Infections of the head, neck, and lower respiratory tract
Infections of the upper respiratory tract

- Common
- 25% bacteria → antibiotics
- 75% viruses
- Diagnosis on clinical grounds
Nonspecific infections of the upper respiratory tract

- No prominent localizing features
- Acute nasopharyngitis
- Acute infective rhinitis
- Acute coryza
- Acute nasal catarrh
- Common cold
- Etiology → viruses → rhinovirus, influenza virus, parainfluenza virus, coronavirus, adenovirus, respiratory syncytial virus (RSV)
Clinical Manifestations

- Acute, mild, and catarrhal syndrome
- Duration of 1 week
- Rhinorrhea, nasal congestion, cough, sore throat
- Fever
- Myalgia, fatigue, conjunctivitis
- 2% secondary bacterial infections in elderly persons, chronically ill patients → purulent secretions
Treatment

- No antibiotics
- Nonsteroidal anti-inflammatory drugs
- Decongestants
Sinusitis

- Maxillary sinus
- Ethmoid sinus
- Frontal sinus
- Sphenoid sinus
- Nasal cavity
- Mucus retained → infected
- Acute vs. Chronic
- Infectious (viral, bacterial, or fungal) vs. noninfectious
Acute Sinusitis

- <4 week’s duration
- Viral and bacterial origin
- 98% of all cases antibiotics prescribed
- Noninfectious causes → allergic rhinitis → mucosal edema or polyp obstruction
- Barotrauma → air travel, deep-sea diving
- Nasal and sinus tumors
- Wegener’s granulomatosis
Acute Sinusitis 2

- Acute infections → viral rhinosinusitis → rhinovirus, parainfluenza virus, influenza virus
- Bacterial causes → *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *Staphylococcus aureus*
Clinical Manifestations

- Nasal congestion
- Facial pain or pressure
- Headache, tooth pain
- Purulent nasal discharge
- Cough, sneezing
- Fever
- Sphenoid or ethmoid sinusitis → severe frontal or retroorbital pain
- Thrombosis of the cavernous sinus
- Complications → meningitis, epidural abscess, cerebral abscess
Diagnosis

- Sinus radiography
- CT
- Otolaryngological examination → sinus aspirate → culture and susceptibility testing
- Biopsy rarely
Treatment of Acute Sinusitis

- Decongestants orally or topically
- Nasal glucocorticoids
- Severe symptoms or moderate symptoms >7 days → empirical antibiotics → **Amoxicillin** or **Amoxicillin/clavulanate** orally
- IV antibiotics
- Surgical intervention
Chronic Sinusitis

- Symptoms lasting > 12 weeks
- Impairment of mucociliary clearance
- Constant nasal congestion
- Sinus pressure
- Otolaryngologist → endoscopic examination, surgery
- Antibiotics → culture-guided, 3-4 weeks
- Mechanical irrigation of the sinus with sterile saline solution
- Intranasal steroids
- Sinus surgery
Otitis Externa

- The auditory meatus
- Localized, diffuse, chronic, invasive
- Itching, severe pain
- Bacteria → S. aureus, P. aeruginosa
- Treatment → removal of debris, topical antiinflammatory agents → acetic acid, aluminium acetate in water, topical steroid, neomycin
Acute Otitis Media

- Inflammation of the middle ear
- Decreased tympanic membrane mobility
- Bulging, erythematous, spontaneously perforate tympanic membrane
- Pneumatic otoscopy → fluid in the middle ear
- Purulent otorrhea
- Tympanocentesis → S.pneumoniae, MRSA
- Fever
- Otalgia
- Decreased hearing, tinnitus
Treatment

- Observation alone
- Amoxicillin orally
- Cefuroxime orally, Azithromycin orally
- Severe cases → Ceftriaxone iv.
Chronic Otitis Media

- Persistent purulent otorrhea
- Tympanic membrane perforation → central, peripheral
- Conductive hearing loss
- Meningitis, brain abscess, parlysis of cranial nerve VII.
- Surgery → myringoplasty, tympanoplasty
- + systemic antibiotics
Acute Pharyngitis

- Sore throat
- Respiratory viruses, rhinoviruses, coronaviruses, influenza virus, parainfluenza virus, adenovirus, EBC, CMV, HSV, coxsackievirus A
- S. pyogenes β-hemolytic $\rightarrow$ acute glomerulonephritis, acute rheumatic fever
Clinical Manifestations

- No fever
- No tender cervical adenopathy
- No pharyngeal exudates
- Influenza → severe acute pharyngitis, fever, myalgias, headache, cough
- EBV, CMV → infectious mononucleosis
- HSV → herpangina → small vesicles on the soft palate and uvula → rupture → white ulcers
- Streptococci → pharyngeal pain, fever, chills, tosillar hypertrophy and exudate, tender anterior cervical adenopathy
Diagnosis and Treatment

- Streptococcal ↔ viral
- Throat swab culture
- S. pyogenes → Penicillin V orally, Amoxicillin orally, Erythromycin orally
- Viral → symptom-based
- Complications → peritonsillar abscess, otitis media, sinusitis, pneumonia, acute GN, rheumatic fever
Oral Infections

- HSV → painful vesicles on the lips, tongue, buccal mucosa
- Topical acyclovir
- Candida albicans → oropharyngeal candidiasis = thrush
- After prolonged antibiotic and glucocorticoid therapy
- White plaques on the gingiva, tongue, oral mucosa
- Oral fluconazole, nystatin, clotrimazole
Laryngitis

- Inflammatory process → larynx
- Respiratory viruses
- Streptococcus, C. diphtheriae
- Hoarseness, reduced vocal pitch, aphonia
- Laryngoscopy → diffuse erythema, edema
- Chronic laryngitis → mucosal nodules, ulcerations
- Treatment → humidification, voice rest
- Streptococcus → penicillin
Pneumonia

- Infection of the pulmonary parenchyma
- Community-acquired pneumonia
- Hospital-acquired pneumonia
- Ventilator-associated pneumonia
Pathophysiology

- Aspiration from the oropharynx during sleep
- Inhalation of contaminated droplets
- Rales on auscultation
- Infiltrate on X-ray
- Hypoxemia
Community-Acquired Pneumonia

Etiology

- Streptococcus pneumoniae → typical
- Haemophilus influenzae, S. aureus, Klebsiella pneumoniae, Pseudomonas aeruginosa → typical
- Mycoplasma pneumoniae, Chlamydia pneumoniae, Legionella spp., Influenza virus, Adenovirus, RSV virus → atypical
- Anaerobes ← aspiration
- MRSA strains → necrotizing pneumonia
Epidemiology

- Alcoholism
- COPD and/or smoking
- Bronchiectasis
- Lung abscess
Clinical Manifestations

- Fever, chills
- Nonproductive or productive cough
- Purulent, or blood-tinged sputum
- Shortness of breath
- Increased respiratory rate
- Pleuritic chest pain
- Physical examination → degree of pulmonary consolidation and pleural effusion
Pneumonia

Systemic:
- High fever
- Chills

Skin:
- Cyanosis
- Jaundice

Central:
- Headache
- Loss of appetite
- Blood in sputum

Lungs:
- Cough with sputum
- Shortness of breath
- Pleuritic chest pain
- Non-productive cough

Vascular:
- Low blood pressure

Heart:
- High fever

Gastrointestinal:
- Nausea
- Vomiting

Joint:
- Gagging
Clinical Manifestations

- Palpation → tactile fremitus ↑↓
- Percussion → dullness
- Auscultation → crackles, bronchial breath sounds, pleural friction rub
Clinical Diagnosis

- Careful history taking
- Precise physical examination
- Chest radiography
- CT rarely necessary
Etiologic Diagnosis

- Gram’s stain and culture of sputum
- Blood cultures
- Antigen tests → Legionella pneumophila antigens in urine → Legionnaires’ disease
- Antigen tests → pneumococcal urine test
- Rapid test for influenza virus
- PCR → mycobacteria, L. pneumophila
- Specific IgM antibody test → atypical pathogens
# Bacterial Causes of Pneumonia

<table>
<thead>
<tr>
<th>Microbial Agent</th>
<th>Community-Acquired</th>
<th>Nosocomial</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td>20-60</td>
<td>10-20</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>3-10</td>
<td>10-20</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>3-5</td>
<td>15-30</td>
</tr>
<tr>
<td>Gram-negative bacilli</td>
<td>3-10</td>
<td>50-70</td>
</tr>
<tr>
<td>Miscellaneous agents</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td><em>Legionella sp.</em></td>
<td>2-8</td>
<td>4</td>
</tr>
<tr>
<td><em>Mycoplasma pneumoniae</em></td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td><em>Chlamydia pneumoniae</em></td>
<td>4-6</td>
<td></td>
</tr>
<tr>
<td>Aspiration pneumonia</td>
<td>6-10</td>
<td></td>
</tr>
</tbody>
</table>
Empirical Treatment
Outpatients

- Previously healthy and no antibiotics in past 3 months
- Clarithromycin PO or Azithromycin PO or Doxycycline PO
- Comorbidities or antibiotics in past 3 months
- Levofloxacin PO, Moxifloxacin PO or Amoxicillin/clavulanate PO or Cefuroxime PO
Empirical Treatment
Inpatients, non-ICU

- Levofloxacin iv., Moxifloxacin iv.
- Cefotaxime iv., Ceftriaxonei iv., Ampicillin iv. + oral Clarythromycin or Azithromycin
Empirical Treatment
Inpatients, ICU

- Cefotaxime iv., Ceftriaxone iv. + Azithromycin
Resistance

- Antimicrobial resistance
- Str.pneumniae
- MRSA
Duration of Treatment

- 10-14 days
- Oxygen therapy
- Fever and leukocytosis resolve 2-4 days
Prevention

- Vaccination
- Influenza vaccine
- Pneumococcal vaccine
Hospital-Acquired Pneumonia

- Anaerobs $\rightarrow$ aspiration