COMMUNITY ACQUIRED PNEUMONIA

NAME- MOHD WAJID ANSARI GROUP NO- LA2 173(2)

Pneumonia - Definition



Pneumonia is an abnormal inflammatory condition of the lung. It is often characterized as including inflammation of the parenchyma of the lung (that is, the alveoli) and abnormal alveolar filling with fluid (consolidation and exudation)

Community Acquired Pneumonia

Definition:

Acute infection of the pulmonary parenchyma that is associated with at least some symptoms of acute infection, accompanied by the presence of an acute infiltrate on a chest radiograph, or auscultatory findings consistent with pneumonia, in a patient not hospitalized or residing in a long term care facility for ≥ 14 days before onset of symptoms.

Community-Acquired Pneumonia (CAP)

- Community-acquired pneumonia refers to pneumonia acquired outside of hospitals or extended-care facilities.
- Community-acquired pneumonia (CAP) is one of the most common infectious diseases diagnosed by clinicians.



Why Community Acquired Pneumonia is a Important disease

Community-Acquired Pneumonia (CAP)

Epidemiology



Bartlett et al: Clin Inf Dis 26:811-838, 1998: File and Tan: Curr Opin Pul Med 3:89-97, 1997; Marston et al: Arch Int Med 157:1709-1718,1997.

- Sixth leading cause of death
- Leading cause of death due to infectious disease
- More than 3 million cases of CAP per year
- 500,000 hospitalizations per year
- 45,000 deaths per year
- Cost: \$21 billion

CAP causes major changes in the Functional physiology of the Respiratory tract



Who Develops Community Acquired Pneumonia

 Community-acquired pneumonia develops in people with limited or no contact with medical institutions or settings.

 CAP occurs throughout the world and is a leading cause of illness and death



Community Acquired Pneumonia

Risk Factors for pneumonia

- age
- alcoholism
- smoking
- asthma
- Immuno suppression
- institutionalization
- COPD
- dementia

Community acquired pneumonia Emerging Health Problem

Causes of CAP - Bacteria, viruses, fungi, and parasites. CAP can be diagnosed by symptoms and physical examination alone, though x-rays, examination of the sputum, and other tests are often used. Individuals with CAP sometimes require hospitalization and treatment in a hospital.

Several Microbes can cause CAP

The most commonly identified pathogens are **Streptococcus** pneumoniae, Haemophilus influenzae, and atypical organisms (i.e., Chlamydia pneumoniae, **Mycoplasma** pneumoniae, Legionella sp).



Typical x Atypical etiological agents

 Typical pneumonia usually is caused by bacteria such as Streptococcus pneumoniae.
Atypical pneumonia usually is caused by the influenza virus, mycoplasma, Chlamydia, Legionella, adenovirus, or other unidentified microorganism.

The patient's age is the main differentiating factor between typical and atypical pneumonia; young adults are more prone to atypical causes, and very young and older persons are more predisposed to typical causes.

X ray chest gives the leading clues in Diagnosis

Pathophysiology

CAP is usually acquired via inhalation or aspiration of pulmonary pathogenic organisms into a lung segment or lobe. Less commonly, CAP results from secondary bacteraemia from a distant source, such as Escherichia coli urinary tract infection and/or bacteraemia. CAP due to aspiration of Oropharyngeal contents is the only form of CAP involving multiple pathogens.

Etiological agents in Communi**Pyneaquined** in Children From Birth to 3 weeks

Group B streptococci, Listeria Monocytogenes, gram-negative bacilli, cytomegalovirus



From 3 weeks to 3 months



Streptococcus pneumoniae, viruses (RSV, Parainfluenza viruses, metapneumovirus), Bordetella pertussis, Staphylococcus aureus, Chlamydia trachomatis (trans natal exposure)

From 4 months to 4 years

S. pneumoniae, *viruses* (RSV, Parainfluenza viruses, influenza

viruses, adenovirus, rhinovirus, metapneumovirus),

 Mycoplasma pneumoniae (in older children), group A streptococci



5 years to 15 years



 S. pneumoniae,
M. pneumoniae, and Chlamydia pneumoniae

COMMUNITY-ACQUIRED PNEUMONIA IN ADULTS

Outpatients—with no modifying factors present

Streptococcu pneumoniae, Mycoplasma pneumoniae, Chlamydia pneumoniae, Haemophilus influenzae, respiratory viruses, miscellaneous (Legionella sp, Mycobacterium tuberculosis, endemic fungi

Outpatients—modifying factors



S. pneumoniae, including drug resistant forms; M. pneumoniae; *C. pneumoniae;* mixed infection (bacteria + atypical pathogen or virus); *H. influenzae;* enteric gram-negative organisms; respiratory viruses; miscellaneous (Moraxella catarrhal is, Legionella sp, anaerobes [aspiration], *M. tuberculosis,* endemic fungi)

CAP in Inpatients not admitted in ICU

S. pneumoniae, H. influenzae; C.Pneumonia; C. pneumoniae; mixed infection (bacteria + atypical pathogen or virus); respiratory viruses; Legionella sp, miscellaneous (M. tuberculosis.



Non-bacterial pathogens causing



Non bacterial pathogens in the differential include many viruses (influenza, adenovirus, rhinovirus, etc.) and fungi (Aspergillusspp., Cand ida spp., Coccidioides immitis, etc.)

Value of chest x-ray in Diagnosis of CAP



 A chest x-ray is recommended to make the diagnosis of pneumonia
An imperfect gold standard

 No studies specifically demonstrate improved patient outcomes through use of chest xray in adults

Microbiological Diagnosis



Common Laboratory Tests

Common laboratory tests for pneumonia have included leukocyte count, sputum Gram stain, two sets of blood cultures, and urine antigens. However, the validity of these tests has recently been questioned after low positive culture rates were found (e.g., culture isolates of S. pneumoniae were present in only 40 to 50 percent of cases).



Microbiological diagnosis is confirmatory

Is not possible to distinguish the causative organisms of pneumonia other than by microbiology as no pathogen leads to a clinical, laboratory or radiological pattern sufficiently characteristic to be the basis of a confident diagnosis, but <u>clinical symptoms</u> and epidemiological features may provide clues to the aetiology as some differences in presentation do occur.

Bacteriological Investigations on sputum



 Expectorated sputum collected (poorly collected) without proper instructions may not yield optimal results

Sputum gram staining and culture

• A good quality sputum sample with a predominant pus cells with proportionately less epithelial cells and bacterial pathogens can be observed in approximately 15% of the cases studied



Newer methods – Diagnosis of Community associated Pneumonias

Antigen detestation in sputum urine by **Fluorescent** methods Immunoelectrophoresis Latex agglutination tests **ELISA**



Diagnosis in cases of Atypical pneumonias



 By serological methods using acute and convalescent sera

 Raise of significant titer or rising titer of antibodies give clues to diagnosis.

Other markers suggestive of CAP

C - reactive protein

trends have been correlated to clinical progress in CAP, and administration of its activated form (drotrecogin alpha) appears to reduce mortality in severe sepsis.



Pencillin still continues to be preferred antibiotic

With a bloodstream or lung infection, you can get a much higher concentration of antibiotic to the site of the infection. Because of that, you can use a standard agent, such as penicillin, even when there is some resistance,"

Dr. Whitney.



Antimicrobial therapy – Empirica approach

Antimicrobial therapy is the mainstay of management for community-acquired pneumonia (CAP). Accordingly, the choices of treatment are influenced by the likely aetiologies, local resistance patterns of the pathogens, as well as patient factors. As the leading cause of acute CAP, the susceptibility patterns of Streptococcus pneumoniae have greatly influenced antimicrobial agents and dosage recommended for empirical treatment of this condition.

MRSA – a concern in treating Community acquired Pneumonias

The worldwide emergence of community-acquired Methicillinresistant Staphylococcus aureus has also led to discussion of this pathogen in recent revisions of the international CAP quidelines.



Vaccination in children

Vaccination is important in both children and adults. Vaccinations against Haemophilus influenzae and Streptococcus pneumoniae in the first year of life have greatly reduced their role in CAP in children



Community Acquired Pneumonia and Vaccination for Pneumococcal infect_ion

- The pneumococcal vaccine (the 'pneumonia shot') protects against 23 types of pneumococcal bacteria.
- Research proves the vaccine is not 100% effective in preventing pneumonia, but found that if you are vaccinated you are less likely to die from pneumonia.



Preventing Inf uenzae

- According to the U.S. Centers for Disease Control and Prevention (CDC), anyone who wants to reduce their risk of getting the flu should have a flu vaccine.
- Older children and adults require only a single shot each year. However, children under age 9 may need two doses



General Health Measures



Smoking cessation is important not only for treatment of any underlying lung disease, but also because cigarette smoke interferes with many of the body's natural defences against CAP.

Future goals on reducing child deaths – by Hand washing

Handwashing with **soap** is among the most effective and inexpensive ways to prevent diarrheal diseases and pneumonia, which together are responsible for the majority of child deaths. a significant contribution to meeting the Millennium **Development Goal of** reducing deaths among children under the age of five by two-thirds.



