PBL-X

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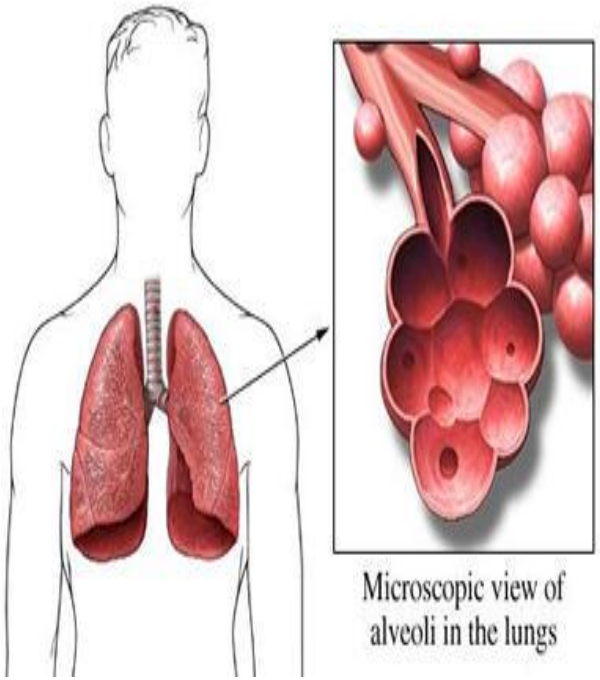
Pneumonia

Definition

- Pneumonia is an acute infection of the parenchyma of the lung, caused by bacteria, fungi, virus, parasite etc.
- Pneumonia may also be caused by other factors including X-ray, chemical, allergen

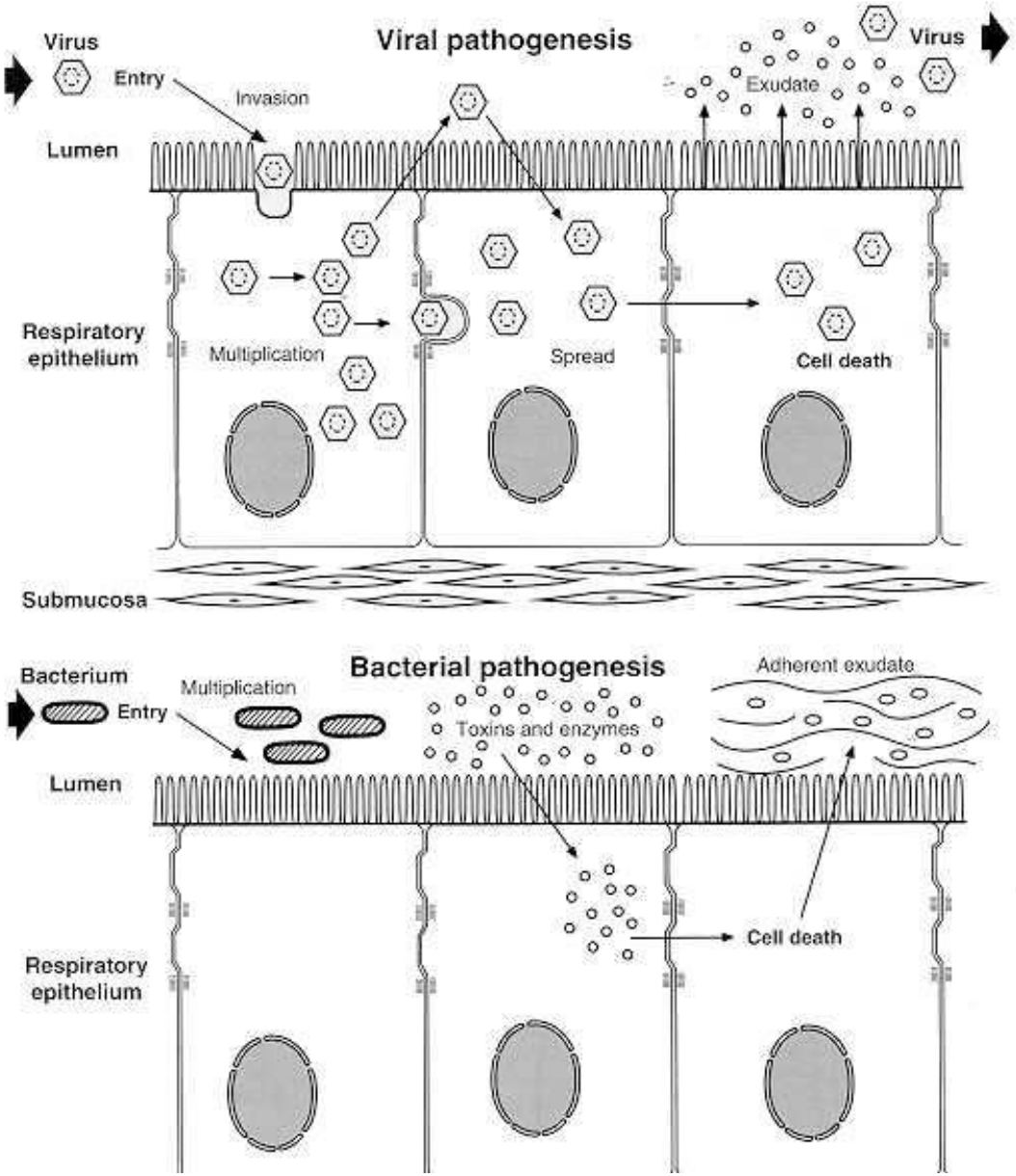


Epidemiology

- The morbidity and mortality of pneumonia are high especially in old people.

Etiology

- There are two factors involved in the formation of pneumonia , including pathogens and host defenses.



Defense Mechanisms of the Respiratory Tract

- Filtration and deposition of environmental pathogens in the upper airways.
- Cough reflex.
- Mucociliary clearance.
- Alveolar macrophages.
- Humoral and cellular immunity.
- Oxidative metabolism of the neutrophils.

Classification

- Classification of anatomy
- Classification of pathogen
- Classification of acquired environment

Classification by pathogen

Pathogen classification is the most useful to treat the patients by choosing effective antimicrobial agents

Bacterial pneumonia

(1) Aerobic Gram-positive bacteria,such as streptococcus pneumoniae, staphylococcus aureus, Group A hemolytic streptococci

(2) Aerobic Gram-negative bacteria, such as klebsiella pneumoniae, Hemophilus influenzae, Escherichia coli

(3) Anaerobic bacteria

Atypical pneumonia

Including Legionnaire's pneumonia ,

Mycoplasmal pneumonia ,chlamydia pneumonia.

Fungal pneumonia

Fungal pneumonia is commonly caused by candida and aspergilosis and pneumocystis jiroveci

Viral pneumonia

Viral pneumonia may be caused by adenoviruses, respiratory syncytial virus, influenza, cytomegalovirus, herpes simplex

Pneumonia caused by other pathogen

Rickettsias (a fever rickettsia),

parasites

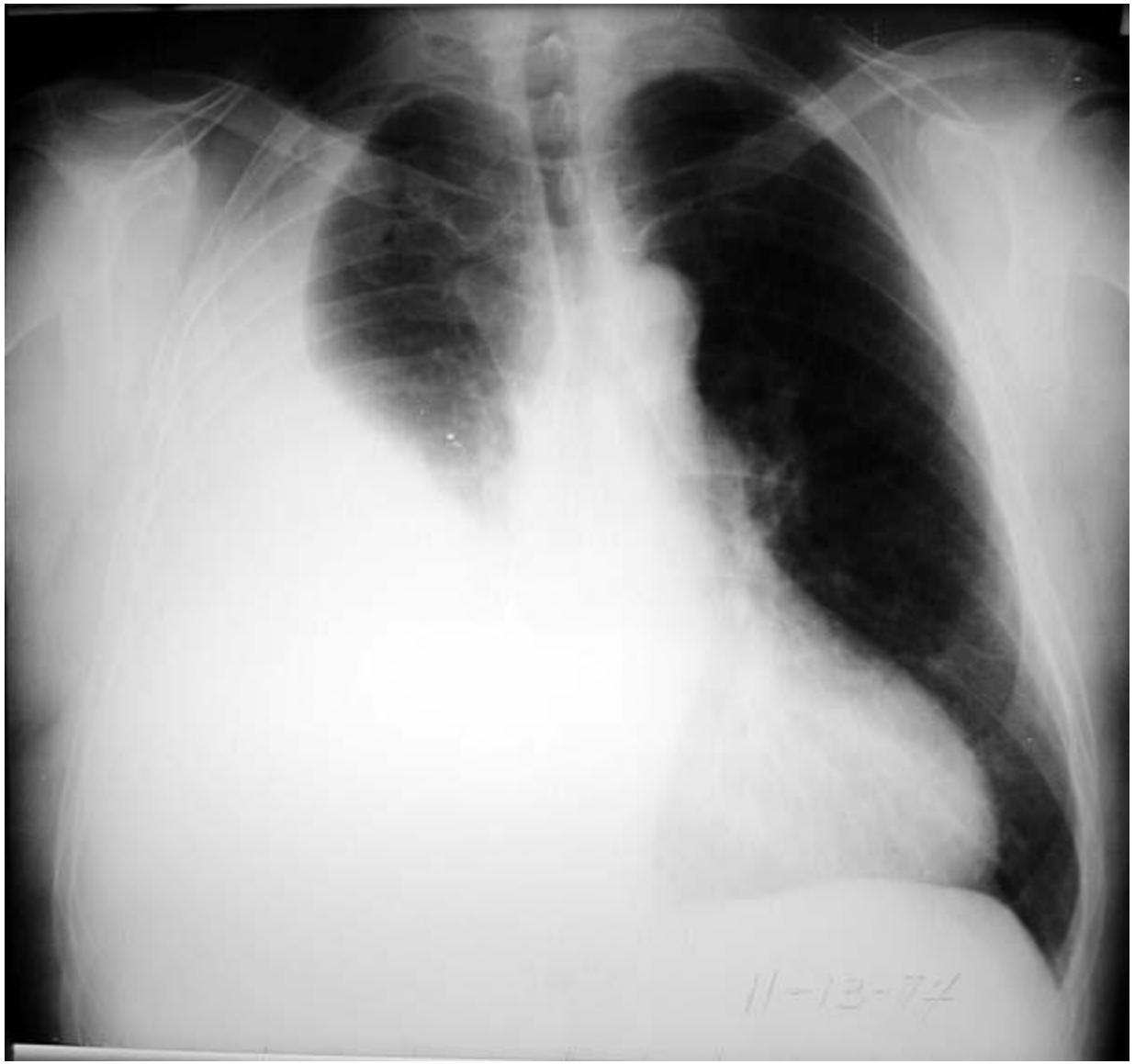
protozoa

Classification by anatomy

1. Lobar: Involvement of an entire lobe
2. Lobular: Involvement of parts of the lobe only, segmental or of alveoli contiguous to bronchi (bronchopneumonia).
3. Interstitial

Lobular pneumonia

Lobar pneumonia



Classification by acquired environment

- Community acquired pneumonia，CAP
- Hospital acquired pneumonia，HAP，NP
- Nursing home acquired pneumonia,NHAP
- Immunocompromised host pneumonia,(ICAP)

CAP

- CAP = pneumonia in person not hospitalized or residing in a long-term care facility for ≥ 14 days

Clinical Infectious Diseases 2000;31:347-82

“Nosocomial” Pneumonia

- Hospital-acquired pneumonia (HAP)
  - Occurs 48 hours or more after admission, which was not incubating at the time of admission
- Ventilator-associated pneumonia (VAP)
  - Arises more than 48-72 hours after endotracheal intubation

Evaluation

- 1. Chest X-Ray
  - Bacteria - Lobular, lobar consolidation
  - Viral – Perihilar infiltrates, Bilateral interstitial pattern
  - Mycoplasma – Patchy alveolar & interstitial infiltrates, single or contagious lobe

Evaluation

- 2. CBC with Differential – Normal Count – Bacterial etiology unlikely
  - Thrombocytosis – 500K, Bacteria?
  - Thrombocytopenia – viral
- 3. ESR – CRP
- 4. Gram Stain
- 5. Blood Culture
- 6. Direct Fluorescent antibody test
- 7. Cold agglutinin antibodies

Guidelines

- American Thoracic Society
  - Guidelines for the Management of Adults with CA (2001)
- Infectious Diseases Society of America
  - Update of Practice Guidelines for the Management of CAP in Immunocompetent adults (2003)
- ATS and IDSA joint effort
  - IDSA/ATS Consensus Guidelines on the Management of CAP in Adults (March 2007)

Guidelines

- PORT Pneumonia Severity Index (PSI)
  - Aids in assessment of mortality risk and disposition
  - Age, gender, co-morbidities, physical exam lab/radiographic findings

IDSA/ATS 2007 Guideline

- Hospital Admission Decision
  - CURB-65 criteria (confusion, uremia, RR, low BP, age 65 yrs or greater) or PSI can be used to ID candidates for outpt management
- Diagnostic Testing
  - Acknowledges the low yield and infrequent positive impact on clinical care
  - Outpt testing for etiologic Dx remain optional
  - Inpt testing for etiologic Dx recommended for specific indications
- Antimicrobial therapy: essentially unchanged

Diagnosis

- Give a definite diagnosis of pneumonia
- To evaluate the degree of the pneumonia
- To definite the pathogen of the pneumonia

Diagnosis

- History and physical examination (5W)
- X-ray examination
- Pathogen identification

History and Examination

- History of exposure to sibling or adult with minor Respiratory illness within preceding week
- Initial symptoms of sneezing, rhinorrhea and cough
- Low grade fever
- Irritability
- Decreased appetite

History and Examination

- Within 1-2 days:
  - Tachypnea
  - Retraction
  - Wheezing
- May progress to:
  - Respiratory failure
  - Apnea

Pathogen identification

- Sputum: More than 25 white blood cells (WBCs) and less than 10 epithelial cells.
- Nasotracheal suctioning
- Blood culture or pleural effusion culture
- Serologic testing (immunological testing)
- Molecular Techniques

Differentiation

- Pulmonary tuberculosis
- Lung cancer
- Acute lung abscess
- Pulmonary embolism
- Non-infectious pulmonary infiltration

The principal of therapy

- Select antibiotics
- According to guideline

Therapy

- The therapy should always follow confirmation of the diagnosis of pneumonia and should always be accompanied by a diligent effort to identify an etiologic agent.
- Empiric therapy,(4-8h)
- Combined empiric therapy to target therapy

The diagnostic standard of sever pneumonia

- Altered mental status
- Pa02<60mmHg.
- Respiratory rate>30/min
- Blood pressure<90/60mmHg
- Chest X-ray shows that bilateral infiltration, multilobar infiltration and the infiltrations enlarge more than 50% within 48h.
- Renal function: U<20ml/h, and <80ml/4h

Complications

Sepsis

Lung Abscess or Empyema

Pleural Effusion

Pleuritis

ARDS

ARF

Pneumothorax

Extrapulmonary Infections

RISK FACTORS FOR MORTALITY

- Age >65 y.
- Presence of coexisting dis. : DM, COPD, CRF, CCF, CLD, aspiration, altered mental status, post splenectomy, alcohol.
- Physical : BP <90/60, temp. >38.3, Extrapulm. Infection
- Lab findings : Leucocytes<4,000/ >30,000, PaO2<60 / PaCO2 >50, mech. Vevt., Creatinine>1.2, Multilobar, spread, Sepsis.

Thanks