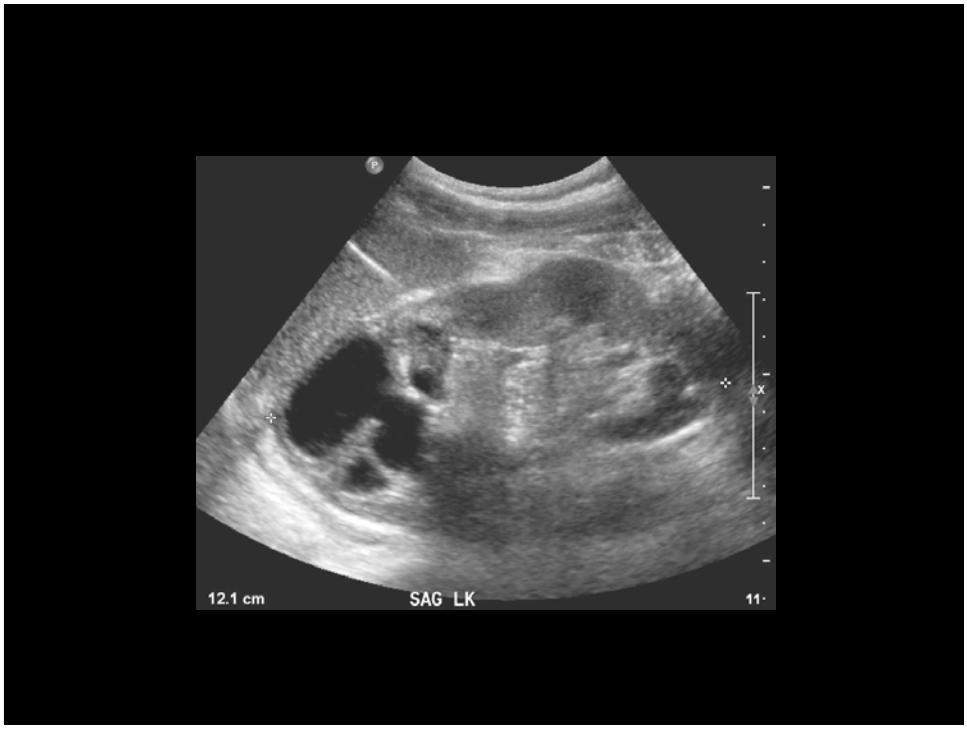
Biopsy indeterminate. What next?



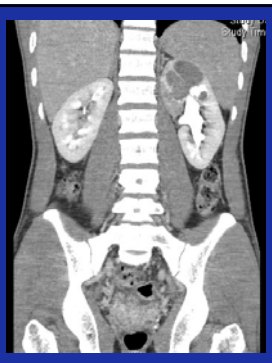
Collecting System: Case 2

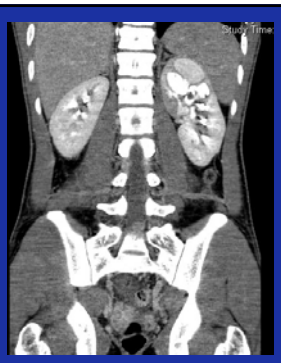
20 y.o. Burmese man with chronic urinary infection (standard cultures negative), upper infundibular and lower ureter stenosis

(3 images)


12.1 cm
SAG LK


Study Time:1:1





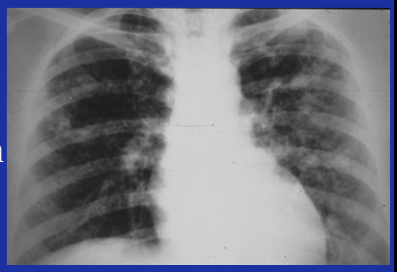
1. Cystic renal cell CA
2. Acute pyelonephritis
3. Ectopic ureterocele with obstructed upper system
4. Tuberculosis

RENAL TUBERCULOSIS

History of pulmonary TB: only 25 %

Chest radiograph:

- 10 %: active TB
- 30 %: scarring, granuloma
- 60%: normal



RENAL TUBERCULOSIS

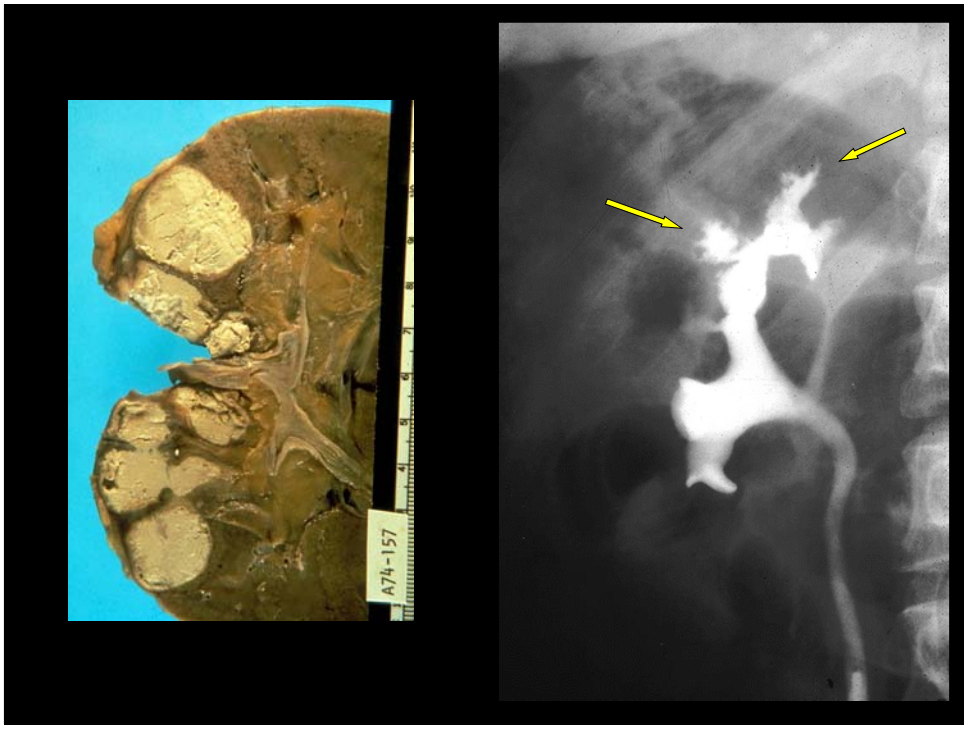
Infection at corticomedullary junction

Erosion into tubule

Ulceration of papillary tip

Granuloma, caseous necrosis

Healing: fibrosis, stricture, calcification



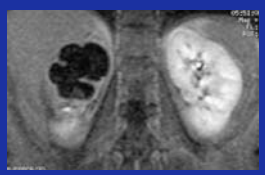
RENAL TUBERCULOSIS

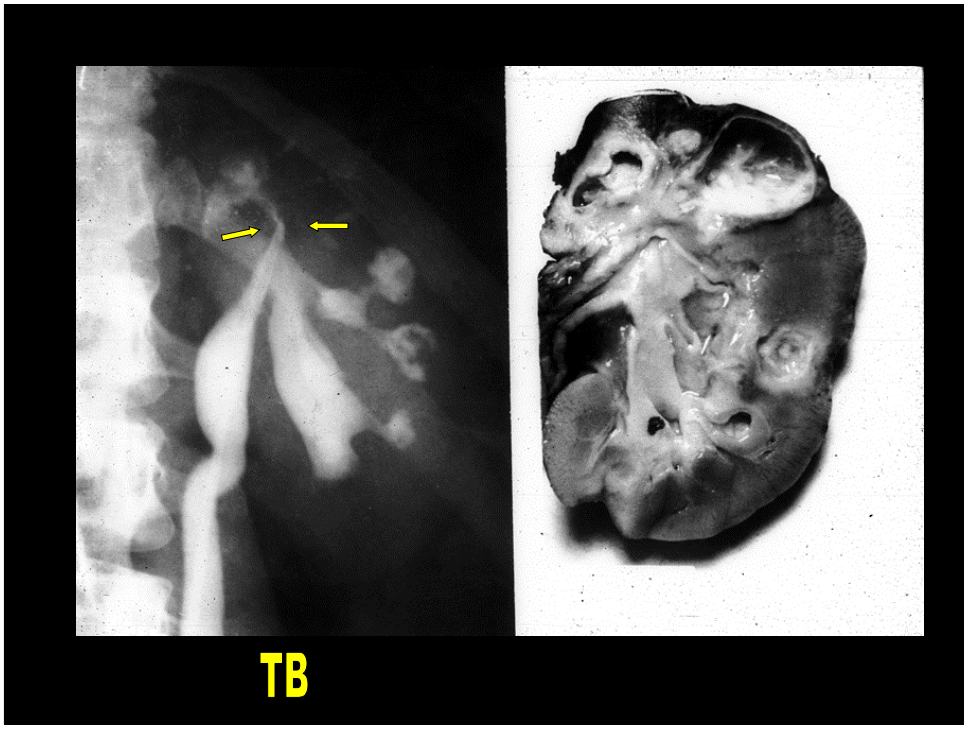
Hallmark: multiple, irregular infundibular stenoses

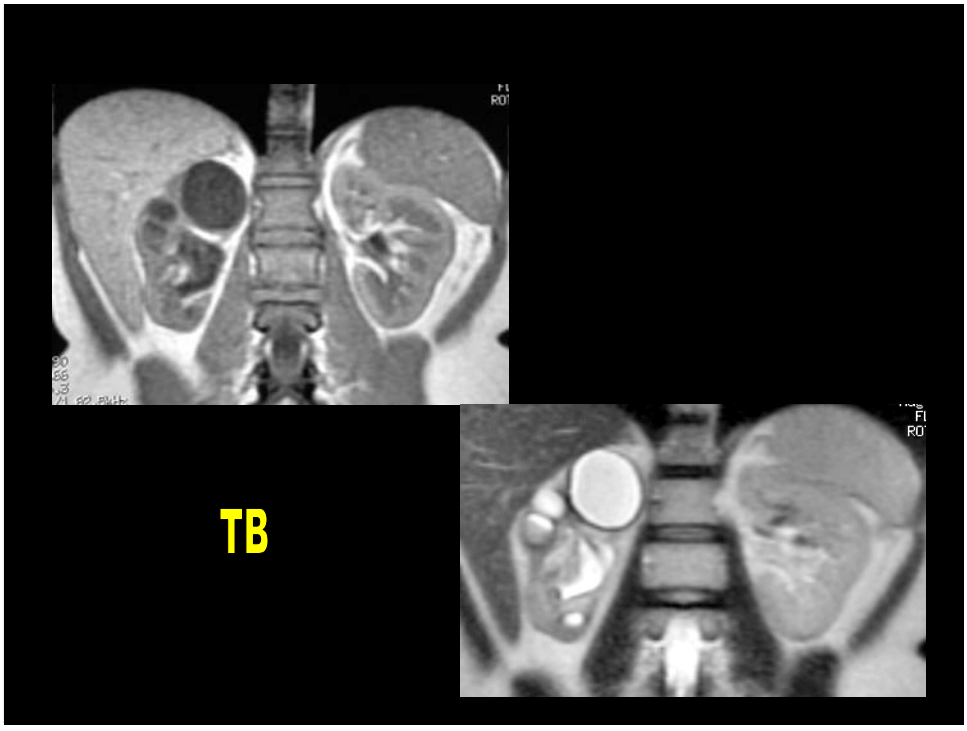
-- subsequent hydrocalyx

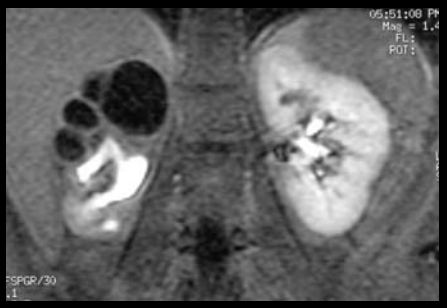
-- scarred renal pelvis

-- distal ureteral stricture

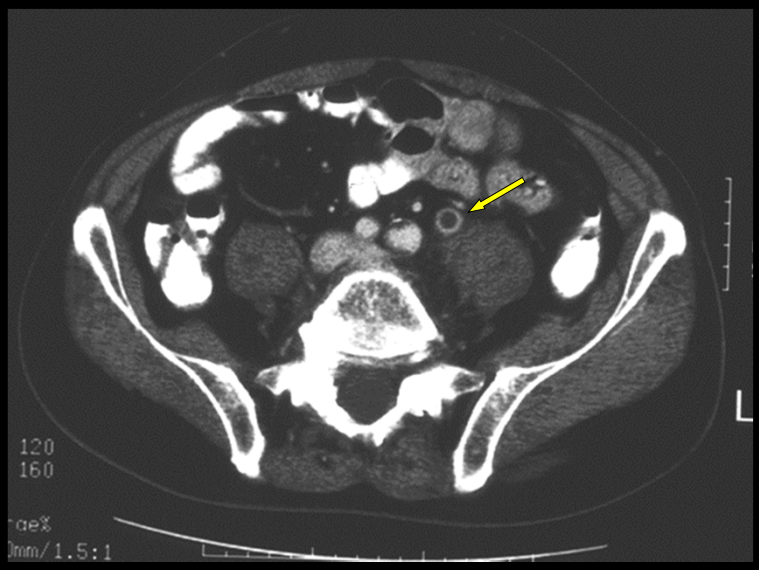



TB

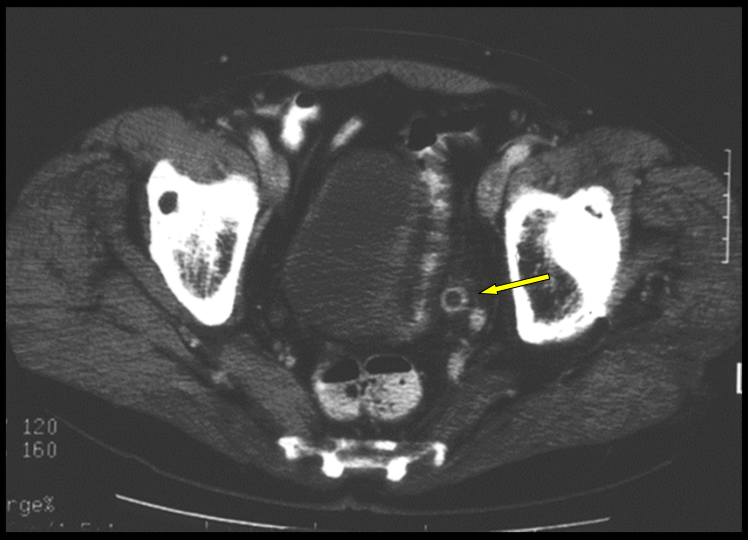

TB



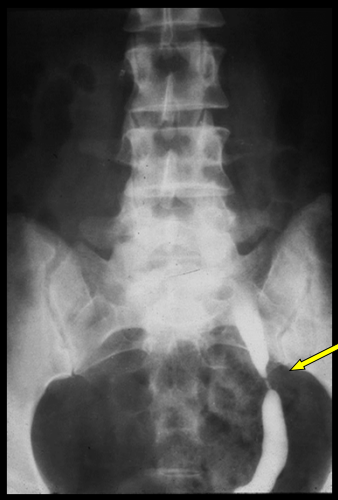
microhematuria + pyuria:
I.V.P.; MRI (T1W post gad)



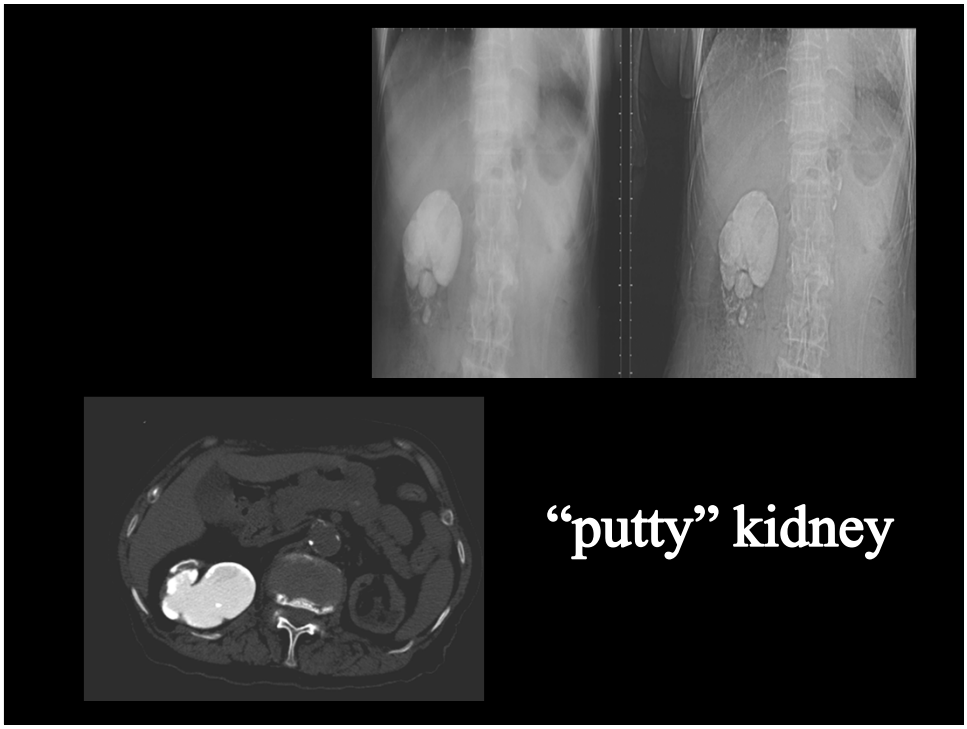
Ureteral enhancement



Ureteral enhancement



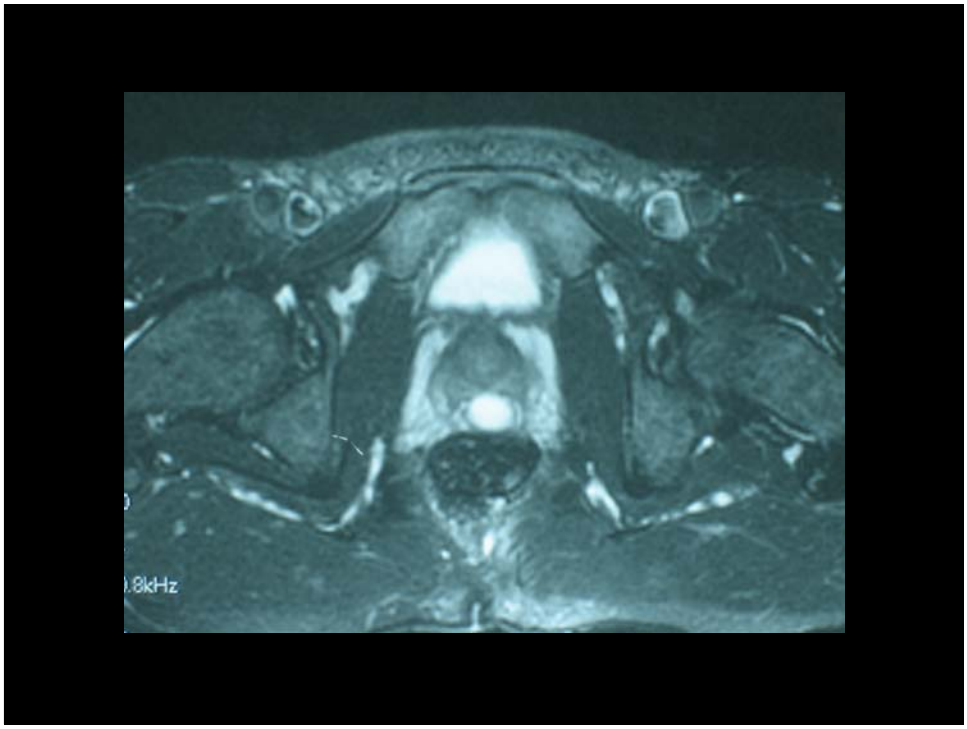
Distal ureteral strictures

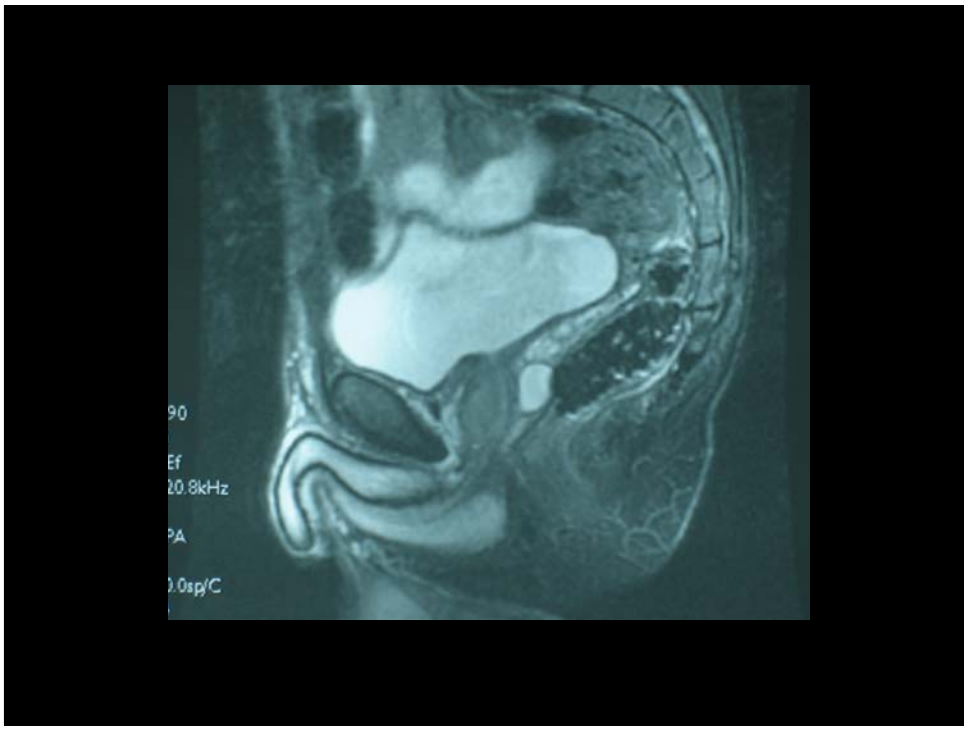


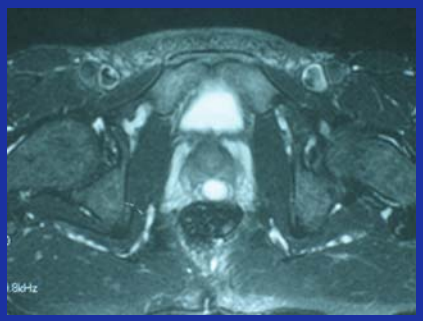
Collecting System: Case 3

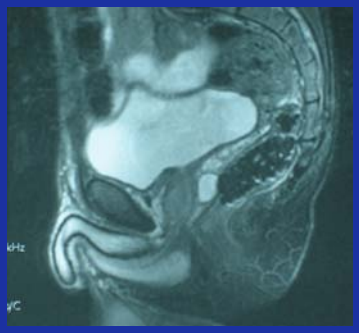
55 y.o. male with vague deep pelvic discomfort and mild hesitancy of urination

(3 images)


.8kHz


90
Ef
20.8kHz
PA
.0sp/C



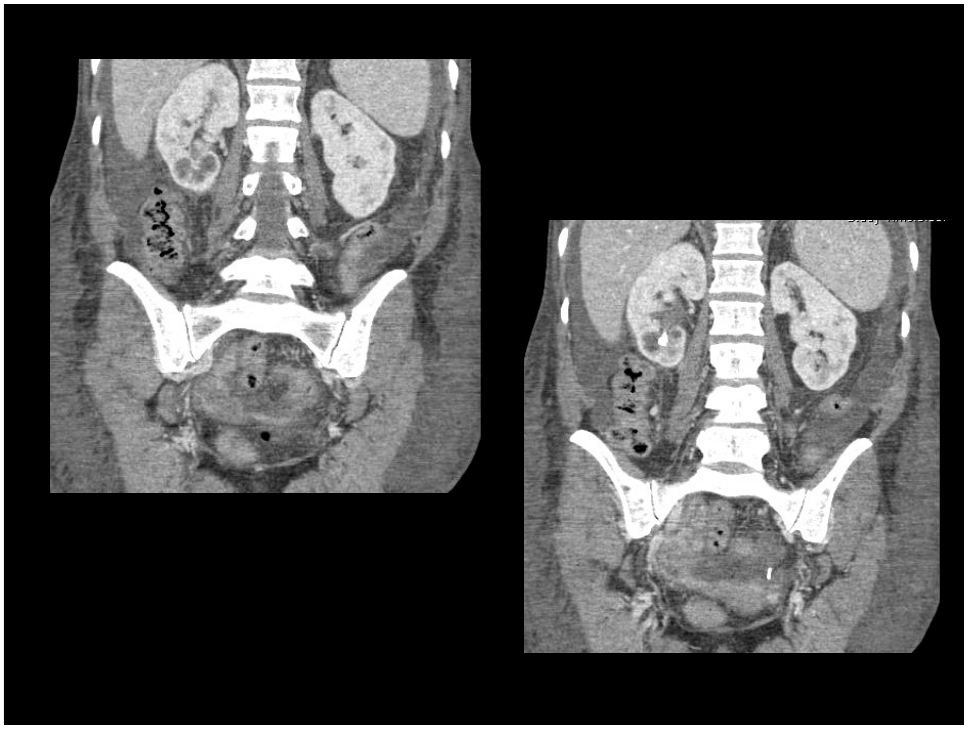


1. Ectopic Ureterocele
2. Muellerian Duct cyst
3. Seminal Vesicle cyst
4. Bladder diverticulum

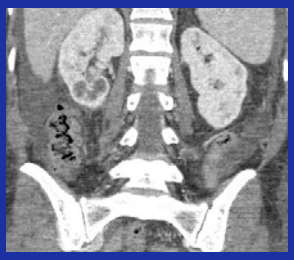
Collecting System: Case 4

52 y.o. female with recurrent ventral hernia; recent repair and surgery for internal hernia. Chronic renal infection.

(3 images)




MRN

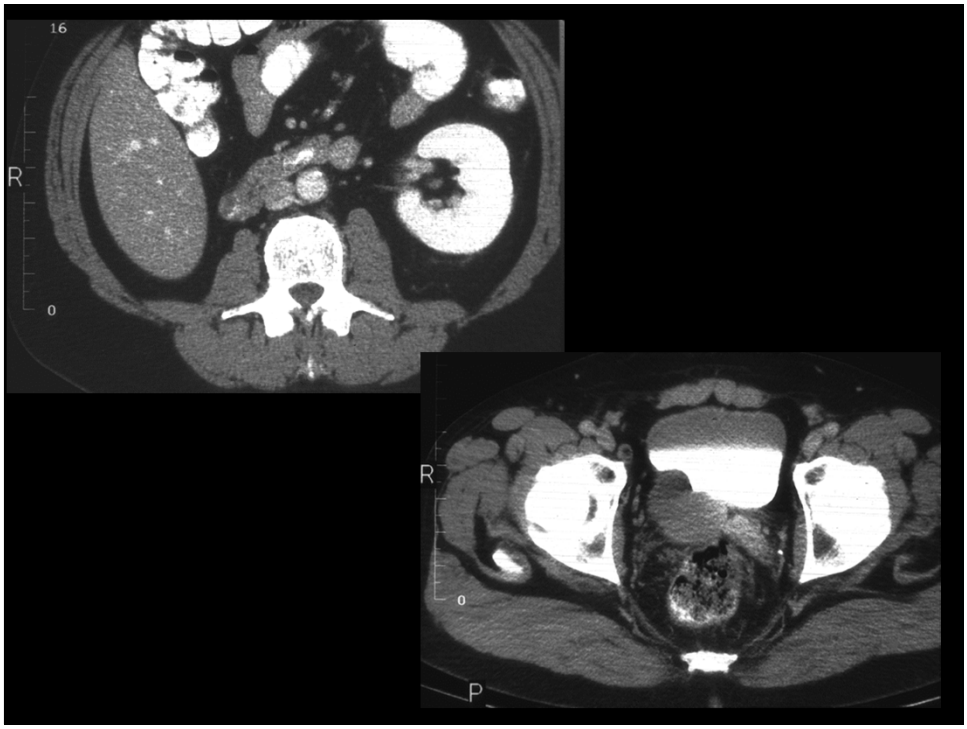


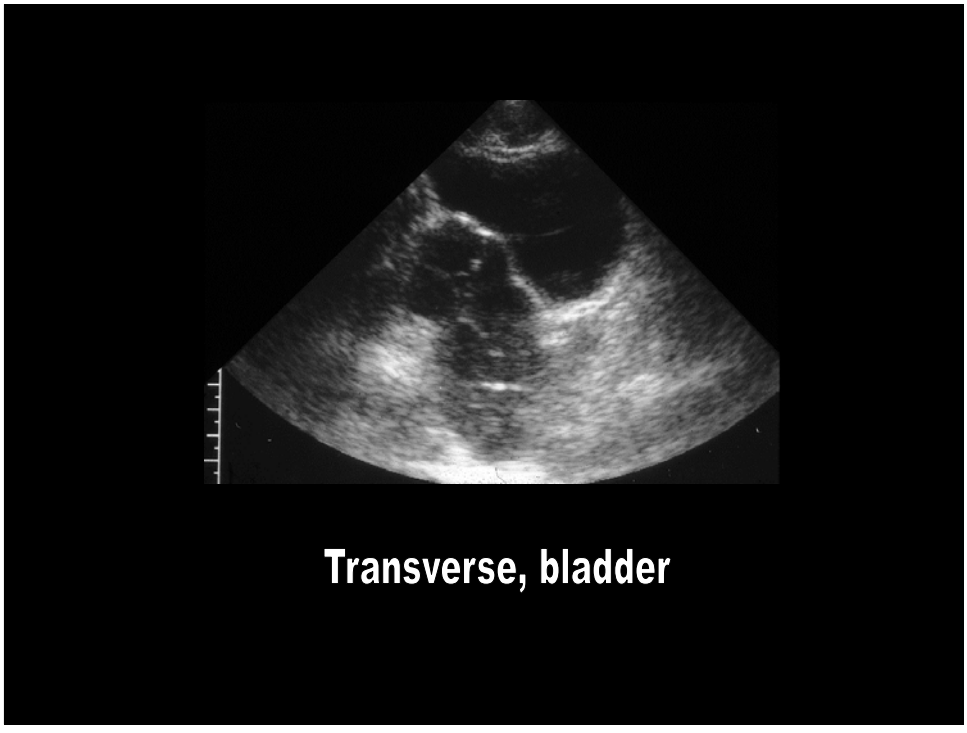
1. Acute Pyelonephritis
2. Xanthogranulomatous Pyelonephritis
3. Tuberculosis
4. Cystic renal cell carcinoma

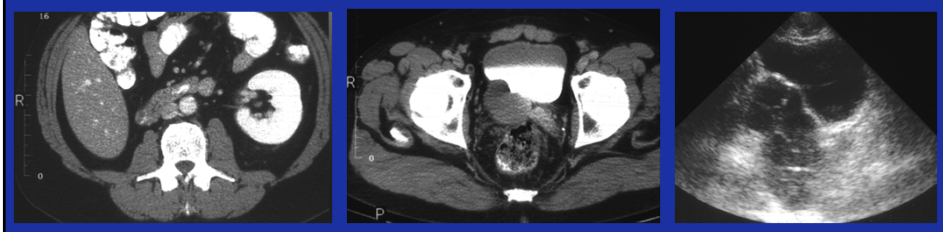
Collecting System: Case 5

A 34 y.o. male presented with complaint of long-standing deep right pelvic discomfort. Nothing palpable.

(2 images)


16
R
0
R
0
P

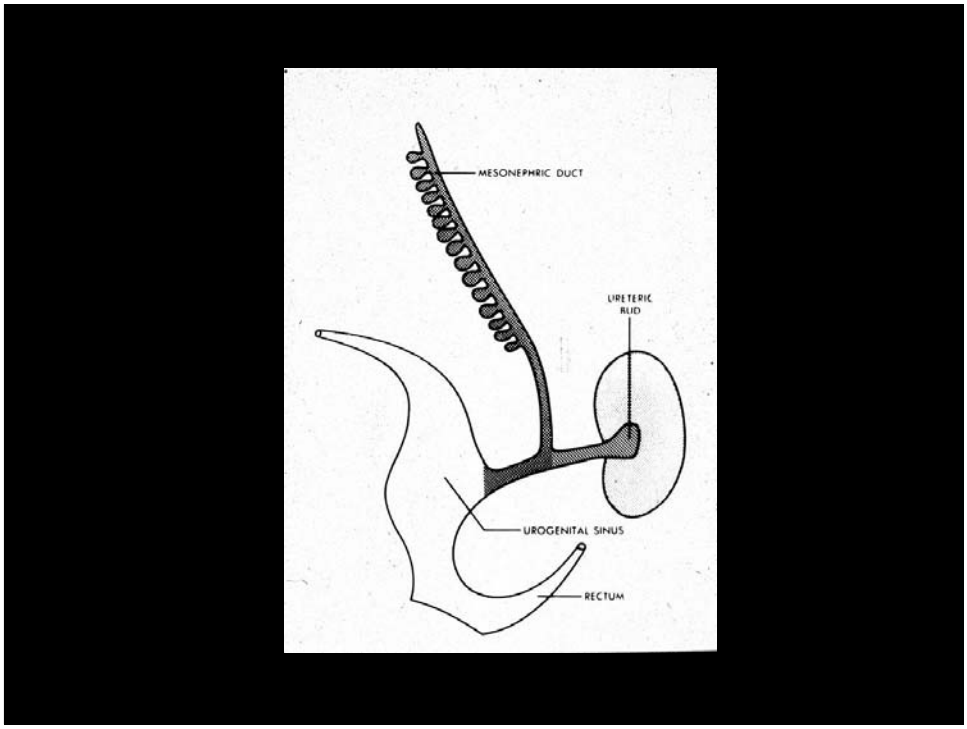

Transverse, bladder

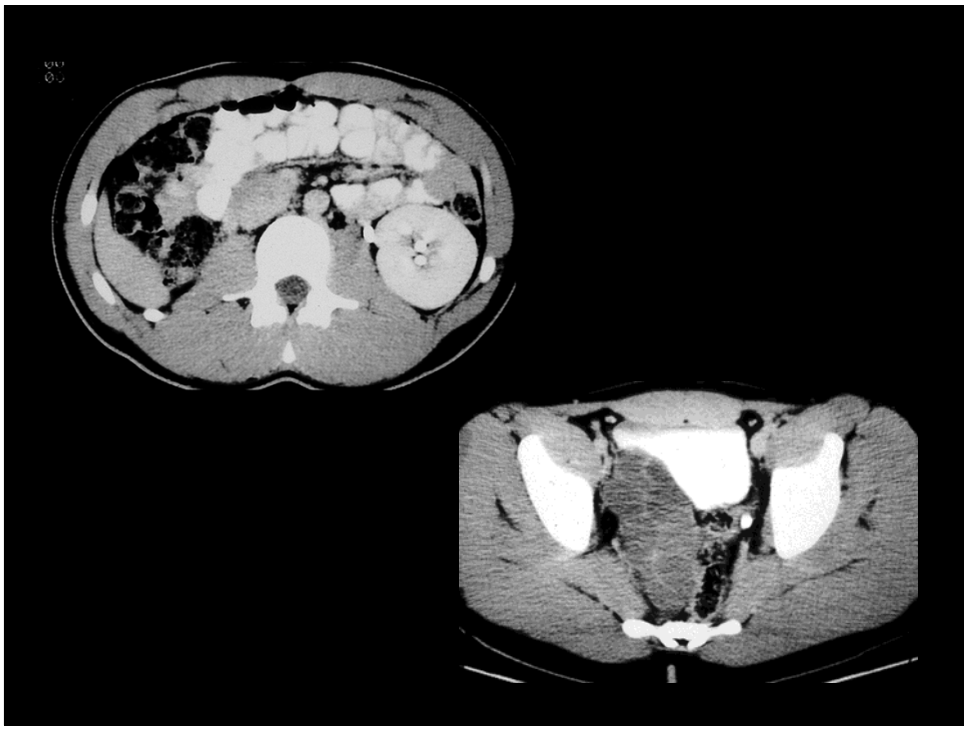


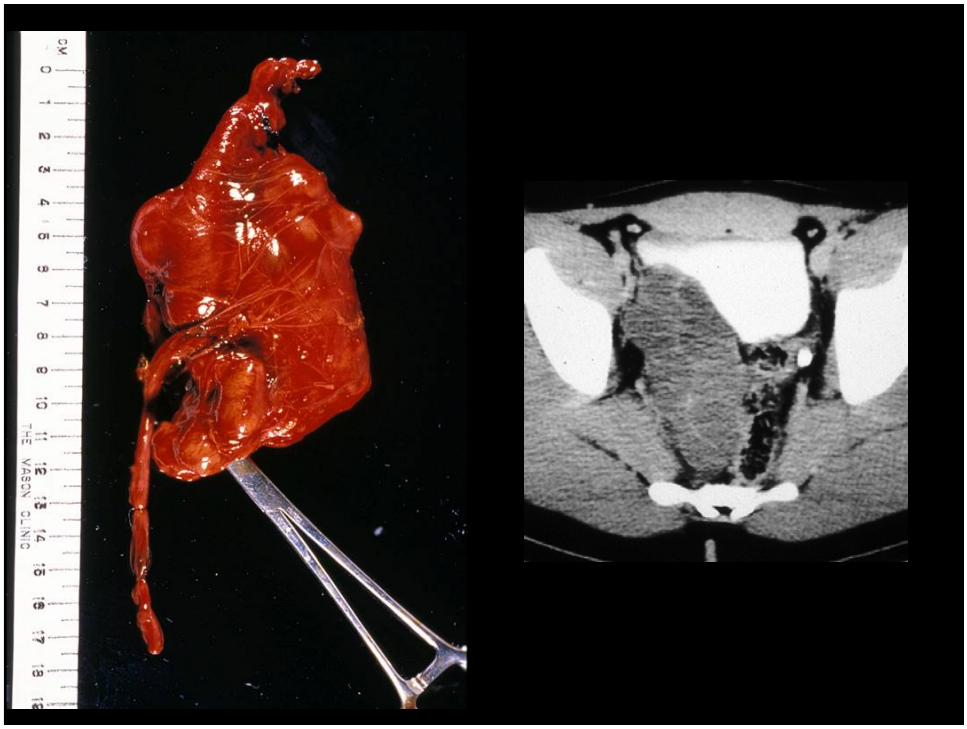
1. Bladder diverticulum
2. Muellerian Duct cyst
3. Seminal Vesicle cyst
4. Ectopic Ureterocele

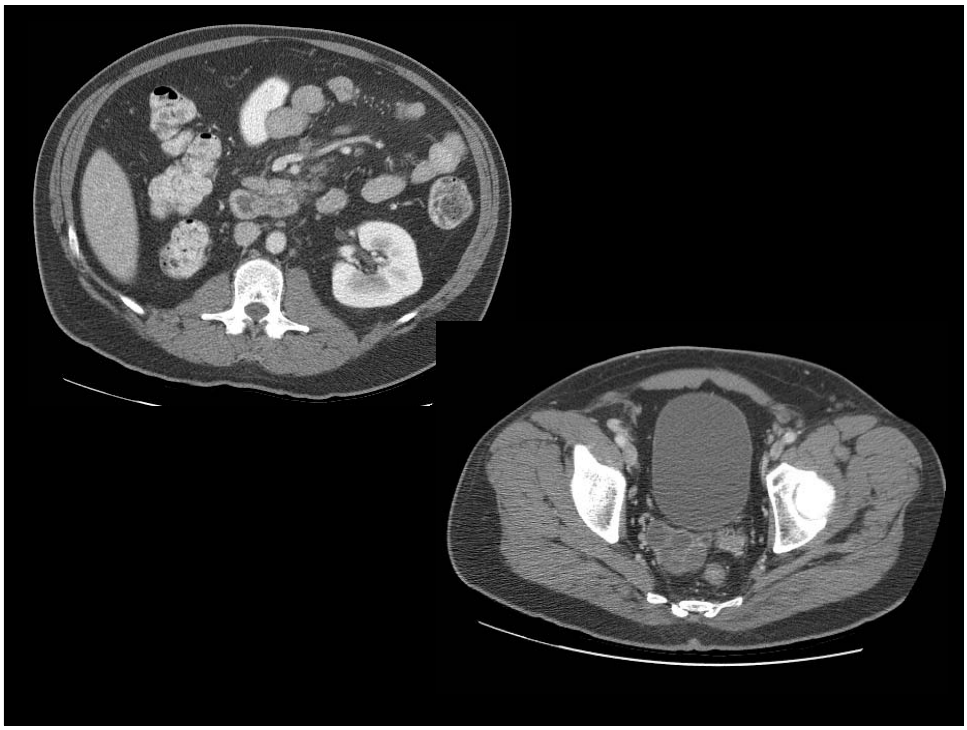
Developmental Anomalies

SEMINAL VESICLE CYST


MESONEPHRIC DUCT
URETERIC BUD
UROGENITAL SINUS
RECTUM



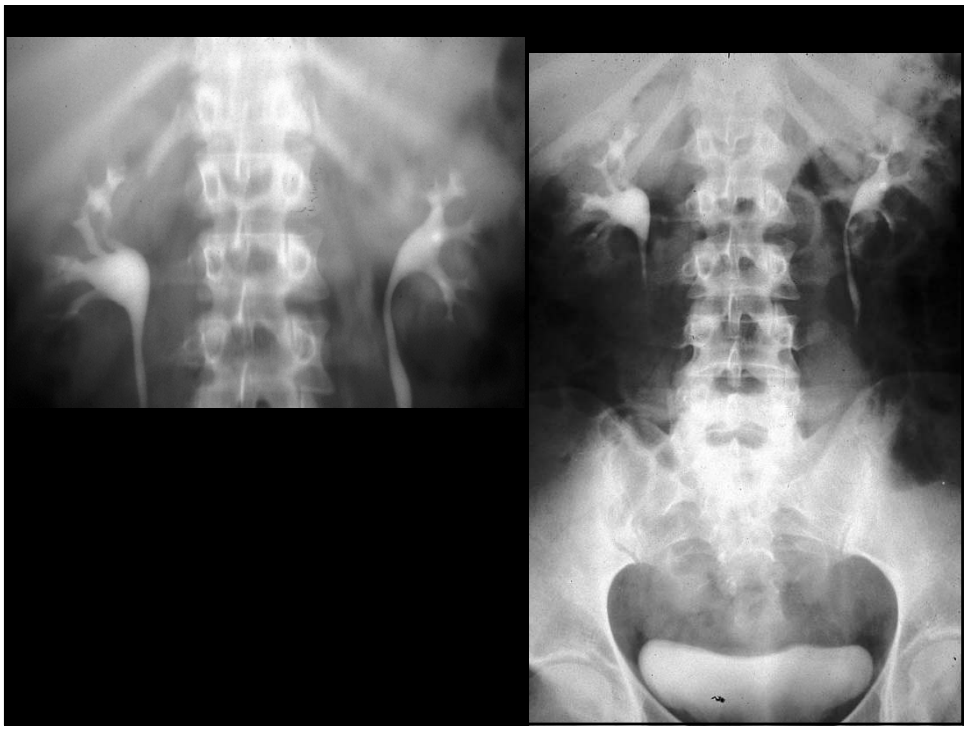

THE VASCN CLINIC

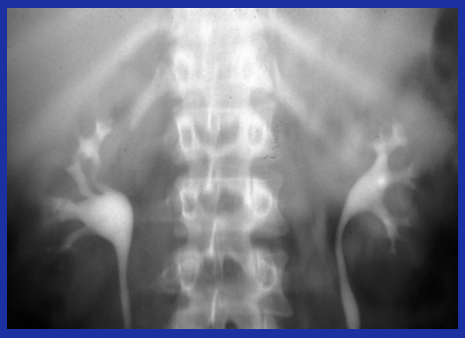


Collecting System: Case 6

A 38 y.o. female presents with complaint of some vague left flank discomfort and intermittent urinary infections. Nothing palpable.

(3 images)

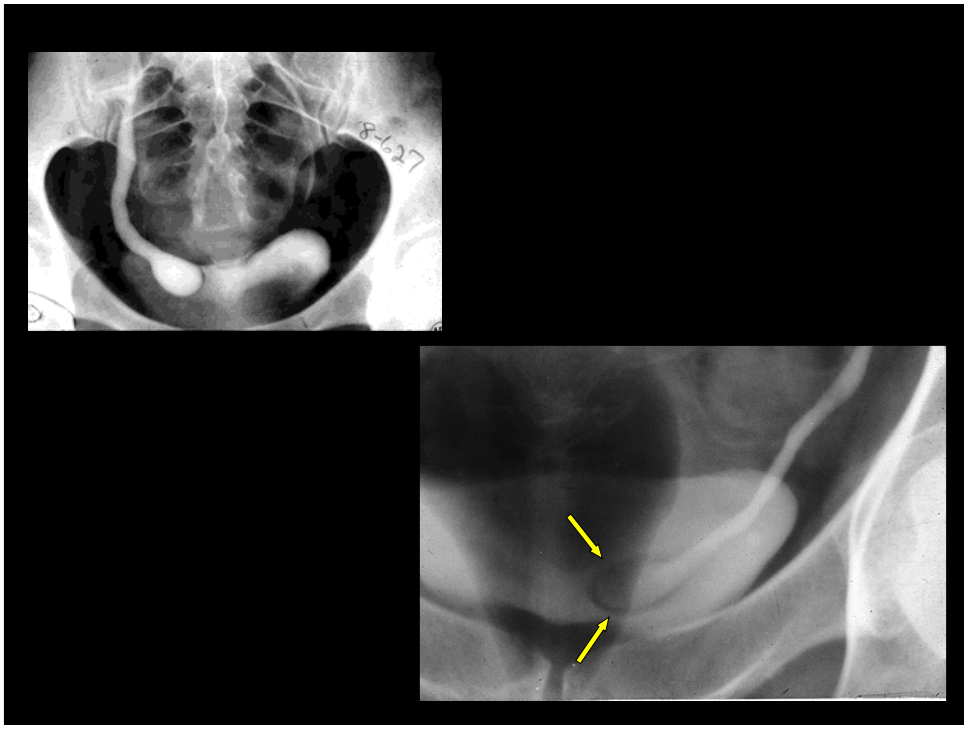


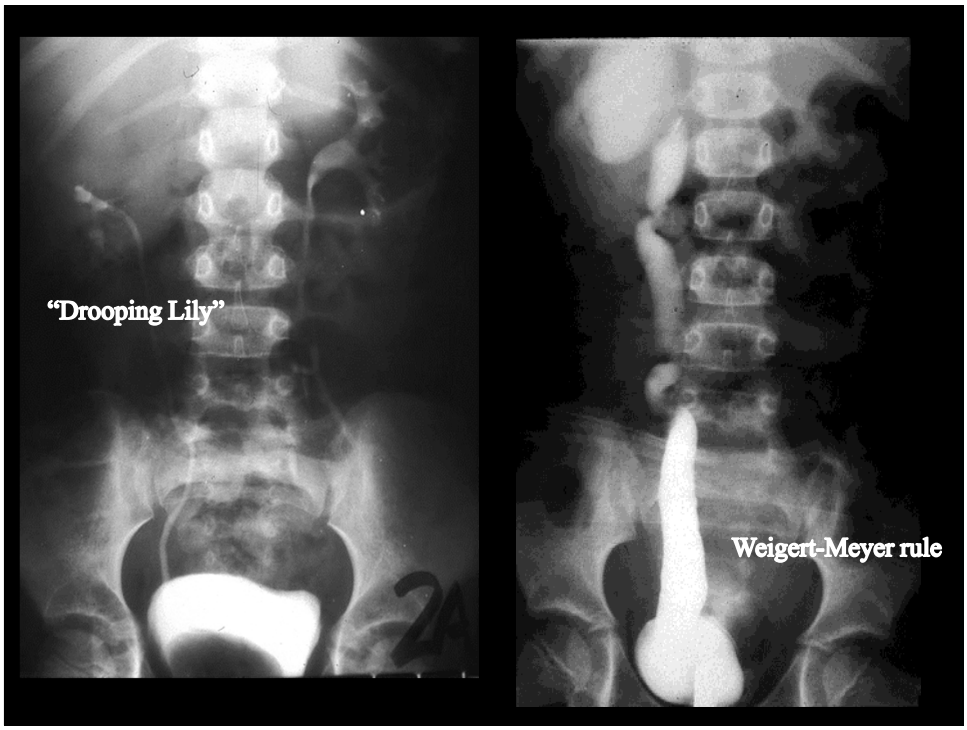


1. Ectopic Ureterocele
2. Adrenal cyst
3. Renal cyst
4. Normal

URETEROCELE

Additional examples

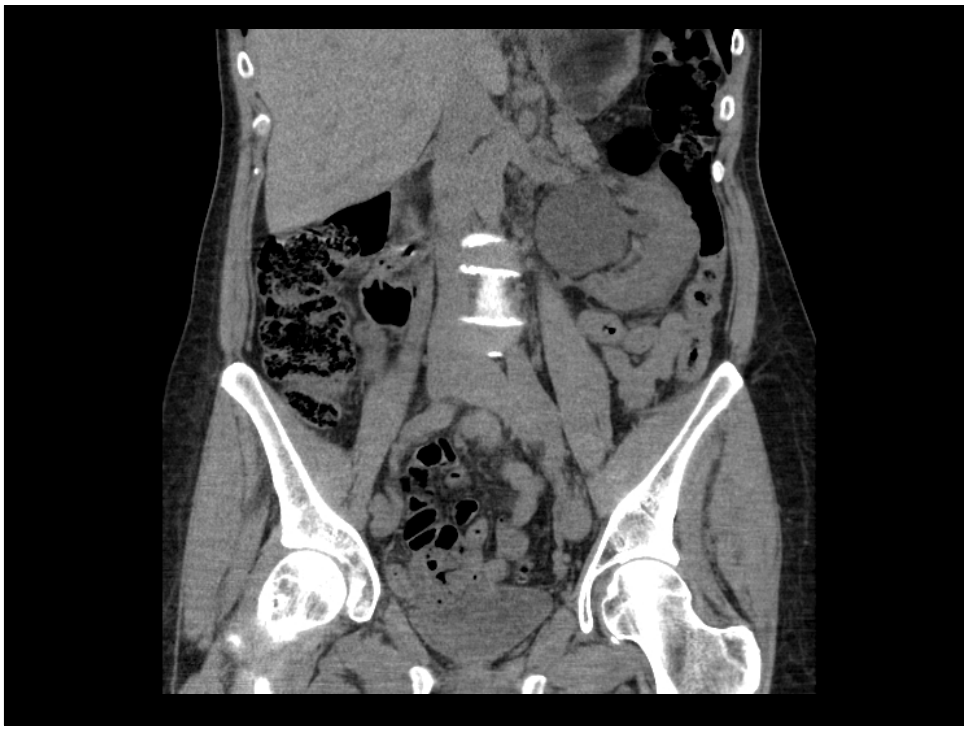



"Drooping Lily"
Weigert-Meyer rule

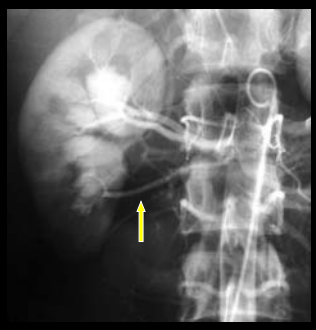
Collecting System: Case 7

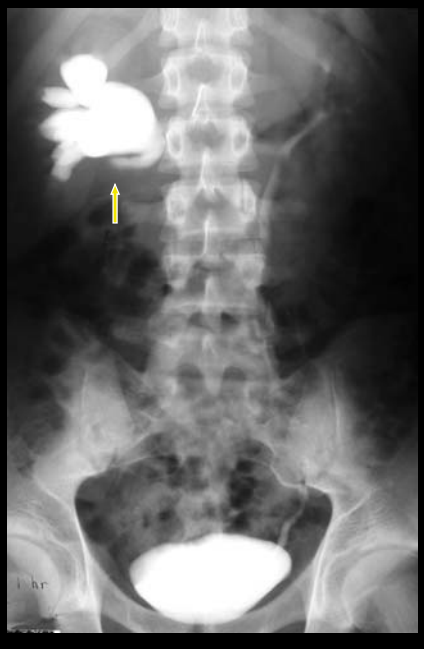
A 26 y.o. female presents with complaint of intermittent left flank pain that varies during the day. Nothing palpable.

(1 image)



1. Cystic renal cell CA
2. Simple renal cyst
3. Ureteropelvic junction (UPJ) obstruction
4. Transitional cell CA





Associated with crossing vessel

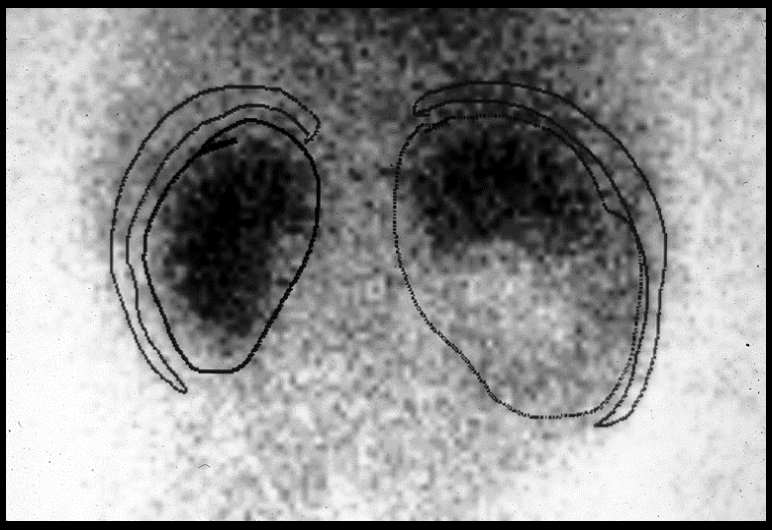
URETEROPELVIC JUNCTION (UPJ) OBSTRUCTION

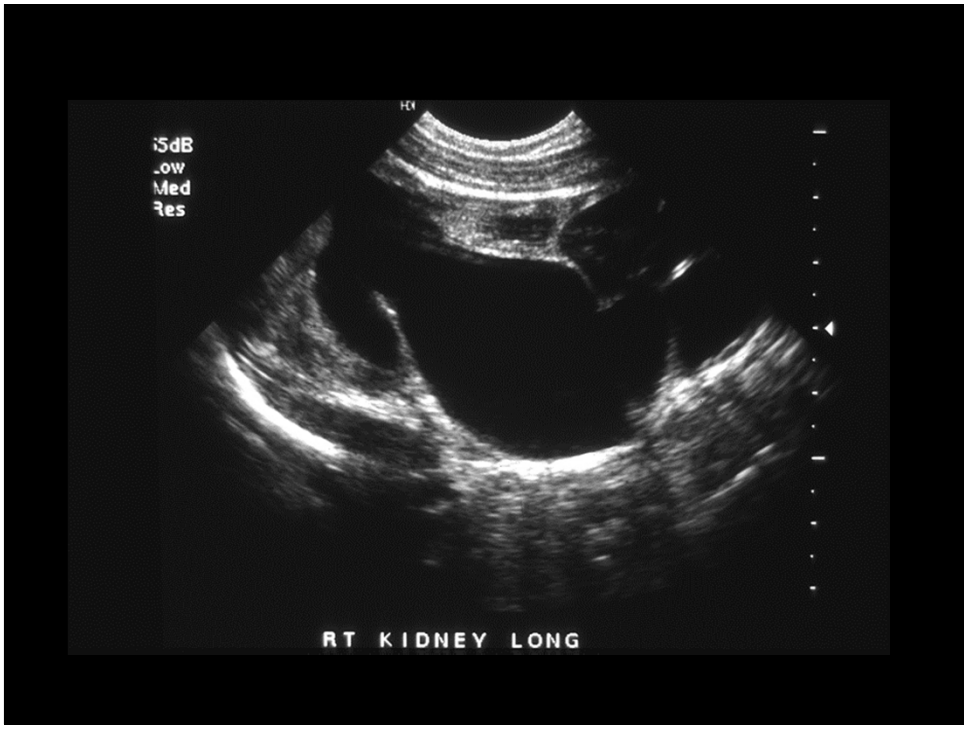
Additional examples

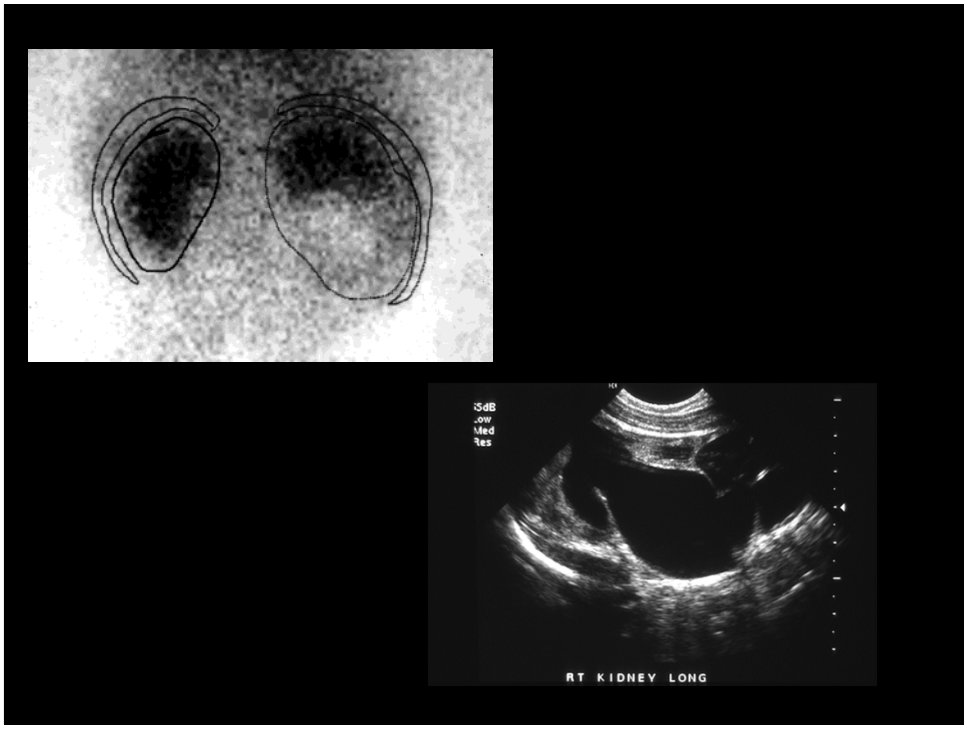
If duplicated system: UPJ of lower moiety

- 4 year old male child
- Abdominal discomfort.

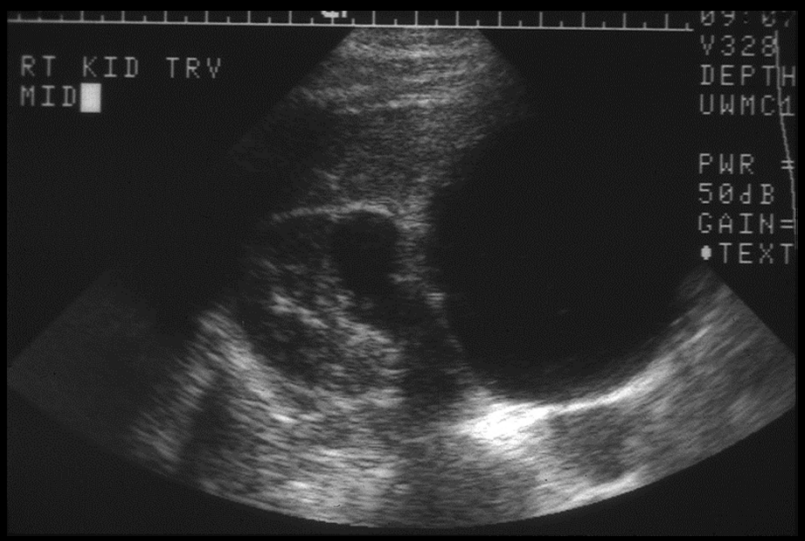
(3 images)



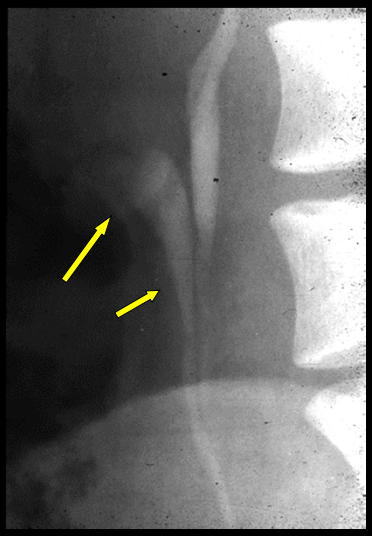

RT KIDNEY LONG


RT KIDNEY LONG

- 26 year old female medical student.
- "Mass" discovered in Physical Exam class by fellow student.



26 y.o. female with palpable right abdominal mass

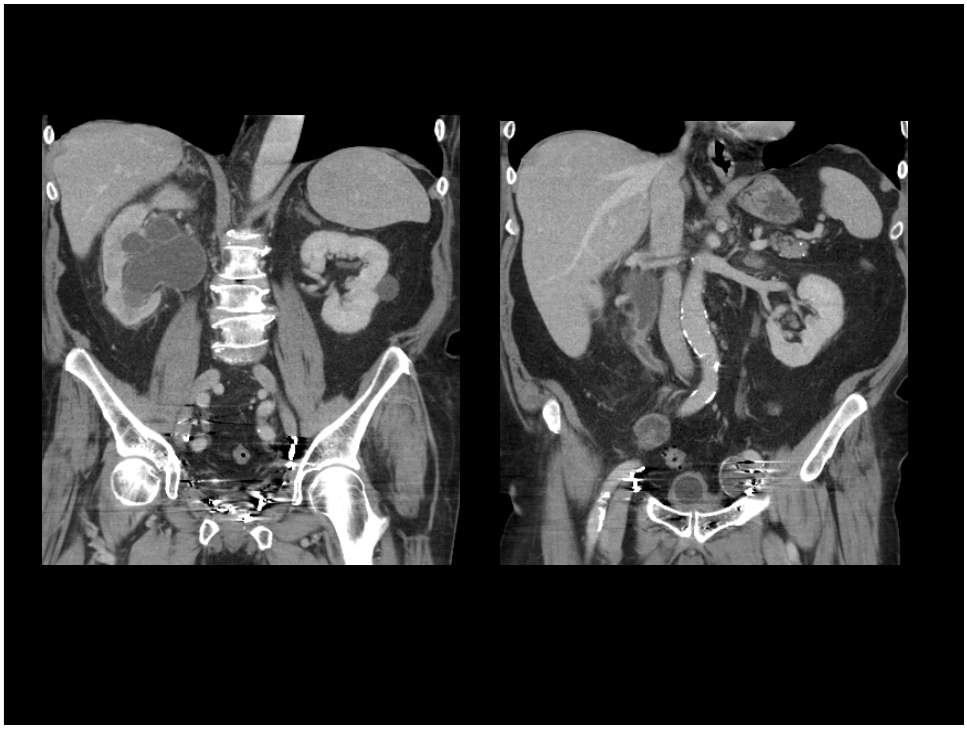


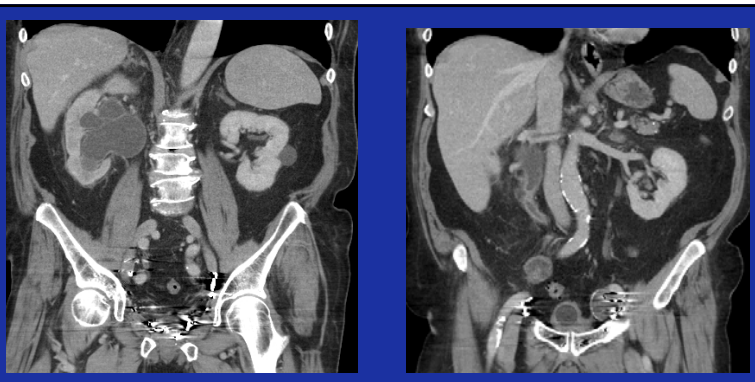
Urogram: reflux up bifid ureter to UPJ of lower moiety

Collecting System Case: 8

70 y.o. female, heavy smoker, with RBC's on urinalysis. No pain

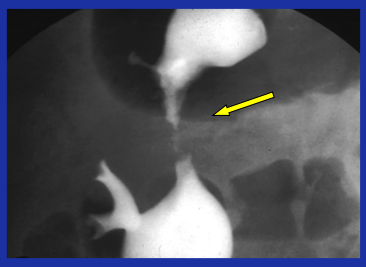
(2 images; 1 slide)



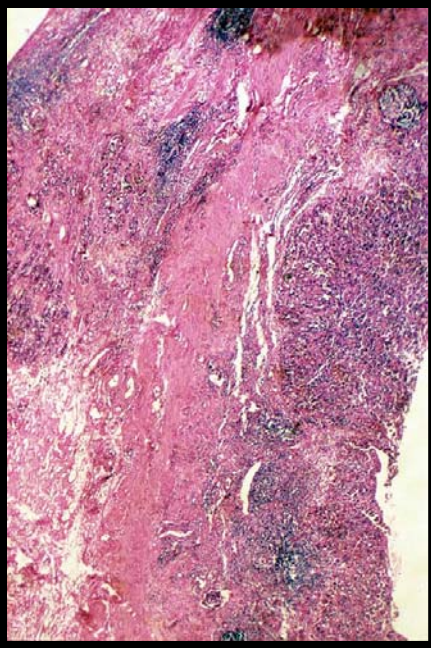


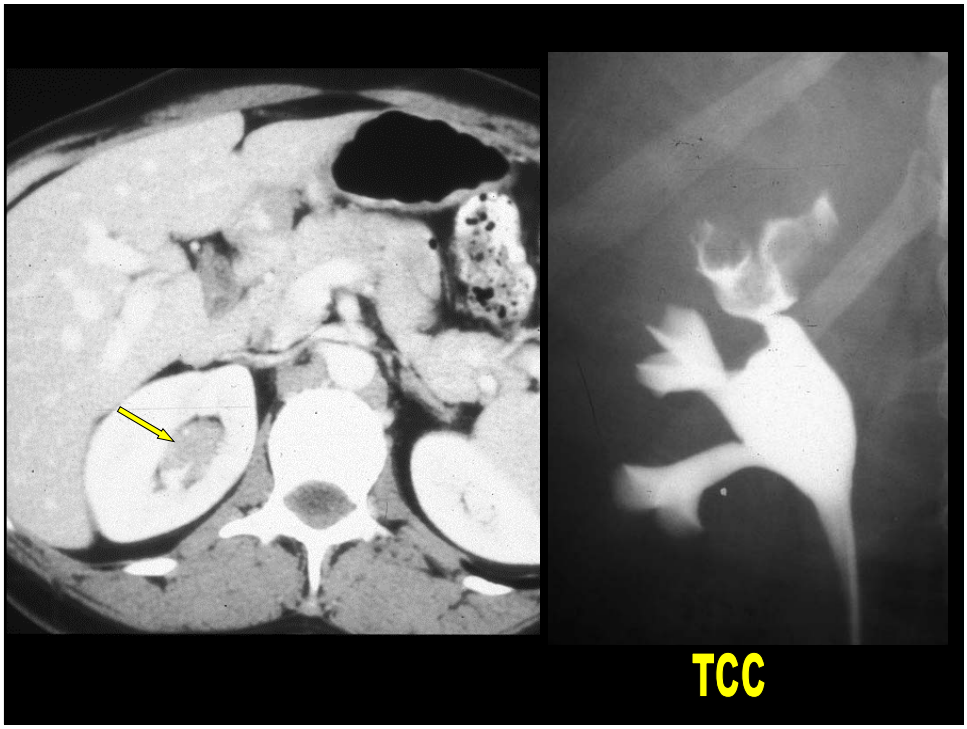
1. TCC of ureter
2. Sloughed papillae
3. Tuberculosis of ureter
4. Malakoplakia of ureter

TUMORS



TCC

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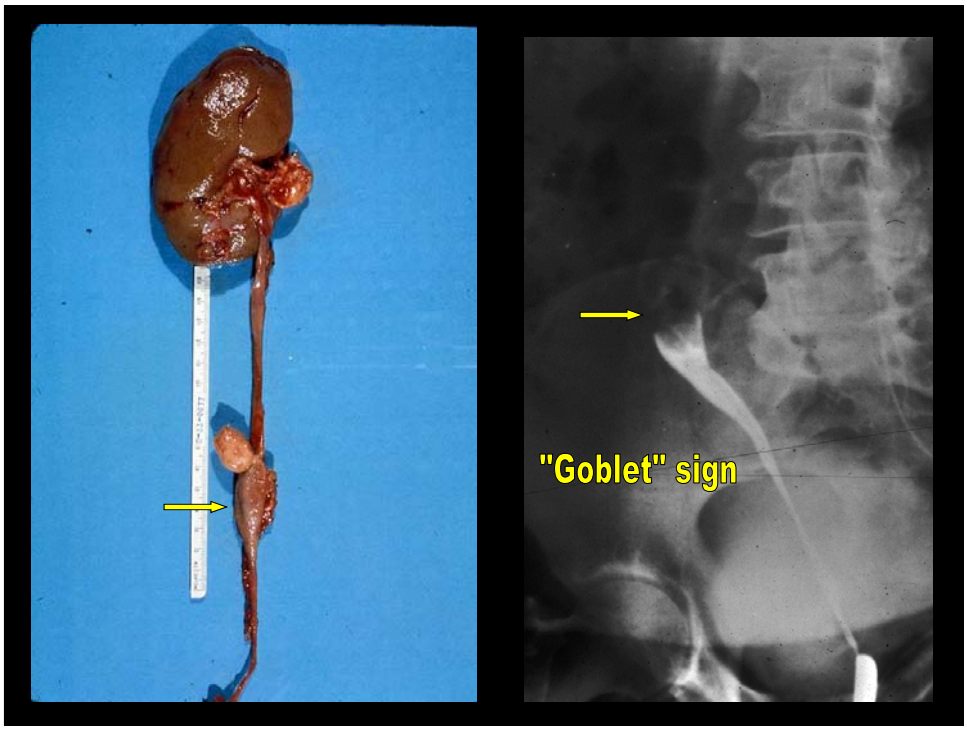
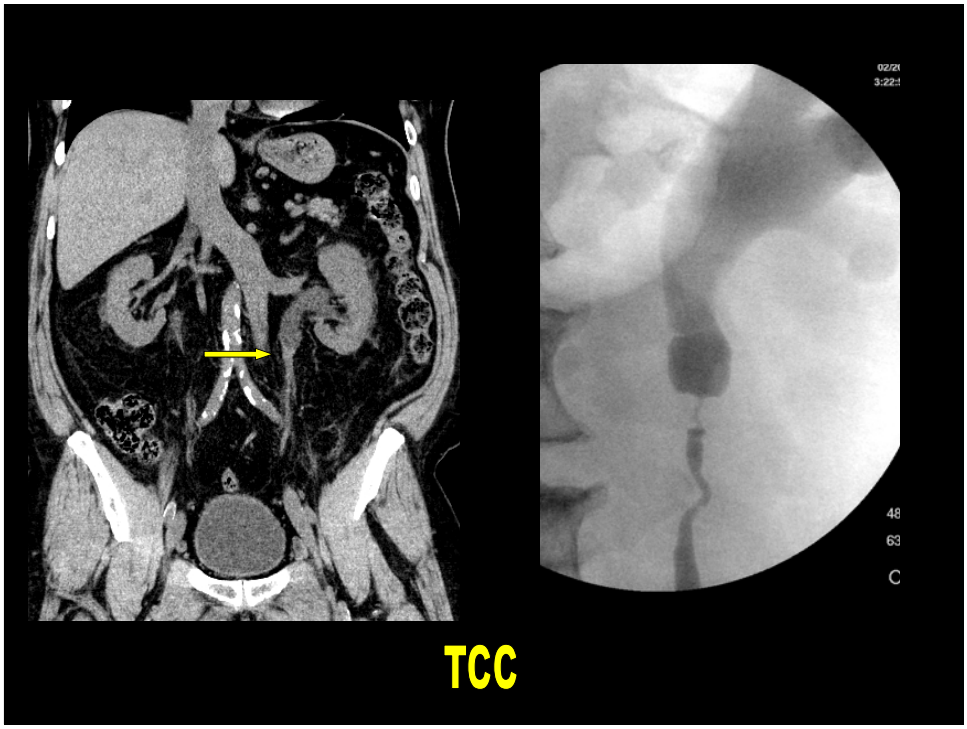

"Goblet" sign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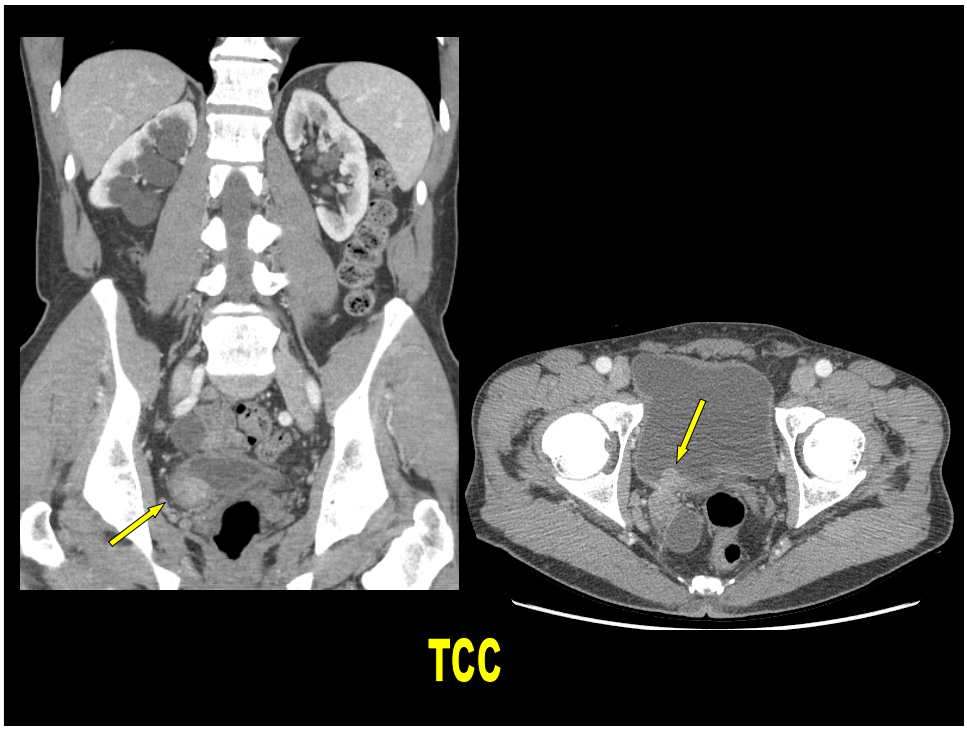
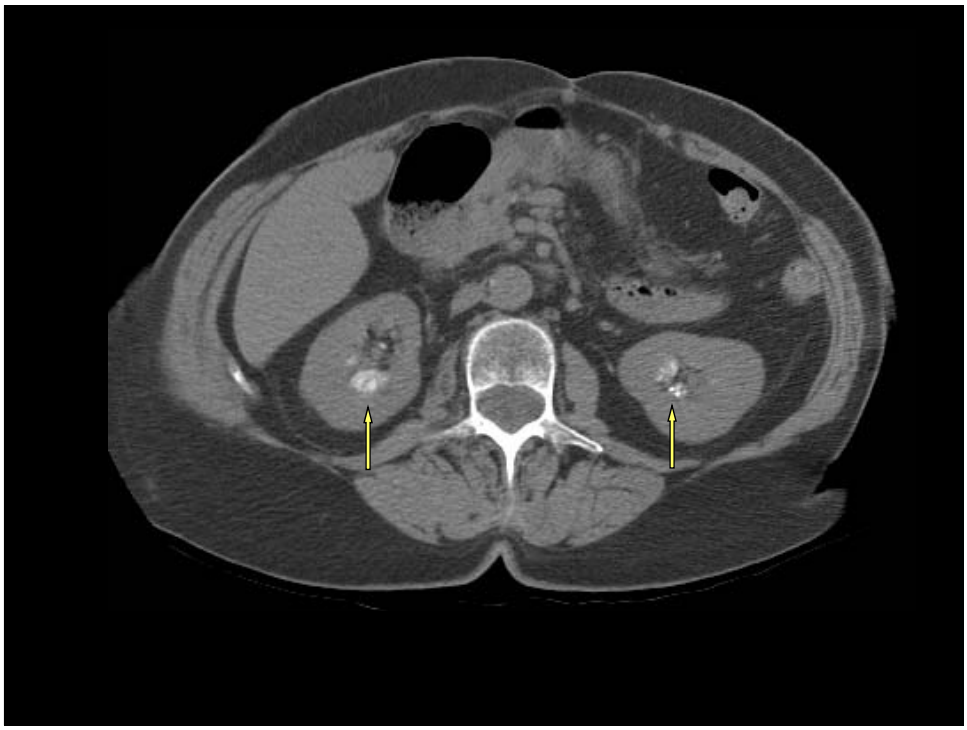
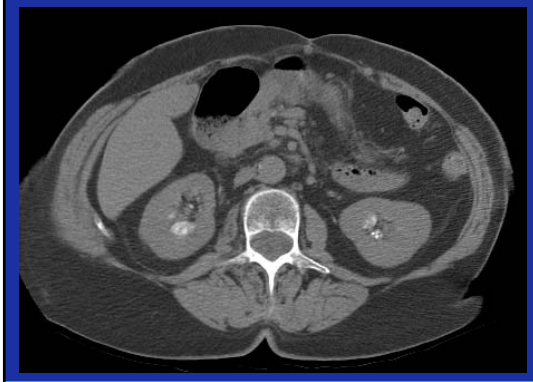

TCC

Collecting System Case: 9

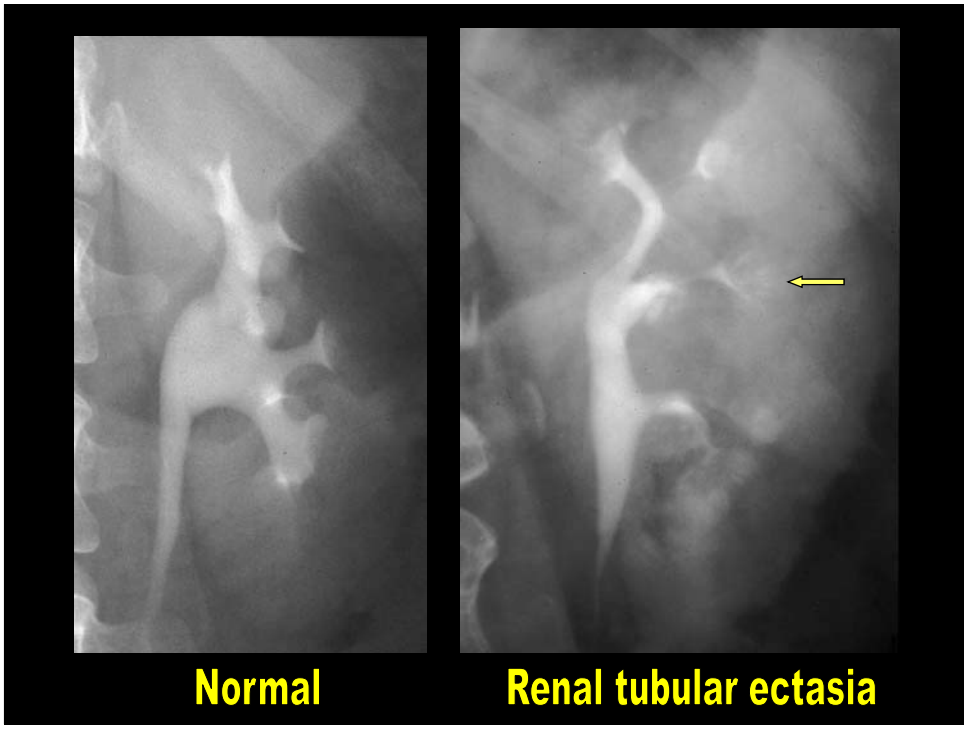
32 y.o. with RBC's on urinalysis. No history of diabetes, sickle cell disease, or pyelonephritis.

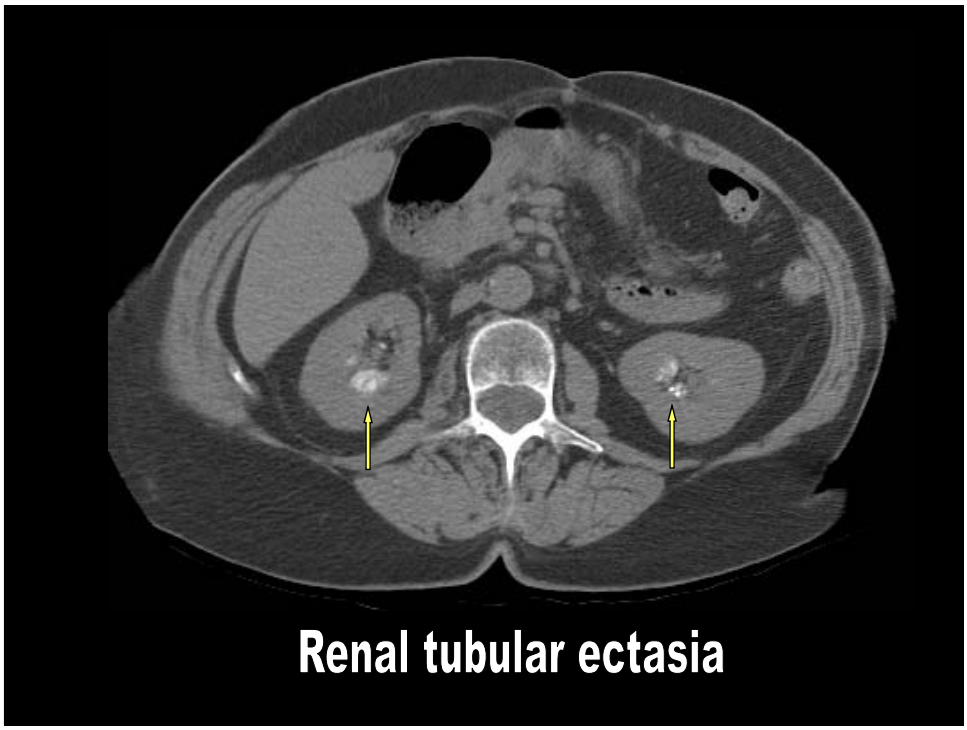
(2 images)





1. Renal Tubular Ectasia (MSK)
2. Papillary Necrosis
3. Tuberculosis
4. Chronic atrophic pyelonephritis


Normal
Renal tubular ectasia


Renal tubular ectasia

Collecting System Case: 10

32 y.o. with history of sickle cell disease
now has RBC's on urinalysis

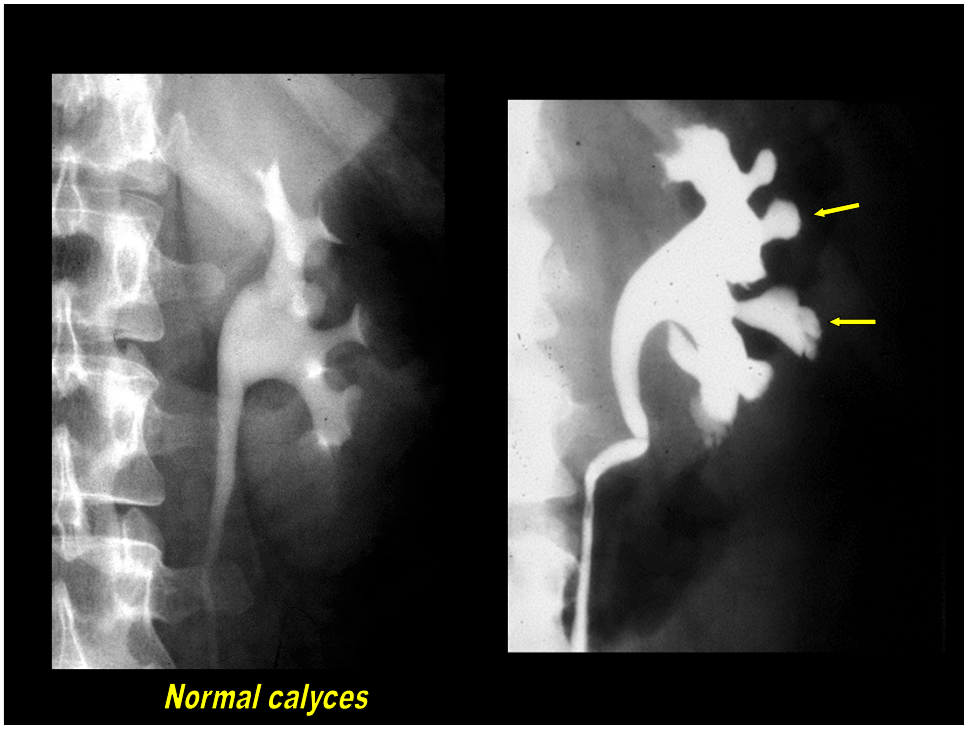
(2 images; one p.p. slide)

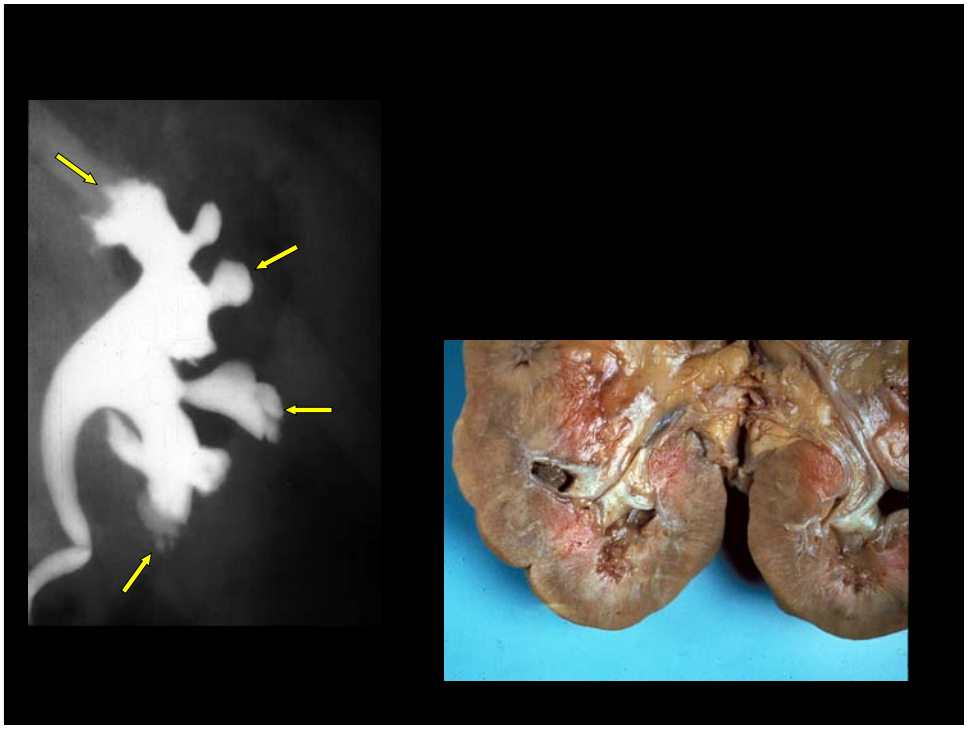
1. Transitional cell CA
2. Renal Tubular Ectasia (MSK)
3. Papillary necrosis
4. Calcium phosphate renal calculi

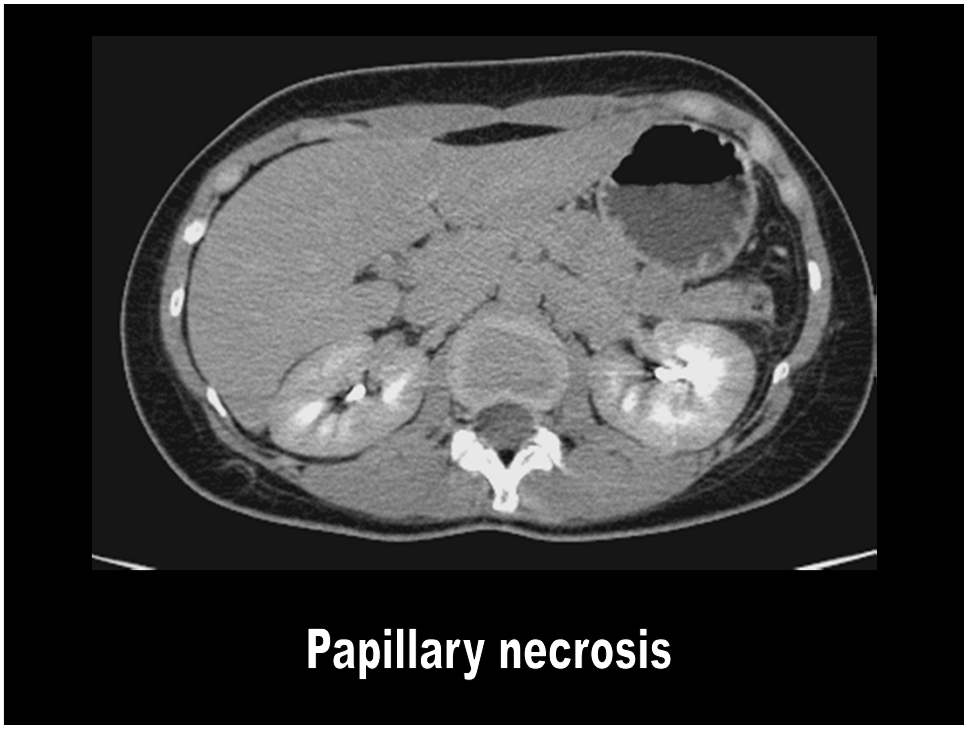
PAPILLARY NECROSIS

Many etiologies
- Sickle cell hemoglobinopathies
- Analgesic abuse
- Diabetes mellitus
- Tuberculosis

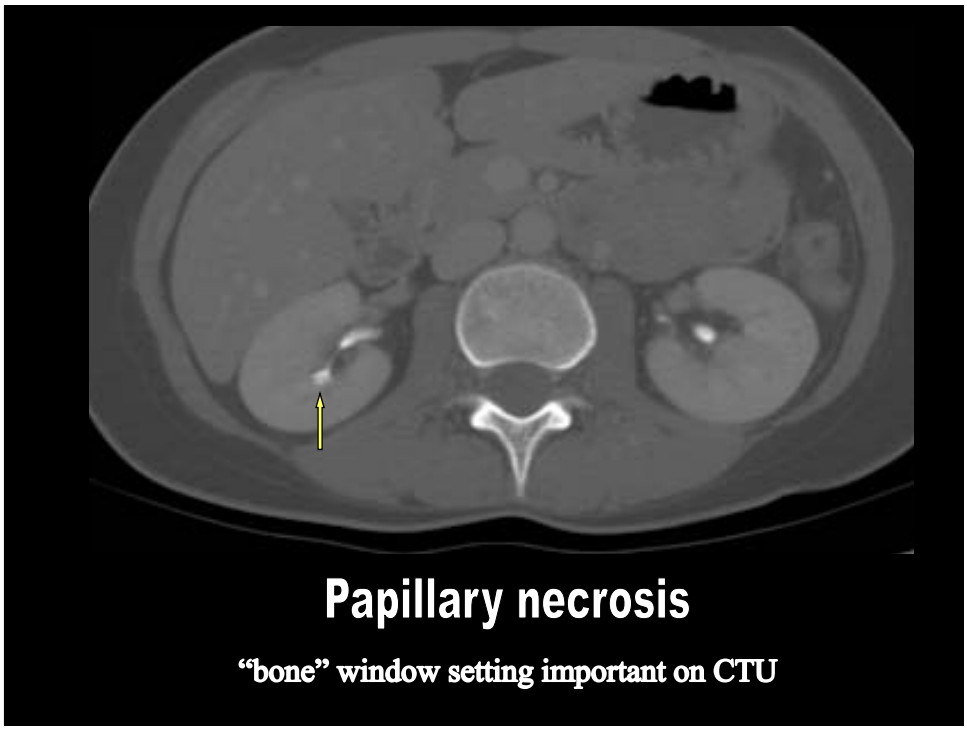
Cavities at papillary tips
- -- variable size, number


Normal calyces



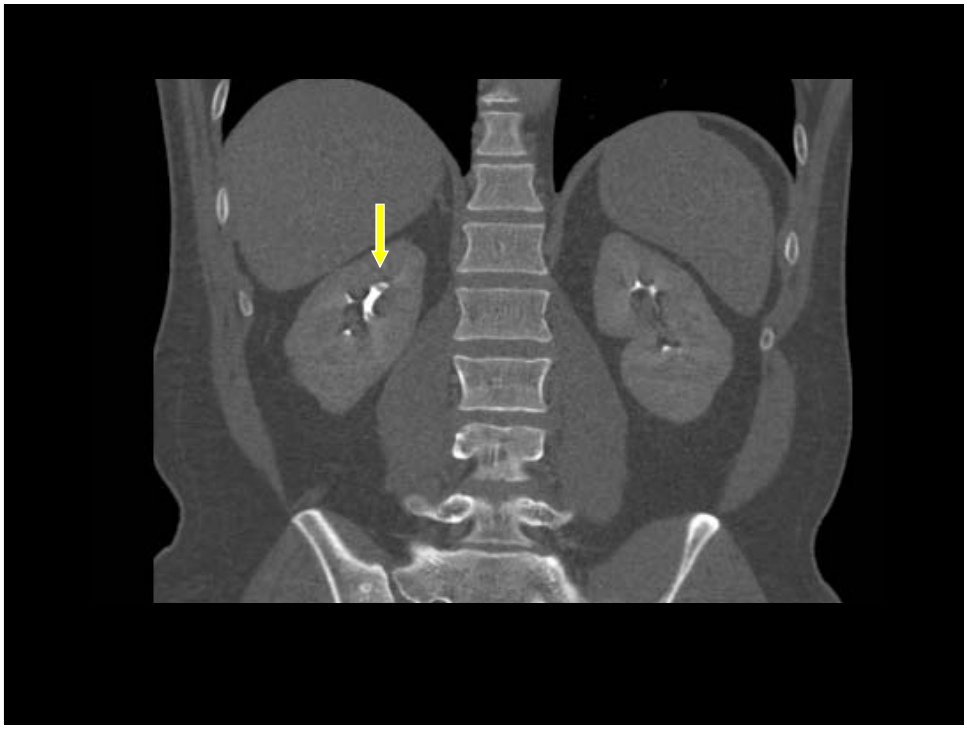


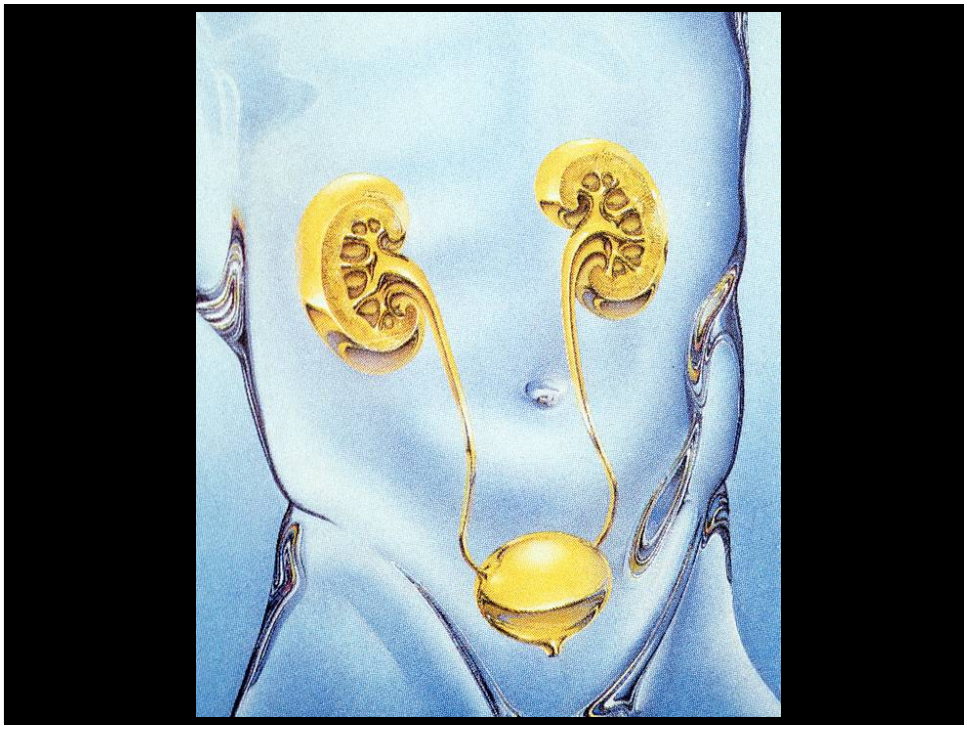
Papillary necrosis



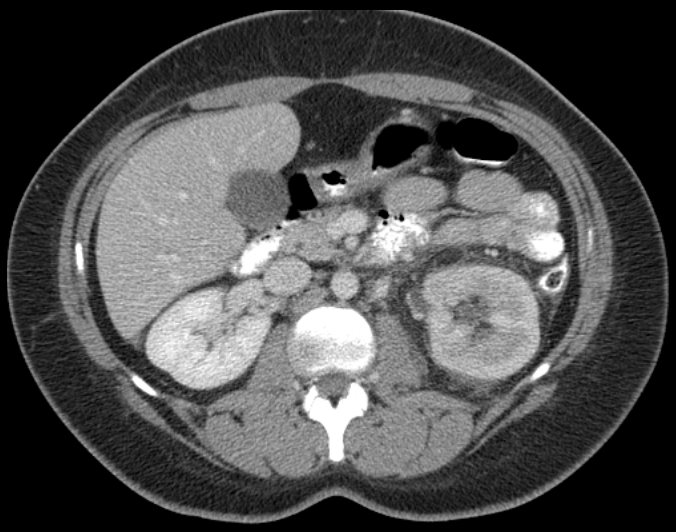
Papillary necrosis

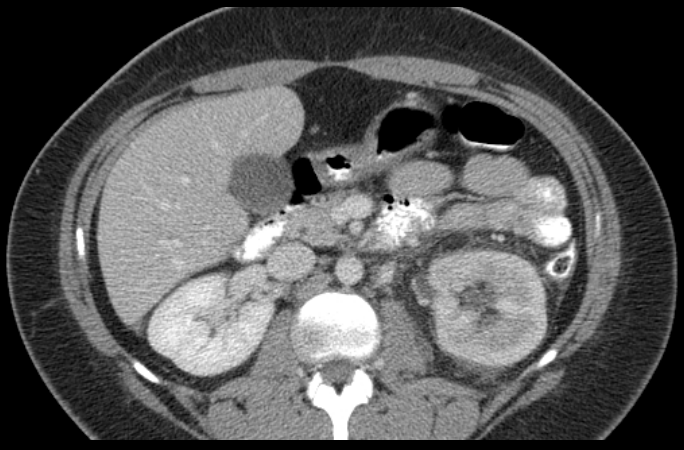
"bone" window setting important on CTU





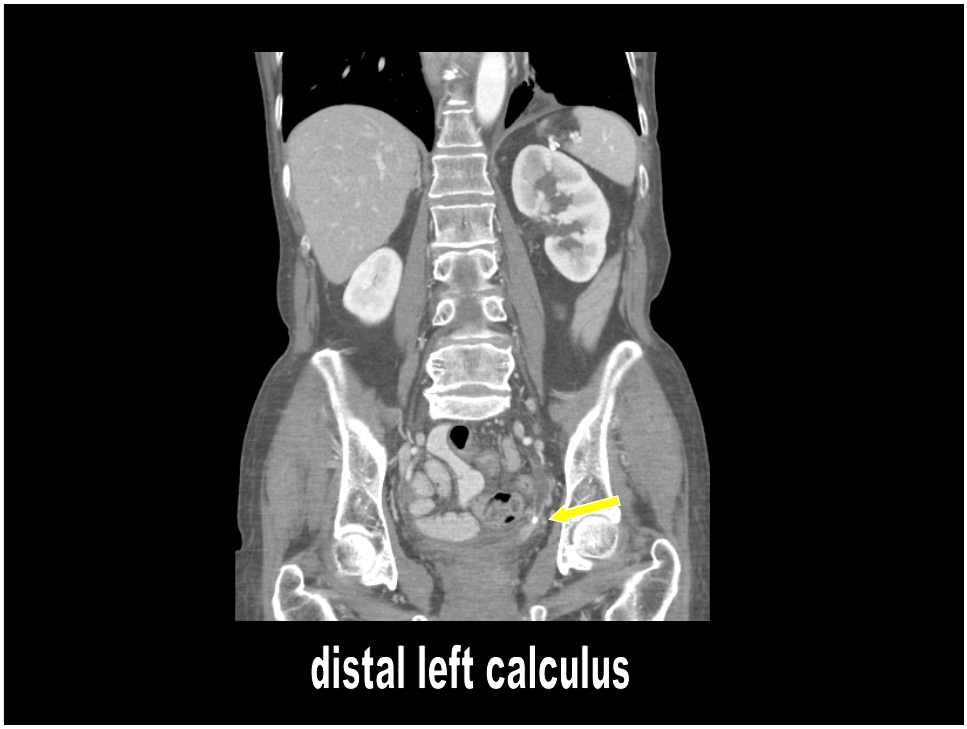
Acute Obstruction

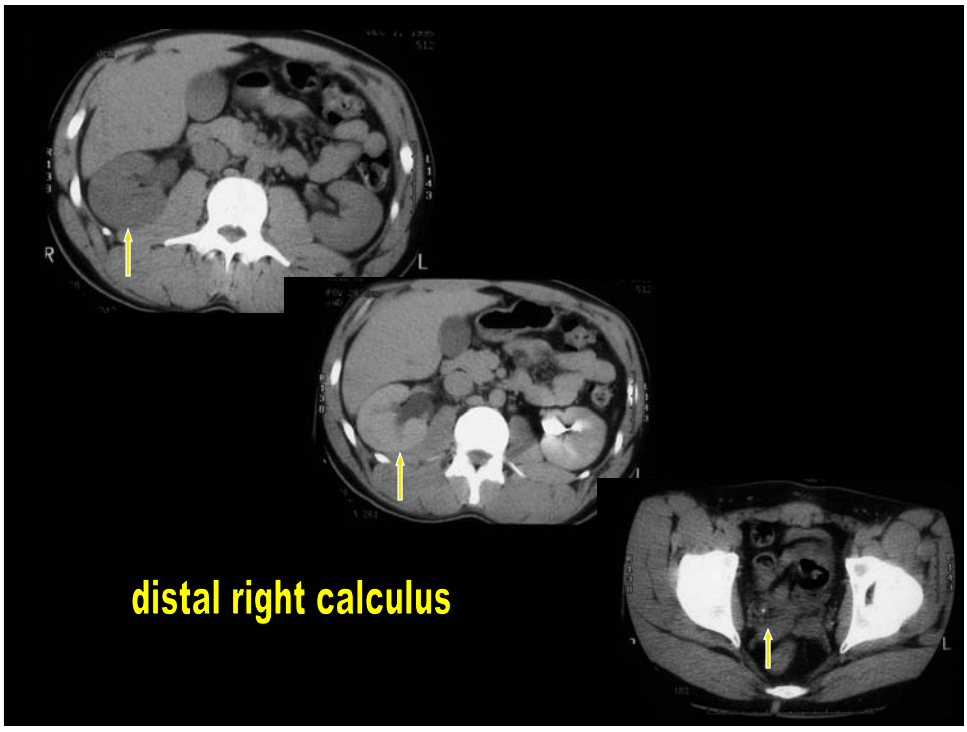


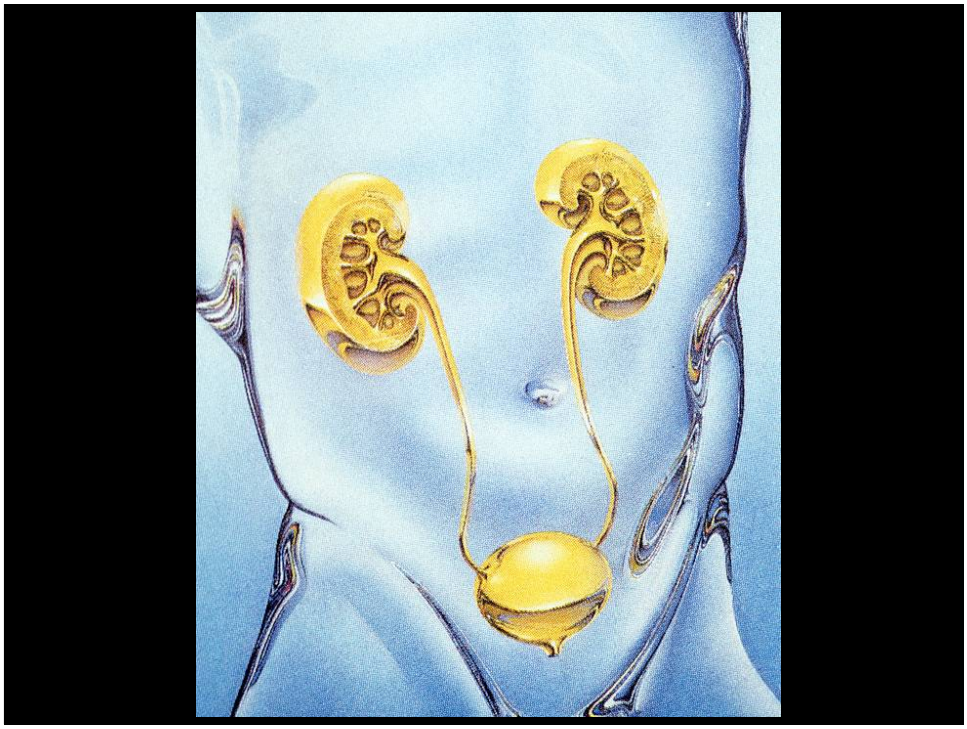


Four important findings:

1. Delayed excretion
2. Enlarged kidney
3. Caliectasis
4. Peripelvic and perinephric stranding.


distal left calculus

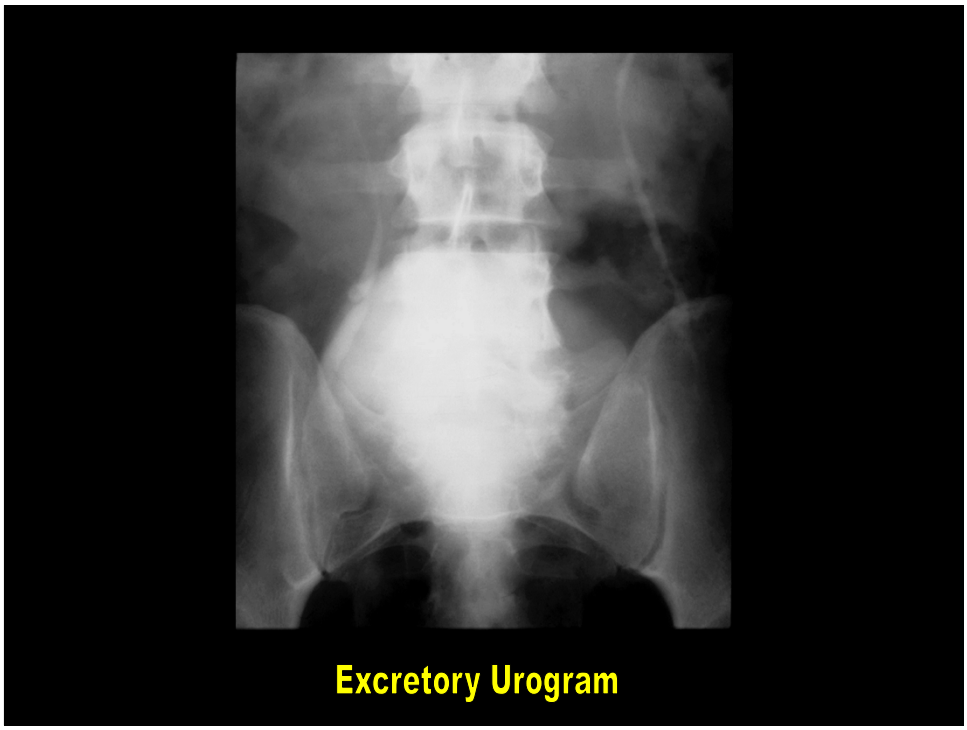

distal right calculus



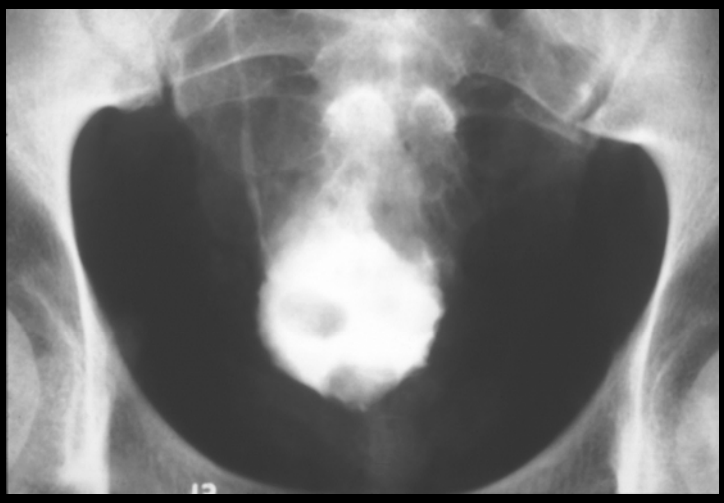
Collecting System

Pelvic Lipomatosis

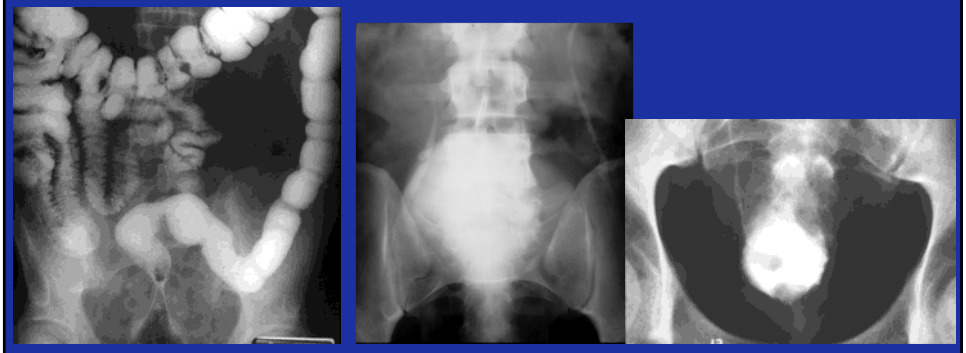
(4 images)



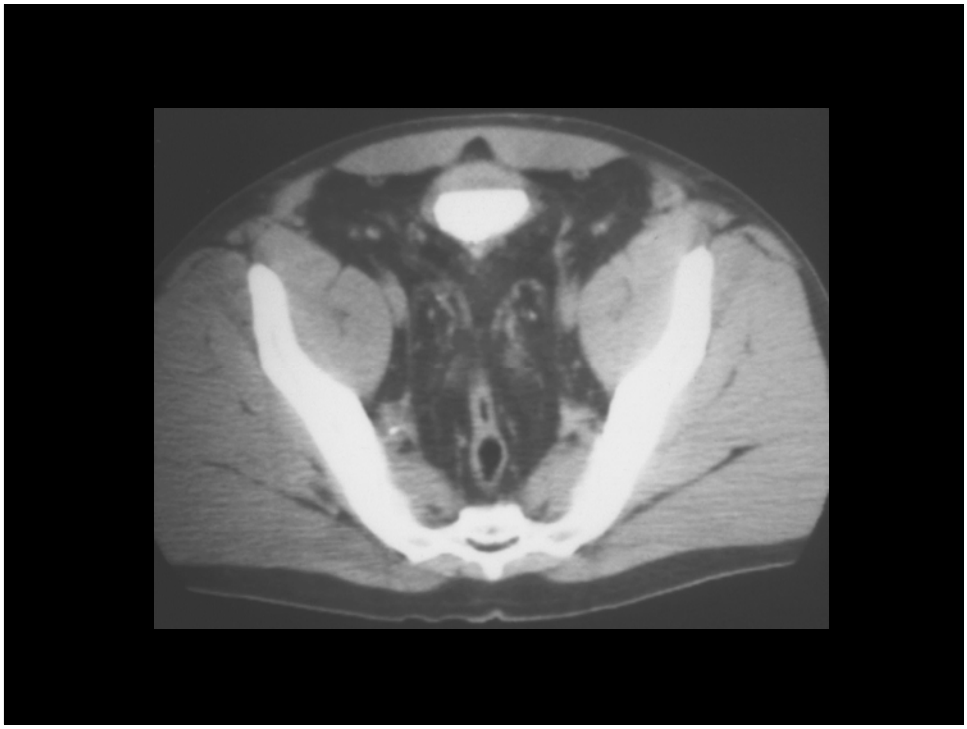
Excretory Urogram



Excretory Urogram: post-void



Collecting System: Pelvic lipomatosis
(secondary cystitis glandularis)



Thank you