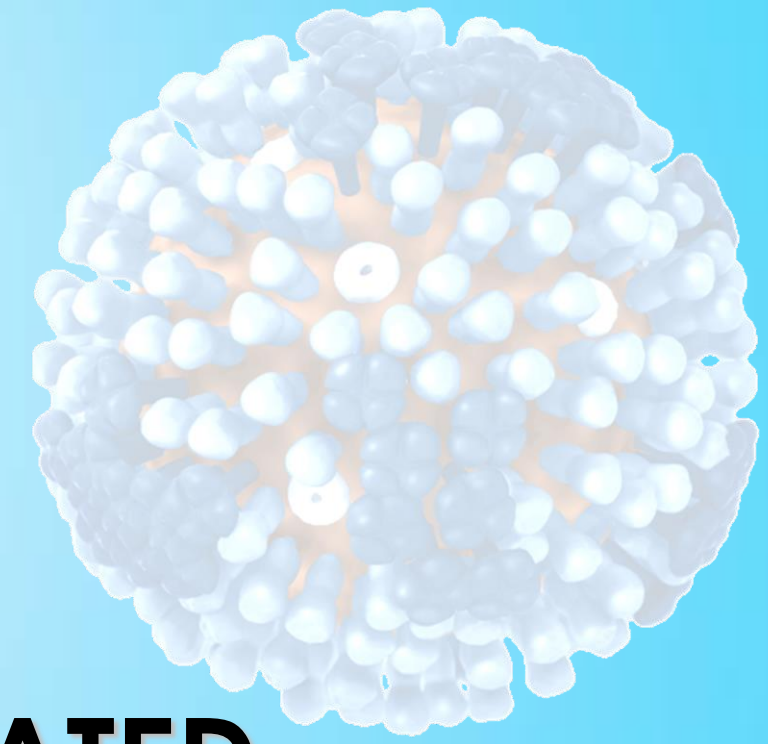
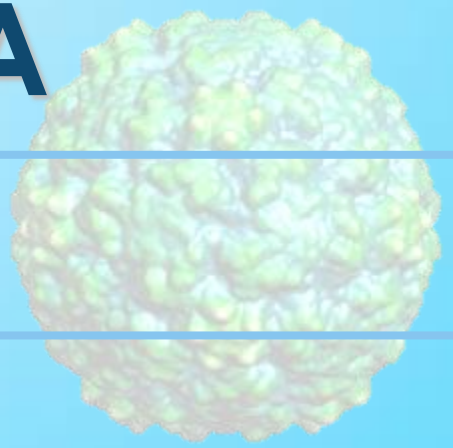


HEALTH CARE ASSOCIATED PNEUMONIA



OBJECTIVES

- Define the terms, pneumonia, community acquired pneumonia, health care associated pneumonia.
- (HCAP) and ventilator associated pneumonia (VAP).
- Describe the pathogenesis of the health care associated pneumonia (hospital associated pneumonia) and VAP.
- Classify HCAP according to the time of onset .
- Name the different causative bacterial agents .
- Classify and describe types of VAP.
- Recognize the ways by which VAP is prevented.
- Describe the different chemotherapeutic anti microbial agents used for the treatment of health care associated pneumonia.
- Evaluate response to treatment and recognize reasons for failure of treatment.

Pneumonia

Infection of the pulmonary parenchyma

It can be

Community acquired pneumonia

acquired in the community by community acquired organismm

eg. *Streptococcus pneumonia*

Health care associated pneumonia

acquired **48-72 hours** after admission to health care institutions

eg. organisms in hospital which are usually resistant to antibiotics like *Pseudomonas aeruginosa*

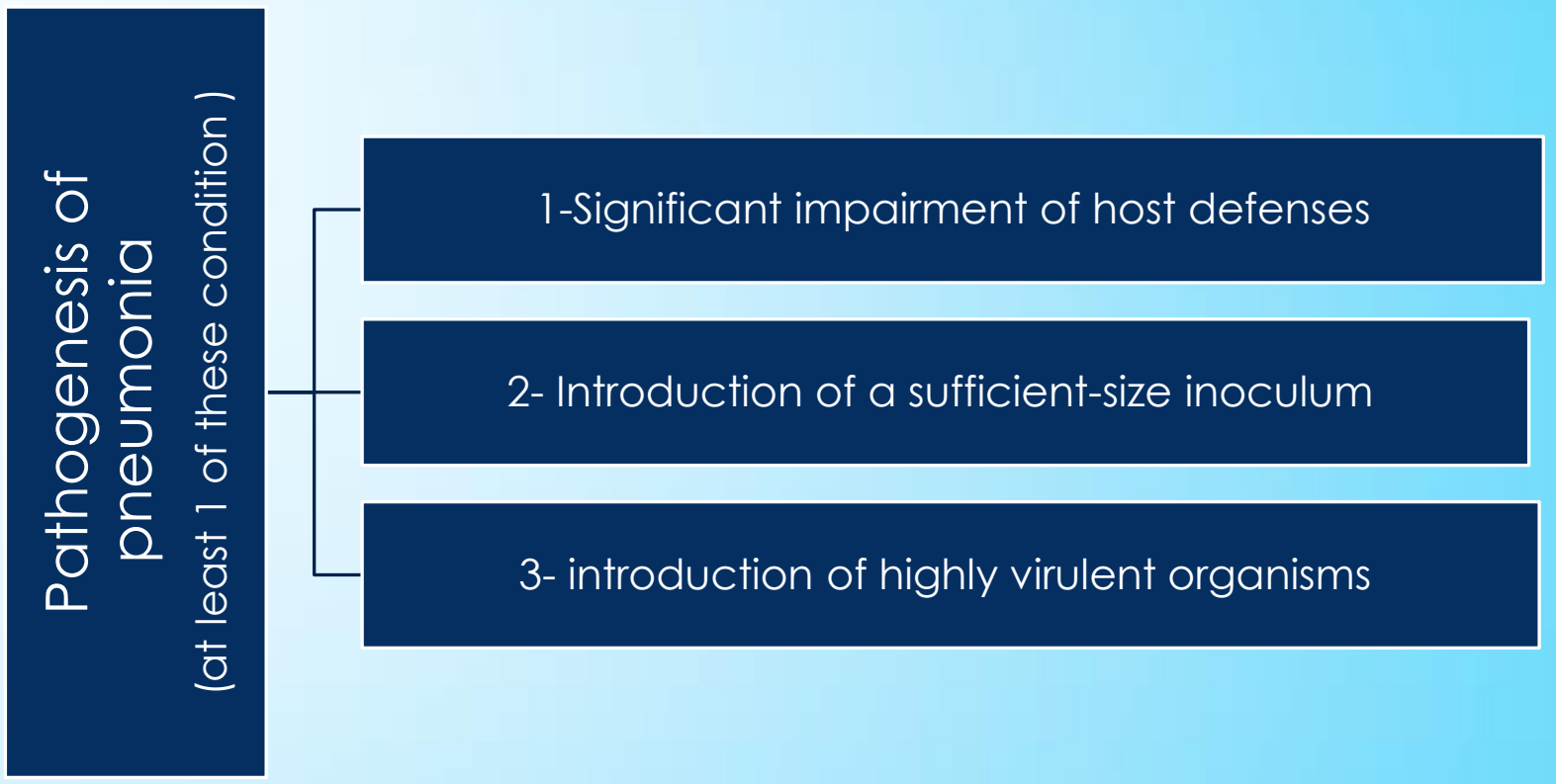
- Hospital acquired pneumonia (HAP)
- Ventilator associated pneumonia (VAP)

Nosocomial pneumonia

- ✓ Is a hospital associated pneumonia (HAP) or health associated Pneumonia (HCAP) .
- ✓ occur at least 48hrs after admission and not incubating at time of hospitalization .
- ✓ It's the 2nd most common hospital-acquired infections after urinary tract infection.

(Accounting for 31 % of all nosocomial infections)

- ✓ It is the leading cause of death from hospital-acquired infections
- ✓ The incidence of nosocomial pneumonia is highest in **ICU** patients and ventilated patients (**10-fold higher**).
- ✓ **mortality** for HAP is 30% to greater than 70%.



- Most common is microaspiration of oropharyngeal secretions colonized with pathogenic bacteria.

Classification

1- EARLY-ONSET NOSOCOMIAL PNEUMONIA :

- DURING THE **FIRST 4 DAYS** OF ADMISSION
- USUALLY IS DUE TO *S. PNEUMONIAE* , MSSA , *H. INFLUENZA*, OR ANAEROBES.

2- LATE-ONSET NOSOCOMIAL PNEUMONIA :

- **MORE THAN 4 DAYS** OF ADMISSION
- GRAM NEGATIVE ORGANISMS, ESPECIALLY: *P. AERUGINOSA, ACINETOBACTER, ENTEROBACTERIACEAE (KLEBSIELLA, ENTEROBACTER, SERRATIA)* , MRSA.

Causative Agent	
Enteric Gram negative bacilli	▪ patients with late-onset disease ▪ patients with serious underlying disease (already on broad-spectrum antibiotics) ▪ immunocompromised state make resistant organisms more likely
P.aeruginosa and ***Acinetobacter***	▪ late-onset pneumonia ▪ particularly in the ventilated patients
S. aureus	▪ Ventilated patients after head trauma, neurosurgery and wound infection ▪ In patients who had received prior antibiotics or Prolonged care in ICU
MRSA	▪ patient Received corticosteroids ▪ Undergone mechanical ventilation >5 days ▪ Presented with chronic lung disease ▪ Had prior antibiotics therapy
Anaerobes	▪ patients predisposed to aspiration

Ventilator-associated Pneumonia (VAP)

Definition

Nosocomial pneumonia that has developed in patient who are receiving mechanical ventilation

Causative Agents

anaerobes occurred more often with oropharyngeal intubation than nasopharyngeal intubation.

Classificat-ion

1- Early-onset: within 48-72 hours after tracheal intubation, which complicates the intubation process

2- Late-onset: after 72 hours

Pathogen-sis

Requires 2 important processes:

1. Bacterial colonization of the aerodigestive tract
2. Aspiration of contaminated secretion into the Lower airway

N.B it mechanical clearance by cough and the mucociliary escalator.

Prevention for VAP

- oral regimen (*topical Gentamicin, Colistin, Vancomycin cream given every 6h for 3 weeks*)
- treating oropharyngeal colonization could prevent VAP.

Non-pharmacologic strategies

- hand washing and protective gowns and gloves
- Semirecumbent positioning
- Avoidance of large gastric volume
- Oral intubation
- Continuous subglottic suctioning
- Humidification with heat and moisture exchanger
- Posture change

Pharmacologic strategies

- Stress-ulcer prophylaxis
- Combination antibiotic therapy
- Prophylactic antibiotic therapy
- Chlorhexidine oral rinse
- Prophylactic treatment of neutropenic patients
- Vaccines

Treatment

- ✓ INITIAL THERAPY IS EMPIRIC (BROAD-SPECTRUM ANTIBIOTIC) TO COVER ALL LIKELY BACTERIAL PATHOGEN ONCE CALTURE RESULT IS KNOWN THIS REGIMEN SHOULD SUBSEQUENTLY BE NARROWED

- ✓ PATHOGEN MAY BE INFLUENCED BY COEXISTING ILLNESSES, PRIOR TREATMENT, AND LENGTH OF HOSPITALIZATION , EG: FREQUENCY OF ICU-ACQUIRED *P. AERUGINOSA* CARRIAGE OR COLONIZATION/INFECTION WAS 23.4% AT 7 DAYS AND 57.8% AT 14 DAYS

- ✓ THE MORTALITY CAN BE REDUCED FROM 30% UPTO MORE THAN 90% WITH EARLY APPROPRIATE EMPIRIC THERAPY

- ✓ GUIDELINES BY AMERICAN THORACIC SOCIETY HAS DIVIDED PATIENTS INTO THREE GROUPS , EACH WITH A SET OF PROBABLE PATHOGENS.

GROUP 1: MILD TO MODERATE HAP WITH NO RISK FACTOR

GROUP 2: MILD TO MODERATE HAP WITH RISK FACTOR

monotherapy has been shown to be effective

GROUP 3A: SEVERE HAP, EARLY-ONSET WITH NO RISK FACTOR

GROUP 3B: SEVERE HAP, LATE-ONSET OR WITH RISK FACTOR

in which infection with resistant organisms is likely, combination therapy until culture result are available

Treatment

- ✓ IF S. AUREUS INFECTION USE AGENTS AGAINST IT , VANCOMYCIN IF MRSA IS SUSPECTED.

** LINEZOLID IS COMPARABLE WITH VANCOMYCIN. HAVING LESS POSSIBLE NEPHROTOXICITY.

- ✓ IF PSEUDOMONAS , COMBINATION OF ANTIPSEUDOMONAL DRUGS IS CONTROVERSIAL:
  1. **Traditional**:
     antipseudomonal Beta-lactam with an Aminoglycoside.
     ((Synergy but potential nephrotoxicity))
  2. **Another approach**:
     antipseudomonal Beta-lactam with a Fluoroquinolone.
     ((No synergy but No nephrotoxicity and quinolone gets into the lungs at higher concentrations))

Response to Therapy

If no clinical response is noted or deterioration occurs, we need to consider:

1. **Infectious causes**:

Resistant pathogen
Superinfection
Unusual pathogens
Lung abscess
Extrapulmonary infection

2. **Noninfectious events**:

Heart: congestive heart failure (CHF)

Lung: fibroproliferative acute respiratory distress syndrome (ARDS), pulmonary emboli, Atelectesis.

Quiz

1.WHICH ONE OF THE FOLLOWING IS USED FOR GRAM +VE BACTERIA.

A. COLISTIN B. VANCOMYCIN C.VORICONAZOLE

2.THE MOST COMMON CAUSE OF PNEUMONIA IS:

A. S.PNEUMONIAE B. S.AUREUS C. STREPTOCOCCI

3. LATE-ONSET NOSOCOMIAL PNEUMONIA OCCURS DURING THE FIRST 4 DAYS OF ADDMISSION.

A. T B. F