Chronic Obstructive Pulmonary Diseases

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COPD: Scope of the Problem

• 30 million Americans
• $15 billions dollars/year
• 4th leading cause of death in US
• 2.74 million deaths worldwide

Missed Diagnosis

• 70% patient with lung disease are cared for by primary care physicians
• 40% of these patients are not accurately diagnosed or treated

Lets take a look at airway obstruction

Mechanism for actual airway obstruction

Chronic obstruction of the airway results from four mechanisms:

• COPD
• Chronic bronchitis
• Emphysema
• Cystic fibrosis
• Bronchiectasis
• Persistent severe asthma--if it is not reversible
“COPD”
Is not emphysema or chronic bronchitis

“COPD”
Partially reversible small airway narrowing from inflammation and fibrosis

Characteristics of COPD
- Decrease in expiratory flow
- Secretions (except in emphysema)
- Increase in WOB
- Dyspnea & chest tightness
- Easily fatigued
- Decrease in ventilatory reserve

Lets be careful when using the term....

COPD!
65

Let's discuss the pathophysiology of chronic bronchitis & emphysema

**Chronic Bronchitis**
- Chronic inflammation of the airway
- Excessive secretions
- Smooth muscle constriction
- Airway obstruction
- Increased size of mucus glands
- Hyperinflated alveoli distal to airway obstruction

**Causes of chronic bronchitis**
- Cigarette smoking
- Pollution/fumes
- Infection
Signs and Symptoms of Chronic Bronchitis

- Increased respiratory rate
- Decreased expiratory flow rates such as
  - FEV<sub>1.0</sub>
  - PEFR

Signs and Symptoms Con’t

- Increased sputum
- Frequent infections
- Cyanosis
- Increased wt (?)
- Sluggish-sleepy

Signs and Symptoms Continued

- Air trapping
- Tachycardia
- Use of respiratory accessory muscles

Signs and Symptoms Con’t

- Polycythemia
- Right heart enlargement
- Low PaO2
- High PaCO2
- Cyanosis

Signs and Symptoms Continued

- Inspiratory/expiratory crackles
- Diminished Breath &heart sounds
- “COPD” CXR

Typical Chronic Bronchitic Patient
Emphysema

- Structural changes that occur in the lung resulting in airway obstruction and other pulmonary dysfunction

What is in a cigarette?
- Tobacco and additives
  - 4000 compounds
  - 110 carcinogens
- Tar
- Nicotine

Elastase

Smoking
- Why do people smoke?
- When do they begin to smoke?
  - Race
  - Gender
- How do you stop?
One disease that smoking will lead to is…..

**Emphysema**
- Weakening and enlargement of air spaces distal to terminal bronchioles
- Destroyed alveolar walls
- Loss of pulmonary capillaries
- Airway collapse on expiration
- Hyperinflation
- Flattened diaphragms

**Etiology of Emphysema**
- Cigarette smoking
- Genetic predisposition
- Infection
- Inhaled irritants/fumes
Signs and Symptoms of Emphysema

- Increased respiratory rate
- Decreased expiratory flows (similar to c. bronchitis)
- Air trapping
- Barrel chest

Signs and Symptoms Con’t

- Use of accessory muscles
- Low blood oxygen
- High blood carbon dioxide levels
- Increased deadspace

Signs and Symptoms Con’t

- Increased shunting
- Enlarged right heart
- Elongated heart
- Increased PVR
- “COPD” CXR

Why do patients with emphysema and COPD have a barrel chest?
Let's discuss Four Components of “COPD” Management

Four Components
- Assess and monitor disease
- Reduce risk factors
- Manage stable “COPD” patients
- Manage exacerbations

Assess & Monitor
- Medical history
- Chronic cough
- Sputum production
- Dyspnea
- Differential diagnosis

Reduce Risk Factors
- Reduce exposure to irritant
- Smoking cessation
Management of Stable COPD

www.goldcopd.com

Key Points
• Stepwise increase in tx
• Health education
• Current medications do not alter decline in lung function but do improve symptoms
• Beta agonists/anticholinergic drugs are frontline

Key Points
• Steroids are of limited use
• Pulmonary rehabilitation improves ADL
• Long-term oxygen (>15 hrs/day) does improve survival

Options for delivery of bronchodilator therapy

Bronchodilator Therapy
• Beta Agonists
  • Albuterol (Salbutamol)
    • 100-200 micrograms/puff
    • 2.5-5.0 mg nebulizer
    • Taken HHN, DPI, or MDI PRN

Bronchodilator Therapy
• Beta Agonists
  • Terbutaline
  • Alupent
Bronchodilator Therapy

- Combination of beta agonist (Albuterol) and anticholinergic (Atrovent) is effective
- Combivent MDI

Bronchodilator Therapy

- New beta agonist
  - Tiotropium bromide (Spiriva) 72 hrs+

Bronchodilator Therapy

- Methylxanthines
  - Slow released preparations improves symptoms
  - Combine with Atrovent helps

Issues

- Patient response
- Cost
- Inhaler technique
- Support
MDIs
- Must inspire slowly
- Should use spacer
  - or
  - Open mouth technique

Hand-held nebulizer
- Effective
- Cleaning issues
- Time consuming
- As effective as properly used MDI
Dry Powder Inhaler

FAST or SLOW inspiration—depending on unit

Steroids

- Prolonged use does not improve mortality
- Use inhaled steroids for pts with a response or FEV$_{1.0}$ < 50%
- Long-term oral steroids not recommended

Steroids

- Beclovent
- Azmacort
- Aerobid
- Flovent
- Pulmocort
- Predinsone (PO) solumedrol (IV)
Combination
Advair
Dulera
Symbicort

Other Therapy
• Vaccines
  • Pneumococcal
  • Flu
• Alpha-1 Antitrypsis Augmentation Therapy

Other Therapy
• Antibiotics
  • Use is not recommended unless there is an infectious exacerbation
  • Acute symptoms
  • Viral vs bacterial?
Oxygen Therapy

- PaO2 < 55 torr on room air
- Pulmonary hypertension
- Cor pulmonale
- Polycythemia

Options for Oxygen Delivery

- Oxygen concentrator
- Liquid reservoirs
  - Home and portable
  - Tanks
  - Special cannulas etc

When to call for help!
Normal range 94-98%
Ok range 90-98%
Not ok range < 88-90%

Rehabilitation
• Improved functional capacity
• Decreased hospital visits
• Improved quality of life
• Reduced symptoms
• No change in pulmonary function

Room Steam
Humidifiers

Break Time....