COPD Review

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Objectives

- Define COPD
- Diagnosis COPD
- Treatment of COPD
I have no disclosures.
Define COPD

COPD is a disorder that causes dyspnea and is characterized by structural changes in the lung that leads to progressive irreversible or fixed airflow limitation.
COPD

- Is fourth leading cause of death in the United States, and by 2020 will be the third leading cause of death.

- Prevalence rates are higher in men than in women and are correlated with increasing age, lower socioeconomic status, and smoking.

- Though in recent years we have seen the diagnosis of COPD increase in women and over in Asia.
COPD

Causes/Risks:

1. Smoking
2. Air Pollution
3. Occupational Exposures
4. Infections
5. Genetics Alph-1-Antitrypsin
6. Increasing Age
Pulmonary Clinic
COPD

- The pathogenesis can be dissected into 4 interrelated events.
- (1) Chronic exposure to cigarettes may lead to inflammatory cell recruitment within terminal airspaces of the lung.
- (2) These inflammatory cells release elastolytic proteinases which damage the extracellular matrix of the lung.
- (3) Loss of matrix-cell attachment leads to apoptosis of structural cells of the lung.
- (4) Ineffective repair of elastin and perhaps other extracellular matrix components result in airspace enlargement.
COPD

![Graph showing the impact of smoking on FEV1 (forced expiratory volume in one second) and age. The graph compares individuals who never smoked, those who smoked regularly and were susceptible to its effects, and those who stopped smoking at different ages.]
COPD Diagnosis

- Emphysema is a permanent enlargement of air spaces as a result of destruction of the lung parenchyma in the absence of fibrosis.
- Emphysema can be classified into centriacinar and panacinar.
- Centriacinar emphysema affects the central portion of the secondary pulmonary lobules, around the central bronchiole, typically involving the superior part of the lungs.
COPD
Panacinar emphysema affects all parts of the secondary pulmonary lobule, typically involving the inferior part of the lungs.

Chronic Bronchitis presents with cough resulting in sputum production for more than three months in each of the past two years.

In contrast to emphysema, chronic bronchitis is primarily a disease of the airways.
COPD
COPD

Common Symptoms

1. Exercise Intolerance
2. Fatigue
3. Weight Loss
4. Depression/Anxiety
5. SOB
6. Chronic Cough
7. Wheezing
8. Chest Tightness
9. Inability to clear mucus
COPD
COPD

Clinical Findings:

1. Hyper-resonant to percussion
2. Hear rhonchi, wheezes, crackles
3. Barrel shaped chest
4. Pursed Lips
5. Muscle retractions
6. Use of accessory muscles
7. Cranial, Cervical, Thoracic, Clavicle, Rib, Diaphragm, and Sacral Dysfunction
COPD
COPD

Clinical Findings:
(8) CXR – increase in lung volumes “hyperinflation”, Flatten diaphragms, Bullous changes in the lung “blebs”
(9) EKG – Right ventricular strain pattern, MAT
(10) CBC- Increase in H/H
(11) PFT’s – Decrease in FEV1, FEV1/FVC, and increase in TLC/RV with decrease in DLCO
A decrease of FEV1 to 1L is 50% of predicted levels which equals severe disease.
Other Diagnosis

- Asthma-COPD (Overlap Syndrome)
- COPD-OSA (Combined Syndrome)
- COPD with Bronchiectasis
- COPD with Fibrosis
COPD

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<tbody>
<tr>
<td></td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt; (%)</td>
<td>Symptoms</td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt; (%)</td>
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<tr>
<td>0 (at risk)</td>
<td>50</td>
<td>NA</td>
<td>70</td>
<td>NA</td>
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<tr>
<td>I (mild)</td>
<td>≥35–49</td>
<td>NA</td>
<td>50–69</td>
<td>NA</td>
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<td>II (moderate)</td>
<td>&lt;35</td>
<td>NA</td>
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<td>III (severe)</td>
<td>&lt;35</td>
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<td>IV (very severe)</td>
<td>&lt;35</td>
<td>NA</td>
<td>&lt;50</td>
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* GOLD denotes Global Initiative for Chronic Obstructive Lung Disease, and FEV<sub>1</sub> forced expiratory volume in one second (shown as a percentage of the predicted normal value). In the Symptoms columns, NA denotes not applicable (staging is based on physiology only), – no symptoms, ± variable symptoms, + mild-to-moderate symptoms, ++ symptoms that limit exertion, and +++ symptoms that limit daily activities.
COPD

Class A or Group A – Low risk with less symptoms to no symptoms and 0 to 1 exacerbation in the past year. (Gold Stage 0 to I-II)

Class B or Group B – Low risk with daily to weekly symptoms and 0 to 1 exacerbation in the past year. (Gold Stage 0 to I-II)
COPD

- Class C or Group C – High risk with less symptoms to no symptoms and 0 to as much as 2 or more exacerbations per year. (Gold Stage III-IV)

- Class D or Group D – High risk with daily to weekly symptoms and more than 2 exacerbations per year. (Gold Stage III-IV)
COPD
COPD
COPD Treatment

- In the TOURCH trial use of LABAs alone reduced exacerbation rates, improved lung function and improved quality of life.

- Combination therapy with LABAs with Fluticasone did better than LABAs alone.

- In the UPLIFT trial use of combination LABAs-Fluticasone and Tiotropium did better than the above in stage 4 lung disease.
COPD

- Pulmonary Rehab is another treatment option for patients to improve physical conditioning and quality of life for 6-12 months after completing rehab.
- Smoking cessation is by far the best thing the patient can do to reduce the rate of ongoing loss of lung function.
- It is very important that these patients get Flu vaccine every year and Pneumovac 23 and Prevnar 13 vaccine.
COPD

There are several studies that now show antibiotics (Macrolides, Doxycycline, Moxifloxacin, Augmentin and possible other PCN’s and Cephalosporins) decrease hospital length of stay and readmission to the hospital. Also long term use of Macrolides in severe COPD have decreased exacerbations.

There is a current study at U of M looking at oxygen therapy in COPD patients whose oxygen saturation decreases only with exertion and the effect on mortality.
Daliresp is a phosphodiesterase type 4 inhibitor that leads to increased cellular cAMP. The increase in cAMP interferes with the expression of proinflammatory mediators and inhibits the activity of inflammatory cells.

Indacaterol (Arcapta) is once a day long acting beta agonist.

Aclidinium bromide (Tudorza) is a twice a day long acting anticholinergic.
COPD

- Umeclidinium (Incruse) is a once a day long acting anticholinergic.
- Vilanterol is a once a day long acting beta agonist.
- Olodaterol (Striverdi) is a once a day long acting beta agonist.
- Anoro (Umeclidinium-Vilanterol), Stioltto (Tiotropium-Olodaterol), and Breo (Fluticasone-Vilanterol)
COPD

- Ciclesonide (Alvesco) is a once a day inhaled steroid.
- Fluticasone furoate (Aerospan, Arnuity) is a once a day inhaled steroid.
Other treatment

- Theophylline
- Steroids
- Mucinex and Fluids
- Oxygen
- Noninvasive positive pressure ventilation
- Alph-1-Antitrypsan replacement
- Surgery or Transplant
- Palliative Care/ Hospice Care
Future Treatment

- Endobronchial Valves
- Thermal Vapor Ablation
- Endobronchial Coils
COPD

- Treatment is done to try to decrease morbidity and mortality, but studies thus far have only shown slight improvement in FEV1 but this is not a long term effect.

- So, treatment is aimed at improving quality of life and decreasing the medical cost of COPD by decreasing the number of hospitalizations. In the CHEST Physician Newspaper, the LIFE Trail confirmed that COPD is an independent risk for sudden cardiac death. The more exacerbations the higher the risk.
References

- Principles of Pulmonary Medicine
- Harrison’s Internal Medicine
- Cecil Essentials of Medicine
- New England Journal of Medicine Website
- LIFE Trail  Lancet. 2002 Mar 23;359[9311]:995-1003
- Chest Journal 2004;125:52S-60S
- J Respir Crit Care Med 2008;178:1139-1147
- Respir Res. 2010;11:10
- CHEST Physician Vol. 11 NO. 1 Jan 2016
- Epocrates
- Internet Images
- UpToDate