### 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: periilar 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 aulfillar 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:
### Further management of pneumonia
- Follow-up CXR at 6 weeks
- Vaccination
  - influenza and pneumococcal

### 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 influenzae
    - Mycoplasma pneumonia
      - Young people
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- WCC can be normal
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    - Erythromycin
      - Rif if allergic
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- Viral
  - Influenza

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- Aspiration

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