FORGOTTEN CO-MORBIDITIES IN COPD

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Multi-morbidity in COPD
Smith MC and Wrobel JP Int J COPD 2014;9
Survival Curves in COPD

Miller J, Respiratory Medicine 2013;107:1376

**Heart Failure**

- **Survival %**
  - No: Green line
  - Yes: Red line
- **p-value = 0.007**

**Hypertension**

- **Survival %**
  - No: Green line
  - Yes: Red line
- **p-value = 0.938**

**Osteoporosis**

- **Survival %**
  - No: Green line
  - Yes: Red line
- **p-value = 0.102**

**Diabetes**

- **Survival %**
  - No: Green line
  - Yes: Red line
- **p-value = 0.006**

*Adjusted for age, gender and pack years*
Impact of Comorbidities on Physical Activity in COPD

Sievi N, Respirology 2015;20:413
Relevant comorbidities less considered

- Gastro-oesophageal reflux disease (GORD)
- Pain
- Postural abnormalities
Relevant comorbidities less considered

Gastro-oesophageal reflux disease (GORD)
Gastro-oesophageal reflux disease (GORD)

- **GOR**: retrograde movement of stomach contents through lower oesophageal sphincter (LOS)
- **GORD**: results in troublesome symptoms or complications

- **Prevalence in COPD**: 17-78%\(^1-4\)
  - Acidic or non-acidic

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\(^1\)Terada K, Thorax 2008;63:951, \(^2\)Kampainen R, Chest 2007;131:1666
\(^3\)Lee A, Respirology 2014;19:211, \(^4\)Casanova C, Eur Respir J 2004; 23;841
Mechanisms of GORD

- Reduced tone of LOS (permanent or transient)

- Smoking History
  - LOS relaxation

- Respiratory medications?
  - Bronchodilators, Corticosteroids, Anti-cholinergics
  - Altered oesophageal motility, LOS tone

Mechanisms of GORD

Turbyville J, Med Hypotheses 2010;74:1075

- With inspiration - ↑ intra abdominal pressure
  - Exacerbated by airway obstruction
  - Compromise anti-reflux barrier
Clinical implications of GORD

- GORD may impact on the severity of lung disease via two mechanisms
  - Reflex bronchoconstriction
    - Airway irritation with inflammatory response
  - Pulmonary microaspiration
    - Refluxed gastric material into hypopharynx and beyond
Relevant comorbidities less considered

Pain
Prevalence of pain
Lee A, Chest 2015;147:1246

Quality effects

Study
HajGhanbari 2014
Bentsen 2011
Borge 2011
Lohne 2010
HajGhanbari 2012
Roberts 2013

66% (95% CI 44% to 88%)
## Diagnoses in COPD and General Population Experiencing Pain

<table>
<thead>
<tr>
<th>Conditions</th>
<th>COPD Patients With Pain (N = 45)</th>
<th>General Population With Pain (N = 333)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Heart attack</td>
<td>15</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>Angina</td>
<td>9</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Stroke</td>
<td>3</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Cancer</td>
<td>7</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>7</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>3</td>
<td>7</td>
<td>34</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>10</td>
<td>22</td>
<td>68</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>1</td>
<td>2</td>
<td>33</td>
</tr>
<tr>
<td>Arthritis</td>
<td>10</td>
<td>22</td>
<td>92</td>
</tr>
<tr>
<td>Ankylosing spondylitis</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Skeletal/muscle</td>
<td>11</td>
<td>24</td>
<td>79</td>
</tr>
<tr>
<td>Psychiatric diagnosis</td>
<td>5</td>
<td>11</td>
<td>29</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>7</td>
<td>16</td>
<td>59</td>
</tr>
<tr>
<td>disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>20</td>
<td>45</td>
<td>38</td>
</tr>
</tbody>
</table>
Clinical impact: dyspnoea and fatigue
Lohne V, Heart Lung 2010;38:226

“It is not easy to live with pain and breathlessness at the same time. The pain is so severe that you hyperventilate..

It’s like a piercing, strenuous aching and I get so exhausted so I can never concentrate on anything, can’t do a thing, I just have to go back to bed again”
Clinical impact

- Higher pain intensity associated with:
  - Greater anxiety ($r=0.41$) and depression ($r=0.32$)\(^1\)

  “Can hardly sleep. I don’t know. I have entered a circle where I lie down and listen to music. To let my thoughts go away. Because when you go to bed, then you can feel all the pain. Or you are aching all over, and this catches my thoughts”\(^2\)

Clinical impact: Activity and PR

- Qualitative study of non-completers of PR\(^1\)
  - Identified pain (legs, spine) as a reason for non-completion
  - Associated with non-COPD medical conditions

- National Canadian survey 2006\(^2\)
  - Higher proportion of people with COPD vs general population reported disability or activity limitations caused by pain

\(^1\)Keating A, J Physio 2011;57:183, \(^2\)Goodridge D (submitted)
Clinical impact: Activity

Proportions of time spent in physical activity

- Pain
- No Pain

Time (mins)

No activity
Low activity
Medium activity
High activity

Pain
No Pain

*p<0.05

Lee A, (submitted) 2016
**Clinical impact: HRQOL**

<table>
<thead>
<tr>
<th></th>
<th>Correlation between Pain intensity and QOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Borge 2011</strong>¹</td>
<td>Disease-specific QOL: $r = 0.32$</td>
</tr>
</tbody>
</table>
| **HajGhanbari 2012**² | SF-36 PCS with MPQ: $r = -0.45$  
SF-36 PCS with BPI: $r = -0.61$ |

- ↑ dyspnoea (CRDQ) in those with pain¹

¹Borge C, Heart Lung 2011;40:90,
²HajGhanbari B, Respir Med 2012;106:998
Relevant comorbidities less considered

Postural Abnormalities
Vertebral deformities in COPD
Kjensli A, Eur Respir J 2009; 33:1018

COPD vs non-COPD
Postural changes in COPD

Heneghan N, Inter J Ther Rehabil 2015;22:119

- Increased spinal stiffness: upper Cx and Tx spine
- No difference in Tx kyphosis or Cx lordosis
3D motion capture of posture

Anatomical landmarks

Force platform and 3D motion capture image
# Measures of posture in COPD

- 21 participants with COPD / 21 healthy, age, BMI, gender and comorbidity-matched controls

<table>
<thead>
<tr>
<th>Measure</th>
<th>COPD (n=21)</th>
<th>Controls (n=21)</th>
<th>Group differences (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP AP Amplitude, cm</td>
<td>1.9 ± 0.8</td>
<td>2.2 ± 0.4</td>
<td>0.202</td>
</tr>
<tr>
<td>COP ML Amplitude, cm</td>
<td><strong>4.8 ± 0.2</strong></td>
<td>3.1 ± 1.8</td>
<td><strong>0.001</strong></td>
</tr>
<tr>
<td>Spinal alignment (C7-S1) (deg)</td>
<td>29.8 ± 27.9</td>
<td>19.2 ± 19.3</td>
<td>0.159</td>
</tr>
<tr>
<td>Pelvic rotation (deg)</td>
<td>-0.4 ± 4.5</td>
<td>2.9 ± 6.9</td>
<td>0.67</td>
</tr>
<tr>
<td>Pelvic tilt (deg)</td>
<td><strong>0.9 ± 2.4</strong></td>
<td>1.1 ± 6.6</td>
<td>0.91</td>
</tr>
<tr>
<td>Thoracic kyphosis (deg)</td>
<td>51.8 ± 11.4</td>
<td>34.0 ± 18.7</td>
<td><strong>0.001</strong></td>
</tr>
</tbody>
</table>

Lee A, Am J Respir Crit Care Med 2016;193:A5738
Summary

- GORD is common in COPD
  - In the event of frequent acute exacerbations without an identified cause - ? Consider GORD

- Pain is common and associated with multi-morbidity
  - Pain has negative clinical effects

- Postural deficits may be present
  - Clinical implications to be determined