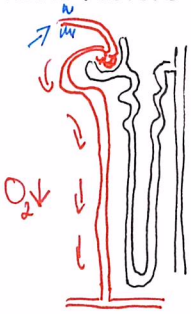
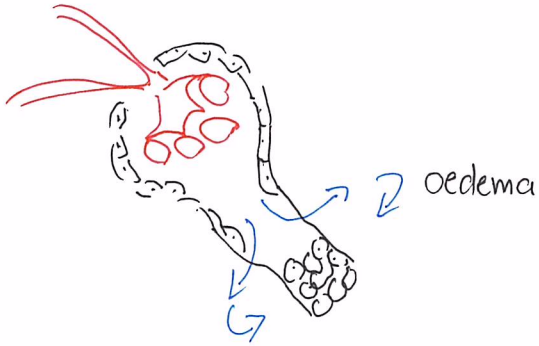
TUBULAR AND TUBULO-INTERSTICIAL KIDNEY DISEASES

1. Acute tubular necrosis (ATN)

- Clinicopathological entity: damage of tubular epithelium + suppression of renal function
- Oliguria: urine falls < 400 ml/day
- Reversible
- Pathogenetic factors:



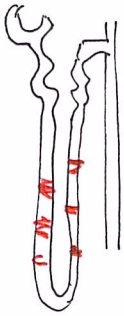


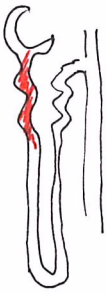
- Vasocontraction of preglomerular arteries → GFR↓→renin/angiotensin↑ →ischaemia → ATN
- Tubular damage obstruct outflow (increase intratubular pressure)
- Through the damaged tubules fluids leaks into the intersticium → compress tubules

A/ Ischaemic ATN
- reduced blood flow
- shock, hypoperfusion

B/ Pigment induced ATN
- haemoglobinuria (haemolisis)
- myoglobinuria (crush sy.)

C/Nephrotoxic ATN
- heavy metals, drugs
- organic solvents





- focal tubular necrosis (skip lesions)
- straight proportion of proximal tube
- distal ascending thick
- rupture of tubular BM (tubulorrhexis)

- proximal convoluted tubules
- tubular BM preserved

- Clinical: - Progressive oliguria, anuria, uraemia, hypervolaemia
  - Recovery: polyuria (3000 ml/day), hypovolaemia, complete recovery within months
  - Ischaemic ATM - 50% mortality, nephrotoxic ATN – better prognosis

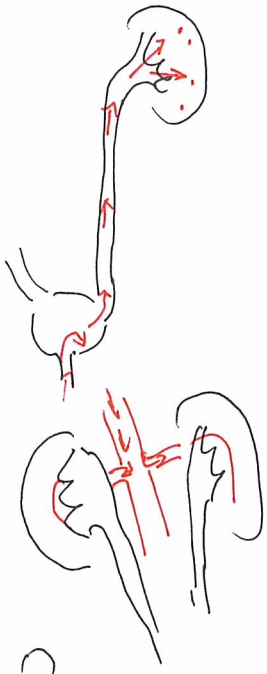
2. Acute pyelonephritis

- Common suppurative (bacterial) infection of kidney and renal pelvis
- Inflammation of the tubules and intersticium
- Pathogenesis:

A/ Ascending infection

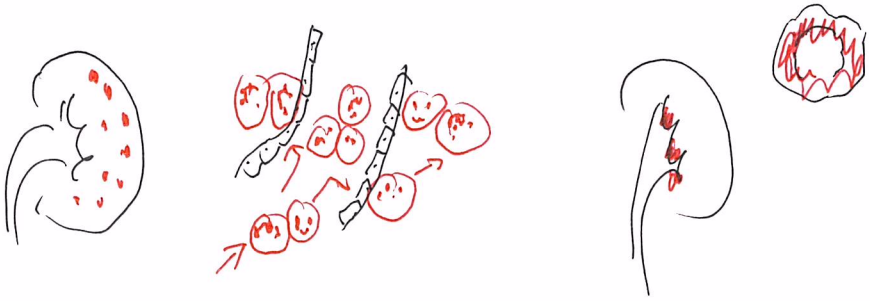
- Most common type
- 85% gram- bacteria → normal inhabitant of the GI tract (endogenous infection)
- E. Coli, Proteus, Klebsiella, Enterobacter, Pseudomonas
- Colonization of urethra → cystitis → pyelitis → pyelonephritis
- Predisposing factors:
  - catheterization (instrumentation)
  - female (short urethra, sexual intercourse)
  - stasis (calculi, prostate hyp., tumor, pregnancy)
  - VUR

  - diabetes, immunodeficiency



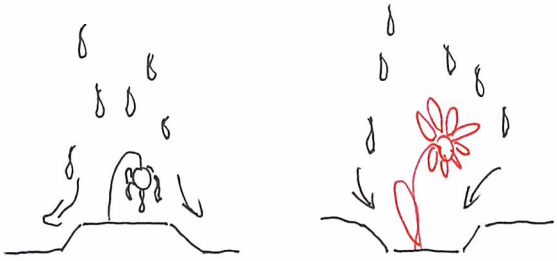
B/ Hematogenous infection

- Sepsis, infective endocarditis
- Non-enteric organisms – staphylococcus, fungi
- Predisposing factors: diabetes, immunodeficiency



Acute pyelonephritis Papillanecrosis Healing (chronic) pyelonephritis

- Clinical:
  - Sudden onset – costovertebral pain, fever
  - Bacteruria, pyuria
  - May progress to sepsis
  - Treatment - antibiotics



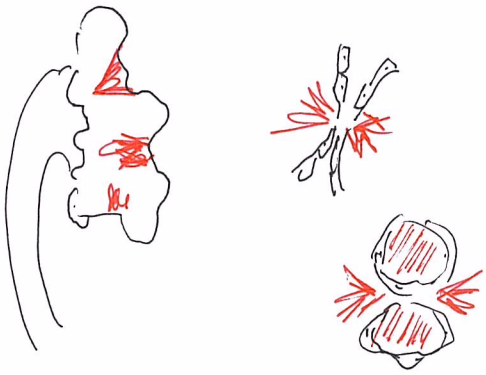
3. Chronic pyelonephritis, reflux nephropathy

- Tubulointersticial inflammation + scarring of renal parencyma
- May cause renal failure

A/ Chronic obstructive pyelonephritis
- Obstruction (stasis) redispose to infection (calculi, prostate hypertrophy, tu. ect.)
- Infection – scarring – infection – scarring algorithm
- Deformed kidney and pelvis

B/Chronic reflux-associated pyelonephritis
- Congenital vesico-urethral reflux (VUR)
- Sterile chronic pyelonephritis

- Morphology
  - Uneven scarring, pelvis and calyces deformities
  - „Flowerbed" impressions on the kidney surface
  - Interstícial fibrosis
  - Atrophic tubules, thyroidization (colloid casts)
  - Hyalinic arteriolosclerosis
  - Glomeruli are not affected
- Clinical:
  - Gradual onset of renal insufficiency
  - Polyuria at the beganing, later renal failure
  - Hypertension



4. Drug induced tubulointersticial nephritis

- Associated with different drugs – antibiotics (penicillin, rifampin), diuretics, NSAID, ect.
- Generate immune mechanism – hypersensitivity type I or type IV
- Drug acts as haptens, during secretion bind to tubular components – become immunogenic
- Morphology:
  - Reaction in the intersticium
  - Mononuclear cell infiltration (lymphocytes, monocytes, eosinophils)
  - In some cases granuloma with giant cells
  - Interstícial oedema
- Clinical
  - Symptoms develop ~15 days after exposure
  - Fever, eosinophilia, rash
  - Renal abnormalities – hematuria, proteinuria, leukocyturia, oliguria ~50%
  - Withdrawal of the drug - recovery