ear, nose and throat pathology

ear-	nose-	throat
oto-	rhino-	laryngology

- diagnostics and treatment of the diseases of upper airways and the head&neck region

the head and neck pathology I

- widespread topic
  - variable anatomical compartments and topography
  - organs, glands and tissues of various histogenesis
  - supporting structures (nerves, vessels...)
- overlap to other branches of pathology
  - endocrinopathology, neuropathology, pathology of GIT, dermatopathology, orthopaedic and bone pathology

the head and neck pathology II

- upper airways
  - nose, paranasal sinuses
  - pharynx (tonsillar ring)
  - larynx and trachea
- ear
  - external, middle, internal
- oral cavity and tongue
- salivary glands
- thyroid gland
- soft tissues and lymph nodes of head and neck
- lacrimal compartment

the head and neck pathology III

- widespread and variable pathological changes and disease units
  - malformations
  - regressive and dystrophic changes
  - circulatory disorders
  - inflammations
  - tumors

nose and paranasal sinuses

malformations I

- disorders of embryonal development and face segments´ configuration
  - agenesis, proboscis, dermoid cyst
- frequently in combination with malformations of other related organs (eye, oral cavity, ear)
  - clefts

malformations II

- nasal and choanal atresia
  - both-sided
    - immediate intubation and surgery
  - one-sided
    - more frequent
    - sometimes not recognized until elderly
    - recurrent respiratory inflammations
- occurence of nervous tissue
  - meningocele, encephalocele
  - brain tissue heterotopy

inflammation

- rhinitis, rhinosinusis, sinusitis

- acute
- chronic
- necrotizing
- granulomatous

rhinitis I

- acute (cold)
  - viral aetiology (rhinovirus, adenovirus, echovirus...)
  - mucosal oedema and hyperaemia, serous secretion (catarrhous inflammation)
  - spreading to surrounding tissues (sinuses, pharynx)
  - possible bacterial superinfection
    - pneumococci, hemophilus
    - purulent inflammation
    - phlegmonous spreading

rhinitis II

- allergic
  - polinosis, hay fever
  - hypersenzitive type I immune reaction (IgE immunoglobulines)
  - catarrhous inflammation with oedema, hyperaemia and serous secretion
    - leukocytic infiltration, eosinophils prominent
  - associated diseases and complications
    - conjunctivitis, oral allergic syndrome
    - otitis, chronic rhinosinusitis with polyps, bronchial asthma

rhinitis III

- chronic
  - repeated attacs of acute or allergic rhinitis
  - cilliary dysfunction of respiratory epithelium, nasal malformations and polyps
  - atrophic form
  - hypertrophic form
    - recomended to exclude other aetiology (vasculitis, tumor)
    - nasal polyps forming
  - syphilitic
    - in congenital syphilis
    - nasal bones destruction
  - possible bacterial superinfection
  - surface epithelium destruction with mixed inflammatory infiltrate

nasal polyps

- protrusions of nasal mucosa
- consequence of recurrent acute rhinitides and hypertrophic chronic rhinitis
- size up to 3-4 cm
- histology
  - surface cilliary epithelium (squamous metaplasia possible)
  - stromal oedema, hyperaemia, mixed (likely chronic) inflammation
    - rise of neutrophils – signs of exacerbation
    - rise of eosinophils – allergic aetiology
- antrochoanal polyp
  - maxillary sinus mucosa
  - often surface defects (ulcerations) with bleeding

sinusitis

- acute
  - spreading of inflammation from nasal cavity (acute / chronic rhinitis, rhinosinusitis)
  - spreading from other sites (oral cavity, dental inflammations)
  - obstruction of outflow of the secretion by inflammatory oedema
    - mucocele
    - bacterial superinfection - empyema
- chronic
  - recurrent acute sinusitides
  - bacterial and mycotic superinfection (immunodeficient patients, DM)
    - spreading to the cranial vault, septic thromboses of dural venous sinuses, osteomyelitis

necrotizing midline lesions

- nose and upper respiratory tract
- lethal midline granuloma (polymorphic reticulosis)
- rapid progression
  - ulceration and superimposed infection (granulomatous inflammation)
  - tissue destruction
  - highly fatal
- heterogenic aetiology
  - granulomatous vasculitides (GPA)
  - invasive mycotic infections (Mucor sp.) and specific infections (blood-borne dissemination and sepsis)
  - highly aggressive tumors (lymphomas, carcinomas)

tumors

- epithelial
- mesenchymal
- other histogenesis

- benign
- malignant

benign tumors I

- sinonasal papilloma
  - Schneiderian membrane papilloma
  - associated with low-risk HPV infection
  - exophytic
    - papillomatous proliferation covered by ciliated or squamous epithelium
  - endophytic (inverted)
    - papillomatous proliferation of squamous epithelium extending to mucosa
    - clinically more severe
      - locally aggressive
      - spreading to orbit or cranial vault
      - recidivas
      - malignant transformation

benign tumors II

- mesenchymal tumors
  - soft tissue tumors
  - haemangiomas,lymphangiomas
  - angiofibromas

malignant tumors I

- squamous cell carcinoma and its subtypes
  - most common nasal cavity and maxillary sinus
  - risk factors:
    - long term inhalation of toxic substances (smoking, industry)
    - high-risk HPV infection
  - clinically:
    - nose obliteration, nasal secretion, bleeding
    - invasive and locally destructive growth

malignant tumors II

- squamous cell carcinoma and its subtypes
  - gross:
    - polypous tumor with surface ulceration
    - necrosis and haemorrhagy
  - histology:
    - squamous cell carcinoma
      - keratizing, non-keratizing
      - undifferentiated (divided in several units according to molecular and immunohistochemical profile)
  - prognosis:
    - poor
      - often locally advanced at the time of diagnosis
      - complicated to impossible radical surgery
      - poor answer on treatment (radiotherapy)

malignant tumors III

- different histogenesis
  - adenocarcinoma
    - intestinal / non-intestinal type
    - salivary gland tumors analogues
  - melanoma
  - haematologic tumors
    - DLBCL, plasmocytoma, extranodal NK/T lymphoma
  - olfactory neuroblastoma (esthesioneuroblastoma)
  - neuroendocrine tumors
  - mesenchymal tumors (sarcomas)

pharynx

pharynx

- nasopharynx
- oropharynx
  - tonsillar ring
- hypopharynx

malformations I

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

- differential diagnosis of neck resistances

malformations II

- malformations of descensus of the thyroid gland
  - 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

inflammation I

- inflammation of the mucosa – pharyngitis
- inflammation and hyperplasia of lymphoid tissue
  - pharyngeal lymphatic tissue hyperplasia
    - adenoid vegetation
  - tonsillitis
- variable aetiology (mostly infectious)
  - viral, bacterial, mycotic

inflammation II

- pathogenesis:
  - droplet infections (inhalation)
  - alimentary pathway
- risk factors:
  - exogenous (air temperature and humidity changes, air condition)
  - endogenous (patients´ immunity, stress – physical and psychical)
- variable type of inflammation and its intensity
  - according to aetiologic agents
  - development and changes in time

tonsillitis I

- pharyngeal lymphoid tissue inflammation (angina, amygdalitis)
- symptomas according to anatomical location
- pathogenetic classification:
  - isolated (purulent)
  - symptomatic (symptomas of systemic infectious disease)
  - secondary (defficiency of immune system)

tonsillitis II

- signs
  - frequently children
  - fatigue, fever, headache
  - sore throat, dysphagia
  - tonsillar oedema (enlargement)
  - reactive cervical lymphadenopathy

tonsillitis III

- catarrhous
  - viral, early bacterial
  - tonsillar oedema and hyperaemia
- lacunar
  - purulent inflammation on the top surface and in lacunae
  - bacterial overgrowth (Streptococcus pyogenes)
  - tonsillar enlargement and hyperaemia, purulent plaques
- phlegmonous
  - interstitial purulent inflammation – plegmonous spreading, abscessi in lymphoid tissue
  - healing by fibroproduction and chronic tonsilitis development

tonsillitis IV

- pseudomembranous
  - isolated (diphteria, streptococci)
  - symptomatic (mononucleosis)
  - compact fixed pseudomembranes, ulcerations and bleeding after removing
- gangrenous
  - putrid bacteria
  - secondary ischaemic changes
- vesiculous
  - viral infections (HSV, Coxackie)

tonsillitis V – complications

- local
  - pseudoabscessi
    - obliterated lacuna filled with inflammatory exsudate
  - phlegmona and abscess
    - peritonsillar
    - parapharyngeal (jugular vein thrombophlebitis, mediastinitis)
    - retropharyngeal
- systemic
  - tonsillogenic sepsis
  - metatonsillar complications
    - sterile consequences (rheumatic fever, glomerulonefritis)

tumors of pharynx – benign I

- squamous cell papilloma
  - exophytic growth pattern
  - narrow papillae covered by mature squamous epithelium
  - associated with low-risk HPV infection
  - surface changes
    - erosions and ulcerations
    - surface epithelium dysplasia

tumors of pharynx – benign II

- nasopharyngeal (juvenile) angiofibroma
  - young patients (adolescent males)
  - polypous tumor of nasopharyngeal region (roof)
  - sparse fibrous stroma (oedema and myxoid change)
  - blood vessels of variable lumen and wall thickness, staghorn branched
  - massive bleeding from surface defects
  - locally aggressive, common recidives

tumors of pharynx – malignant I

- nasopharyngeal carcinoma
  - associated with EBV infection
  - squamous cell carcinoma of variable differentiation
    - keratinizing / non-keratinizing
    - undifferentiated – lymphoepithelioma-type
  - locally aggressive
  - early metastatic spread
  - poor prognosis
    - locally progressed tumors
    - complicated surgery
    - therapy resistant (CHRT)

tumors of pharynx – malignant II

- oropharyngeal tumors
  - tonsills (tonsillar fossa), base of tongue, soft palate and uvula, lateral pharyngeal wall, retromolar trigonum
  - squamous cell carcinoma and its subtypes
    - keratinizing, non-keratinizing, papillary, basaloid, adenosquamous, spindle cell, lymphoepitelioma-type...
    - sufrace defects and ulcerations, bleeding, necrosis
  - risk factors
    - high-risk HPV infection, exogenous (smoking, alcohol)
  - early metastatic spread to the cervical lymph nodes

oropharyngeal squamous cell carcinoma I

- according to present classiffication 2 basic types:
  - HPV positive (HPV-associated)
  - HPV negative (non-HPV)
- different prognosis and treatment strategy

oropharyngeal squamous cell carcinoma II

- HPV positive
  - associated with high-risk HPV infection
    - viral oncoproteins transcription (E7, E6)
    - inactivation of p53 a pRb proteins and their signalling pathways
    - uncontrolled prolifertion, loss of apoptotic function
    - immunohistochemical proof of p16 marker
      - alternatively in situ hybridisation, nuclear acid analysis using PCR methods, mRNA examination of E7, E6 oncoproteins
  - younger patients
  - non-keratinizing carcinomas of basaloid pattern
  - favourable prognosis

oropharyngeal squamous cell carcinoma III

- HPV negative
  - in the most cases mutation in TP53 gene
    - negative immunohistochemistry for p16
  - older patients
  - associated with smoking and alcohol abuse
  - keratinizing carcinomas
  - worse prognosis

tumors of pharynx – malignant III

- other malignant tumors
  - carcinomas
    - adenocarcinomas (salivary gland tumors analogues)
  - neuroendocrine tumors
  - lymphomas
  - melanoma
  - mesenchymal tumors

larynx

malformations I

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

malformations 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

inflammation

- often combined with inflammations of the rest of airways
- aetiopathogenesis
  - infection (viral, bacterial, mycotic)
  - physical and chemical influence
  - voice overuse
- acute laryngitis
  - children
  - catarrhous / stenosing
- chronic laryngitis

acute catarrhous laryngitis

- related to current upper airways inflammation
- viral aetiology, often bacterial superinfection
- sore throat, hoarse voice
- cough
  - dry → mucopurulent expectoration
- red, hyperaemic mucosa of larynx and vocal cords with mucopurulent cover

stenosing (suffocating) laryngitis I

- rapidly progreding fulminant inflammations
- severe dyspnea requiring immediate treatment
  - intubation, tracheostomia
- laryngeal stenosis
  - inflammatory oedema
    - infectious, non-infectious
  - pseudomembranes covering the surface mucosa

stenosing (suffocating) laryngitis II

- subglottic laryngitis (pseudocroup)
  - viral aetiology
  - „crying“ cough, stridor, inspiratory dyspnea, reflexive laryngospasmus
  - severe oedema of the subglottic part of larynx
- acute epiglottitis (supraglottic laryngitis)
  - Haemophilus influenzae, type B
  - phlegmona of epiglottis, laryngeal oedema, dyspnea, odynofagia, laryngospasmus

stenosing (suffocating) laryngitis III

- oedematous laryngitis (Quincke´s angiooedema)
  - venostatic and lymphostatic oedema of submucosal fibrous tissue
  - hypersensitive IgE reaction
    - allergies
    - systemic diseases
  - hereditary angiooedema
    - complement´s C1 component inhibitor mutation
  - rapid progreding laryngeal oedema with dyspnea

stenosing (suffocating) laryngitis IV

- pseudomembranous laryngitis (laryngotracheitis, croup)
  - consequence of severe catarrhous laryngitis
    - erosions, ulcerations, pseudomembranes
    - bacterial superinfection (Staphylococcus aureus)
    - in past diphteria
  - dyspnea, cough
    - expectoration of pseudomembrane´s fragments, aspiration risk
  - complications
    - healing by fibrosis and larynx deformations
    - spreading of infection to mediastinum (mediastinitis)

chronic laryngitis

- recurrent inflamations and airways irritation
  - smoking, gastrooesophageal reflux
  - atrophic / hypertrophic form
  - metaplastic changes of surface epithelium
    - ciliated → squamous
      - abrupt keratinization – plaques (leukoplakia)
      - dysplastic changes, possible malignant transformation

pseudotumors

- vocal cord polyps
  - organising haematoma, posttraumatic
  - postintubatory
  - surface epithelium metaplasia, dysplastic changes
- laryngeal (vocal cord, „singers´“) nodule
  - common both sided
  - myxoid connective tissue with blood vessels
  - haemorrhagic changes
  - fibrin exsudation
  - secondary defects of surface epithelium

laryngeal tumors – benign

- squamous cell papillomas
  - asociated with low-risk HPV infection
  - common multiple and recidiving in case of so called papillomatosis
- salivary gland tumor analogues
  - pleomorphic adenoma
- mesenchymal tumors
  - chondromas, hemangiomas

laryngeal tumors – malignant I

- squamous cell carcinoma
  - risk factors:
    - smoking, alcohol, gastrooesophageal reflux, former radiotherapy, asbestos exposition, HPV (minimally)
  - dysplastic changes (leukoplakia) as precursor
    - low-grade / high-grade
  - metaplastic changes of surface epithelium by chronic irritation and repetitive inflammations
  - predominantly keratinizing type SCC (HPV/p16 negative)

laryngeal squamous cell carcinoma I

- different prognosis after anatomical location in larynx:
  - supraglottic type
  - glottic type
  - subglottic type

laryngeal squamous cell carcinoma II

- supraglottic type
  - around 25 % cases
  - worse prognosis
    - rich lymphatic drainage (early and common angioinvasion and metastatic spread to cervical lymph nodes)
    - rich neural network (perineural invasion)
    - late clinical manifestation
- glottic type
  - around 70 % cases
  - favourable prognosis
    - early clinical manifestation (treatment of low-stage tumors)
    - low density of lymphatic vessels and nerves

laryngeal squamous cell carcinoma III

- subglottic (infraglottic) type
  - particularly rare (around 5 % cases)
  - worse prognosis
    - late manifestation
    - clinically high-stage tumors by diagnosis and treatment begining

laryngeal tumors – malignant II

- epithelial
  - adenocarcinomas of small salivary glands
  - neuroendocrine tumors
- mesenchymal
  - chondrosarcoma
- haematologic
  - extremely rare
- secondary spread from surrounding structures and organs
  - upper head and neck tumors, oesophagus, trachea, thyroid gland

ear

malformations

- congenital
  - aural skin polyp (auricular appendices)
  - malformations of shape, size and location of the auricle
    - part of craniofacial dysmorphy in genetic syndromas
  - malformations of the internal ear (labyrinth)
    - congenital dystrophy (Alport´s syndrome)
    - postinfectious complications (morbili, lues)
- acquired
  - otohematoma (subperichondrial bleeding of auricle)
  - repetitive traumatisation
    - so called „cauliflower deformation“ (fighters, rugby players)

external ear pathology

- skin changes and inflammations
  - chondrodermatitis nodularis helicis
  - cerumen (sebaceous secretion)
- tumors
  - skin and cutaneous adnexal tumors
    - malignant / benign
  - exostosis of external ear canal (osteoma)

middle ear pathology I

- inflammation (otitis media)
- acute
  - particularly chidren
  - viral, with bacterial superinfection
  - spreading:
    - throught the auditive tube
      - different anatomical configuration in children (short, horizontal)
    - alternatively haematogenic, lymphogenic, from the external ear canal, porogenic from the cranial vault

middle ear pathology II

- acute mesotitis
  - catarrhous / purulent / fibrinous / haemorrhagic / gangraenous inflammation
  - exsudate in the middle ear space
    - elevation of the tympanic membrane (risk of rupture)
  - complications of the inflammation and its healing
    - mastoiditis, meningitis, phlegmona of dural venous sinuses, sepsis
    - scaryfying fibrosis of the tympanic membrane (loss of hearing)

middle ear pathology III

- chronic mesotitis
  - lasting longer than 6 weeks
  - recurrent attacs of acute inflammation
  - long-lasting secretion from ear
  - organizing granulation tissue (polypous shaped)
    - locally destructive process
  - cholesteatoma
    - cystic lesion lined by squamous epithelium and filled with keratine matter
    - addition of infectious agents (bacteria, yeast)
    - chronic inflammation in surrounding tissues (possible exacerbation)

internal ear pathology

- hearing disorders
  - presbyakusy
    - degenerative changes of cochleary aparate
  - acustic trauma
  - ototoxicity of drugs (streptomycin, cytostatics)
  - haemorrhage (altitudinal hypoxia)
  - inflammations
  - otosclerosis of the labyrinth
- balance disorders (membranous labyrinth)
  - Meniér´s disease (hydrops)
- tumors
  - endolymphatic sac carcinoma

thank you