Pneumonia
Lecture no. 4

Is inflammatory of parenchyma of the lungs, associated with consolidation of alveolar spaces, is
Substantial cause of morbidity & mortality in childhood
Particularly among children below 5 years of age.
**Etiology:**

- Depend on the 1- age of patient  
  2- immune state  
  3- presence of cystic fibrosis or other chronic lung disease  
  4- exposure history & nosocomial versus community

Streptococcus pneumonia (pneumococcus) is the most common bacterial pathogen, followed by chlamydia & mycoplasma.

Other bacterial causes in previously healthy children include group A streptococcus & staph aureus.

Pneumococcus, staph, H. influenza are a major causes of hospitalization & death from pneumonia among children.

Viral pathogens are a prominent cause of lower RTI in infant & children below 5 years of age, its responsible for 45% of the episodes identified in hospitalized children (highest frequency between the age 2-3 years of age & decreased slowly after which unlike bronchiolitis with peak incidence in 1st year of life).

**Pneumonia is caused by:**

1- Infection: viral (common cause), bacterial, Ricketisial, fungal parasite.

2- Inflammatory process like SLE, sarcoidosis, histiocytosis
3- toxic substances like hydrocarbon, gastric contents, dust, gases & chemical substances.

Common causes according to age:

1- Neonate: group B strep., E-coli, Listeria, H.infl.: CMV, Herprs:
   ureoplasma ureolyticum

2- 1-3 months: strept., H. inf., RSV, PIV, CMV, chlamydia

3- 3-12 month: strep., H. infl, staph: RSV, PIV, adeno

4- 2-5 years: pneumo ciccus, strepto. Group A, staph, H.inf.
   PIV, Infl. Virus, adeno
   mycoplasma, chlamydia

5- 5-18 years: strept., H. infl.
   adeno, influnza
   mycoplasma
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Pathogenesis:--
LRTI is normally kept sterile by physiological defense mechanism including the mucociliary clearance, properties of normal secretion such as secretory IgA & clearing of normal secretion.

Viral pneumonia: - 1- direct injury to epithelium resulting in airway obstruction from swelling, abnormal secretion, cellular debris.

2- is predisposed to secondary bacterial infection by disturbances of normal host defense mechanism, altering secretion, modifying bacterial flora.

Bacterial infection:--

S. pneumonia: producing local edema that aids in proliferation of organism & then spreads to adjacent portion of lung Causing lobar pneumonia.

Group A streptococcal; result in more diffuse infection with interstitial pneumonia.

Staph infection: - manifest as confluent broncho pneumonia which is unilateral & characterized by extensive area of necrosis & irregular area of cavitation resulting in pneumatocele, empyma, fistula.
Recurrent Pneumonia: is defined as 2 or more episode in a single year or 3 or more episode ever, with x-ray clearing between occurrence.

DD: of recurrent pneumonia:
- 1- hereditary disorders; cystic fibrosis, SCA.
- 2- disorder of immunity; AIDS, Bruton a gama globulinemia, CVIDS, SCIDS.
- 3- WBC disorders; chronic granulomatous dis, Job syndrome, WBC adhesive defects.
- 4- Disorder of cilia; immotile cilia syndrome & kartagner synd.

CIF:
- Viral & bacterial are often proceeded of several days symptoms of an URTI.
- In viral pneumonia: fever is less than in Bacterial infection.
- Tachypnea is consistant with pneumonia.
- Cynosis in sever infection.

by auscultation; rhonci, creptation (difficult to localize in very young infant).
Bacterial Pneumonia:—

in older children:—typically begin suddenly with a shaking chill followed by high fever, cough, chest pain, may accompany by

Drowsiness with intermittent episode of restlessness, rapid respiration & many children noted to be splinting on affected side to reduce pain.

OIE:— depend on stage of pneumonia:

• early in course of disease; diminished breath sound, scattered cripitation & rhonchi.

• with development of consolidation or CX like effusion, empyema, shows dullness on percussion.

• abdominal distension may be prominent due to gastric dilatation, ileus, swallowed air.

Abdominal pain is common in lower lobar pneumonia & nuchal rigidity in upper lobar pneumonia with out meningitis.

In infant:— may proceeded by URTI, depressed appetite leading to

Abrupt onset of fever, restlessness, apprehensive & resp distress, may associated with G.I.T disturbances. 

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Rapid progressive symptoms is characteristic in most severe cases of bacterial pneumonia.

Diagnosis:

1- clinical diagnosis  
2- chest x-ray: may confirm pneumonia, & may indicate the CX like pleural effusion, empyema

in viral pneumonia: hyperinfiltration with bilateral interstitial infiltration  

lobar consolidation is typically seen in patients with pneumococcal pneumonia.

3- WBC: important to differentiate between viral from bacterial  

Note: pleural effusion, lobar pneumonia, & high fever: suggested bacterial pneumonia.

Atypical pneumonia due to chlamydia or mycoplasma is difficult to differentiated from pneumococcal pneum. by x-ray & other lab.  

although pneumococcal is associated with high ESR, WBC&C-RP
Definitive diagnosis of viral pneumonia by isolation of virus or detection viral genome or antigen in resp tract secretion. While bacterial pneumonia required isolation of M.O from blood, lung & pleural fluid (sputum culture is little value in diagnosis of pneum in young children).

In mycoplasma is diagnosed on basis of PCR or sero-conversion in an IgG assay (cold agglutinin at titer of more than 1:64 are found in 50%).

ASOT is useful for group A streptococcal pneumonia.

Treatment:
- treatment of suspected pneumonia is based on presumptive cause, & clinical appearance of child.
- mild ill (home treatment) by amoxyline 80-90 mg lKg l day & alternative with cefuroxime axetil or augmentin.

In school age children with suspected mycoplasma: azithromycin

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Hospital treatment:--

parenteral cefuroxime 150mg/kg/day or cefotaxime or ceftriaxone. If suggest staph: vancomycin or clindamycin

In viral pneumonia; no need antibiotic.

30% of viral pneumonia may have coexisting bacterial pathogene.

Oral zinc 20mg/day may accelerate recovery for severe pneumonia.

Indication of admission of pneumonia:---

1- age of less than 6 months  
2- SCA with acute chest syndrome  
3- multiple lobe involvement  
4- immune compromised pt.  
5- toxic pt.  
6- severe respiratory distress  
7- required O2 therapy  
8- dehydration  
9- vomiting  
10- non-compliance  
11- non response to oral therapy

Response to therapy:---

clinical improvement within 48-96 hr of initiation of A.B  
X-ray evidence of improvement lags behind clinical improvement

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Number of factors must be considered if patient not respond to treatment:

1. cx like empyema  
2. bacterial resistance

3. non bacterial etiology like viral or aspiration of F.B or food
4. bronchial obstruction from endobronchial lesion, F.B & mucous plug
5. pre-existing dis like immune def, pulmonary sequestration, malformation, cystic fibrosis
6. other non infectious causes like bronchiolitis obliterance, aspiration.

CX:

are usually the result from direct spread of infection within thoracic (pleural effusion, empyema, &pericarditis).

or bacteremia or hematological spreads (meningitis, suppurative arthritis, osteomyelitis) are rare cx of pneumoccocus or H influenza

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Staphylo-coccus pneumonia :--
is serious & rapidly progressive infection that is associated with prolong morbidity & high mortality ( unless recognize early & treated Appropriately ), is more common in infant than in children ( 30% under 3 month & 70% under 1st year of life ). CIF :--

1- frequently proceeded by URTI of several days to one wk then patient abruptly has high fever, cough & evidence of resp distress & S.T associated with gastrointestinal disturbances characterized by vomiting, anorexia & abdominal distension which Secondary to paralytic illeus.

Diagnosis :--

CIF + WBC ( leucocytosis of more than 20000Imm with predominantly PMN ( in young infant S.T WBC remains normal ) & if WBC of less than 5000 is poor prognosis

3- pleural tap or tracheal aspiration for gram stain & culture

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4- chest –x ray : non specific broncho pneumonia in early stage. May associated with pleural effusion or empyema. May associated with pneumatocele.

Note ;- rapid progressive from bronch-pneumonia to effusion or pyo-
Pneumothorax with or without pneumatocele is highly suggestive staph pneumonia.
Clinical improvement usually proceeded chest x-ray which cleared by days or wks & pneumatocele may persist for months.

CX :-
1- empyema ,pyo-pneumothorax
2- septic lesion outsideresp. Tract

Treatment ;--
1- supportive therapy (O2, I.V fluid, S.T needs assisted ventilation, chest tube is indicated if effusion with empyema. Repeated pleural tap to reduce chance of fistula)
2- specific therapy (naficilin 200mg/lkg, Methicillin, cloxacilin) if sensitive to pencillin, used vancomycin 40mg/lkg by infusion

thank you ---12---