

## Chronic Obstructive Lung Disease

Dr. Susan Chaney

NURS 5415- Women's Health Nursing III



## Objectives

- Differentiate among the following respiratory problems: COPD, asthma, bronchitis, croup, pneumonia, & lung cancer.
- Describe the management and teaching related to the problems in objective #1.
- Explain the lifespan approach and family interventions for a respiratory diagnosis.
- Recommend an appropriate treatment plan for respiratory problems.

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## COPD DIAGNOSIS

- Disease state characterized by the presence of airflow obstruction due to emphysema or chronic bronchitis.
- Airflow obstruction is generally progressive, may be accompanied by airway hyperreactivity, and may be partially reversible.

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## COPD Diagnosis

- Essentials of diagnosis
  - History of cigarette smoking
  - Chronic cough and sputum production (chronic bronchitis) and dyspnea (emphysema)
  - Rhonchi, decreased intensity of breath sounds, and prolonged expiration on PE
  - Airflow limitation on pulmonary function testing

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## COPD (COLD)

- The hallmark of COPD is expiratory airflow limitation characterized by a reduced ratio of FEV1 to FVC
- Although COPD can be divided into 2 diagnoses, most patients have a combination of both in varying proportion
- Generally, either chronic bronchitis or emphysema can be considered predominant

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## COPD

- The restriction of airflow is due to abnormalities of both lung parenchyma and airways
- Diagnosis of chronic bronchitis is clinical and made by the history
- Emphysema diagnosis is pathologic: made by high resolution CT scans or histological exams of whole lung

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## Components of COPD

- **Emphysema**  
Permanent abnormal distention of the terminal air spaces with destruction of the alveolar septa & resultant air trapping & without fibrosis
- **Chronic Bronchitis**  
Excessive tracheobronchial mucous production sufficient to cause cough with expectoration for at least 3 months of the year for more than 2 consecutive years in absence of any other disease that may account for symptoms

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## Epidemiology

- 20% of adult males have chronic bronchitis. Majority not clinically disabled; 14 million US
- Increased smoking by females associated with increased incidence of chronic bronchitis in females
- Smoking most important etiologic agent; occupational & environmental exposures
- In 5th decade 2/3 males and 1/3 females will have asymptomatic emphysema

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## Epidemiology (continued)

- COPD and asthma now represent the 4<sup>th</sup> leading cause of death in the US; over 100,000 deaths reported annually
- Death rate is increasing rapidly, especially among elderly men

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## COPD:

### Salient features of the two types, Part 1


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## COPD:

### Salient features of the two types, part 2


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## COPD Risk Factors, 1

- **Cigarette smoking-**
  - 10-15% will develop COPD; > age 40
  - Impairs ciliary movement
  - Inhibition of alveolar macrophages
  - Hypertrophy & hyperplasia of mucous secreting glands
- **Air Pollution**
  - Higher incidence & mortality in industrialized urban areas
  - Exacerbation of CB with heavy pollution

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## COPD Risk Factors, 2

- Occupation
  - Exposure to inorganic or organic dust, and noxious fumes
- Infections
  - Etiology/progression of COPD
  - Rhinovirus often found with exacerbation.
  - Pathogenic bacteria, mycoplasmas, other virus
- Family and Genetics
  - Alpha 1 protease inhibitor deficiency or absence in younger emphysema (~35 y/o)

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## Clinical Findings

- Emphysema
  - Pink puffer; dyspnea
  - Thin, muscle wasting
  - Use of accessory respiratory muscles
  - Reduced diaphragmatic excursion & breath sounds
  - AP chest > transverse (barrel chest)
- Chronic Bronchitis
  - Chronic cough & sputum; mild dyspnea
  - Blue bloater
  - Overweight
  - Cyanosis
  - Lung wheezes; rhonchi
  - AP chest diam. < transverse

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## Differential Diagnosis

- Asthma in younger persons, especially smokers
- Congestive heart failure
- Acute bronchitis
- Other obstructive disorders: bronchiectasis, cystic fibrosis (rarely in adults)
- Lung cancer

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## Initial Diagnostic Tests

- CXR-PA and Lateral
  - Hyperinflation with emphysema
  - Cardiac enlargement in bronchitis
- CBC with differential; sputum culture
- ABG's not common in ambulatory setting
- Alpha 1-antitrypsin serum levels in younger patient (~35 y/o)
- ECG may show sinus tachycardia

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## Initial Diagnostic Tests

- FEV1, FVC, FEV1/FVC ratio-PFTs are critical
- Emphysema: elastic recoil properties impaired
  - Decreased FEV1; very low diffusion capacity
  - Markedly elevated residual volumes
  - Markedly increased total lung capacity
- Bronchitis: elastic recoil properties normal
  - Decreased FEV1; near normal TLC
  - Normal FVC; fairly normal compliance
  - Decreased FEV1/FVC ratio

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## COPD Stages

- Early screening: when FEV1/FVC ratio is one second lower than normally expected, airflow obstruction is present
- Diagnosis COPD: FEV1/FVC ratio is equal to or < 70%
- Stage I (moderate) FEV1 > or = to 50%
- Stage II (severe) FEV1 35-49%
- Stage III (very severe) FEV1 < or = 34%

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## Principles of Management

- Understand extent of obstruction
- Understand extent of disability
- Understand reversible factors
- Prevent progression and avoid acute insults

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## Treatment Measures-1

- Modification of smoking and environment
  - Cessation to stop progression
  - Eliminate environmental irritants
- Respiratory infections
  - H. influenza, S.pneumonia , M. catarrhalis
  - 7-10 days broad spectrum antibiotics
- Immunization
  - One time pneumococcal and yearly flu

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## Treatment Measures-2

- Exercise and nutrition
  - Increase well being and exercise tolerance
  - 85% IBW-less fatigue, SOB, muscle strength
  - No improvement on PFT's
- Hypoxemia
  - Pa O<sub>2</sub> 55-60 mm hg with Cor Pulmonale continuous low flow O<sub>2</sub>
  - Pa O<sub>2</sub> <55 mm hg continuous low flow O<sub>2</sub> vs intermittent nocturnal use

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## Treatment Measures-3

- Erythrocytosis
  - Hct >50%, periodic phlebotomy and continuous low flow O<sub>2</sub>
- Upper-extremity exercise
- Psychological support
- Other measures
  - Volume reduction surgery
  - Periodic negative pressure ventilation
  - Lung transplantation

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## Treatment Measures-Rx

- Bronchodilators
  - Atrovent 2 puffs q 6 hrs. routinely
  - Albuterol MDI w spacer 1-2 puffs q 4-6 hrs
  - Alupent MDI w spacer 2-3 puffs q 3-4 hrs
  - Theophylline varied clearance, side effects interactions
- Corticoidsteroids
  - If bronchodilator ineffective- Prednisone 30-40 mg p.o. 14 day "burst"
  - If improved, taper to minimum effect dose

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## Bronchial Secretions

- Increasing fluid, use of mucolytic and expectorants have not shown to be of great benefit to the patient with COPD
- For chronic bronchitis, adequate systemic hydration, cough training methods, postural drainage

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## Breathing Exercises

- Purse-lip breathing and diaphragmatic exercises are skills that can benefit the patient with COPD
- Patient education/pulmonary rehabilitation programs
  - Encourage exercise
  - Nutritional therapy

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## Complications

- Otherwise stable COPD patient
  - Acute bronchitis
  - Pneumonia
  - Pulmonary embolization
  - Left ventricular failure
- Advanced COPD patient
  - Pulmonary hypertension, cor pulmonale
  - Chronic respiratory failure

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## Prognostic Indicators

- After an initial episode of respiratory failure, the patient with predominant emphysema has a poorer prognosis as compared to the patient with predominantly bronchitis features of COPD
- Median survival time of patients with severe COPD is about 4 years
- Degree of pulmonary dysfunction (FEV1) at time of initial diagnosis is indicator of survival

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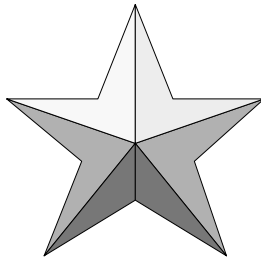
## Antihypertensive Medications

- Calcium channel blockers have mild Bronchodilating effect and should be used first line for the patient with HTN and COPD
- Beta Blockers, including ophthalmic agents, cause bronchoconstriction and should be avoided
- ACE Inhibitors can produce a persistent cough

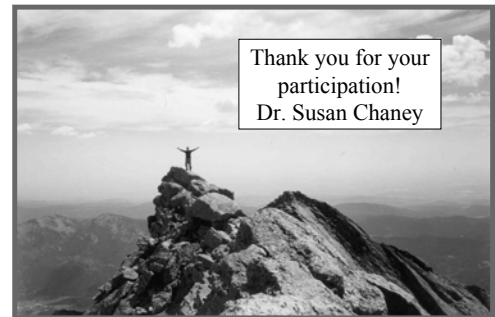
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## Follow Up

- Acute: contact patient by phone 24-48 hours
- Theophylline: levels at 2 weeks and regular intervals
- FU visits q 3-6 months
- Teach S & S of infection and distress



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