ANPH 252:

Urinary Pathology

Terminology

- Hematuria -Blood in Urine
- Pyuria - Pus in Urine
- Anuria - No Urine
- Dysuria - Difficult/Pain to Urinate
- Polyuria – Large/Excessive amounts of urine

Terminology

- Flank Plain
  - Pain in the mid to back
- Renal Colic
  - Pain caused by passage of kidney stone

Inflammatory Disorders

- Cystitis
- Pyelonephritis

Cystitis

- Inflammation of the urinary bladder
- More common in women due to shorter urethra
- Bacteria enter the urethra and travel to the bladder
- Can also be caused by catheterization, most common hospital acquired infection for patients

Cystitis

- Cystitis. Intravenous urogram shows irregular, lobulated filling defects (representing intense mucosal edema) at the base of the bladder.



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Pyelonephritis

- infection of the kidneys and renal pelvis, caused by pyogenic bacteria
- affects interstitial tissue between the tubules
- usually unilateral
- more common in women and children
- also develops in patients with obstruction of the urinary tract


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Pyelonephritis

- Associated with fever, flank pain, dysuria and pyuria
- Appears radiographically as clubbing of the calyces due to interstitial edema
- Treated with antibiotics and fluid management
- More aggressive treatment may involve surgery, percutaneous drainage and antibiotics



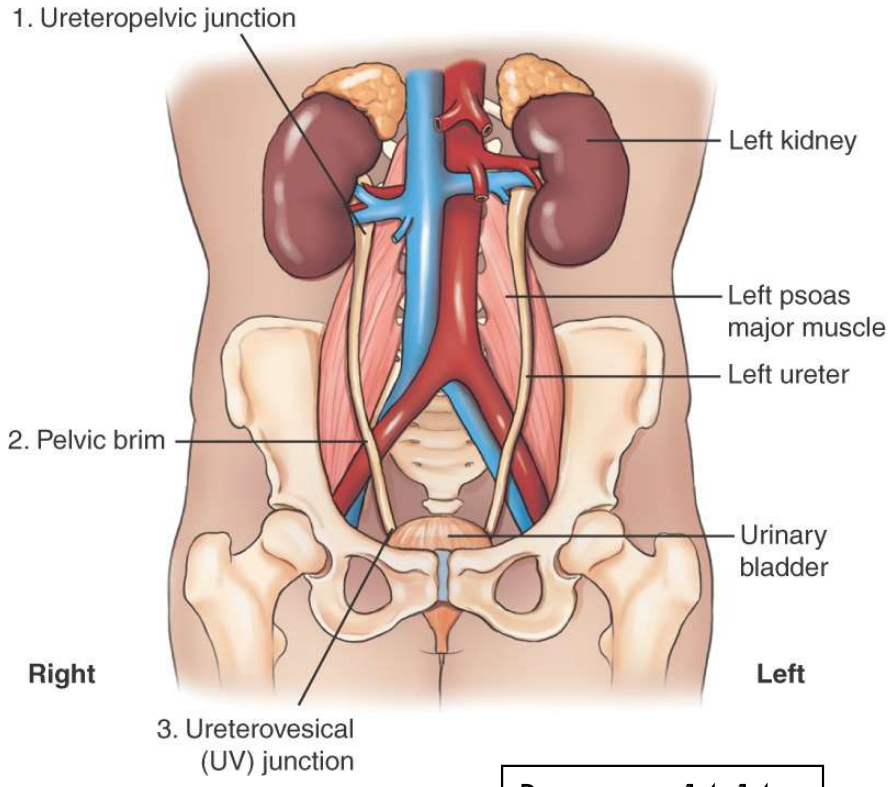
Case courtesy of Dr Dalia Ibrahim
Radiopaedia.org, rID: 31188

Urinary Calculi

- Urinary/Renal Calculi
- Form in the kidney
- Asymptomatic until the obstruct the ureter, causing extreme pain
- Usually contain enough calcium to be seen on plain radiographic imaging

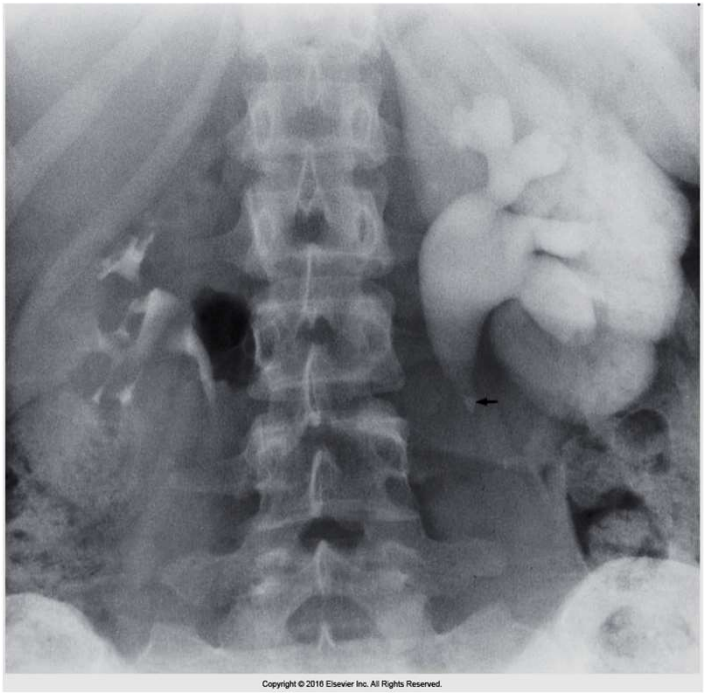
Stones can obstruct at constriction points of the ureter

- Three constriction points of the ureter
  1. Ureteropelvic Junction
     - Junction between the renal pelvis and ureter
  2. Brim of the Pelvis
     - Illiac blood vessel intersects with the ureter
  3. Ureterovesical Junction
     - The opening between the ureter and the bladder



Bontrager 14-14

Calculi

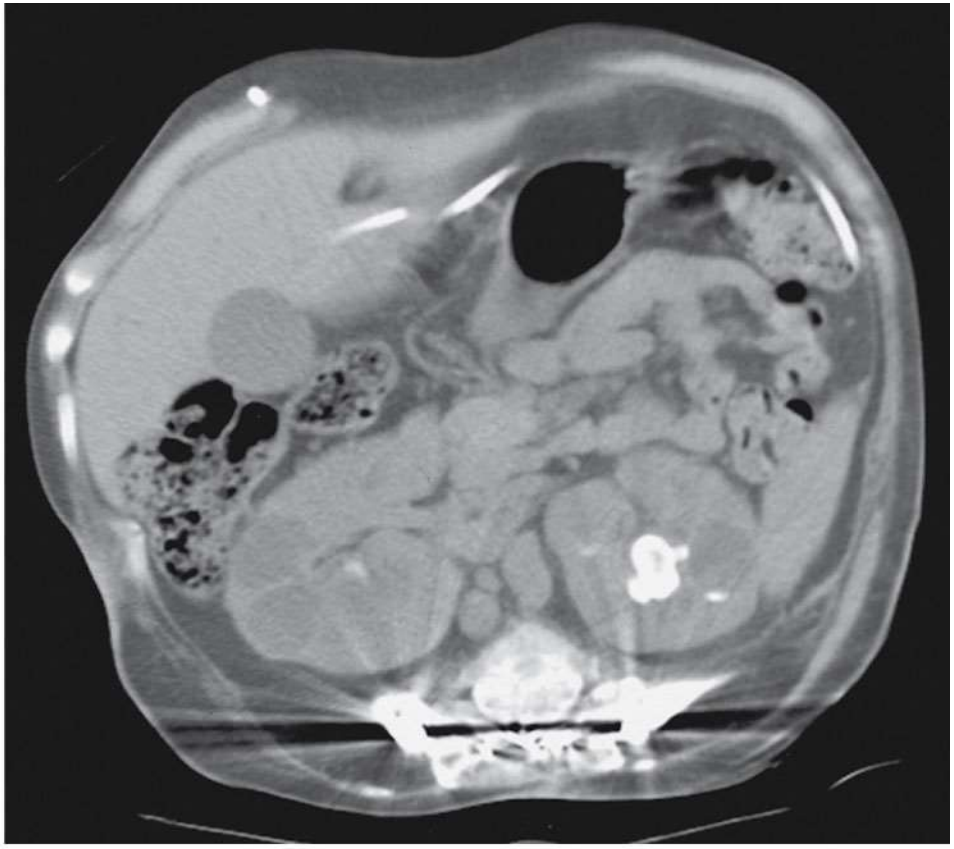

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Obstructing ureteral calculus. Intravenous urogram demonstrates prolonged nephrogram and pronounced dilatation of collecting system and pelvis proximal to the obstructing stone (*arrow*). **Figure 06-28.**



Case courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 12555

B



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Spiral CT scanning obtained at 5-mm intervals on an 11-year-old boy, demonstrating bilateral renal calculi with caliectasis (dilated calyces) and kidney enlargement.

Figure 06-26B

Staghorn Calculi

- Large calculus that fills the renal pelvis and assumes the shape of the calyces



Case courtesy of Dr Natalie Yang, Radiopaedia.org, rID: 9733

Urinary Tract Obstruction

- Blockage above the level of the bladder causes unilateral dilation of the ureter, hydroureter, and dilation of the renal pelvicalyceal system, hydronephrosis

Hydronephrosis


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Hydronephrosis of pregnancy. Intravenous urogram performed 3 days postpartum demonstrates bilateral large kidneys with dilatation of ureters and pelvicalyceal systems, especially on the right. The large pelvic mass (*arrows*) indenting the superior surface of the bladder represents the uterus, which is still causing extrinsic pressure on the ureters. **Figure 06-34**



Case courtesy of Dr Ian Bickle, Radiopaedia.org, rID: 27831

Neoplastic Disorders

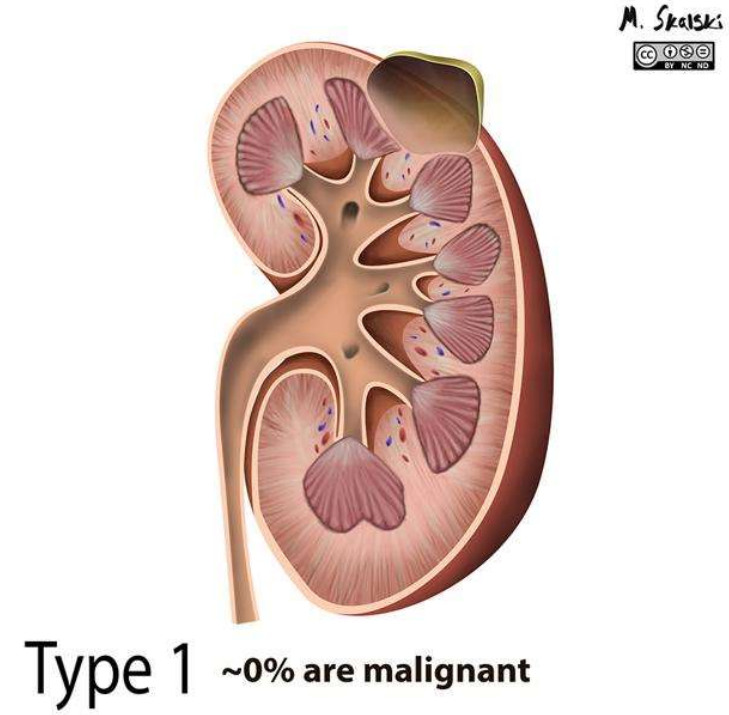
- Simple Renal Cyst
- Malignant Hypernephroma
- Cancer of Bladder

Simple Renal Cyst

- Evaluated by complexity
- A simple cyst is mainly a benign type of cyst
- More complex cysts/ lesions can be suspicious for malignamncy
- Increased frequency with age, seen on 40% of CT scans as an incidental finding
- Usually asymptomatic, but rupture can cause pain
- Can displace the renal pelvis and calyces
- If hematuria or hypertension occurs, a cyst aspiration will be used to determine type of cyst or drain cyst for therapeutic relief

Simple Renal Cyst

- Case courtesy of Dr David Cuete, Radiopaedia.org, rID: 27479



Simple Renal Cyst

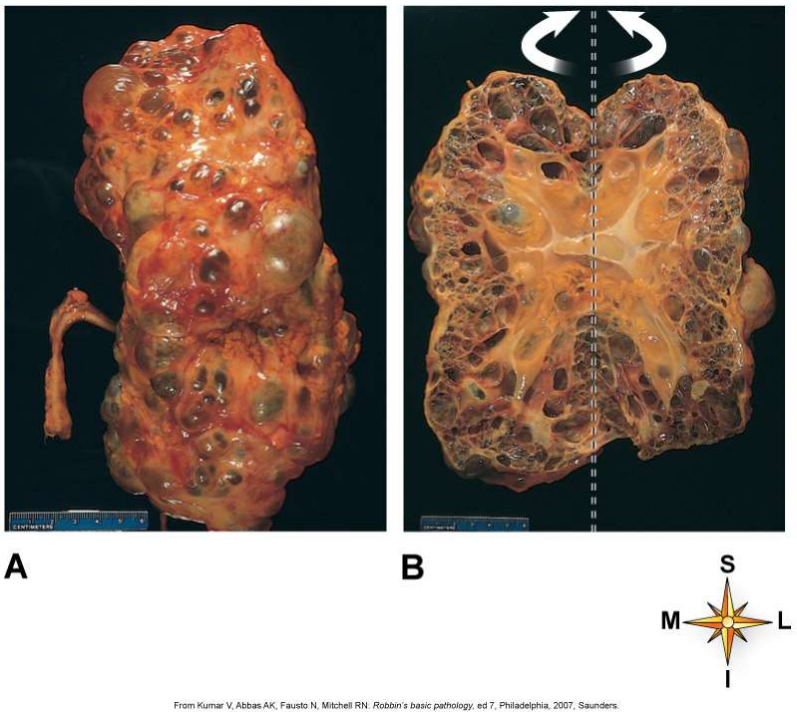


Case courtesy of David Puyó, Radiopaedia.org, rID: 18176

Polycystic Kidney Disease

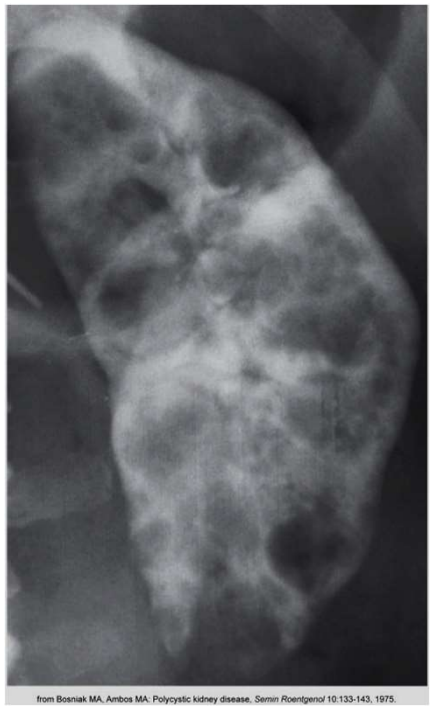
- Genetic disorder, usually asymptomatic until 3rd or 4th decade
- Multiple fluid-filled cysts in tubules of nephrons
- Symptoms include high blood pressure, headaches, abdominal pain, hematuria and polyuria
- Can alter appearance and function of the kidney
- Appearance of "a bunch of grapes" or "swiss cheese" appearance scattered throughout the kidney
- No cure, renal failure will require dialysis and possible transplant

Polycystic Kidney Disease



From Kumar V, Abbas AK, Fausto N, Mitchell RN: *Robbin's basic pathology*, ed 7, Philadelphia, 2007, Saunders.

Figure 20-15 – Patton and Thibodeau



from Bosniak MA, Ambos MA: Polycystic kidney disease, *Semin Roentgenol* 10:133-143, 1975.

Fig. 6-39 - Eisenberg

THANKS