COPD: Hospital & Home Care

C Echevarria
Case example

• 75 year old woman, “Mrs Smith”
• Known severe COPD. 2-3 exacerbations per year.
• Admitted with cough, shortness of breath and green phlegm

• FEV1 0.97L (42% pred) | FVC 1.2L (41% pred) | VC 2.2L (76% pred)
  | TLCO 35% predicted | KCO 45% predicted

• pO2 6.9mmHg | pCO2 6.8mmHg | pH 7.35 | HCO3 35 | BE -1
Key aspects

• Confirm diagnosis
• Oxygen prescribing
• ABG- ?NIV treatment required
• DECAF score (risk assessment)
• Initial management
• COPD specialist review
Confirm diagnosis, does the patient have COPD, the basics.

• Clinical history
• Spirometry
  • FEV1/VC less than 70%
  • BTS national audit 2015- availability of spirometry results only 46%!
• Smoking history, occupational exposure
  • Smoking, coal dust, silicosis, biomass fuel

• 717 of 1,122 (63.9%) patients with primary ECOPD codes had proven ECOPD (positive predicted value).
Clinical features which point towards underlying COPD

- A heavy smoking history
- Chronic cough
- Wheeze
- Exertional breathlessness
- Sputum production
- Costal paradox
- Hyper-resonance
- Decreased breath sounds
- Prolonged expiratory time
Confirm diagnosis- ECOPD or AECOPD

“Acute exacerbation of COPD” (not non-infective/ infective)
Increase in symptoms beyond normal day-to-day variation:
• Breathlessness, cough, increased sputum volume or discolouration
• Up to 50% of AECOPD are unreported
• One in five require hospital admission
• Second commonest reason for hospital admission
• Associated with measures of deprivation (income, employment, disability, education)
• Inpatient mortality ~7.7% in hospitals in North East of England
Pneumonic AECOPD (pAECOPD)

- **Treatments are similar between AECOPD and pneumonic AECOPD**

- Similar sociodemographics, severity of COPD and range of organisms between those with pAECOPD and npAECOPD

- Patients with community acquired pneumonia (CAP) without COPD have higher rates of complication

- Risk assessment scores for CAP without COPD underestimate risk in pAECOPD

- Chest x-ray has limited sensitivity for diagnosis of pneumonia
Some AECOPD mimics

• Asthma
  • Look at the eosinophil count
  • Note, eosinophil count is associated with steroid responsiveness

• Anxiety
  • Objective markers of illness no different from baseline

• Heart failure (pulmonary congestion)

• Pulmonary embolism
Heart failure (pulmonary congestion)

• 23% of patients hospitalised with congestive heart failure had diagnosis of COPD at time of admission (144 of 619)

• Of these 144 with COPD, 78% (112) had COPD excluded on lung function at 6 months

• 9% (58 of 619) fulfilled spirometric criteria for COPD (26 were new diagnosis)
Pulmonary Thromboembolism


• “One in four COPD patients who require hospitalization for an AECOPD may have PE”

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>% with PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartman</td>
<td>Consecutive patients with suspected PE</td>
<td>29</td>
</tr>
<tr>
<td>Lesser</td>
<td>Patients with COPD in whom PE was suspected</td>
<td>19</td>
</tr>
<tr>
<td>Mispelaere</td>
<td>COPD exacerbation without evidence of infection and positive d-dimer</td>
<td>29</td>
</tr>
<tr>
<td>Tille-Leblond</td>
<td>AECOPD of unknown origin (around 30% of AECOPD)</td>
<td>25</td>
</tr>
<tr>
<td>Rutschmann</td>
<td>Consecutive patients with a diagnosis of AECOPD who had moderate to very severe COPD were recruited.</td>
<td>3.3 (1.3)</td>
</tr>
</tbody>
</table>
Controlled oxygen- avoid high flow oxygen
Austin, BMJ 2010

• Controlled oxygen by venturi mask, O2 target saturations 88-92%

• Number needed to harm with high flow oxygen= treat 20 to kill 1

• Subgroup with COPD NNH= 14
Hyperoxia and hypertonic saline in patients with septic shock (Schortgen 2017, Lancet RM)

• Treat 12.5 to kill 1

• 1:1:1:1 hyperoxia, normoxia (85-95%), hypertonic saline or isotonic saline

• Trial stopped early:
  • Death at 28 days 93 of 217 (43%) for hyperoxia group compared to 77 of 217 (35%) in the normoxia group (HR 1.27, 0.94-1.72)
  • Serious adverse events higher in the hyperoxia group (85%) compared to normoxia group (76%); p=0.02.
NIV in ECOPD

• Indication is T2RF with acidaemia
• Nationally, NIV treatment is suboptimal
• NIV should be started within one hour of ABG
• Call the physiotherapist early, and generally, avoid a trial of controlled FiO2 without NIV
• Reduction in mortality of 20 to 10% (Lancet, Plant 2000; )
• Treat 10 patients to save 1 life
ABG/ NIV- prescribe O2 correctly to avoid T2RF and acidaemia

<table>
<thead>
<tr>
<th>Results</th>
<th>09/Mar/18 08:00 GMT</th>
<th>09/Mar/18 10:55 GMT</th>
<th>11/Mar/18 14:41 GMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>fiO2 Flow Rate 4L/min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td></td>
<td>7.37</td>
<td>7.23</td>
</tr>
<tr>
<td>pCO2</td>
<td></td>
<td>8.1</td>
<td>14.9</td>
</tr>
<tr>
<td>pO2</td>
<td></td>
<td>7.5</td>
<td>33.9</td>
</tr>
<tr>
<td>Actual Bicarbonate</td>
<td></td>
<td>34</td>
<td>45</td>
</tr>
<tr>
<td>Standard Bicarbonate</td>
<td></td>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>Base Excess</td>
<td></td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>% O2 Saturation</td>
<td></td>
<td>87</td>
<td>100</td>
</tr>
</tbody>
</table>
The DECAF score

Risk assessment: Simple prognostic scores outperform expert judgement

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dyspnoea eMRCD</strong></td>
<td>1-4</td>
</tr>
<tr>
<td>5a</td>
<td>0</td>
</tr>
<tr>
<td>5b</td>
<td>1</td>
</tr>
<tr>
<td><strong>Eosinopenia</strong> (&lt;0.05 x 10^9L^-1)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Consolidation on chest x-ray</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Acidaemia</strong> (pH &lt; 7.3)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Fibrillation</strong> (Atrial Fibrillation)</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>1 / 6</td>
</tr>
<tr>
<td>DECAF 0-1 mortality risk</td>
<td>1-1.4%</td>
</tr>
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In-hospital mortality with DECAF score

Mrs Smith
1.5%  84/5583
Home treatment of COPD exacerbation selected by DECAF score
Thorax 2018, Echevarria et al.

• HAH home treatment that would otherwise require hospital admission- NOT early supported discharge
  • 1-2 daily visits from respiratory specialist nurses + 24 / 7 support from respiratory specialist, controlled $O_2$ and nebulised bronchodilators, IV therapy if required, monitoring of physiological parameters, input from physiotherapy, social services, and psychology

• Hospital care preferred by 90% of patients

• Safe- 90 day mortality the same

• HAH was £1,016 less expensive than UC per patient, largely savings through reducing bed stay and social support. Reduction in LOS in usual care!
Low risk Pneumonic AECOPD $n=788$
(DECAF 1, CURB-65 0-1)

<table>
<thead>
<tr>
<th></th>
<th>DECAF</th>
<th>CURB-65</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day mortality (AUROC)</td>
<td>0.75 (0.71-0.79)</td>
<td>0.66 (0.62-0.71)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>30-day mortality low risk group, %*</td>
<td>3.3 (4/122)</td>
<td>10.1 (24/237)</td>
<td>0.022</td>
</tr>
<tr>
<td>In-hospital mortality low risk group, %*</td>
<td>1.6 (2/122)</td>
<td>7.2 (17/237)</td>
<td>0.026</td>
</tr>
</tbody>
</table>

*DECAF 0-1 and CURB 0-1 groups*
Who to treat and antibiotic choice

• Discoloured sputum -> treat
• If no sputum, do not treat unless:
  • Retaining sputum
  • More severe AECOPD (e.g. pneumonia, NIV, high DECAF score)

• Doxycyline ?sufficient for milder inpatient AECOPD
• Quinolones/ broad spec penicillins for severe AECOPD
• Ciprofloxacin if known pseudomonas
• Two week course if coexistent bronchiectasis (as opposed to 7 days)
• Amoxicillin not good against haemophilus (v common bug in AECOPD)
Oral corticosteroids

• Early (small) improvement in lung function and symptoms
• Reduced length of stay from 9 to 7 days (Niewoehner 1999)
  • However, length of stay far shorter now than in 1999, so may not be applicable
• No benefit in mortality outcome (meta-analysis of 1,319)
• Avoid long courses- associated with numerous side-effects
• Some patients do seem to improve with treatment (? Coexistent asthma/ eosinophilic disease)
• Eosinophil count may be a marker of responders
Bronchodilators

- SABA improve symptoms and airflow obstruction
- No large RCTs of treatment v placebo with meaningful outcome

- Small RCT of 5mg v 2.5mg four hourly, showed no different in lung function or length of stay (Nair 2005)
- Cause lactic acidosis in excess; cardiovascular risk not clear

- SAMA improve symptoms and airflow obstruction in stable COPD
- Lack of evidence of benefit of these in addition to salbutamol for inpatients with AECOPD already treated with 5mg salbutamol (Moayyedi 1995)
General points

• Avoid theophyllines in AECOPD

• Continue long-term azithromycin?
  • Probably safe to continue during AECOPD, but risks and benefits unclear
  • Probably stop if similar factors or interactions with other antibiotic (long QT syndrome, especially with clarithromycin, LFTs, hearing, potential concern re: TB)

• What to do with LAMA (tiotropium) on SAMA nebs (ipratropium)?
  • If giving SAMA, stop LAMA. However, consider not giving SAMA and leave on LAMA if able to take

• When to stop inhaled corticosteroid
  • Increased risk of pneumonia with ICS beyond doubt- may need to be discontinued in certain patients (mild airways disease, and susceptible to pneumonia)
  • Be careful stopping if asthma
Questions