COPD DIAGNOSIS

FLAME LECTURE: 16

PETERS 10.24.18

LEARNING OBJECTIVES

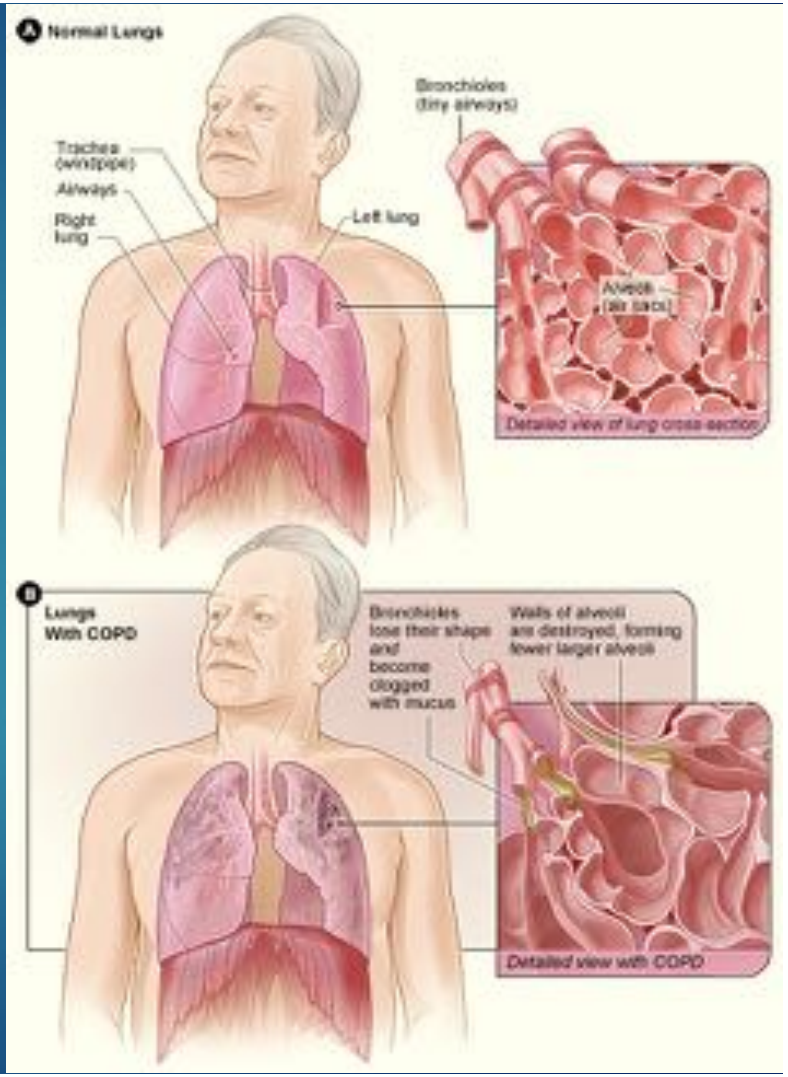
- To understand who is at risk for COPD and how to make the diagnosis
- To describe the stages of COPD
- Prerequisites:
  - None
- See also:
  - FLAME lectures regarding treatment and exacerbations of COPD

EPIDEMIOLOGY

- Affects >5% of population
- Third leading cause of death in the U.S.
- Requires frequent office visits, hospitalizations, and chronic medical treatment and therapy
- Correct diagnosis can decrease use of healthcare resources and prolong patient survival

DEFINITION

- The GOLD Definition (Global Initiative for Chronic Obstructive Lung Disease):
  - COPD is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases
  - The airflow limitation that characterizes COPD is caused by a mixture of small airway disease (eg, obstructive bronchiolitis) and parenchymal destruction (emphysema)
  - Chronic inflammation causes structural changes, small airway narrowing, and destruction of lung parenchyma. A loss of small airways may contribute to airflow limitation and mucociliary dysfunction, a characteristic feature of the disease



SUBCATEGORIES

The current definition of COPD does not distinguish between the following, instead considering them a spectrum of one disease, useful for guiding treatment:

- Chronic bronchitis
  - Productive cough for at least 3 months in 2 successive years in a patient for which no other diagnosis of chronic cough has been established
- Emphysema
  - Airspace enlargement distal to terminal bronchioles without distinct fibrosis
- Asthma
  - Reversible airflow obstruction

MAKING THE DIAGNOSIS

SUBJECTIVE

- History:
  - Tobacco abuse: the greater the number of pack years smoked, the greater the severity of disease
    - >40 pack years is best predictor of airflow obstruction on spirometry
  - Occupational or environmental exposure to fumes and dusts
- Symptoms:
  - Most common: dyspnea, chronic cough, sputum production, progressive decline in activity, wheezing, chest tightness
  - Less common: weight change, cough syncope, depression, anxiety
- Comorbid Conditions:
  - Lung cancer, bronchiectasis, cardiovascular disease, osteoporosis, metabolic syndrome

MAKING THE DIAGNOSIS
OBJECTIVE

- Physical Exam:
  - Prolonged expiration, wheezes, crackles
  - Increased anteroposterior diameter of chest, depressed diaphragm
  - End-stage disease: postural changes to improve airflow (i.e. leaning forward with weight supported on palms or elbows, use of accessory muscles, expiration through pursed lips)
- Labs:
  - CBC: Assess for anemia in evaluation of dyspnea
  - BNP: Assess for suspicion of heart failure
  - Serum bicarbonate: elevations may indicate chronic hypercapnia
  - Alpha-1 antitrypsin: Level below 11 um/L indicates deficiency
    - Especially important in patients younger than 45 years and non-smokers

MAKING THE DIAGNOSIS

SUBJECTIVE

- Pulse oximetry
- Arterial blood gas:
  - Hypoxemia worsens with disease severity and hypercapnia develops
- Imaging:
  - Chest radiography:
    - Pathognomonic findings: hyperinflation, flat diaphragm, bullae, prominent hilar vascularity
    - Also can exclude other diagnoses, assess for comorbid conditions (lung cancer, heart failure etc.), look for complications of disease (pneumonia, etc.)
  - Chest CT: not routinely necessary for diagnosis
    - Performed when symptoms indicate alternative diagnosis or worsening complications of COPD

SPIROMETRY

Diagnosis confirmed by:

- Airflow limitation
  - Forced expiratory volume in one second (FEV_1)/forced vital capacity (FVC) ratio < 0.7 or less than lower limit of normal
  - FEV_1 <80% of predicted
  - And these findings are incompletely reversible after inhaled bronchodilator
- Absence of alternative diagnosis
- Repeat spirometry revealing persistent airflow limitation

STAGING

GOLD Classification	National Institute for Health and Care Excellence Classification	Post-bronchodilator FEV_1 % of Predicted	Post-bronchodilator FEV_1/FVC Ratio
Stage 1 - Mild	Mild	≥ 80	< 0.7
Stage 2 - Moderate	Moderate	50 to 79	< 0.7
Stage 3 - Severe	Severe	30 to 49	< 0.7
Stage 4 - Very Severe	Very severe	< 30	< 0.7

STAGING – COMBINED ASSESSMENT

Risk Group	GOLD Classification	Exacerbations per year	mMRC Score	CAT Score
A (low risk, less symptoms)	1 or 2	0 or 1	0 or 1	< 10
B (low risk, more symptoms)	1 or 2	0 or 1	≥ 2	≥ 10
C (high risk, less symptoms)	3 or 4	≥ 2	0 or 1	< 10
D (high risk, more symptoms)	3 or 4	≥ 2	≥ 2	≥ 10

mMRC: modified Medical Research Council research scale
CAT: COPD Assessment Test

DIFFERENTIAL DIAGNOSIS

- Chronic obstructive asthma
- Chronic bronchitis (normal spirometry)
- Central airway obstruction
- Bronchiectasis
- Heart failure
- Tuberculosis
- Constrictive bronchiolitis
- Pulmonary artery hypertension
- Lung cancer

NEXT STEPS

- Treatment
  - Medications
    - See FLAME lectures 17-20
  - Treat underlying cause
    - Tobacco cessation
    - Asthma
    - Workplace exposure
    - Prior history of tuberculosis
    - Alpha 1 antitrypsin deficiency

REFERENCES

1. Uptodate.com - Chronic obstructive pulmonary disease: Definition, clinical manifestations, diagnosis, staging
2. Chronic Obstructive Pulmonary Disease: Diagnosis and Management. https://www.aafp.org/afp/2017/0401/p433.html