Pneumonia

Definition of pneumonia

- Infection of the lung parenchyma
- Usually bacterial

Epidemiology of pneumonia

- Commonest infectious cause of death in the UK and USA
- Incidence - 5-11 per 1000 per year
- Worse during autumn and winter

Risk factors for pneumonia

- Age
- Aspiration (of gastric contents or oral secretions)
    - Usually gram negative organisms and anaerobes
- Immunosuppression
- Alcoholism
- Diabetes
- Smoking
- COPD
    - Haemophilus influenza, Moraxella catarrhalis
- Nursing home residents

Presentations of pneumonia

- Cough, usually productive
- Fever
- Shortness of breath
- Pleuritic chest pain
- Non-specific features, especially in the elderly e.g. confusion, weakness, malaise
- Associated features in specific causes (e.g. headache in mycoplasma)

Differential diagnosis of pneumonia

- Infective exacerbation COPD
- Infective exacerbation of bronchiectasis
- Malignancy
- Empyema
- Effusion

Common bacterial causes of pneumonia

- Strep pneumonia
- Haemophilus influenza
- Staph aureus
- Moraxella
- Chlamydia pneumoniae
- Chlamydia psittacosis
- Aspiration (usually anaerobes)

- Mycoplasma pneumonia
    - Young people
    - Headache, malaise and cough
    - WCC can be normal
    - Cold agglutinins in 50%
        - Other complications: pericarditis, myocarditis, erythema multiforme, D&V, meningoencephalitis
    - Treatment
        - Erythromycin
            - Doxy is second line
            - Has no cell wall, so penicillins and cephalosporin are useless
- Legionella
    - Middle-aged smokers (M>F 2:1)
    - Presentation
        - Mild WCC, hyponatraemia
        - Proteinuria and haematuria
    - Investigations
        - Urinary antigen is pretty easy
        - IgG and IgM titres in urine, blood or sputum
    - Treatment
        - Erythromycin (rifampicin if allergic)

Other causes of pneumonia

- Viral
    - Influenza
- Fungal
    - Aspergilloma
    - Invasive aspergillosis
        - Diffuse shadowing on CXR
    - ABPA
        - High IgE and abs to aspergillus (skin prick positive)
        - CXR: perihilar infiltrates
        - Sputum: hyphae
        - Biopsy: stains with H&E (unusual for a fungi)
        - Treatment - Antifungals. Itraconazole in ABPA
- Eosinophilic pneumonia
    - Flitting peripheral X-Ray shadows
    - Large numbers of eosinophils on BAL
    - Treat with steroids
- Tropical pulmonary eosinophilia
    - Immune reaction wuceria bancroftii
    - Patchy infiltrates on CXR and all the other systemic pneumonia things including lymphadenopathy
    - Treatment: diethylcarbamizine
- Organising pneumonia (often cryptogenic)
    - Pneumonia, which then recurs on a different place.
    - Non-specific malaise and dry cough as well
    - CT: patchy avlveolar opacities (granulation tissue)
        - Treatment: steroids

Investigation of pneumonia

- Oxygen saturations
- Bloods
  - FBC, U&Es, LFTs, Clotting, CRP
  - Cultures
  - Venous/arterial blood gas
    - ? metabolic acidosis, respiratory failure, lactate
  - Consider HIV testing
- Urinary antigen detection
  - Legionella
  - Pneumococcal
- CXR (although changes lag behind clinical illness).
  - Repeat at 6/52 after discharge to check full resolution and no remaining lesion, i.e. underlying Ca
  - Cavitation
    - Staph aureus, klebsiella, TB, apergilloma, anaerobes, pseudomonas
    - Malignancy, Wegener's
- Sputum culture and sensitivity
- Respiratory viral screen
- Pleural fluid culture

Severity assessment score for pneumonia

- CURB-65
  - Confusion: or new AMTS<8
  - Urea: ≥ 7mmol/l
  - Respiratory Rate: ≥ 30/min
  - Blood Pressure: Systolic ≤ 90 and/or diastolic ≤60
  - Age: ≥ 65
- 4 factors gives a mortality of 83%, 3 factors 33%, 2 factors 23%, one factor 8%, no factors 2.4%
- Should not be used as a substitute for clinical judgement – can sometimes over/under-estimate severity

Management of pneumonia

- ABCDE
  - Oxygen: aim sats > 92% (if no risk CO2 retention)
  - Iv access and bloods/cultures/sputum cultures/viral screen
  - CXR
  - ABG
  - IV fluids
- Analgesia/anti-pyretics
- Work out CURB-65
- Antibiotics
  - Guided by clinical scenario, severity, and local protocols
  - Consider IV if:
    - Severe pneumonia
    - Reduced GCS
    - Loss of swallow reflex
    - Impaired absorption
  - Add anaerobic cover e.g. metronidazole if:

- Possible aspiration
- Suspicion of abscess
- Duration
  - 5-7 days: non-severe, uncomplicated pneumonia
  - 10 days: severe pneumonia
  - 14-21: if staphylococcal, legionella or gram-neg suspected
- Iv to oral switch
  - As soon as possible, especially if clinical improvement and apyrexial
- Consider reasons for treatment failure if no improvement
  - Incorrect diagnosis
  - Secondary complication
  - Inappropriate antibiotics
  - Impaired immunity
    - Systemic: hypogammaglobulinaemia, HIV, Malignancy
    - Local: Bronchiectasis, aspiration, underlying malignancy

- May need NIV
  - Should only be done in a HDU/ITU setting as high risk of proceeding to require intubation
- Consider nutritional supplementation (?NG)

Further management of pneumonia

- Follow-up CXR at 6 weeks
- Vaccination
  - influenza and pnemococcal

Complications of pneumonia

- Parapneumonic pleural effusion
- Empyema (suspect if persistent fever and WBCs in spite of 4-5d appropriate Abx therapy)
- Lung abscess
- DVT (immobility)
- Septicaemia (and thus shock) , or septic emboli
- Post-infective bronchiectasis
- Acute renal failure (likely pre-renal)

Prognosis of Pneumonia

- Age adjusted death rates of between 1 and 24/ 100 000
- Up to 40% of UK adults with CAP require hospital admission
- Hospital mortality varies between 5-12%

Common questions concerning Pneumonia

- What organisms cause Pneumonia?
  - Bacterial
    - Strep pneumonia
    - Haemophilus influenza
    - Mycoplasma pneumonia
      - Young people

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  - Steroids

- What are indications for ITU admission with pneumonia?
  - Persistent hypoxia
  - Acidosis
  - Hypercapnia
  - Hypotension
  - Reduced GCS