pathology of pericardium

pericardium

- anatomy
  - serous membrane of heart and origination of great vessels
  - parietal and visceral layer
  - containing small amount of serous liquid (5-50 ml)
- histology
  - fat tissue with collagen fibres
  - surface covered with mesothelial cells
- physiology
  - covering and protecting heart
  - slippery surface helpful by heart contraction

pericardial pathology

- circulation disorders
- pathologic content
- inflammation
- tumors

circulation disorders

- petechial haemorrhage – ecchymoses
  - signs of asphyxia (suffocation, intrauterine asphyxia)
  - traumatic
  - eclampsia
  - haemorrhagic diathesis
  - sepsis
  - tumorous dissemination (leukaemias)
  - after resuscitation (manual, LUCAS)
- haemosiderosis after haematoma organisation

pathologic content – liquid

- hydropericardium (pericardial hydrops, effusion)
- transsudate (over 100 ml)
  - clear pale liquid, poor on protein
  - small amount of leukocytes
- hypoalbuminaemia
- chronic heart failure (left-sided)
- complications
  - alteration of heart function (mild – slow filling)
  - pressure on mediastinal structures and lungs
  - fibroproduction – adhaesions

pathologic content – blood I

- haemopericardium
- small bleeding
  - after diagnostic or therapeutic punction
  - anticoagulative treatment
- massive bleeding
  - rupture of heart, great or coronary vessels
    - exogenous trauma (violence, accident, iatrogenic)
    - aneurysm perforation (dissecting, sacculate, left ventricle)
    - attenuation of ventricle wall (necrosis – myocardial infarction)

pathologic content – blood II

- secondary haemorrhagic content
  - haemorrhagic component of inflammatory exsudate by severe inflammation (TBC)
  - blood addition in effusions acompanying tumorous dissemination (pericardial carcinomatosis, haematologic tumors)

haemopericardium - complications

- heart tamponation
  - pressure on heart (diastola failure)
  - loss of blood (hypovolaemia)
  - clinically tachycardia, hypotension, heart collaps

- conclusions
  - acute heart failure
    - poor prognosis
  - chronic tamponation
    - very rare

pathologic content – air

- pneumopericardium
- rare
- insuflation of air
  - penetrating of oesophageal, tracheal or lung tumor
  - severe (gangraenous) inflammation
  - primary in pericardial cavity
  - spreading from mediastinum and surrounding organs
- iatrogenic (after effusion punction)

inflammation – pericarditis I

- infectious
  - bacteria, mycoses, viruses, specific, parasites
  - porogenic spreading
    - vulners
    - infectious spreading from surrounding tissues or from heart
  - induction by lymphatic vessels
  - metastatic haematogenous spreading

inflammation – pericarditis II

- aseptic (non-infectious)
  - immune-mediated
    - rheumatic fever, SLE, scleroderma
    - drug hypersensitivity
    - post cardiotomy, post myocardial infarction syndrome
  - miscellaneous
    - uraemia
    - upon recent infarction – pericarditis epistenocardiaca
    - after cardiac surgery
    - trauma, irradiation, neoplasia

pericarditis

- exsudative
- productive

exsudative pericarditis I

- developing in time
  - according to intensity of inflammation and its aetiology

- serous
  - mostly non-infectious aetiology
  - induced
    - by inflammation by infections of surrounding tissues (e. g. bacterial pleuritis)
  - haematologic spreading of viral infections
  - serous exsudate (pale, milky – water, few of fibrin, proteins, WBC)
  - opacification of the pericardial surface, hyperaemia, sparse petechial bleeding

exsudative pericarditis II

- serofibrinous
  - rising amount of fibrin
  - more intensive proliferative phase
    - higher risk of adhaesions

exsudative pericarditis III

- fibrinous
  - domination of fibrin over the liquid
    - covering the heart (cor villosum, hirsutum – hairy heart)
  - sometimes liquid missing
    - pericarditis fibrinosa sicca (dry pericarditis)
  - early fibrinous (fresh) adhaesions with high organisation potential
  - pericarditis by rheumatic fever, after cardiac surgery

exsudative pericarditis IV

- haemorrhagic
  - adition of blood (erythrocytes) in inflammatory exsudate
  - severe septic infections accompanied by haemorrhagic diathesis
  - tuberculosis
  - pericarditis by tumorous dissemination

exsudative pericarditis V

- purulent (suppurative)
  - invasion of the pericardial space by infective organisms
    - pus (neutrophils, fibrin, erythrocytes, bacteria)
  - direct invasion from neighboring inflammation
  - haemorragic dissemination (sepsis, septicopyaemia)
  - lymphatic extension
  - direct spreading (through vulners, during the heart surgery)

- putrid (gangraenous)
  - anaerobic or putrid bacteria
  - immunosuprimated patients

specific pericarditis I

- tuberculosis
  - hematogenic (milliary), lymphogenic, porogenic spreading
  - serofibrinous to fibrinous exsudation (cor villosum) + massive addition of blood
  - neutrophils, lymphocytes, histiocytes
  - pericardial nodules with tuberculoid granulomas
  - caseous desintegration ➡ massive proliferative phase
    - constrictive pericarditis (pericarditis fibrinosopetrosa)

specific pericarditis II

- syphilis, actinomycosis
  - extremly rare
- other specific aetiology
  - infectious (fungal)
  - non-infectious

productive pericarditis I

- = healed pericarditis
- reparative phase after exsudative inflammation
- proliferative phase of the inflammation

productive pericarditis II

- organisation of fibrinous and/or haemorrhagic exsudation
  - proliferation of granulation tissue
  - production of collagen fibres
  - variable severity
    - thickening of serosal membranes
      - pale white collagen maculations (maculae tendinae/lactae, „soldier´s plaque)
    - adhesive mediastinopericarditis
      - fibrous adhaesions (pericarditis fibrosa/adhaesiva)
    - constrictive pericarditis
      - dystrophic calcification (pericarditis petrosa, Panzerherz)

productive pericarditis III

- complications
  - systolic contraction failure
    - output reduction
    - cardiac hypertrophy and dilatation
    - dilated cardiomyopathy
    - heart failure
- treatment
  - surgical removal of adhaesinos (pericardiectomy)

tumors of pericardium I

- primary
  - rare
  - mesothelioma
    - same characteristics than pleural or peritoneal tumors
    - often multifocal
    - several histologic variants, variable aggressivity
  - soft tissue tumors
    - benign (fibroma, lipoma, haemangioma)
    - malignant (sarcomas)

tumors of pericardium II

- secondary
  - metastases form other primary site
    - carcinomas – carcinomatous pericarditis
      - breast, lung...
    - tumors of other histogenesis
      - melanoma, germinal tumors, sarcomas
  - direct spreading from mediastinum and surrounding organs
- haematologic tumors
  - lymphomas, leukaemias

malformation of the respiratory system

resiratory system

- extensive area of variable organs and tissues
- upper respiratory tract
  - nasal cavity and paranasal sinuses
  - pharynx
  - larynx and trachea
- lower respiratory tract
  - bronchi
  - lungs

nose and paranasal sinuses I

- developmental malformations of nose and face configuration
- often in combination with malformations of neighboring organs (eye, ear, oral cavity)

- nose agenesis
  - usually 1 nasal cavity missing
  - often accompanied by agenesis of the same sided sinuses
- proboscis
  - malformations of medial and lateral nasal protuberance
  - cutaneous sinuosity with central channel, arising from medial canthus

nose and paranasal sinuses II

- dermoid cyst
- nose clefts
  - combined with oral compartment clefts (harelip)

nose and paranasal sinuses III

- nasal and choanal atresia
  - both-sided
    - immediate intubation and surgery
  - one-sided
    - more frequent
    - sometimes not recognized until elderly
    - recurent respiratory inflammations

- occurence of nervous tissue
  - meningocele, encephalocele
  - brain tissue heterotopy

pharynx I

- clefts
  - soft palate, uvula
  - combined with clefts of lip and hard palate (harelip)

pharynx II

- malformations of descensus of the thyroid
  - accessory thyroid gland
    - remnants of the thyreoglossal duct in base of tongue
  - median neck cyst
    - cystic dilatation of persistent thyreoglossal duct
    - fixed to the hyoid bone

- branchial clefts malformation
  - lateral neck cyst (branchiogenic, lymphoepithelial)
    - lined by squamous epithelium, lymphoid tissue in the wall
    - diff. dg. cystic metastatis of head and neck or thyroid carcinoma

larynx I

- laryngomalacia
  - abnormal configuration of epiglottis
  - several types
  - inspiratory stridor

larynx II

- vocal cords paralysis
  - inspiratory stridor
  - recurent aspiratory pneumonias
- luminisation disorders
  - laryngeal atresia
  - laryngeal diaphragm
  - congenital subglotic stenosis
- retention cysts of laryngeal glands (laryngocele)
- fistules and pathologic communications

trachea

- rare
  - combined with malformations of other respiratory or digestive organs (oesophagus, larynx, bronchi)
- tracheal agenesis
- tracheal stenosis
  - combined with malformations of mediastinal structures and great vessels
- tracheal (tracheooesophageal) fistules
  - several types
  - associated with malformations of oesophagus

bronchi

- bronchial atresia
  - luminisation disorder
  - complications according to location
    - peripheric – mild or no symptoms
    - central – ventilation disorder
  - overproduction of mucus behind the atresia
    - mucous cysts (mucocele), recurent inflammations
- bronchogenic cysts
  - usually extrapulomonary
  - wall of bronchus (squamous metaplasia of the surface epithelium)
  - filled with mucus
  - often asymptomatic (possible pressure on mediastinal structures)

lungs I

- agenesis and hypoplasia
  - part of genetic syndromes (12, 18, 21 trisomy, bone dysplasias)
  - oligohydramnion (congenital malformation of kidneys)
  - diaphragmatic hernia
    - migration of abdominal organs to the thoracic cavity

lungs II

- congenital pulmonary airway malformation (CPAM)
  - = congenital cystic adenoid malformation (CCAM)
  - bronchioloalveolar unit development disorder
  - defect of bronchial tree configuration
  - mucus accumulation and cysts formation
  - usually only part of lung parenchyma
  - several types according to size and location of cysts
  - frequent mucinous metaplasia in the cysts´ epithelium
    - origin of lung adenocarcinoma in children

lungs III

- lung sequestration
  - lobes or segments of lung tissue without a normal connection to airway system
  - own aberant blood support (usually direct from aorta)
  - intrapulmonary or extrapulmonary manifestation
  - complications
    - cystic dilatation of bronchi
      - bacteria proliferation and recurent inflammations
    - overloading of circulation (pulmonary hypertension)

lungs IV

- other rare malformations
  - vascular anomalies
  - congenital lobar overinflation (emphysema)