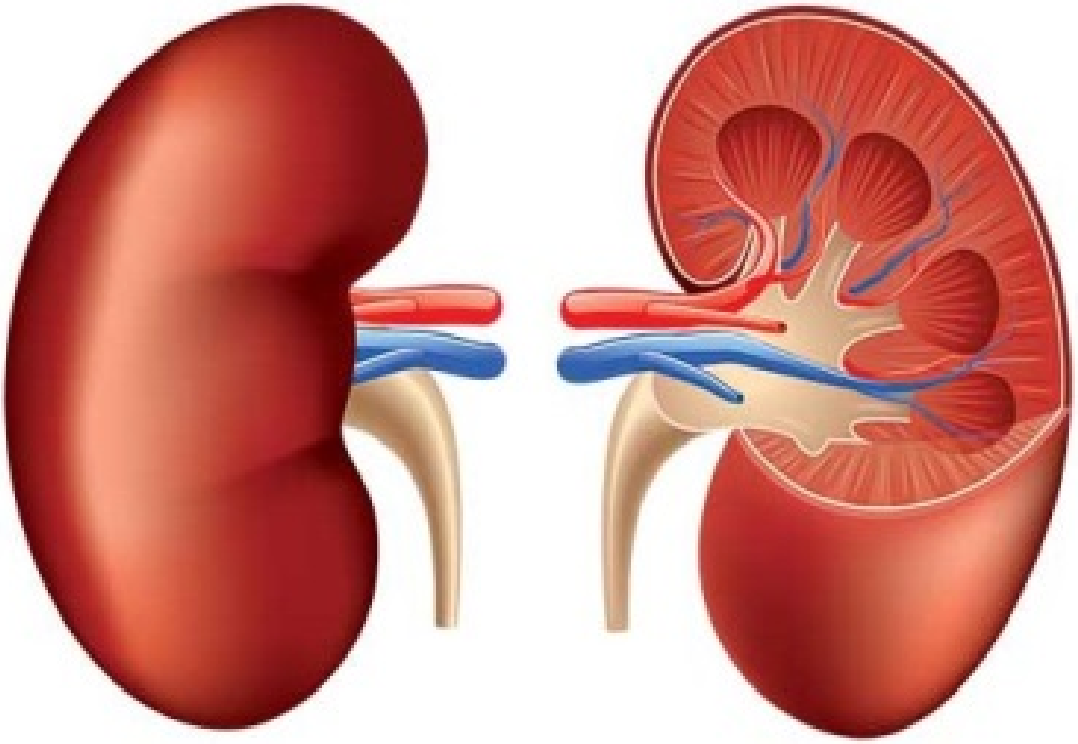
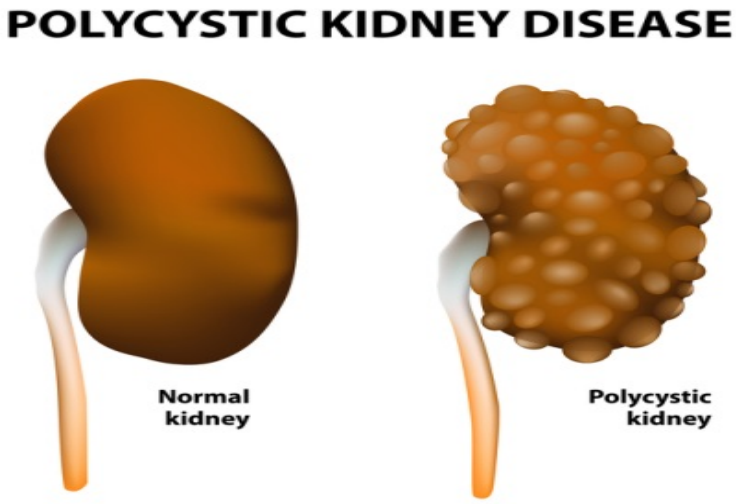
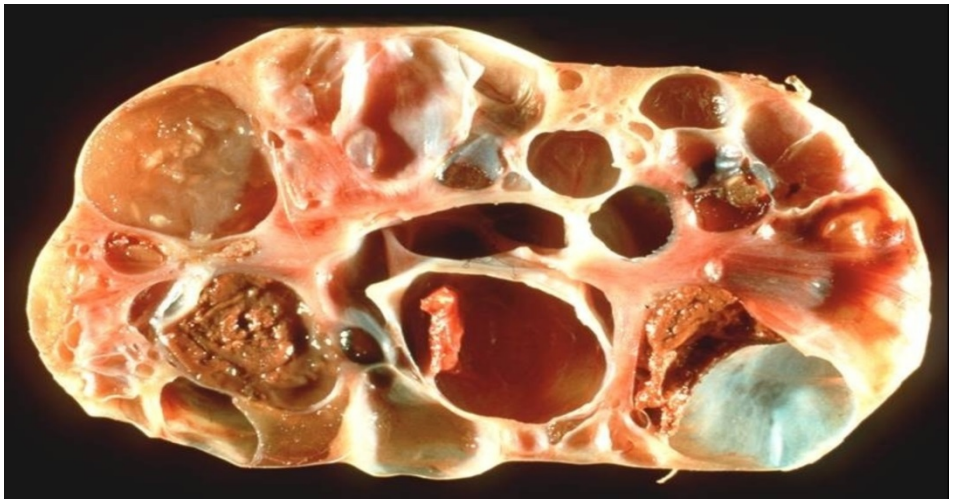
Lab 9
Renal Pathology



Polycystic kidney disease

- **It is characterized by tubular dilatation with cyst formation interspersed between normally functioning nephrons. The cysts may be single or multiple and can vary in size from microscopic to several centimeters in diameter.**



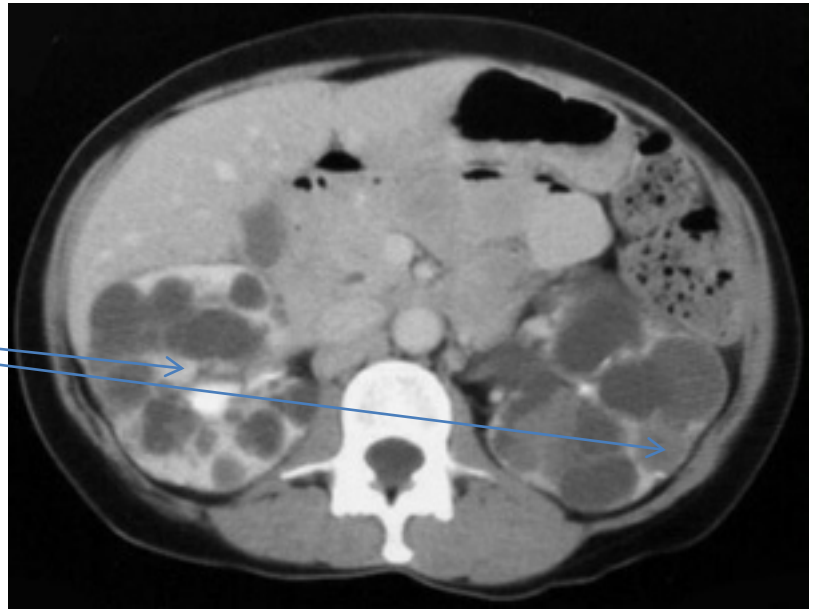


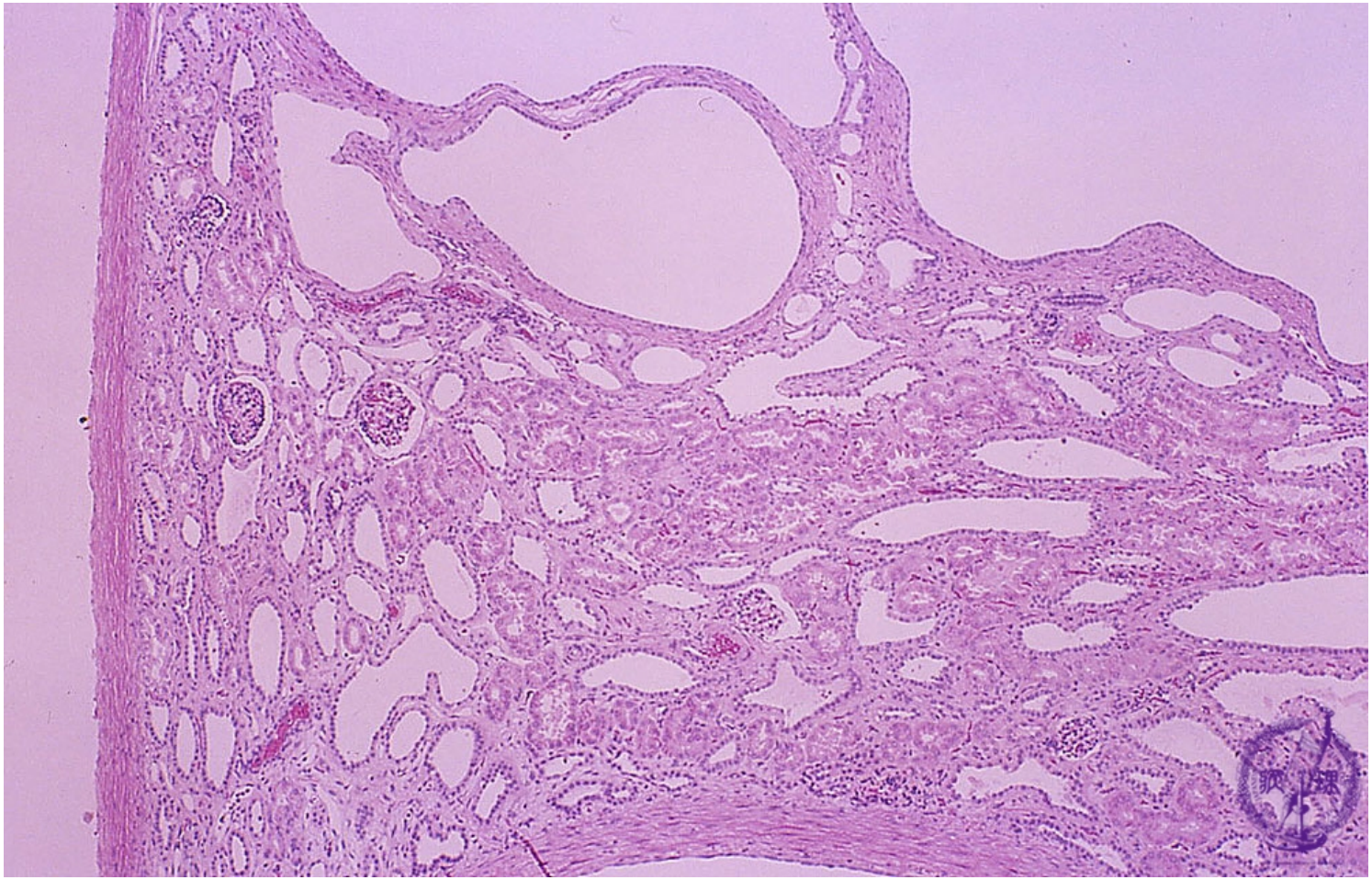
- **Types:**

1. Autosomal recessive:

- **It is present at birth.**
- **It is bilateral, and significant renal dysfunction usually is present**

Pediatric Radiology CT showing multiple cysts bilaterally





Autosomal recessive PKD in infant

- **Liver fibrosis and portal hypertension may occur.**
- **It can be diagnosed by ultrasonography.**
- **There is no known treatment for the disease. Approximately 75% of infants die during the perinatal period.**

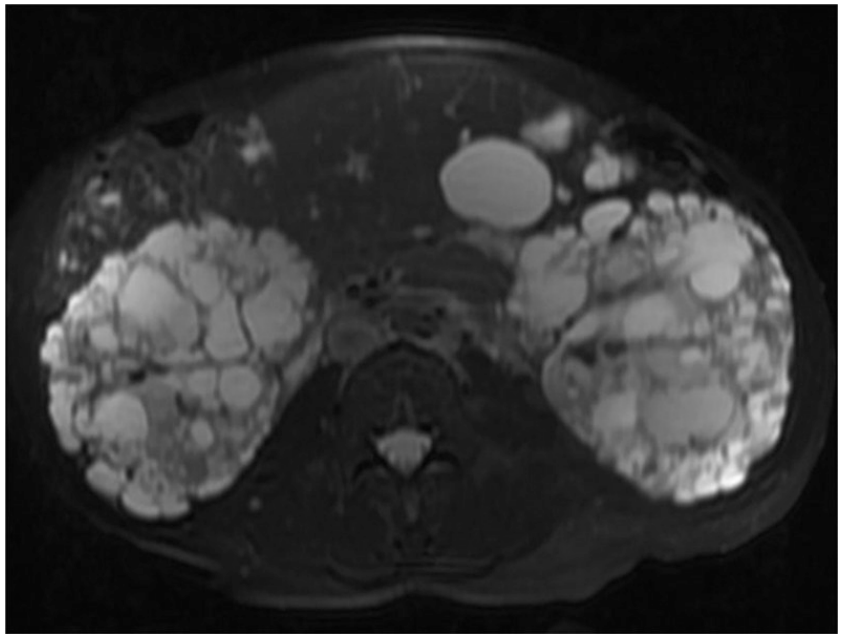
2. Autosomal dominant :

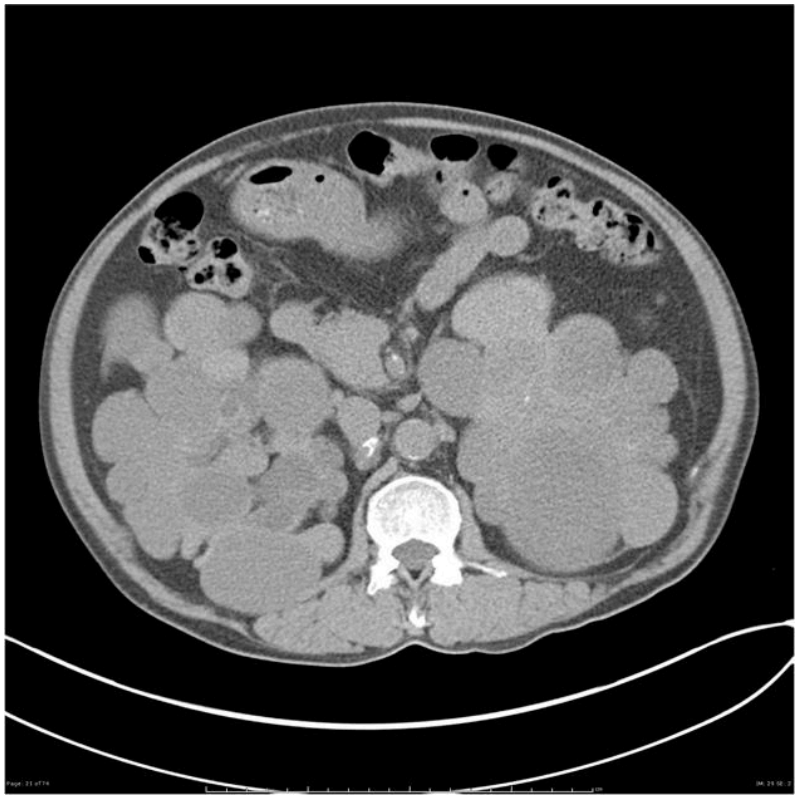
- **It affects children and adults and also called adult polycystic kidney disease.**
- **The symptoms occur later in life.**
- **Three types of genes are implicated:**

a. **First gene is polycystic kidney disease gene called PKD1, located on chromosome 16, is responsible for approximately 85% of cases.**

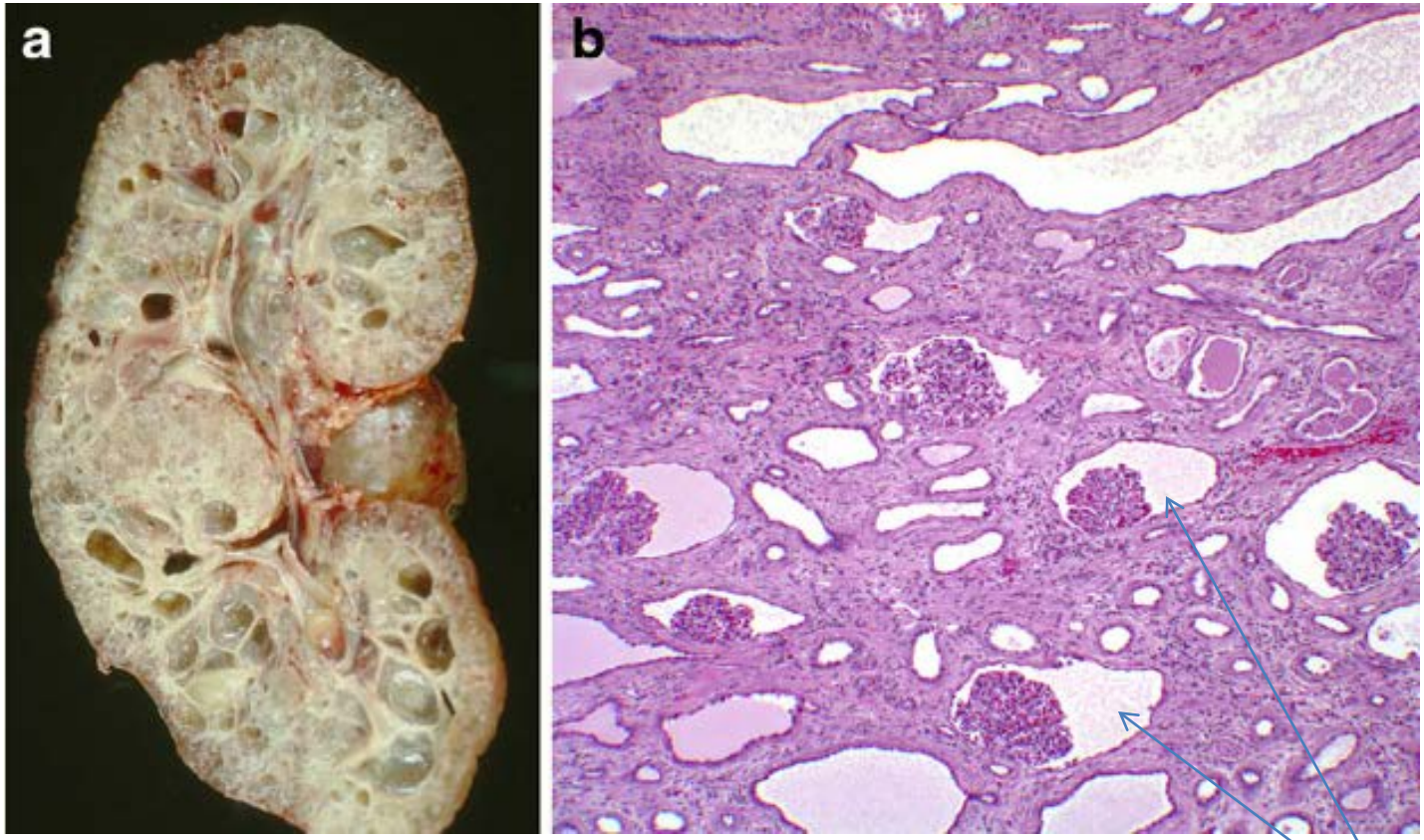
b. **Second gene, called PKD2, which is located on chromosome 4, is responsible for a milder form of the disease.**

c. **Third gene, PKD3, on chromosome 11, is responsible for a minority**





MRI of the abdomen and pelvis of a patient affected by autosomal dominant polycystic kidney disease



Autosomal dominant polycystic kidney disease **cysts**

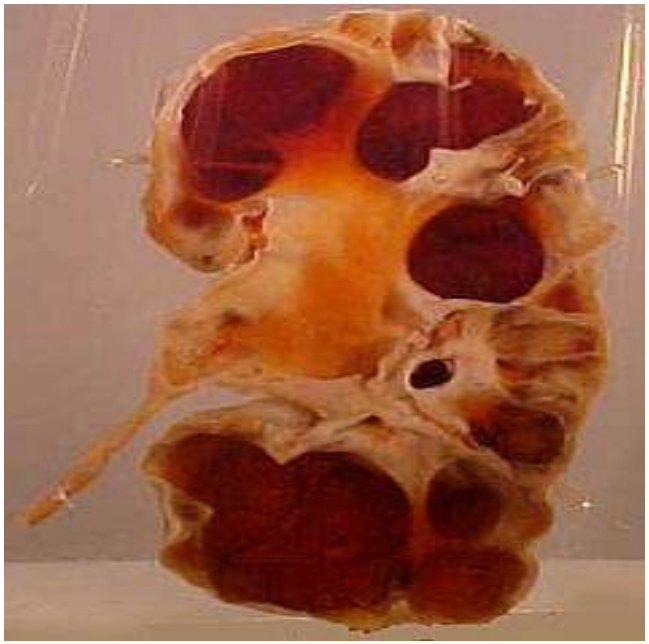
Urinary tract obstruction

- **It can occur in persons of any age and can involve any level of the urinary tract from the urethra to the renal pelvis.**
- **The two most damaging effects of urinary obstruction are:**

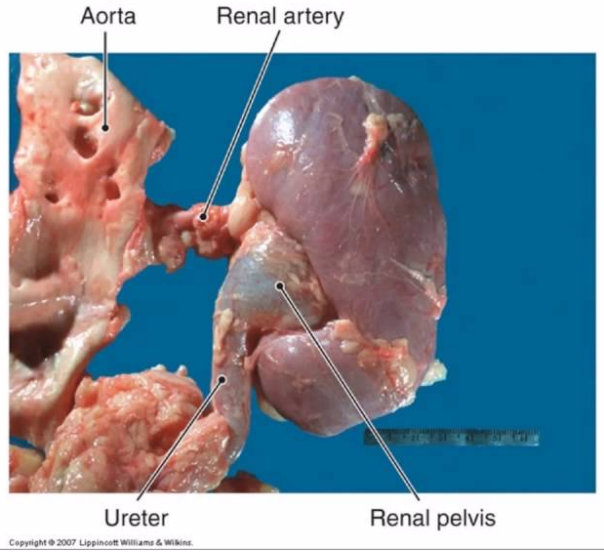
1. **Stasis of urine: which predisposes to infection and stone formation**
2. **Development of backpressure: which interferes with renal blood flow, destroys kidney tissue, and predisposes to hydronephrosis**

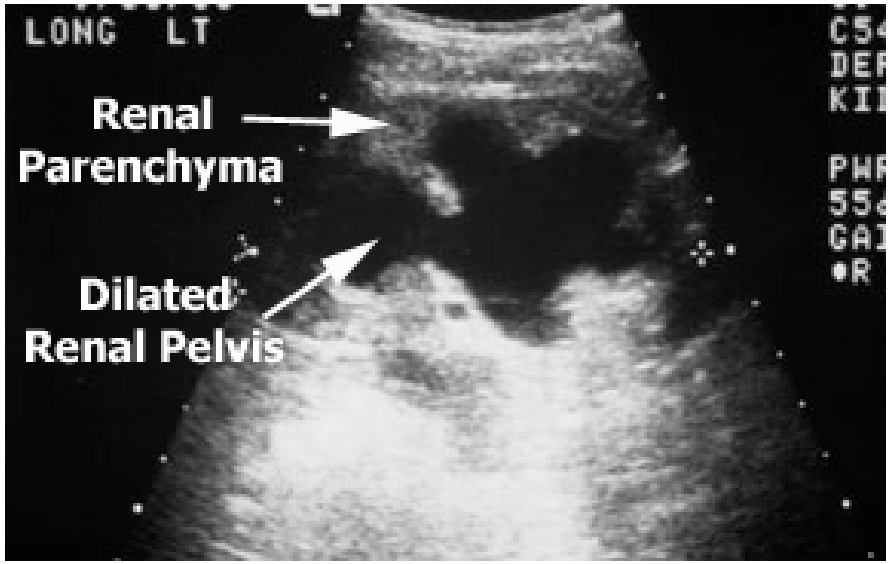
What is hydronephrosis?

- **It refers to dilation of the renal pelvis and calices, with atrophy of renal tissue, that is caused by obstruction to the outflow of urine. The obstruction may be sudden or insidious in onset and may occur at any level of the urinary tract.**



Hydronephrosis





Causes of urinary tract obstruction:

1. **Renal calculi**
2. **Tumors**
3. **Ureteral stricture**
4. **Bladder cancer**
5. **Stones**
6. **Prostatic hyperplasia**
7. **Congenital defects**

- **Renal calculi (stones):**

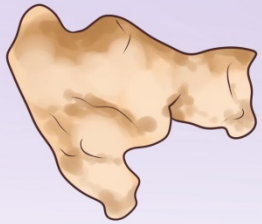
Kidney stones are crystalline structures that are formed from components of the urine.

Types of stones:

a. **Calcium stones (*i.e.*, ca-oxalate or ca-phosphate)**
b. **Magnesium ammonium phosphate stones**
c. **Uric acid stones**
d. **Cystine stones.**

Calcium Stone

Uric Acid Stone



Struvite Stones

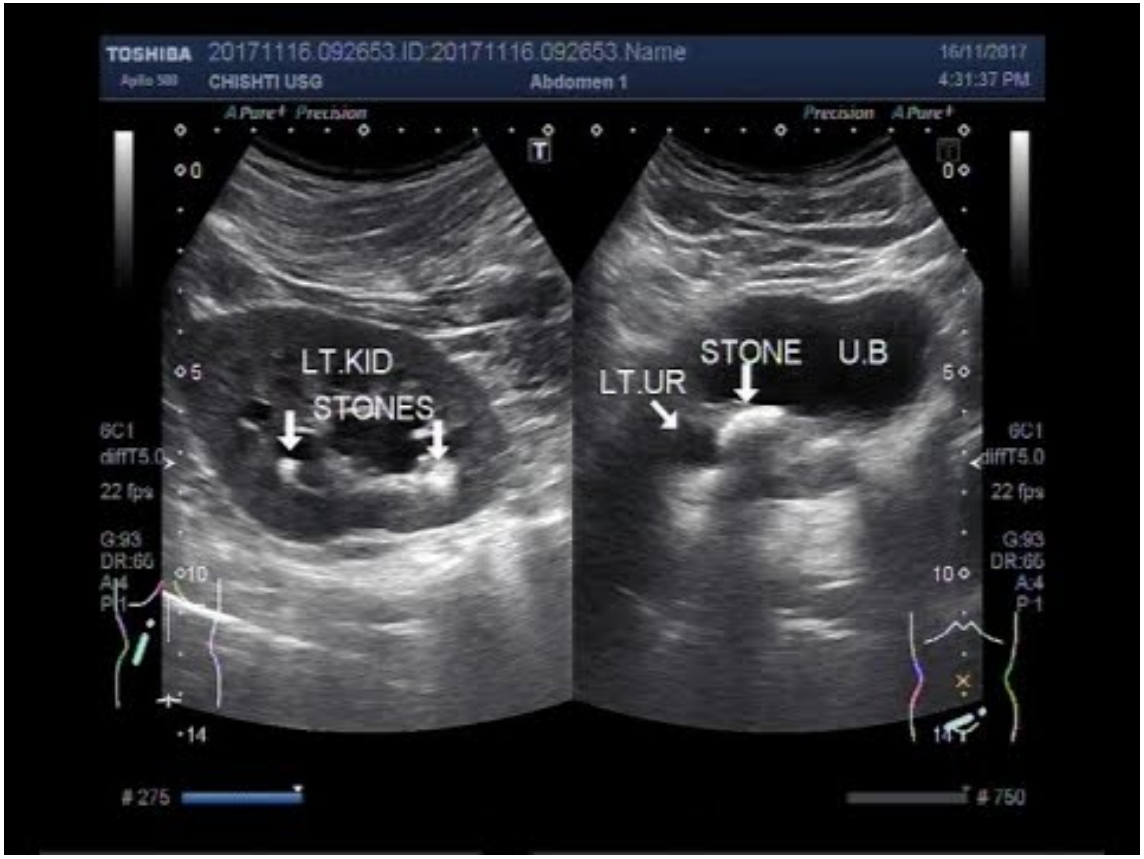
Cystine Stone

Renal stones

Calcium stones:

Most kidney stones (70% to 80%) are calcium stones—calcium oxalate, calcium phosphate, or a combination of the two materials. Calcium stones usually are associated with increased concentrations of calcium in the blood and urine.

Calcium phosphate stone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diffT5.0
22 fps
G:93
DR:66
A:4
P:1
275
750

Magnesium Ammonium Phosphate Stones:

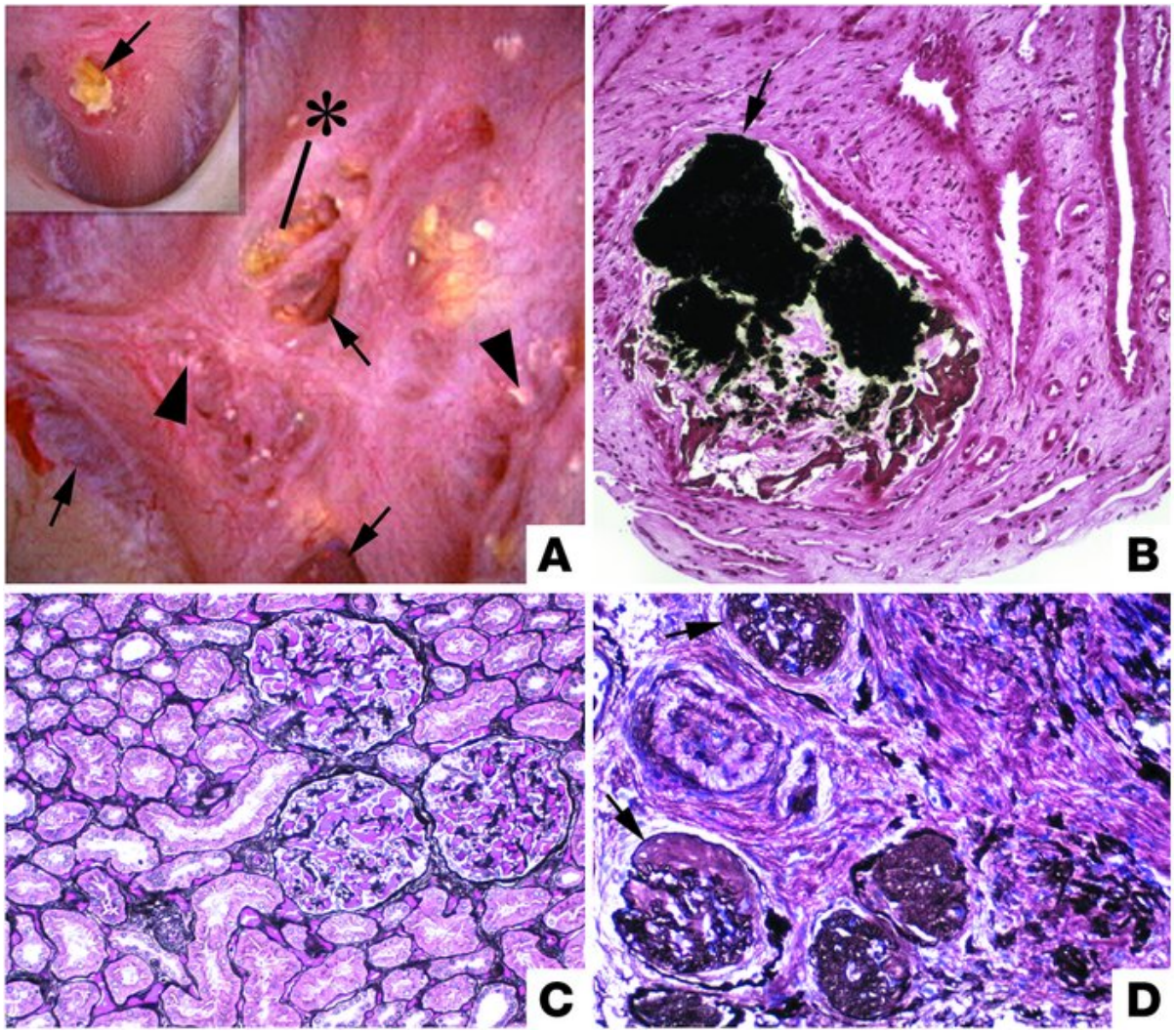
- **It is also called struvite stones, form only in alkaline urine and in the presence of bacteria that possess an enzyme called *urease*, which splits the urea in the urine into ammonia and carbon dioxide.**

Uric Acid Stones:

- **Uric acid stones develop in conditions of gout and high concentrations of uric acid in the urine**

Cystine Stones:

- **Cystine stones are rare. They are seen in cystinuria, which results from a genetic defect in renal transport of cystine**



Kidney stones


THANK YOU