Chronic Renal Failure

Chronic kidney Disease is an irreversible deterioration in renal function that develops over a years period.

GFR Normal → 100 - 120 mL/min/1.73m², less in women, age.

- Initially only biochemical changes, then ↓ excretion, secretion, metabolism → Signs of Renal failure (uremia).

Etiopathalogy

(1) Hypertension → Walls thickened → Narrow lumen.
5 - 20%.

↓ Less Blood & O₂
↓
Ischemia & Injury
↓
Immune cells. (Macrophage & Foam cell)
↓
Mesangial cell damage
↓
Glomerulo Sclerosis
↑
↓GFR → CKD

(2) Diabetes → ↑ Glucose → Sticks to Protein
20 - 40%.
↓
Non Enzymatic Glycation.
↓
Efferent arteriole
↓
Stiff & Narrow.
(Hyaline Arteriosclerosis)
↓
↑ Increased pressure in kidney.
↓
Glomerulo Sclerosis
↓
↓GFR → CKD.

(3) Glomerular diseases → Common IgA Nephropathy
10 - 20%

(4) Interstitial 20 - 30% → NSAIDS

⑤ Systemic Inflammatory Disease → SLE, RA, Vasculitis.
⑥ Congenital → PCKD, Alport Syndrome
⑦ others - Infection (HIV), Medicines (NSAIDS), Toxins (Tobacco).

Clinical Features

① ↓ GFR → ↑ Urea (Azotemia).

① Nausea & Vomiting
Weight loss.
Anorexia

② Encephalopathy
- Asterixis (Tremor of Hand like Bird flapping wings)
- Coma & death.

③ Pericarditis

④ Bleeding
↓
↑ Urea causing ↓ Platelet adherions.

⑤ Uremic Frost → Crystal in skin looking like snow flakes.

⑥ Uremic Pruritis.

Investigation

- Urea & Creatinine ↑ in Blood
- GFR → CKD - less than 90 mL/min/1.73 m^2
  End stage kD - less than 60 mL/min/1.73 m^2.
- Biopsy → Glomerulosclerosis.
- Electrolytes → Imbalance, Hyperkalemia, Acidosis.
- Calcium, 1,25, PTH, Phosphate → Renal osteodystrophy.
- Urinalysis & Proteinuria
- CBC → (Ferritin, B_{12}, Folate, Hb)
- CVS → Lipids,

- Blood Glucose, HbA1c
- Renal Ultrasound → Congenital.
- ELISA, Western Blot - HIV.

→ Complication

(1) ↓ GFR → ↑ Potassium (K^+) → Cardiac arrhythmias
→ Metabolic acidosis.

(2) Vitamin D inactivation,
↓
lower Ca absorption → Hypocalcemia
↓
Ca resorption ← PTH release.
↓
Bones Weak & Brittle
↓
Renal osteodystrophy.

(3) Renin → Increase Blood pressure → Hypertension
↓
↓↓↓ GFR →
ESKD.

(4) Erythropoetin → ↓ RBC → Anemia.

Management

→ Reducing the rate of progression.
→ Antihypertensive medicines.
↳ ACE inhibitors - "Pril"
ARB → "Sartan"
NSAIDs, Diuretics → "amide"

- Reducing potassium rich food
  Vegetables → Boiling vegetable (Tomatoes, Spinach, potatoes)
  Fruits → Rhubarb, Banana, Avacodos, Figs.
  Sweets - Chocolate, Nuts, Peanut, butter.
  Drinks → Beer, Wine, Milk, Juice Fruit,
- Acid Base Balance → Sodium Bicarbonate.
→ Vitamin D activated form.
→ Iron Supplements, Erythropoeitin.

Dialysis — Peritoneal dialysis

↓ Haemodialysis
- 4 hrs, 3 days in week
- In hospital.
- AV fistula
- Diet restriction

↓ ① Continuous ambulatory Peritoneal Dialysis
4 times per day.
30-60 mins per time
- At home.
- Injections are common
- Less restrictions

② Automated Peritoneal dialysis
- 8-10 hrs in night

Renal Replacement therapy.