Pulmonary Haemorrhage
### Diffuse alveolar haemorrhage vs. massive haemoptysis

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<thead>
<tr>
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<th>DAH</th>
<th>Massive haemoptysis</th>
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<td><strong>Presents with</strong></td>
<td>Dyspnoea, hypoxaemia</td>
<td>Haemoptysis</td>
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<tr>
<td><strong>Haemoptysis</strong></td>
<td>Small, absent in 1/3</td>
<td>&gt;100 – &gt;500ml a day</td>
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<td><strong>Bleeding from</strong></td>
<td>Capillaries</td>
<td>Bronchial arteries</td>
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<td><strong>CXR</strong></td>
<td>Diffuse (localised)</td>
<td>Localised + underlying</td>
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<td><strong>Causes</strong></td>
<td>Vasculitis, auto-immune</td>
<td>Bronchiectasis, ca, TB</td>
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<td><strong>Most useful test</strong></td>
<td>Bronchoscopy and BAL</td>
<td>CT angiogram (systemic)</td>
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<td><strong>Treatment</strong></td>
<td>Immune suppression</td>
<td>IR and embolization, ABs</td>
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<tr>
<td><strong>Life threatening because</strong></td>
<td>Respiratory failure</td>
<td>Large airway obstruction</td>
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DAH - pathogenesis

• 3 histological patterns:

**Pulmonary capillaritis** - inflammation secondary to vasculitis or AI disease

**Bland pulmonary haemorrhage** — bleeding without inflammation - elevated LAP, coagulopathy

**Diffuse Alveolar Damage = ARDS**
Causes

• **Vasculitis** – GPA (cANCA, anti-PR3), MPA (pANCA, anti-MP0), HSP, isolated pulmonary capillaritis

• **Auto-immune** – anti-GBM, SLE, APLA, cryoglobulinaemia

• **Drugs** – Crack, carbimazole, amiodarone, anti-coagulants, anti-TNF

• **Malignant** – chemotherapy, post HSCT, promyelocytic leukaemia

• **Raised pulmonary capillary pressure** – mitral stenosis, PVOD

• **Other** – IPH, Leptospirosis
DAH - presentation

- Abrupt onset (less than 1/52)
- Dyspnoea, cough, haemoptysis, fever
- Haemoptysis absent at presentation in 1/3
- Acute respiratory failure requiring IMV
- Examination nonspecific: tachypnoea, hypoxia, crackles
- Uveitis, nasal / oral ulcers, rash, arthritis, urine

- DDx – CAP, OI, pulmonary oedema, aspiration pneumonia, ARDS, AEP, AIP, LP

- MR upto 50%
Tests

- Falling Hb
- Elevated CRP in capillaritis
- AKI with active sediment (pulmonary-renal syndrome)
- ANCA, ANA, Anti-dsDNA, C3, C4, APA, Anti-GBM
- Anti-cardiolipin antibodies, anti-β-2-glycoprotein I, +/- lupus anticoagulant consistent with antiphospholipid syndrome
Radiology
Radiology
Radiology
Radiology
Radiology
More tests

- Tlco elevated but requires 10s breath hold

- Bronchoscopy and BAL – increasingly blood stained effluent from same sub-segmental bronchus
  >20% hemosiderin-laden macrophages
  Exclude infection, eosinophilia and malignancy

- Biopsy
- Echo
DAH without systemic findings

- Anti-GBM antibody disease (Goodpasture's disease) confined to the lung
- Isolated pulmonary capillaritis with P-ANCA or without autoantibodies
- Idiopathic pulmonary hemosiderosis
Treatment

- Stop drugs, correct clotting
- Treat infection (bacterial, PCP, CMV)
- Supportive care – O2, IMV, ECMO, rFVIIa
Treatment - DAH with capillaritis

• Pulsed methylprednisolone – 1g daily for 3/7 can be initiated whist awaiting diagnostic tests

• Systemic vasculitis (GPA and MPA):
  +cyclophosphamide / rituximab +/- plasma exchange

• Maintenance with Azathioprine / methotrexate
Treatment - DAH with capillaritis

- Anti-GBM antibody (Goodpasture’s) disease: MP, Cyc and PE
- SLE / CAPS: Methylprednisolone and rituximab / cyclophosphamide
- Isolated pulmonary capillaritis: Methylprednisolone and cyclophosphamide
DAH - case study

• 31 year old lady, Bengali heritage

• 6/52 cough, sputum + dyspnoea

• Initially denied haemoptysis

• Exam: low grade fever, no rash, nil specific
Background

• 2 similar admissions early 2013. CT – nodules and consolidation
• FOB negative. Seemed to improve with antibiotics
• May 2013 – arthritis and episcleritis, ESR 120, proteinuria + mild AKI
• Anti-MPO and PR3 negative. Renal and nasal biopsy - chronic inflammation. No vasculitis, granulomas or immune complex
• Improved with depomedrone IA
• Immunological investigation negative for deficiency
• 2014 - intermittent oral ulceration, joint pains and malaise
Management

• Treated for CAP

• Sputum smear negative

• Increasing O2 requirement and hypotensive

• 2g Hb drop over 48 hours
CT
CT
CT
Management

- Wanted tissue but Friday evening
- Prednisolone 60mg od
- Continued antibiotics
- Bronchoscopy with TBB on monday
Management

• TBB - inflammation and necrosis associated with granulomas and giant cells

• BAL – TB culture negative, IGRA negative

• Azathioprine added, steroids weaned

• Improving
Thank you.