Glomerulonephritis glomerulopathy

### Definition
Glomerulopathies and glomerulo-nephritis are group of diseases of inflammatory or non-inflammatory nature involving primarily the renal glomeruli.

### Etiology

1. Primary or idiopathic
2. Secondary:
   a. Infection (bacteria, parasite, virus).
   b. Drug (Penicillamin, gold, Aspirin, Paradoxion, heroin).
   d. Malignancy (Hodgkin lymphoma).
   e. Heredofamilial (Alport’s Syndrome).
   f. Malignancy (Hodgkin lymphoma).
3. Isolated
   a. 1st (isolated) GN → Disease almost entirely restricted to the kidney e.g. IgA Nephropathy, post-streptococcal GN
   b. 2nd (associated) GN → Occurs in association with more diffuse inflammation e.g. systemic lupus erythematosus and systemic vasculitis

### Histopathology of GN

1. **Minimal change (nil-change) disease** → idiopathic type of this lesion usually clinically presents as steroid sensitive nephrotic syndrome with good prognosis.
2. **Focal and segmental glomerulosclerosis** → this lesion usually presents with nephrotic syndrome with impaired kidney function and HTN.
3. **Membranous glomerulonephritis** → this lesion usually presents as nephrotic syndrome with spontaneous remission and exacerbation. It may be steroid sensitive.
4. **Proliferative glomerulonephritis.**
   a. **Mesangial proliferative GN** → this lesion usually presents with hematuria or with nephrotic syndrome with good prognosis.
   b. **Mesangiocapillary (membranoproliferative) GN** → this lesion may present as nephrotic syndrome, usually steroid resistant and slowly progress to chronic renal failure.
   c. **Crescentic GN** → this lesion usually represent as rapidly progressive GN.
   d. **IgA nephropathy** → is the commonest glomerular disease presenting with gross or microscopic hematuria.

### CP of GN

#### Nephrotic syndrome
1. Insidious onset of massive oedema.
2. Heavy proteinuria.
3. Hypoalbuminaemia.
4. Hyperlipidemia.

- **Acute nephritic syndrome (acute nephritis)**
  - Rapid onset of oedema, smoky urine, oliguria and hypertension.
  - Urine shows red cell casts, proteinuria.
  - Serum creatinine may be high, but albumin and lipids usually normal.
  - Prognosis is usually good and recovery occurs.
  - Can develop suddenly (acute) or progress slowly (chronic) or rapidly progressive
  - Complications → encephalopathy, heart failure, acute renal failure
  - Treatment
    1. Irradiation of infection.
    2. Rest.
    4. Hypotensive drugs.
    5. Diuretics.
    6. Dialysis treatment if renal failure develop.
    7. Steroids and immunosuppressives for cases with RPGN.

#### Rapidly progressive GN
- **Rapid onset of nephritis with development of uraemia.**
- **Urine shows nephritic sediment.**
- **Serum creatinine is high.**
- **If untreated aggressively, the prognosis is poor**

### Chronic nephritic syndrome
1. Slowly progressive (mon. years) uraemia.
2. Urine shows proteinuria, hematuria, broad casts, no urine concentration.
3. Serum creatinine is high as well as other stigmata of uraemia.

### Asymptomatic urinary abnormalities
- Microscopic hematuria or proteinuria or both.
- Serum creatinine is normal.
- Prognosis is usually excellent.

### Acute GN
1. Acute Post streptococcal GN
2. MPGN, mesangial proliferative GN
3. IgA nephropathy
4. SLE, systemic vasculitis, cryoglobulinemia, endocarditis, Henoch – Scholein purpura

- > 150 mg/24 hr, < 3 gm/24 hr, almost always 1 gm/24 hr, occur in 0.6- 8.8% of healthy young adults.
- All lab tests and clinically are OK.
- Orthostatic or constant, persistent or transient.
- 70% with persistent, constant isolated proteinuria have abnormal biopsies, while in only 10-15% of those with persistent arthostatic.
- Ten-years prognosis is excellent.
- Also with vigorous exercise, stress, fever, C. H. F., and hypertension.
### Acute Post streptococcal GN

**Introduction**
- Occurs after infection with nephritogenic strain of group A, B-haemolytic streptococci.
- Ether pharyngeal or skin infection.
- Latent period is 1-3 weeks.
- Children are affected more than adults.

**Clinical picture**
- 1-3 weeks after streptococcal infections patient presents with acute nephritis (oliguria, smoky urine, oedema, headache, high blood pressure, \( \uparrow S.Cr. \)).
- 20% of cases presents with NS.
- 5% of cases present with RPGN.
- Some cases may be asymptomatic.

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Histopathology</th>
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<tr>
<td>Light microscopy ( \rightarrow ) diffuse proliferative GN, Crescents</td>
<td>Immunofluorescent ( \rightarrow C3, C1q, IgG, IgM, IgA )</td>
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<tr>
<td>Electromicroscope ( \rightarrow ) humps</td>
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<tr>
<td>Condition</td>
<td>Description</td>
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<td>Cryoglobulinemia</td>
<td>HCV + low complement + high titer rheumatoid factor = HCV nephritis + cryoglobulinemia</td>
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| Goodpasture syndrome | (page 122)  
- Anti glomerular basement membrane disease  
- Affect lung and kidney → alveolar hemorrhage (comes with hemoptysis + lung purpura on radiology) + hematuria  
- More common in young male > female  
- More common in heavy smoker due to recurrent chest infection  
- Histopathologically, the glomerular disease varies from mild focal proliferative GN to very severe crescentic GN and acute interstitial nephritis  
- Immunofluorescent shows linear IgG deposits along the GBM. IgA and IgM are seen in 10 – 20% of cases |
| ANCA | (page 125)  
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| ANCA | Associated disease include  
1. Wegener’s granulomatosis  
2. Polyarteritis nodosa  
3. Leucocytoclastic (hypersensitivity) angitis  
4. Idiopathic, type III crescentic GN |
| Churg – Strauss syndrome |  
a.k.a. Allergic granulomatosis. It is triad of  
1. Necrotizing granulomatous vasculitis with esinophilic tissue infiltrate and extravascular granuloma  
2. Peripheral esinophilia  
3. Bronchial asthma  
Glomerular show mild focal segmental necrotizing GN sometimes associated with small crescents. |
| Proteinuria | Types of proteinuria  
- Tubular → usually low molecular weight protein, eg → B2 – macroglobulin <2g/day  
- Glomerular → usually it is albumin and globulins, >2g/day  
- Secretory → due to inflammation or tumor |
| DDx of proteinuria |  
1. Functional proteinuria → due to strenuous exercise, fever, orthrostatic proteinuria, miscellaneous  
2. Patient with Proteinuria 0.5 – 3.5g /day  
   a) Acute interstitial nephritis  
   b) Chronic interstitial nephritis  
   c) Tubular proteinuria → Fanconi syndrome, heavy metal intoxication, multiple myeloma, hypokalemic nephropathy, polycystic kidney disease, medullary cystic kidney disease  
3. Patient with Proteinuria >3.5g/day  
   a) Primary glomerular disease  
   b) Secondary glomerular disease |
| Cast |  
- Fine granular cast → chronic renal disease  
- Hyaline cast → chronic renal disease  
- RBC cast → acute nephritic syndrome  
- WBC cast → UTI  
- Fat cast → nephrotic syndrome |
| Determination of 24 hour urine chemical substance |  
Calcium  
- Increases in hyper parathyroidism, Vitamin D intoxication (hypervitaminosis)  
- Decreases in hypo parathyroidism, rickets  
High Urinary LDH  
- Carcinoma of kidney, prostate and bladder  
- Glomerular disease  
- Myocardial infarction |