

**Institute for Microbiology, Medical Faculty of Masaryk University
and St. Anna Faculty Hospital in Brno**

Miroslav Votava

**Agents of respiratory
diseases – I**

**The 1st lecture for 3rd-year students of dentistry
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Significance of respiratory diseases

- They are **the most significant infections** in general practitioner's office (respiratory tract = an ideal incubator)
- They have a big **economic effect** on the economics in general and on health care in particular
- They tend to be seen in **collectives** and often produce **outbreaks and epidemics**
- **3/4** of respiratory infections (and even more in children) are caused by **viruses**

Localization of infection in the respiratory tract

- **Localization of infection**
 - influences the **clinical symptomatology**
 - enables to **suspect specific agents**
- **Therefore, it is necessary to distinguish:**
 - **upper respiratory tract (URT) infections (and adjacent organs infections)**
 - **lower respiratory tract (LRT) infections (infections of lower respiratory ways and pneumonias)**

URT infections and infections of adjacent organs

- **Classification:**
 - infections of **nose a nasopharynx**
 - infections of **oropharynx incl. tonsillae**
 - infections of **paranasal sinuses**
 - **otitis media**
 - **conjunctivitis**

LRT infections and lung infections

- **Classification:**
- **Infections of LRT**
 - infection of **epiglottis**
 - infection of **larynx and trachea**
 - infection of **bronchi**
 - infection of **bronchioli**
- **infections of lungs**

Common flora in respiratory ways

- To differentiate between the pathologic or normal finding it is necessary to know **which bacteria are typically found in the respiratory tract of a healthy person**
- **Nasal cavity:** usually *Staph. epidermidis*, less often sterile, coryneform rods, rarely *Staph. aureus*, pneumococci
- **Pharynx:** always neisseriae and streptococci (viridans group), usually haemophili, rarely pneumococci, meningococci, enterobacteriae, yeasts
- **LRW:** rather sterile; nevertheless, materials from these sites are often contaminated by URW flora

Etiology of rhinitis and nasopharyngitis

- **Viruses** – the most common („common cold“):
 - more than 50 % rhinoviruses
 - coronaviruses (2nd position)
 - other respiratory viruses (but not flu!)
- **Bacteria:**
 - **Acute** infections: usually secondary
 - *Staph. aureus*, *Haem. influenzae*, *Strep. pneumoniae*, *Moraxella catarrhalis*
 - **Chronic** infections:
 - *Klebsiella ozaenae*, *Kl. rhinoscleromatis*

Treatment recommendation

- Because of viral etiology, the majority of rhinitis and nasopharyngitis cases **does not require antibiotic treatment and even does not require bacteriological examination**
- **If necessary** (pus full of polymorphonuclears, high CRP levels → markers of bacterial infection) treatment should fit with the **result of bacteriological examination**
- Sometimes we try to treat (but rather locally only) even without symptoms – treatment of carriers of some epidemiologically important pathogens (e. g. MRSA)

Etiology of sinusitis and otitis media – I

- **Acute sinusitis and otitis is usually started by respiratory viruses, *M. pneumoniae* (myringitis)**
- **Secondary pyogenic inflammations are due to:**
- ***S. pneumoniae*, *H. influenzae* type b, *Moraxella catarrhalis*, *Staph. aureus*, *Str. pyogenes***
- **even anaerobes: genus *Bacteroides*, *Prevotella*, *Porphyromonas*, *Peptostreptococcus***
- **Complications: mastoiditis, meningitis purulenta**

Etiology of sinusitis and otitis media – II

- **Otitis externa acuta:** *Staph. aureus*
- **Sinusitis maxillaris chronica, sinusitis frontalis chronica:** *Staph. aureus*, genus *Peptostreptococcus*
- **Otitis media chronica:** *Pseudomonas aeruginosa*, *Proteus mirabilis*

Examination and treatment

- **Today, it is not recommended to perform bacteriological examination in otitis media and sinusitis, except when a relevant specimen is available**
- **Relevant specimen** – only a punctate from middle ear or paranasal sinus; **NOT** nasal swab and **NOT** ear swab (contamination is present, but no pathogen)
- **Treatment is usually started by an aminopenicillin or a 1st gen. cephalosporin**

Etiology of conjunctivitis – I

- **Conjunctivitis is usually of viral origin**
- **It usually accompanies acute URT infections**
In adenovirus infections typically:
follicular conjunctivitis, pharyngoconjunctival fever (adenoviruses 3, 7), epidemic keratoconjunctivitis (adeno 8,19)
- **Viral conjunctivitis of other origin:**
hemorrhagic conjunctivitis (enterovirus 70)
herpetic keratoconjunctivitis (HSV)

Treatment is usually only local

Etiology of conjunctivitis – II

- **Bacterial conjunctivitis**
- **Acute:**
 - **suppurative conjunctivitis:**
S. pneumoniae, *S. aureus*, in children also other bacteria
 - **inclusion conjunct.:** *C. trachomatis* D – K
- **Chronic:**
 - *S. aureus*, *C. trachomatis* A – C (trachoma)
- **Allergic, mechanic (alien body)**

Oropharyngeal infections

- **Acute tonsillitis and pharyngitis:** usually **viral** (rhinoviruses, coronaviruses, adenoviruses, Epstein-Barr virus – inf. mononucleosis, coxsackieviruses – herpangina)
- **Among bacterial, the most important:** ac. tonsillitis or tonsillopharyngitis due to ***S. pyogenes*** (= β -haemolytic streptococcus, group A according to Rebecca Lancefield)
- **More bacterial** agents: streptococci group C, F, G, pneumococci, *Arcanobacterium haemolyticum*, *H. influenzae*?, *N. meningitidis*?, anaerobes?
- Rare, but **significant:** *Corynebacterium diphtheriae*, *Neisseria gonorrhoeae*

Treatment of oropharyngeal infections

- Bacteriological examination recommended in all cases, incl. a „typical tonsillitis“
- When *Streptococcus pyogenes* is found, the „old good“ Fleming’s penicillin is the best
- Modern drugs like azithromycin, clarithromycin etc. have worse effect and should be used in allergic persons only
- Besides bacteriological examination, a determination of CRP level (marker of a bacterial infection) is recommended

Homework 1

What is the name of the painting and of its author?



Answer and questions

The solution of the homework and possible questions please mail (on 6.30 a.m. at the latest) to the address

mvotava@med.muni.cz

Thank you for your attention