

RENAL CALCULI(PATHOLOGY)

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- Renal calculi or urolithiasis is the formation of urinary stones or calculi in the urinary tract.
- The calculi seen in the urinary tract are classified into 4 main groups
 1. Calcium stones
 2. Struvite stones
 3. Uric acid stones
 4. Cystine stones

- **Calcium stones** are composed of **calcium oxalate or calcium phosphate**.
- They are the most common accounting for 75% of all stones.
- These stones are seen in patients with hypersecretion of calcium or patients who have excess absorption of calcium in the intestine.

- **Struvite stones** are composed of **magnesium ammonia phosphate or sulfate**.
- These stones are seen typically as a complication of urinary tract infections.
- These account for 15% of cases of urinary stones.

- **Uric acid stones** are seen in patients with gout or hyperuricemia.
- They account for 5% of all urinary stones.

- **Cystine stones** are rare accounting for 1% of urinary calculi.
- They are seen in patients with inborn errors of metabolism

- ❑ Urinary stones are unilateral in a majority of cases
- ❑ They are formed in the **renal pelvis and calyces or urinary bladder.**
- ❑ A majority of stones are small (less than 3mm) in size
- ❑ Struvite stones relatively **large in size.** They are also called **staghorn calculi** as they are larger as well as irregular in shape.
- ❑ They grow progressively by deposition of minerals and fill entire pelvis and calyceal system

Clinical features

- Urinary colic (flank pain radiating to groin)
- Cloudy or foul smelling urine
- Nausea vomiting
- Fever with chills if infection presents
- Haematuria

Glomerulonephritis

- The glomerular diseases are classified based on the pathogenesis into the following categories.
 1. Immunological diseases
 - The immunological diseases are characterized by the presence of deposits of immunoglobulins in the glomeruli.
 - If the deposit of immunoglobulins evoke an inflammatory reaction it causes glomerulonephritis.

2. Metabolic diseases

3. Those related to circulatory disturbances

Acute glomerulonephritis

- This is immune mediated glomerular disease seen in children
- This disease occurs 1-2 weeks after an acute streptococcal upper respiratory tract infection.
- Streptococcal infection causes production of antibodies. There is formation of antigen antibody complexes which are trapped in the glomerular basement membrane. they activate complement and attract the inflammatory cells into kidney

- **Microscopy**
- Hypercellular glomeruli due to proliferation of mesangial cells and numerous inflammatory cells.
- These cells occlude the capillaries and prevent the blood flow through the glomeruli

Clinical features

- The child presents with nephritic syndrome .The features characterizing nephritic syndrome are
 - Generalized edema
 - Hypertension
 - Hematuria
 - Proteinuria
 - Hypoalbuminemia
 - oliguria

Crescentic Glomerulonephritis

- The term is used to describe severe glomerular injury accompanied by the formation of exudates in the glomerular urinary space. It is composed predominantly of macrophages.
- The inflammatory cells surround the compressed capillary loops in form of a crescent moon.

Membranous nephropathy

- This is an immune mediated glomerulopathy characterized by massive deposition of immune complexes resulting in diffuse thickening of the glomerular basement membrane
- The glomeruli do not contain any inflammatory cells
- This disease is seen in adults

- **Microscopy**
- Glomeruli with thickened basement membrane
- Glomeruli are not hypercellular as there is neither an inflammatory response nor a proliferative response.

Lipoid Nephrosis

- This disease is also known as minimal changes disease or nil disease
- The etiology of this disease is unclear
- It is seen in children who present with nephrotic syndrome.
- **Microscopy**
 - Glomeruli show no changes
 - Under electron microscopy shows fusion of foot processes of podocytes.

Focal segmental Glomerulosclerosis

- This entity comprises a group of diseases that share common features and present with partial scarring of the glomerular loops.
- The term focal denote only few glomeruli are involved and the segmental denote that only some segments of the capillary loops in affected glomeruli are scarred.

- Etiology of disease is unclear
- Primary disease predominantly seen in children
- Secondary disease seen in obese patients, HIV infected patients and patients with sickle cell anemia.

THANK YOU