

COPD

Monday, October 27, 2014
11:59 AM

Learning Objectives:

- airflow limitation mechanisms in COPD
- pathological changes that lead to air trapping & progressive airflow limitation
- identify & define presence of airflow limitation in COPD
- signs & symptoms
- classify the following in a patient case to determine GOLD grouping:
 - exacerbation risk
 - airflow limitation
 - symptom severity

COPD - persistent airflow limitation that is usually progressive & associated with enhanced chronic inflammatory response in the air ways

In the Past

- **EMPHESYMA** - destruction of gas-exchange surfaces (destruction of alveoli) (pink puffer)
- **CHRONIC BRONCHITIS** - chronic cough + sputum >3 months for 2 consecutive years; (inflammation of bronchioles) (blue bloater)

Airflow Limitation Mechanisms

Air Movement	Damage
- small airway disease	- parenchymal destruction
- airway inflammation	- loss of alveolar attachments
- airway fibrosis	- poor elastic recoil
- airway resistance	

Risk Factors

- poor, female, >40
- lung development
- asthma, chronic bronchitis, lung infections
- genes (↓ α1-AntiTrp)
- gene-environment (genes + smoking/pollution)
- particles

α1-AntiTrp - inhibitor of serine proteases

Pathology (- due to inflammation that causes structural changes)

Causes	Results
- oxidative stress (↑ oxidants (H ₂ O ₂), ↓ antioxidants)	- airflow limitation/trapping
- protease imbalance (too much cleaving)	- abnormal gas exchange
- inflammatory cells (CD8)	- too much mucus
- inflammatory mediators (chemokines, cytokines, GF)	- ↑ pulmonary BP
	- difficulty breathing
	- systemic features (frail/sickly)

Diagnosis

- >40
- symptoms
- risk factors
- comorbidities
- family history
- spirometry (**FEV₁/FVC < 0.7**)

Symptoms

- dyspnea (SOB)	progressive, persistent, worse w/exercise
- cough	maybe intermittent & non-productive
- sputum	3+ months x 2 yrs
- wheezing	
- chest tightness	w/exercise

Severe Symptoms

- fatigue
- weight loss
- anorexia
- cough syncope
- depression
- anxiety

Assessing Symptoms

- Dyspnea (SOB):
 - COPD Assessment Test (longer)
 - mMRC (5 Q's: 0-4)

0	strenuous exercise
1	hurrying level/walking hill
2	walks slower/walking level
3	walking 100yds (few mins) on level
4	can't leave house/breathless with dressing

FEV₁/FVC = 1 sec exhale/full exhale

Airflow Limitation

GOLD Classification

GOLD 1	Mild	(FEV predicted) > 80%
GOLD 2	Moderate	50% < (FEV predicted) < 80%
GOLD 3	Severe	30% < (FEV predicted) < 50%
GOLD 4	Very Severe	(FEV predicted) < 30%

Example:

Parameter	Predicted (L)	Actual (L)	Percent Predicted (%)
FEV ₁ (L)	3.14	2.0	64
FVC (L)	4.14	3.0	72.5
FEV ₁ /FVC (%)	77.3	66.7	86

- Exacerbation History:

Low Risk	0-1
High Risk	2+

- Final Classification (A,B,C,D)

**if between 2, always go for the higher classification
b/c you don't want to mess with breathing*

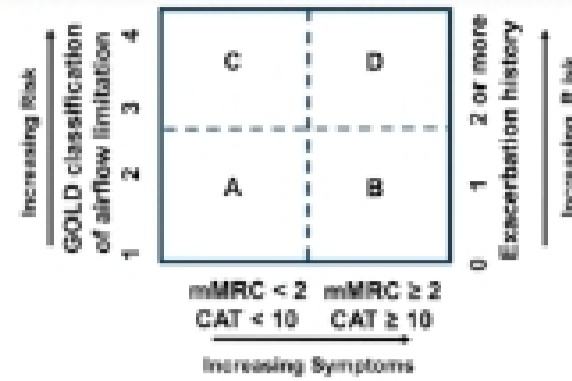
COPD EXACERBATION - acute event causing worsening of respiratory symptoms

beyond normal variations & results in a change in meds (bacteria/virus)

**most exacerbations can be treated as outpatient*

**if there is a long progression, probably not an exacerbation*

COPD Assessment in 2012



Additional Investigations

- X-Ray

- flat diaphragm
- larger retrosternal airspace
- hyperlunacy
- rapid tapering of vascular markings

RETROSTERNAL AIRSPACE

- space behind sternum gets bigger to accommodate more air b/c of airflow limitation

HYPERLUNACY - ↓ tissue density, translucence (darker than normal)

- Pulse Ox

- ↓ α1-AntiTrp screening

Differential Diagnosis

- Asthma
- CHF
- Bronchiectasis
- TB