

# **Microbiological perspective of lower respiratory tract infections**

Veronika Holá

Institute for Microbiology

Faculty of Medicine, Masaryk University  
and St. Anne's Faculty Hospital in Brno

TZKM, spring 2018

# Respiratory infections

- Common infections
- Strong economic impact
- Transmitted in collectives
- Outbreaks or epidemics

# Respiratory infections

- Localisation of infection in the respiratory tract
- Distinguish
  - URTI
  - LRTI

# URT infections

- Infections of nose a nasopharynx
- Infections of oropharynx incl. tonsillae
- Infections of paranasal sinuses
- Otitis media
- Conjunctivitis

# LRT infections

- Infection of epiglottis
- Infection of larynx and trachea
- Infection of bronchi
- Infection of bronchioli
- + Infections of lungs

# Normal flora of RT

- Nasal cavity
- Pharynx
- LRW

# Incidence of pneumonia

- First year of life
- CZ - 80 000 - 150 000/year
- Factors increasing lethality
- Etiology of pneumonia
  - Infectious
  - Non-infectious (=„pneumonitis“)

# Pneumonia

- **Pneumonia** – acute or chronic inflammation of lung parenchyme on the infectious, allergic, physical or chemical basis
- **Affected sites**
- **Symptoms**
- **Severity**
- **Worldwide – 3<sup>rd</sup> most often cause of death**

# According to mechanism of development

- Primary
- Secondary

# According to pathological-anatomy

- Alveolar
- Interstitial



# According to RTG findings

- Alar
- Lobar
- Segmental
- Bronchopneumonia

# According to clinical manifestation and RTG

- Typical (bacterial)
  - Classical symptoms of pneumonia
- Atypical pneumonia
  - Symptoms not typical for bacterial pneumonia
  - EA – IC pathogens

# Atypical pneumonia

- The term rather obsolete
  - mostly caused by
    - respiratory viruses
    - atypical bacteria
- In bacterial agents, antibiotic therapy (doxycycline, macrolides)

# Pneumonia - according to course of infection

- Acute
- Subacute
- Chronic
- Recurrenting
- Migrating

# Pneumonia - according to course of infection

- Acute
  - Acute – community-acquired pneumonia
  - Acute – nosocomial pneumonia
    - VAP
    - Other

# Etiology of community pneumonia I.

- **According to epidemiology and clinic**
- Community acquired
  
- **Acute – community-acquired in healthy adults**
- Most common EA
  
- Elderly
- Atypical pneumonia

# Etiology of community pneumonia II.

- Etiology of acute community-acquired pneumonia in healthy children
  - Bronchopneumonia
    - In newborns
  - Atypical pneumonia
    - In newborns

# Etiology of community pneumonia III.

- Acute community-acquired pneumonia in immunocompromised
- In more serious immunodeficiency



# Etiology of community pneumonia IV.

- Acute community-acquired pneumonia after a contact with animals
  - Bronchopneumonia
  - Haemorrhagic pneumonia
  - Atypical pneumonia

# Etiology of nosocomial pneumonia I.

- **Acute nosocomial VAP**
  - ATB treatment
- Early pneumonia
- Most common EA

# Etiology of nosocomial pneumonia II.

- Late nosocomial pneumonia
- Most common EA
- Therapy

# Etiology of nosocomial pneumonia III.

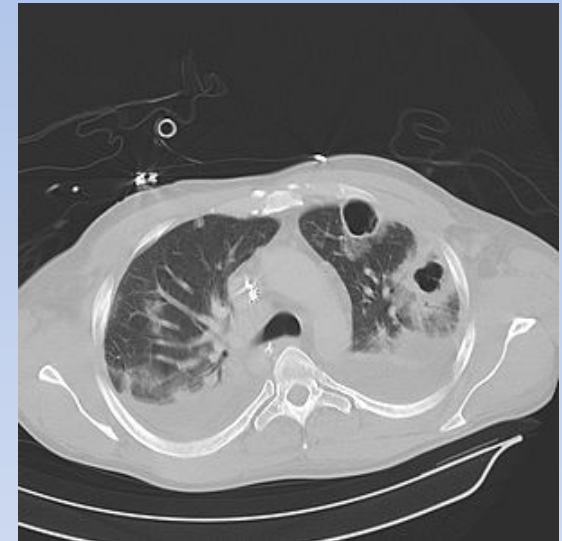
- Pneumonia in immunocompromised
- Most common EA
- Pneumonia in Social work institutions
  - Elderly
  - More resistant strains than in community

# **Etiology of subacute and chronic pneumonia**

- Subacute and chronic pneumonia
- Aspiration pneumonia and lung abscesses
- Lung tuberculosis and mycobacterioses

# Diagnostics of pneumonia I.

- Physical finding
- RTG of lungs
- Microbiological examination of sputum
  - Avoid saliva contact



CT of pneumonia with two abscesses surrounded by pyogenic membrane

# Diagnosics of pneumonia II.

- Sputum
  - Mucopurulent, purulent samples
  - Semiquantitative inoculation
- Haemoculture
- Examination of exudate, BAL
- Urine examination for antigens
- Serology
- Blood count

# Diagnosics of pneumonia III.

- **Panel of respiratory viruses and other microorganisms**
  - Respiratory viruses
- Include non-viral agents – unculturable bacteria
- Atypical pneumonia



# Therapy of pneumoniae

- According to type and etiology
- In general
  
- Acute bronchopneumonia
  
- Atypical pneumoniae
  - Relapse
  
- Treatment

# Treatment

- Nosocomial pneumonia
- Symptomatic treatment
- Nebulisation therapy
- Regime arrangement
- Satisfactory input of liquids, energy, vitamins
- Breath rehabilitation
- 6 weeks after recovery – functional examination of lungs

# Complications

- Respiratory insufficiency
- Pleural exudate
- Empyema
- Lung abscesses
- Pulmonary gangrene
- Atelectasis and subsequent bronchiectasia
- Sepsis with dissemination of infection to other localities (arthritis, otitis, nephritis, endocarditis, meningitis, peritonitis) or septic shock

