COPD Exacerbation and Prevention/Control of Infection

Lifespan Cardiovascular Institute
Rhode Island Hospital • The Miriam Hospital
Newport Hospital
Delivering health with care®

Center For Cardiac Fitness
Pulmonary Rehab Program
The Miriam Hospital
Outline

• Background COPD
• Acute Exacerbation of COPD
  – Prevention of COPD Exacerbations
    • Tobacco Cessation
    • Medications in COPD
• Prevention of Infection
  – Hand Hygiene
  – Vaccinations
What is COPD?

- COPD is a chronic respiratory disease characterized by airflow limitation
- Affects more than 5% of the population
  - 13 million adults in the United States
- Third leading cause of death in the United States
- Smoking is by far the most important risk factor
Obstructive Lung Diseases

- Asthma
- Emphysema
- Chronic Bronchitis

Chronic Obstructive Pulmonary Disease (COPD)
COPD: Chronic Bronchitis

Normal bronchi

Bronchitis

Thickened airway wall

Increased Mucus Production
COPD: Emphysema
What is COPD?

• COPD is a **chronic** disease that is both preventable and treatable

• Airflow limitation is typically progressive and gets slowly worse over time

• Enhanced airway inflammation makes patients susceptible to “exacerbations” and infections
  – 1.5 million ER visits and 750,000 hospitalizations per year
Acute Exacerbations of COPD and Prevention
COPD Exacerbation

• Acute worsening of respiratory symptoms occurring over a few days to weeks
• Possible symptoms include:
  – More breathless than usual
  – Less energy for daily activities
  – Increased or thicker phlegm
  – Change in color of phlegm
  – Increased use of rescue inhaler
  – Increased cough
  – Feeling of having a “chest cold”
  – Symptoms at night
  – Loss of appetite
  – Feeling that medications are no longer helping
Triggers of COPD Exacerbations

Wedzicha, JA, Seemungal T
Lancet 2007
Frequent Exacerbators Associated With Many Worse Outcomes

Patients with frequent exacerbations

- Poorer quality of life
- Higher mortality
- Greater airway inflammation
- Faster decline in lung function

Wedzicha, JA, Seemungal T Lancet 2007 370-786-796
Natural History of Lungs

Never Smoker
or
Non susceptible

Susceptible Smoker

FEV-1(%)

Time (yr)

Death

Disability

50%
Frequent Exacerbators

- **Never Smoker**
- **or**
- **Non susceptible**
- **Susceptible Smoker**

**Exacerbations**

**Disability**

**Death**

**Time (yr)**

**FEV-1(%)**

100%

50%
Reduction in Exacerbations

- Smoking Cessation
- Medication Compliance
- Early Treatment of Exacerbations
- Hand Hygiene and Vaccinations
Tobacco Cessation and Natural History of Lung Function

- Never Smoker or Non susceptible
- Susceptible Smoker
- Tobacco Cessation Age 45
- Tobacco Cessation Age 65
- FEV-1 (%)
- Disability
- Death

Time (yr)
Tobacco Cessation

• Self-help and group smoking cessation programs
  – Average 7 attempts to quit
• Nicotine replacement therapy
  – Chewing gum with better quit rates than counseling alone.
  – Transdermal nicotine patches
    • Long-term success rates range from 22-42%, vs 2-25%.
• Prescription Medications
  – Bupropion (Wellbutrin)
    • 1 year quit rates 23% vs. 12% with placebo
  – Varenicline (Chantix)
    • 1 year quit rates 23% vs. 9% with placebo
Medications for COPD

• Short acting bronchodilators
  – Albuterol, ipratropium, combivent
• Also referred to as “rescue inhalers”
• All have been shown to improve symptoms and quality of life
• None have been shown to decrease the rate of exacerbations
• No added benefit to taking short acting bronchodilators “regularly” versus “as needed”
Short acting bronchodilators
(rescue inhalers)

ProAir
Proventil
Ventolin
Atrovent
Combivent
Nebulizers

• The same medications that come in rescue inhalers are sometimes prescribed in nebulized form
• Albuterol, ipratropium, duonebs
• Most patients have similar improvement in lung function with inhalers vs nebulizers
• Some patients have a better response with neublizers
Medications for COPD

• Long acting bronchodilators
  – Spiriva (tiotropium), Serevent (salmeterol), Foradil (formotorol)

• Maintenance Inhalers
  – Improve lung function
  – Improve quality of life
  – Reduce exacerbations
Long Acting Bronchodilators

Spiriva

Foradil

Serevent
Medications for COPD

• Combination long acting bronchodilator with inhaled corticosteroids
  – Advair, Symbicort, Dulera

• Reduces exacerbations compared to either agent alone

• Improves lung function

• Improves quality of life

• Can increase rate of pneumonia
Combination long acting bronchodilators and inhaled corticosteroids

Advair

Dulera

Symbicort
Medications improve lung function

![Graph showing adjusted mean change in FEV₁ over weeks for different treatments: Placebo, Salmeterol, Fluticasone, Combination therapy. The table below the graph shows the number of patients for each treatment group.]

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>1524 1248 1128 1049 979 906 819</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>1521 1317 1218 1127 1054 1012 934</td>
</tr>
<tr>
<td>Fluticasone</td>
<td>1534 1346 1230 1157 1078 1006 908</td>
</tr>
<tr>
<td>Combination therapy</td>
<td>1533 1375 1281 1180 1139 1073 975</td>
</tr>
</tbody>
</table>
Medication Conclusions

• Medications help to prevent hospital admission and keep patients healthy
• Common Problems:
  – feel no effect from medications
  – cost a lot of money

Avoid the urge to stop Medications
Hand Hygiene and Vaccinations
Triggers for COPD Exacerbations

Majority of COPD exacerbations are triggered by infection

- **Viral**: 5-10%
- **Bacterial**: 40-50%
- **Atypical bacteria**: 10-25%
- **Air pollution**: 30%
How are germs spread?

- Germs are released into the air when you sneeze or cough
Cover with Your Sleeve!!

How long do particles stay in the air?

- hair: ~100 μm, ~3-5 sec.
- dead skin: 20-40 μm, ~15 sec.
- pollen: ~6-50 μm, ~45 sec.
- fly ash: 1-100 μm, ~5-30 min.
- mold: 0.5-30 μm, ~30-60 min.
- bacteria: ~1-3 μm, ~1-2 hr
- smoke: ~0.1-10 μm, ~2-10 hr
- soot: ~0.05-0.2 μm, ~8-24 hr

The approximate time it takes for these particles to settle one meter (39") in undisturbed air.
Prevent the Spread

• To prevent the spread of infection
  – Turn away from other people before sneezing or coughing
  – Sneeze or cough into your sleeve making sure to completely cover your mouth and nose
  – If you have to cough or sneeze into your hands try to use a tissue. Throw away tissue immediately after use.
  – Always wash your hands after coughing or sneezing

Your Mother Does Know Best
Best Protection Is To Clean Your Hands

- 1 in 3 people leaving the restroom fail to wash their hands.
- MD’s in the hospital traveling from patient to patient:
  - 70-80% compliance w/ hand hygiene
  - Feel free to complain

[Image: Germ Farm Scrub'em!]
[Website: www.1st-in-handwashing.com]
Washing with Soap and Water

• Adjust water to desired temperature
• Moisten hands with soap and water
• Wash well under running water for a minimum of 15-20 seconds, using a rotary motion and friction
• Rinse hands well under running water
• Turn off faucet with paper towel and discard
• Dry hands with a clean paper towel and discard
Use Alcohol Based Hand Gels

- For routine hand cleaning only if your hands are not visibly soiled
- After contact with another persons intact skin
  - i.e. shaking hands
- After contact with inanimate objects
  - i.e. telephone, door knob
Vaccinations

Influenza and pneumococcal vaccinations are recommended for all patients with chronic lung disease!
General Concepts

- Inject either live weakened form or part of the bacteria/virus
- Body forms antibodies against the component of the vaccine
- Antibodies subsequently fight infection if you are exposed
- Myth
  - Neither flu or pneumococcal vaccine can give you the disease
- Neither guarantee that you will not get the disease
Community Acquired Pneumonia
Community Acquired Pneumonia

• Pneumonia No. 1 cause of infection-related mortality
  – 3rd Most frequent hospital diagnosis in patient >65 years
  – 1.3 million cases/yr in US in 2005
Pneumonia Associated Mortality Rates

Mortality rates for pneumonia have not improved since penicillin.
Incidence and Mortality Increase with Age

Pneumonia is the most common cause of infectious death in people age >65.
Pneumococcal Vaccination

- *Streptococcus Pneumoniae*: “Pneumococcus”
  - Common inhabitant of mouth
  - Most common cause of bacterial pneumonia - acquired in the community
    - 500,000 Cases per Year
  - Responsible for >40,000 deaths/yr

- Vaccine Recommendations:
  - Age 2-64 w chronic disease
  - All patients >65

- Vaccine does not prevent all cases of pneumococcal pneumonia but decreases the severity of disease
  - I.e. less likely to die from it

- Vaccine does not prevent other types of bacterial pneumonia
Pneumococcal Vaccination Algorithm

Has the Person Been Vaccinated before?

Yes
- Was the Person > age 65 At the time of vaccination?
  - Yes
    - Vaccination Not Indicated
  - No or Unsure
    - Vaccination Indicated

No or Unsure
- >5 Years Elapsed Since Vaccine
  - Yes
  - Vaccination Indicated
  - No
    - Vaccination Not Indicated
Flu Vaccine
Yearly peak
Weeks 5-15

Pneumonia and Influenza Mortality
for 122 U.S. Cities
Week Ending 1/14/2012
During Flu Season

Vaccination:
• May not prevent the “Flu”
  – Decreases severity of disease
    • Less hospitalization, less loss of work, lower mortality

Important For People at RISK
Conclusions

• COPD is a common progressive disease
• Acute exacerbations present significant short and long term risk to patient
• Medications can help to prevent acute exacerbations of COPD
• Tobacco cessation is the only therapy known to slow the decline of lung function in COPD
• Washing your hands is important
• The flu and pneumonia vaccines play an important role in keeping you healthy
Comments/Questions