How to Breathe at the End of Life: COPD management

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Objectives

• Define end stage COPD and hospice eligibility
• Discuss pharmacologic options for “maximal medical management” of COPD
• Discuss symptom management of dyspnea and role of non-pharmacologic management of end stage disease
• Discuss some of the struggles and challenges related to the “most expensive hospice diagnosis”
CDC 2009 deaths data

- Number of deaths for leading causes of death
- **Heart disease: 599,413**
- Cancer: 567,628
- **Chronic lower respiratory diseases: 137,353**
- Stroke (cerebrovascular diseases): 128,842
- Accidents (unintentional injuries): 118,021
- Alzheimer's disease: 79,003
- Diabetes: 68,705
- **Influenza and Pneumonia: 53,692**
- Nephritis, nephrotic syndrome, and nephrosis: 48,935
- Intentional self-harm (suicide): 36,909
Pathophysiology

- **Blue Bloater**
  - Chronic bronchitis
  - More obstruction $\rightarrow$ higher CO, CO2
  - Lung volume increases $\rightarrow$ “bloating”

- **Pink Puffer**
  - Pure COPD/emphysema
  - Destruction of pulmonary capillary bed
  - Low CO $\rightarrow$ weight loss $\rightarrow$ cachexia
Visual learners
Signs and symptoms

Early signs
- Chronic cough which occurs throughout the day
- Sputum production with profuse expectoration on arising from sleep
- Persistent dyspnea which worsens with exertion
- Sleep apnea with nocturnal oxygen desaturation
- Weight loss, muscle wasting
- Frequent/severe upper respiratory infections
- Anxiety

Late signs
- Normochromic normocytic anemia
- Oxygen desaturation with exertion, often normal at rest
- Cyanosis of mucous membranes
- Barrel-shaped chest
- Difficult auscultation of cardiac apex related to pulmonary hyperinflation
- Resting shallow respiratory rate of 20+ bpm
- Diminished breath sounds
- Prolonged expiratory effort and use of accessory muscles to breathe
GOLD/NYHA class IV picture
What is the best course of action if a patient wishes to pursue curative treatment for COPD?

A. Referral to pulmonologist
B. Trial of oral steroids
C. Patient education about natural history and progression of COPD as a chronic disease
D. Smoking cessation education
# Hospice eligibility criteria

<table>
<thead>
<tr>
<th>Class</th>
<th>GOLD</th>
<th>Typical Symptoms</th>
<th>FEV1 (% predicted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At risk</td>
<td>0</td>
<td>Productive cough</td>
<td>Normal</td>
</tr>
<tr>
<td>Mild</td>
<td>I</td>
<td>Productive cough</td>
<td>&gt;80</td>
</tr>
<tr>
<td>Moderate</td>
<td>II</td>
<td>Productive cough; reduced physical activity with or without exertional dyspnea, episodes of acute bronchitis</td>
<td>&lt;80 and &gt;50</td>
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<tr>
<td>Moderately Severe</td>
<td>III</td>
<td>Productive cough; dyspnea with moderate exertion, occasional exacerbations</td>
<td>&lt;50 and &gt;30</td>
</tr>
<tr>
<td>Severe</td>
<td>IV</td>
<td>Productive cough; dyspnea with mild exertion or at rest; frequent exacerbations, with or without ankle swelling</td>
<td>&lt;30</td>
</tr>
</tbody>
</table>
# BODE index

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points on BODE Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1 (% predicted)</td>
<td>0</td>
</tr>
<tr>
<td>≥65</td>
<td>0</td>
</tr>
<tr>
<td>50-64</td>
<td>0</td>
</tr>
<tr>
<td>36-49</td>
<td>2</td>
</tr>
<tr>
<td>≤35</td>
<td>3</td>
</tr>
<tr>
<td>6 minute walk (meters)</td>
<td>0</td>
</tr>
<tr>
<td>&gt;350</td>
<td>0</td>
</tr>
<tr>
<td>250-349</td>
<td>1</td>
</tr>
<tr>
<td>150-249</td>
<td>2</td>
</tr>
<tr>
<td>≤149</td>
<td>3</td>
</tr>
<tr>
<td>MMRC/GOLD scale</td>
<td>0</td>
</tr>
<tr>
<td>0-1</td>
<td>0</td>
</tr>
<tr>
<td>2-3</td>
<td>2</td>
</tr>
<tr>
<td>4-6</td>
<td>3</td>
</tr>
<tr>
<td>7-10</td>
<td>4</td>
</tr>
<tr>
<td>Body-mass index</td>
<td>0</td>
</tr>
<tr>
<td>&gt;21</td>
<td>0</td>
</tr>
<tr>
<td>≤21</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BODE score</th>
<th>One year mortality</th>
<th>Two year mortality</th>
<th>Three year mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>2%</td>
<td>6%</td>
<td>19%</td>
</tr>
<tr>
<td>3-4</td>
<td>2%</td>
<td>8%</td>
<td>32%</td>
</tr>
<tr>
<td>4-6</td>
<td>2%</td>
<td>14%</td>
<td>40%</td>
</tr>
<tr>
<td>7-10</td>
<td>5%</td>
<td>31%</td>
<td>80%</td>
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</table>
Poor prognostic factors

• Cor pulmonale
• pO₂ < 55 mm Hg on oxygen
• Albumin < 2.5

• With these factors, 50% were still alive at six months.
Basic eligibility

• Pulmonary patient is NYHA/GOLD/MMRC class IV (short of breath at rest or with minimal exertion) despite:

MAXIMAL MEDICAL MANAGEMENT

So what is maximal medical management?
Classes of medicines for COPD

• Inhaled bronchodilators
• Anticholinergics
• Inhaled corticosteroids
• Methylxanthines
• Oral steroids
• Oxygen
• Opiates
Inhaled bronchodilators

- First line treatment for COPD/asthma
- Works directly on bronchial smooth muscle
- Short acting and long acting preparations
- Sympathomimetic
- SE include tremor, tachycardia, vasoconstriction
- Delivery methods include MDI and nebulizer (theoretically equivalent if delivered effectively)
# First line medications

<table>
<thead>
<tr>
<th>Drug</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol Sulfate MDI</td>
<td>Short-acting</td>
</tr>
<tr>
<td>• <strong>Proair</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>Proventil</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>Ventolin</strong></td>
<td></td>
</tr>
<tr>
<td>Combivent (MDI with albuterol and atrovent)</td>
<td>Short-acting</td>
</tr>
<tr>
<td>Albuterol nebulized, syrup, or tablet</td>
<td>Short-acting</td>
</tr>
<tr>
<td>Duoneb (nebulizer dose with albuterol and atrovent)</td>
<td>Short-acting</td>
</tr>
<tr>
<td>Salmeterol Xinofate (serevent)</td>
<td>Long-acting</td>
</tr>
<tr>
<td>Advair diskus (salmeterol + inhaled corticosteroid)</td>
<td>Long-acting</td>
</tr>
</tbody>
</table>
Delivery systems

MDI

Diskus
Meds for “justification”

- (Brovana/Foradil/Performist)-sub Serevent (~$300/month)
- (Accuneb/xopenex)- sub albuterol ($100-300 month)
- Symbicort- sub advair ($400/month)
- Advair HFA- sub diskus ($500/month)
Fun facts

- Google results for COPD
- 20,000,000
- Percentage of people in US that smoke
  - 19.3% (21.5% men, 17.3% women)
- Average cost of pack of cigarettes in MI
  - $6.90 (15th) Who is #1?
- New York: $11.90
Anticholinergics

• Cholinergics are the main neural bronchoconstriction pathway
• Anticholinergic medications aid bronchodilation by antagonizing constriction
• Can help with sleep in dyspneic patients
• Side effects dry mouth, tachycardia
Per diem meds

• Ipratropium Bromide
  – Atrovent MDI
  – Combivent (albuterol + ipratropium MDI)
  – Duoneb (albuterol + atrovent nebulized)
  – Ipratropium nebulizer solution alone
Spiriva (tiotropium)

- Once daily
- EXPENSIVE (~$350/mo) although should be covered for COPD pts
- Very questionable difference in efficacy, can they switch to ipratropium?
Inhaled corticosteroids

- Reduce inflammation related to chronic bronchitis/COPD
- Seems to reduce exacerbations
- Often used in conjunction with LABA, for which they may potentiate function
- SE include thrush (rinse mouth after each use), skin thinning, but usually very well tolerated
- NO USE AS A “PRN”
First line medications

• Beclomethasone (QVAR) 40-80 mcg BID
• Triamcinolone (Azmacort) 75 mcg 4 inhalations BID
• Fluticasone/salmeterol (Advair)
  – 50/100
  – 50/250
  – 50/500 (LABA variable)
Theophylline

• Methylxanthine class
• OLD
• Thought to relax smooth muscle, although definitive mechanism unknown
• Third line treatment if others above not effective
• SE include rash, headache, tachycardia, seizures
• MANY drug interactions
Question

Which of these medications is a long acting (controlling) medication for COPD?
A. Albuterol
B. Atrovent (ipratropium)
C. Spiriva (tiotropium)
D. Xopenex
Oral steroids

• Last line of therapy
• Can be very helpful
  – Increased appetite
  – Increased energy
  – Pain relief
  – Dyspnea relief
• Tapering for exacerbations, steady dose in Hospice
## Side effects (counseling needed!)

### Short term
- Euphoria
- Hyperphagia
- Insomnia
- Stomach irritation/bleeding
- Immunosuppression
- Blood sugar elevation
- LE edema
- Easy bruising

### Long term
- Body changes
- Osteoporosis
- Tendon weakness
- Adrenal insufficiency

![Image of side effects](image.png)
Contractual obligation
Oxygen

- Proven as only intervention that prolongs life in COPD
- Less robust data and some evidence that oxygen therapy not particularly effective for treatment of dyspnea especially at the end of life
- Bottom line: ok to use, but believe your patient if it is not relieving dyspnea and more hassle than it’s worth
- Do NOT use pulse ox machines in hospice care
  - Pulse ox 99% + patient report of dyspnea = dyspnea
  - Pulse ox 70% + comfortable patient = comfortable patient
Morphine

- Only researched opioid for dyspnea
- Mild vasodilator
- Not usually used in outpatient setting prior to hospice care
- Other opioids could probably work too
- Doses required usually less than those needed for pain
- Don’t forget 1mg/cc liquid concentration
- Can be nebulized, anecdotal evidence only
Side effects of opioids

- CONSTIPATION
- Sedation (dose related)
- Pruritis
- Nausea
- Respiratory depression can occur in overdose of opioids and is the most commonly known side effect of opioids, but the order of side effect occurrence is symptom relief, sedation, and then respiratory depression. **DECREASING RESPIRATORY RATE IS NOT A GOAL OF OPIOID THERAPY FOR REFRACTORY COPD.**
Benzodiazepines

- Break anxiety cycle
- No studies of efficacy in COPD
- Second line after morphine for relief
- Usually more sedating than properly dosed morphine
- 0.25 q6 PRN recommended opening Ativan dose
Nebulized furosemide

• Proposed mechanisms include
  • Possible bronchodilator
  • Inhibition of irritant-receptors of the lung
  • Anti-inflammatory effect
• Used as 40 mg solution dye free via nebulizer
• Very limited evidence, but anecdotal success
Exacerbations

• Antibiotics evidence based to be an added benefit
  – Usually Azithromycin first line
• May also do a steroid burst followed by return to baseline or slight increase in baseline dose
Nonpharmacologic management

- Relaxation techniques
- Breathing exercises
- Music therapy
- Aromatherapy
- Cool humidified air
- Circulating fan
- Fowler’s position
This is the most expensive hospice diagnosis there is...

- I have learned more about pharmacy economics than I ever wanted to...
- 30 day supply more cost effective than less in most cases
- Liquid more expensive than tab
- Morphine ER is expensive now...
- COMBO products (duoneb, combivent, Advair, symbicort)
My struggles

• Getting worse = less medication
• I am doing this for cost reasons
• Pharmacy cost has no rationale IMHO at times and is not fun for me to think about
Other diseases

• Not all respiratory problems are COPD
  – CHF
  – Pulmonary fibrosis
  – Lung cancer

• No indication for nebulized/inhaled treatments in this population and possible harm
Summary

• Hospice eligibility criteria not completely concrete, but based off of maximal medical management

• Multiple faceted attack of disease process may provide long period of stability

• Symptom management can significantly improve QOL and combines medicine and nonpharm treatments
Questions?

http://www.youtube.com/watch?v=dzpBCymhSp0

http://www.youtube.com/watch?v=2nBPqSiLg5E

Palliation of COPD, @home support, 2011, Remillard, Roth, and Fonger

