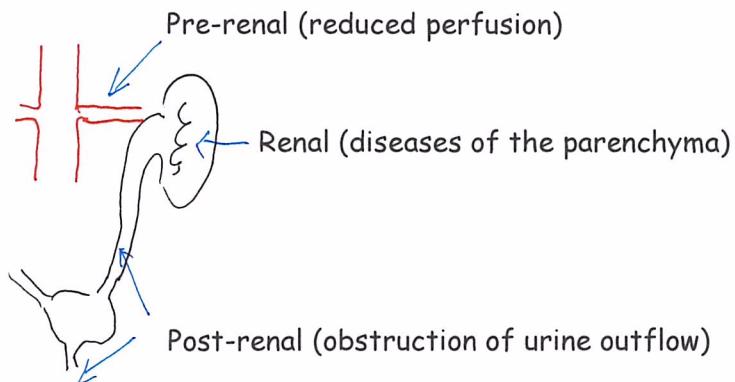


RENAL FAILURE AND END-STAGE KIDNEY

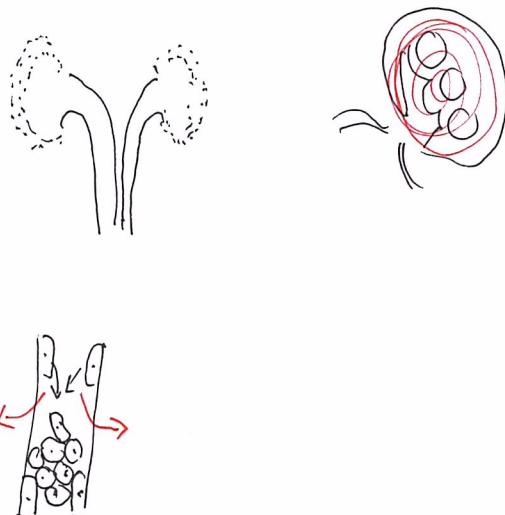


I. Pre-renal diseases

1. *Shock (acute renal failure)*
 - Related to shock or reduced blood pressure
 - Macroscopically shock kidney
 - Microscopically acute tubular necrosis
2. *AS stenosis of a. renalis (chronic renal failure)*
 - Kidney atrophy
 - Bilateral stenosis is needed for the renal failure

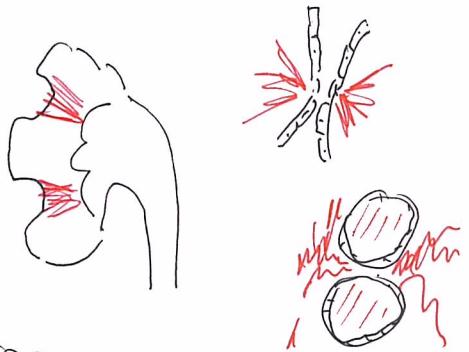
II. Renal diseases

1. *Glomerular*
 - a. *Primer glomerulonephritis*
 - Bilateral kidney atrophy
 - Hyaline glomeruli
 - Atrophic cortex and medulla
 - b. *Secondary glomerulonephritis*
 - SLE, SS, RA etc.
2. *Tubular/interstitial*
 - a. *Acute tubular necrosis*
 - Ischemic, toxic, pigment



b. Chronic pyelonephritis

- Uneven, rough scars (flowerbed)
- Interstitial fibrosis
- Thyroidisation
- Infiltration of chronic inflammatory cells
- Hyaline glomeruli, arteriolosclerosis



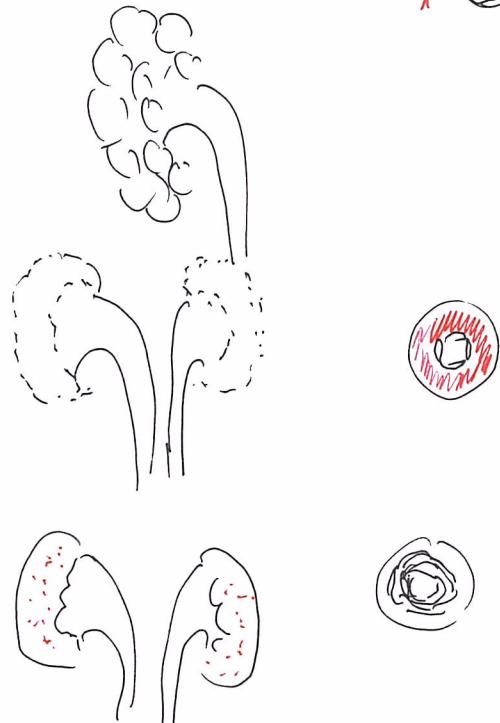
c. Kidney cystic diseases

- Autosomal dominant polycystic kidney disease

3. Vascular

a. Benign hypertension

- Nephrosclerosis (fine granular surface)
- Hyaline arteriolosclerosis
- Tubular atrophy
- Interstitial fibrosis
-



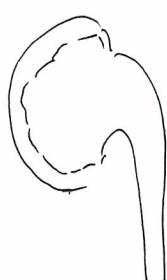
b. Malignant hypertension

- Pinpoint petechial hemorrhage (flea-beaten)
- Hyperplastic arteriolosclerosis
- Microinfarcts
- Focal necrosis

III. Post-renal diseases

1. Obstruction of urine outflow

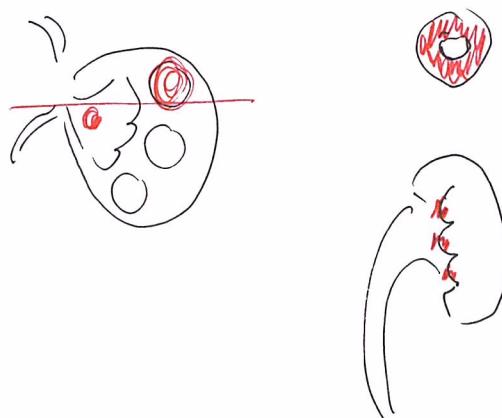
- Urolithiasis
- Prostate hypertrophy
- Tumor
- Obstruction causes hydronephrosis



IV. Systemic disorders

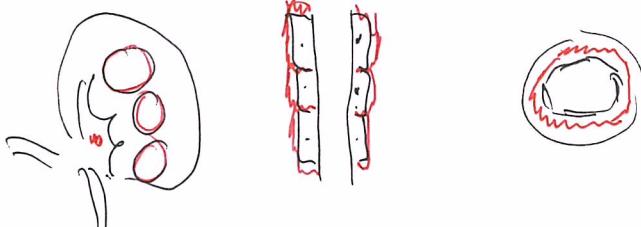
a. Diabetes mellitus

- Glomerular - hyaline glomerulosclerosis
- Vascular - diabetic arteriolosclerosis
- Papilla necrosis



b. *Amyloidosis*

- Glomerular deposit
- Interstitial (peritubular) deposit
- Vascular deposit



c. *Vasculitis*

- PAN
- Wegener granulomatosis

Renal failure caused by	
Diabetes mellitus	40%
Hypertension	30%
Glomerulonephritis	15%
Polycystic kidney disease	10%
Other (pyelonephritis)	5%

CLINICAL MANIFESTATION OF KIDNEY FAILURE

Azotemia

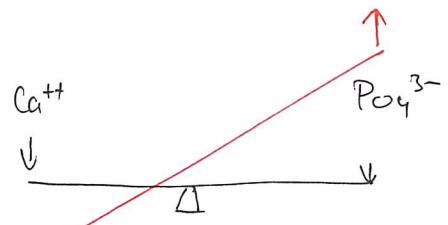
- Biochemical abnormality
- Blood urea nitrogen > 9 mmol/l (norm. 2-9 mmol/l)
- Creatinine > 120 µmol/l
- Reduced GFR

Uremia

- Azotemia + biochemical abnormalities + clinical symptoms
- Clinical symptoms related to end-product of nucleic acid metabolism (3-500 D aliphatic amines, guanidino components)
- Parathormone - direct toxicity

1. Fluid-, electrolyte-, acid-base disturbance

- Oedema - reduced GFR - fluid-, electrolyte retention - hyperaldosteronism
- Metabolic acidosis

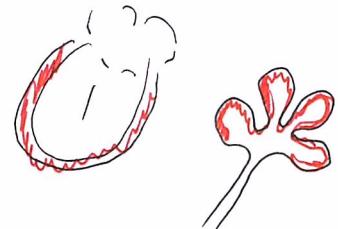


2. Ca^{++} , PO_4^{3-} metabolism

- Renal osteodystrophy (osteitis fibrosa cystica)
- PO_4^{3-} retention - serum reduced Ca^{++} - hyperparathyroidism - Ca^{++} mobilization

3. Cardio pulmonary abnormalities

- Uremic pericarditis
- Uremic pneumonitis (direct toxicity, hyaline membrane)



4. Hemopoietic disturbance

- Anemia (reduced erythropoietin)
- Hemorrhage (reduced thrombocyte factor 3 production)

5. GI disturbance

- Uremic gastritis, colitis

6. Neuromuscular disturbance

- Different degree of encephalopathy, neuropathy