

Non Resolving pneumonia

Introduction

- Pneumonia- Not cured easily
- 10% -CAP,60% of HAP have inadequate responses to the empirical therapy initiated
- Necessitates Pulmonary specialist opinion bronchoscopic evaluation,
- 10% of diagnostic bronchoscopies and 15% of pulmonary consultations
- Variously defined

Definition

- Non resolving pneumonia is a clinical syndrome in which focal infiltrates begin with some clinical association of acute pulmonary infection and despite a minimum of 10 days of antibiotic therapy patients either don't improve or worsen or radiographic opacities fail to resolve within 12 weeks

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- Non responding pneumonia, Progressive pneumonia, Non resolving pneumonia
- Non responding-absence of clinical response antibiotic treatment after 3-5 days
- Clinical stability- HR<100/min
BP->90mm of Hg
RR<24 /min
Temp-37.2

Contd

- Progressive- increase in radiographic abnormalities and clinical deterioration during first 72 hours of treatment
- Median time to stability 3 days
- 6% have progressive pneumonia
- Evolution depends – Host factors, Severity of initial present, Causal organism
- Non resolving- Persistence of radiographic infiltrates at 30 days after initial clinical response

Causes of non resolution

- Complications
- Host factors
- Delayed radiological recovery
- Presence of resistant organisms
- Presence of unusual organisms
- Defects in defense
- Diseases mimicking pneumonia

Complications

- Empyema/Para pneumonic effusion
- Abscess
- Metastatic focus of infection
 - Infective endocarditis
- Require drainage and appropriate antibiotic therapy and addressal of the basic disease

Host factors

- Age esp. greater than 50
- Co morbid illnesses- Diabetes
 - COPD
- Alcoholism
- Immunosuppressive/cytotoxic therapy
- Bacteremia
- Multilobar pneumonia

Radiological recovery

- Non resolving pneumonia encompasses failure clinical or radiological recovery
- Many will have clinical improvement but radiological recovery lags – undue investigation
- Important to know what time it takes for radiological recovery
- Exclusion of these ,as CAP far outnumber non resolving pneumonia

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<u>Causative agent</u>	<u>time to clearance</u>
Pneumococcus	
bacteremic	3-5 months
non bacteremic	1-3 months
Legionella	2-6 months
Mycoplasma	0.5-2 months
Chlamydia	1-3 months
Virus	variable

Resistant pathogens

- DRSP suspected if:
 - treated with beta lactams within 6 mo
 - close exposure to young children
 - Pneumonia in last one year
 - hospitalized in last 3 mo
 - HAP in last 2 months
- MIC >4ng/ml significant

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- MRSA suspected if –
 - Advanced age
 - Indwelling IV catheters
 - Prior antibiotic coverage
 - Contact with pts having MRSA
 - Dialysis
 - Burns
 - Surgical wounds
 - Tertiary care centers

Unusual organisms

- Tuberculosis
- Nocardia
- Atypical mycobacteria
- Fungi- aspergillus, cryptococcus, mucor, histoplasma, coccidioides
- Exposure to animals- Francisella, Yersinia, leptospira, Chlamydia psittaci
- Travel to Endemic areas- Hantavirus, Paragonimiasis

Lapse in defense

- Nasal filtration- ET tube, tracheostomy
- Oral adherence- aging, smoking, severe illnesses, xerostomia, viral illness
- Epiglottitis- stroke, ca upper airway, RT, ET, sedatives
- Impaired cough- sedatives, neuromuscular illness, stroke
- mucociliary transport- chr bronchitis, ET, dehydration, alcohol, vit A def

Contd

- IG or complement def-specific disorders, aging malnutrition, B6, folate, zinc def
- Bacterial adherence to airway epithelium and decreased function of alveolar macrophages
- Immune deficiency states-primary and secondary, B cell and T cell

Non infectious causes

- Neoplasia-1-8% in most series-
 - Abscess
 - Post Obstr pneumonia
 - Drugs
- Neoplasia mimicking infiltrative process
 - Bronchoalveolar cell carcinoma
 - Lymphoma
 - Lymphangitic carcinoma
- Lobar Atelectasis-Bronchogenic CA, carcinoid, metastatic

Inflammatory disorders

- Systemic vasculitis - CTD
- Wegeners including DAH
- BOOP
- AEP, CEP
- PAP
- Sarcoidosis
- AIP

Drugs

- Nitrofurantoin
- Amiodarone
- Methotrexate
- Bleomycin
- Mitomycin
- Paclitaxel, Docetaxel
- cyclophosphamide
- IL-2

Subtle clues

- Num of cases of pneumonia vastly outnumber non infectious possibilities
- Pronounced extra pulmonary manifestations
- Mediastinal adenopathy not very common in CAP-sarcoid,malignancy

Diagnostic eval

- Re evaluate host factors
- Possibility of antimicrobial failure
 - patient noncompliance
 - improper dosage review antibiotic
 - resistant pathogen review sensitivities
 - unusual pathogen
- Infectious complications
 - empyema Rpt CXR/chest CT
 - endocarditis Echo
 - super infection

- Gram stain and culture of sputum is neither sensitive nor specific.
 - contamination by upper airway flora
 - failure to get secretions from lower airway
 - previous use of antibiotics
- Look for atypical organisms
- Hence the role of secretions from endotracheal aspirate and protected brush specimens

Radiology

- CXR repeated -infiltrates,pleural effusion,lymphadenopathy,cavitation
- CT scans -detailed study of parenchyma, interstitium,pleura and mediastinum
- Nodular lesions,cavitations,interstitial infiltrates,halo sign,feeding vessel sign when present will indicate specific diagnosis

Bronchoscopy

- Simpler procedures no yield-Invasive
- PSB/BAL and TBLB
- Sensitivity of PSB 40% -non responding
- Gram stain of cytocentrifuged BAL- identifies intracellular organisms
- Biopsies seldom useful in achieving bacterial diagnosis. Invaluable in TB, fungal, neoplasms, BOOP, histiocytosis
- Also of important role in immunosuppressed

Protected brush specimens

- Reported sensitivities of 50-80%
- Specificity >80%
- Gram, ZN, Giemsa, IF and C/S of the specimen
- However it is of limited utility
 - lack of standardization of the tests
 - paucity of studies demonstrating benefit in morbidity or mortality

Usefulness of BAL

- Predominance of PMN-
bacterial infections ,BOOP
- Predominance of lymphocytes
TB,HP,Sarcoidosis
- Predominance of eosinophils-
pulmonary eosinophilia, fungus, drugs,
.systemic diseases ,PCP
- Hemosiderin laden macrophages-Alveolar Hemo
- After 2week -BAL shows lymphocytes,eosino,cf normally which shows resolution

