COPD:
A GUIDE TO DIAGNOSIS AND MANAGEMENT

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I have no pharmaceutical endorsements or business relationships to disclose.

COPD: OVERVIEW

- Definition- Slowly progressive disease involving involving the airways and/or lung parenchyma resulting in airway obstruction
  - Subtypes include Emphysema, Chronic Bronchitis, Chronic Obstructive Asthma, these disease states may overlap and present in conjunction
- 3rd leading cause of the United States
- Estimated to cost $29.5 billion per year in medical costs
- Latest guideline recommendations were published in 2011 from a cooperative effort from ACP, ACCP, ATS and ERS

TOPICS TO DISCUSS

- The value of history and physical exam to predict airflow obstruction
- Value of spirometry for screening and diagnosis
- New and Old Management for treatment of COPD

SUBTYPES VS OVERLAP DISEASE STATES

- Chronic Bronchitis- chronic productive cough for three months in two successive years, where other causes of chronic cough have been excluded
- Emphysema- abnormal and permanent enlargement of the airspace distal to the terminal bronchioles. *Emphysema can exist without airflow obstruction*
- Asthma- chronic inflammatory disorder associated with airway responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning

HISTORY

- Patients may report:
  - *Decrease in ADLs, fatigue exertion dyspnea, chronic cough which is worsening, sputum production in the morning, wheezing*
  - Comorbid diseases may include lung CA, CAD, osteoporosis, metabolic syndrome, depression, cognitive dysfunction
  - Family History of COPD, chronic respiratory illness
  - single most important risk factor is cigarette smoking
    - it is imperative to ascertain the number of pack years
    - In the access of genetic/environmental predisposition, smoking less than 10-15 years is unlikely to result in COPD
    - The single best variable to predict that an adult will have airflow destruction is a history of >40 pack years of smoking

Mannino DM, Gagnon RC, Petty TL, Lydick E. Obstructive Lung Disease and Low Lung Function in Adults in the United States: Data From the National Health and Nutrition Examination Survey, 1988-1994. *Arch Intern Med.* 2000;160(11):1683-1689. doi:10.1001/archinte.160.11.1683.

PHYSICAL EXAM

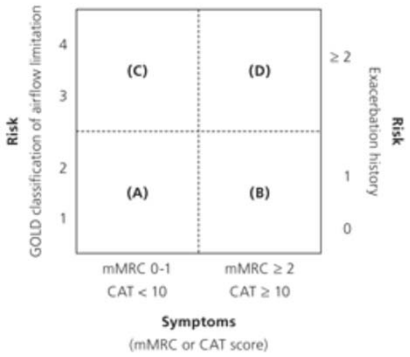
- PE has high specificity (90%) but poor sensitivity for airflow obstruction
- The combination of patient reported smoking history greater than 55 pack years, wheezing on auscultation and patient self report of wheezing is a high predictor for obstruction and the absence of all 3 essential can rule out airflow obstruction

MAKING THE DIAGNOSIS: SPIROMETRY UTILIZATION

- The use of PFTs helps to measure the presence and severity of airflow obstruction
- COPD is demonstrated if there is evidence of airflow obstruction that is not full reversible
- Guideline recommendation: There is no evidence of benefit of using spirometry to screen adults who have no respiratory symptoms (asymptomatic)
- Spirometry along has been shown to be independently improve smoking cessation but “lung age” on spirometry may be included to assist in smoking cessation counseling

GOLD VS ERS/ATS CRITERIA

Combined Assessment of COPD



When assessing risk, choose the highest risk according to GOLD grade or exacerbation history. One or more hospitalizations for COPD exacerbations should be considered high risk.

Patient group	*Characteristic*	*Spirometric classification*	*Exacerbations per year*	*mMRC*	*CAT*
A	Low risk, less symptoms	GOLD 1 or 2	≤ 1	0 or 1	< 10
B	Low risk, more symptoms	GOLD 1 or 2	≤ 1	≥ 2	≥ 10
C	High risk, less symptoms	GOLD 3 or 4	≥ 2	0 or 1	< 10
D	High risk, more symptoms	GOLD 3 or 4	≥ 2	≥ 2	≥ 10

GOLD VS ERS/ATS CRITERIA

- RECOMMENDATIONS
- Use Gold criteria to diagnose obstructive lung disease in patients 65 and older who at risk for COPD
  - A large cohort study found that in U.S. adults 65 years and older was more sensitive for COPD-related obstructive lung disease than using the ATS criteria
- Use ATS criteria to diagnose obstructive lung disease in patients younger than 65 regardless of smoking status and in nonsmokers who are 65 and older and
  - Studies found that GOLD criteria can miss up to 50% of young adults with obstructive lung disease and can over diagnose healthy nonsmokers

Am Fam Physician. 2014 Mar 1;89(5):359-366.

TREATMENT: EDUCATION

- Smoking cessation prevents excessive decline lung function
- Avoiding exposure to respiratory irritants
- Pneumococcal vaccination
- Annual Influenza vaccination

SMOKING CESSATION

- Nicotine replacement therapy
- Varenicline (Chantix)
- Bupropion (Wellbutrin or Zyban)
- Smoking cessation groups
- Others: Hypnotherapy, Acupuncture

EXERCISE AND REHABILITATION

- Self-directed exercise can prevent muscle deconditioning
- 20-30’ constant low-intensity aerobic exercise: walking 3 times a week. Pace: 1 mph or 1/2 mile in 30’
- O2 with exercise may be necessary
- Formal rehabilitation program

NUTRITION

- Half of patients with very severe COPD (FEV1 <35%) show protein-calorie malnutrition
- Increased resting metabolic demands
- Inadequate caloric intake
- Cachexia-associated inflammatory cytokines

SLEEP DISORDERS

- More common in COPD than in the general population
- Overlap Syndrome: COPD + OSA
- Inconclusive whether is effective treating nocturnal O2 desaturations
- Nocturnal bronchospasm may respond to LABA, GERD Rx and elevation of the head of the bed

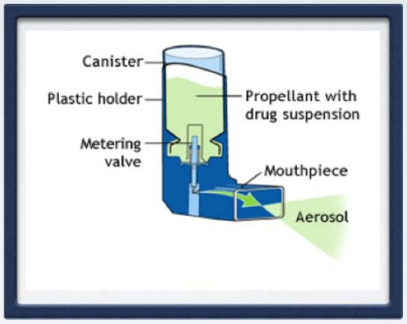
OXYGEN THERAPY

- Resting room-air PaO2 <55 mmHg or O2 sats <88%
- Resting room-air PaO2 56-60 mmHg or O2 sats 88-89% with supporting evidence of chronic hypoxemia such as polycythemia, pulmonary hypertension, cor pulmonale or phycological impairment
- O2 should be used 24 hours a day. 18 hours is preferred over 12 hours

DRUG THERAPY

- No drug treatment diminishes the decline in pulmonary function while continued smoking
- Combination of inhaled steroids and long-acting bronchodilators may improve survival as well as reduce exacerbations
- Bronchodilators decrease dynamic hyperinflation

METERED DOSE INHALERS



- Addition of a spacer device is helpful

ANTICHOLINERGICS

- Parasympathetic pathways are involved in bronchospasm
- Cholinergic receptor is the muscarinic M3 receptor
- Slower and less intense bronchodilation than ß-agonists

IPRATROPIUM BROMIDE

- Inhaled anticholinergic
- 4-8 hours of bronchodilation
- Inhibition of vagal stimulation of the airways
- Side effects: mouth irritation and cough. Very rare: urinary retention and acute-narrow angle glaucoma
- 2 MDI inhalations Q8H, can be increased to 6 puffs 4 times daily

SHORT ACTING BETA AGONISTS

- Selective Beta-2 agonists
- 2 inhalations every 4 to 6 hours as an AS NEEDED agent
- Albuterol or pirbuterol
- Proventil®, ProAir®, Ventolin®

LONG-ACTING BETA AGONISTS

- Salmeterol or formeterol
- Monotherapy is discouraged in a
- Side effects: hypokalemia, tremo
  tachycardia
- These occur more with more frequent administration

INDICATEROL

- Rapid onset
- Duration of action of 24 hours
- Once a day dosing
- Improves dyspnea and health status
- Reduces exacerbations

OLODATEROL

- Striverdi® Respimat
- Long-term
- Once daily
- Warning on asthma

INHALED CORTICOSTEROIDS

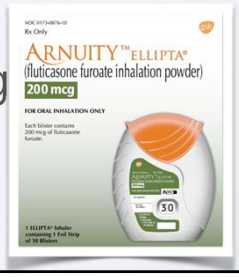
- Does not affect the progression in ongoing smokers
- Can reduce the frequency of exacerbations
- Improve airways reactivity
- Slow the decline in quality of life
- Side effects: cataracts, capillary fragility, osteoporosis

INHALED CORTICOSTEROIDS

- Ciclesonide (Alvesco®)
- Beclomethasone (Qvar®)
- Fluticasone
- Budesonide (Pulmicort®)
- Mometasone (Asmanex Twisthaler®)
- Triamcinolone (Azmacort®)
- Flunisolide (Aerobid®)

FLUTICASONE

- Inhaled corticosteroid
- Approved for management of Asthma
- 2 doses, 100 and 200 µg



LONG ACTING ANTICHOLINERGICS

- Historically, stramonium (Jimson weed, Devil's snare or datura) and belladonna alkaloid
- Has been approved for the management of Asthma
- Careful with urinary retention
- New evidence link to dementia in elderly population

LONG-ACTING MUSCARINIC AGENTS

- Potent bronchodilation
- Long duration
- Symptom relief is enhanced
- No corticosteroid content
- Preferable when no history of acute exacerbations

TIOTROPIUM

- Anticholinergic bronchodilator
- Once a daily dosing

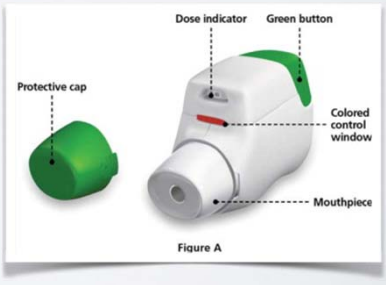
- More effective in bronchodilation, quality of life, and reducing exacerbations. Exercise capacity is increased
- Tolerance does NOT develop
- Spiriva®

TIOTROPIUM

- Now comes as a Respimat® inhaler
- Slow moving mist
- Help patients inhale the medication independent of respiratory effort

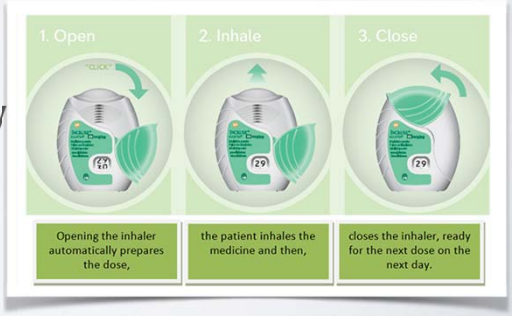
ACLIDINUM

- Long acting muscarinic antagonist (LAMA)
- Selective muscarinic antagonist with affinity for M3
- 400 mcg INH BID
- Tudorza®



UMECLIDINUM

- Long acting muscarinic antagonist (LAMA)
- blocks acetylcholine at muscarinic receptor (M1-M5)
- 62.5 mcg INH daily
- Incruse Ellipta®



COMBINATION INHALERS

- Beta agonist + short-acting anticholinergic
- Better bronchodilation than either agent alone
- Simplified treatment may improve adherence

FLUTICASONE AND SALMETEROL

- Advair®
- Three doses
- 250/50 mcg approved for COPD
- HFA

BUDESONIDE AND FORMOTEROL

- Symbicort®
- Long acting agonist and an inhaled steroid
- Proven efficacy
- Both for COPD and Asthma
- COPD approved dose is 160 mcg

UMECLIDINIUM AND VILANTEROL

- Anoro® Ellipta
- Once a day
- Indicated for COPD
- It may cause paradoxical bronchospasm
- Side effects include cardiac arrhythmias, use with caution in patients with cardiovascular disease, urinary retention or narrow-angle glaucoma

VILANTEROL / FLUTICASONE

- LABA + inhaled corticosteroid
- 25 mcg/100 mcg INH daily
- Breo Ellipta®

TIOTROPIUM AND OLODATEROL

- Stiolto® Respimat for COPD
- NOT for asthma or acute exacerbations
- Long acting beta-agonist (Olodaterol)
- Long acting beta agonist PLUS Anticholinergic

THEOPHYLLINE

- Bronchodilator, non selective Methylxanthine
- Improves arterial oxygenation and exercise tolerance
- Long-acting oral preparation once or twice daily
- The drug is protein-bound
- Poor correlation between serum levels and efficacy or side effects (N/V, tremor, tachyarrhythmias)

ROFLUMILAST

- Selective Phosphodiesterase (PDE)-4 inhibitor
- Leads to accumulation of intracellular cAMP in lung tissue
- Liver metabolism
- Renal excretion
- 500 mcg PO daily

ORAL CORTICOSTEROIDS

- Effective for COPD exacerbations
- Most patients should not be maintained on long term
- When receiving long-term therapy, remember to start prophylaxis for osteoporosis with calcium and vitamin D or bisphosphonates

MUCOLYTIC AGENTS

- Mucomyst (N-acetyl cysteine)
- Chest Physiotherapy
- Expectorants

QUESTIONS?

- Thank you.

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