

GLOMERULAR DISEASES

ILOS

Define glomerulonephritis

Describe pathogenesis of glomerular injury

Define nephritic and nephrotic syndromes

Enumerate causes of each

GLOMERULAR DISEASES

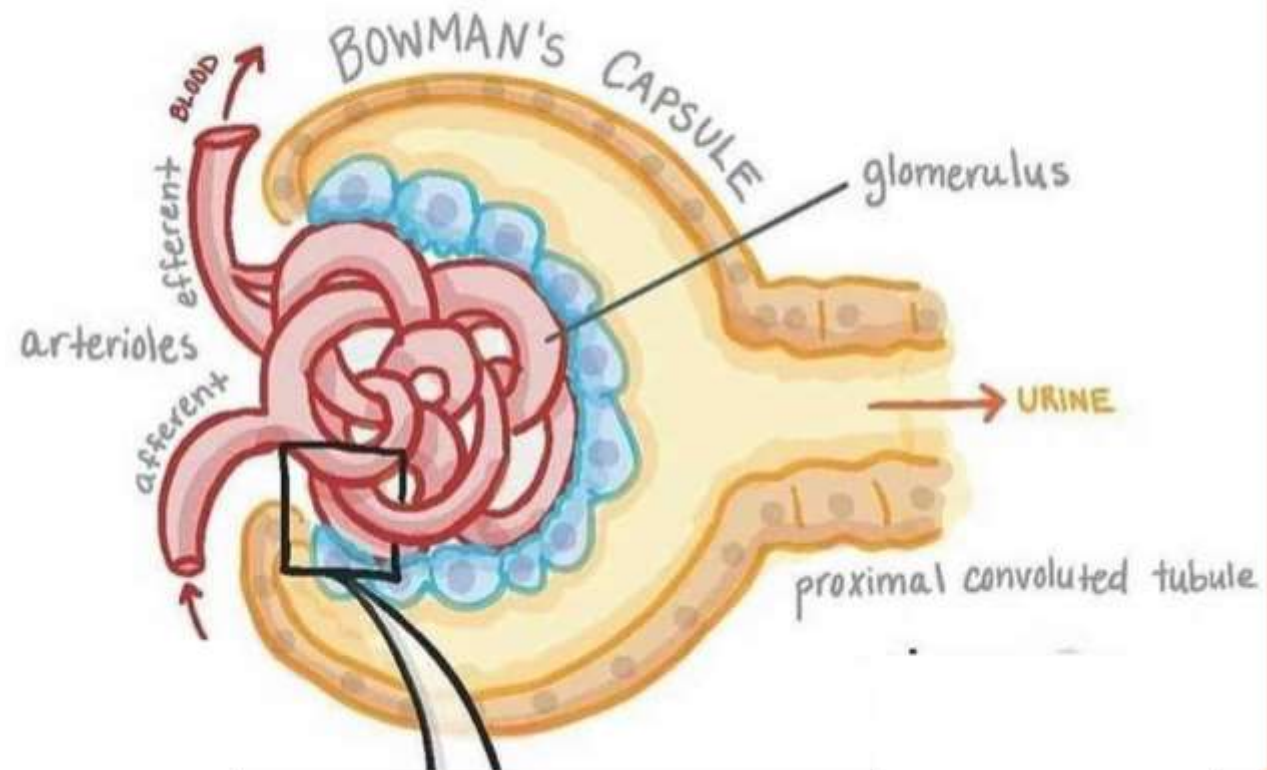
- **Definition**

Diseases primarily involving renal glomeruli

Classified into two broad groups:

Primary glomerulonephritis: glomeruli main site

Secondary glomerular diseases: systemic/hereditary



CLINICAL MANIFESTATIONS

Four common features: proteinuria, hematuria
Hypertension, disturbed excretory function
Major glomerular syndromes: nephritic/nephrotic
Acute/chronic renal failure
Asymptomatic proteinuria and hematuria

ACUTE NEPHRITIC SYNDROME

Acute onset: microscopic hematuria, mild proteinuria

Hypertension, edema, oliguria

Classic in post-streptococcal GN

Hematuria gives smoky urine, red cell casts

Proteinuria mild (<3 gm/24 hrs)

- **EDEMA & HYPERTENSION IN NEPHRITIC SYNDROME**

Hypertension variable, generally mild

Edema mild from sodium/water retention

Oliguria variable

- **CONDITIONS WITH NEPHRITIC SYNDROME**

PRIMARY GN: Acute GN (post-/non-streptococcal)

Rapidly progressive GN

Membrano-proliferative GN

Focal/diffuse proliferative GN, IgA nephropathy

- **SYSTEMIC DISEASES WITH NEPHRITIC SYNDROME**

SLE, Polyarteritis nodosa

Wegener's granulomatosis

Henoch-Schonlein purpura

NEPHROTIC SYNDROME FEATURES

- - Massive proteinuria (>3 gm/24 hrs)
 - Hypoalbuminaemia, edema, hyperlipidaemia
 - Lipiduria, hypercoagulability
- **Mechanisms in nephrotic syndrome**
 - Hypoalbuminemia from urinary albumin loss
 - Edema due to low colloid osmotic pressure
 - Hyperlipidemia: increased cholesterol, triglycerides
 - Lipiduria from leaky glomerular barrier
 - Hypercoagulability: risk of thrombosis

CAUSES OF NEPHROTIC SYNDROME

In children: mostly primary glomerulonephritis

In adults: systemic diseases (diabetes, amyloidosis, SLE)

Most common primary GN in adults: membranous GN (40%)

NEPHRITIC VS. NEPHROTIC SYNDROME

- - Proteinuria: mild (<3 gm) vs. heavy (>3 gm)
 - Hypoalbuminemia: uncommon vs. present
 - Edema: mild vs. marked, generalized
 - Hematuria: present vs. absent
 - Hypertension: present vs. in advanced disease
- - Hyperlipidemia: absent vs. present
 - Lipiduria: absent vs. present
 - Oliguria: present vs. in advanced disease
 - Hypercoagulability: absent vs. present

PATHOGENESIS OF GLOMERULAR INJURY

- Most primary GN has immunologic pathogenesis
Antibody-mediated injury: In situ immune complex
Circulating immune complex deposition
Cell-mediated immune injury: sensitized T cells

- **ANTIBODY-MEDIATED INJURY MECHANISMS**

In-situ: antibodies react directly within glomerulus

Form immune complexes, cause inflammation

Circulating: Ag/Ab complexes trapped in glomeruli

Initiate injury and inflammation

- **CELL-MEDIATED IMMUNE INJURY**

Sensitized T cells cause glomerular injury

Involved in progression of some GN types

HISTOLOGICAL ALTERATIONS IN GN

Hypercellularity: mesangial/endothelial/epithelial proliferation

Leucocytic infiltration (neutrophils, monocytes, lymphocytes)

Thickening of glomerular basement membrane

Crescent formation from parietal cell proliferation

OTHER GLOMERULAR ALTERATIONS

Intra-capillary thrombosis, fibrin deposition

Lipid accumulation

Changes may be diffuse (>50% glomeruli)

Global (entire glomerulus)

Focal (<50% glomeruli)

Segmental (part of glomerulus) atrophy and sclerosis