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

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

**RECOMMENDATIONS**

- Use Gold criteria to diagnose obstructive lung disease in patients 65 and older who are 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

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
ANTICHLINERGICS

• 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 ASNEEDED agent
- Albuterol or pirbuterol
- Proventil®, ProAir®, Ventolin®

LONG-ACTING BETA AGONISTS

- Salmeterol or formeterol
- Monotherapy is discouraged in asthma
- Side effects: hypokalemia, tremor, 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
UMECLIDINUM 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.
BIBLIOGRAPHY


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