Common Pulmonary Problems

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Family Medicine Board Review Course, 2015

Obstructive Sleep Apnea

Asthma COPD

ILD Cancer, Nodules
Obstructive Sleep Apnea

- Repeated episodes of apnea during sleep
- Defined s >5 episodes per hour
- Present in 2-4% of population

Mr. Nap

56 year old obese man complaining of daytime somnolence.
Difficulty concentrating at work, falls asleep during meetings.
Wife notes loud snoring at night and episodes of interrupted breathing.

Sequelae

Neurocognitive
- Excessive daytime sleepiness
- Decreased cognitive performance
- Increased automobile accidents
- Decreased quality of life
- Mood disturbance

Sequelae

Cardiac and metabolic
- Pulmonary hypertension
- Coronary artery disease
- Cerebrovascular disease
- Arrhythmias
- Systemic hypertension
- Insulin resistance

Physical Exam

- Obesity
- Crowded pharynx (Friedman Tongue Position)
- Systemic hypertension
- Nasal obstruction
- Neck circumference > 17”
- Lower extremity edema

Diagnostic Testing

- Polysomnography: “Sleep Study”
  - Apnea-hypopnea index
    - Number of apneic or hypopneic events/hour
    - Titrate CPAP pressure and delivery mechanism

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>Normal</td>
</tr>
<tr>
<td>5-15</td>
<td>Mild</td>
</tr>
<tr>
<td>15-30</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;30</td>
<td>Severe</td>
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Diagnostic Testing

- Split night polysomnography
  - Most common test
  - Diagnostic study for 2-3hr, then titrate and monitor effects of CPAP (therapeutic)
Treatment

Behavior Modification:
• Weight loss
  — Also ameliorates cardiovascular risk
• Positioning
• Tobacco cessation
• Avoid sedative hypnotics

Continuous Positive Airway Pressure

• Most effective treatment
  — Reduces apneic events
  — Reduces sleepiness
  — Reduces systolic BP
• Should be offered to anyone with AHI>15 or AHI>5 and sequelae or cardiovascular risk
• Efficacy directly correlates with hours/night used

Oral Appliances

• Reduce night-time awakenings, hypoxia
• Improve neurocognitive function, reduce sleepiness, improve QOL
• No evidence of impact on mortality
• Less effective than CPAP

• Can be offered to patients with mild-moderate OSA who do not want or tolerate CPAP

Surgery

• Effective if an obstructing lesion is present
  — Tonsilar hypertrophy
• Uvulopalatopharyngoplasty (UPPP) for other patients
  — Scant evidence of efficacy
  — Cure achieved in a minority of patients
Upper Airway Stimulation Therapy

- Approved by FDA in 2014
- Reduces apneic events by 68%
- Improves quality of life measures
- Senses inspiration and provides mild stimulation to upper airway muscles to maintain airway patency
- Only data so far is in non-randomized cohort trial, so remains second or third line therapy

Strollo P et al, Upper-Airway Stimulation for Obstructive Sleep Apnea NEJM Jan 2009

Mr. Nap

- Polysomnography showed an AHI of 21.
- During the test, CPAP was administered and improved the AHI to normal at a pressure of 5 mm Hg
- You prescribe CPAP and on follow up, the patient’s daytime sleepiness has resolved

Ms. Wheeze

34 year old woman complains of episodic shortness of breath and wheezing, particularly severe when she visits her neighbor, who has a dog.
Has episodes of dyspnea 3-4 times a week, and wakes at night coughing twice a week.
She was hospitalized on multiple occasions for respiratory issues as a child.
No smoking history.
Asthma

Caused by bronchial inflammation
Increased secretions
Bronchial constriction

Recent guidelines emphasize
• Assess asthma severity
• Assess and monitor asthma control
• Use inhaled corticosteroids early
• Use written asthma action plans
• Control environmental exposures

Assessing Asthma Severity

<table>
<thead>
<tr>
<th></th>
<th>Mild Intermittent</th>
<th>Mild Persistent</th>
<th>Moderate Persistent</th>
<th>Severe Persistent</th>
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</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>≤ 2 per week</td>
<td>&gt; 2 per week</td>
<td>daily symptoms</td>
<td>continual symptoms</td>
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<tr>
<td><strong>Nighttime symptoms</strong></td>
<td>≤ 2 per month</td>
<td>&gt; 2 per month</td>
<td>&gt; 1 per week</td>
<td>frequent</td>
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<tr>
<td><strong>Lung function</strong></td>
<td>≤ 80% predicted</td>
<td>≤ 80% predicted</td>
<td>&gt; 60% - ≤ 80%</td>
<td>≤ 60%</td>
</tr>
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</table>

*Albuterol PRN*  
Low dose inhaled steroid  
↑ steroid or Add LABA  
LABA + mod dose steroid

Assess Control
Ms. Wheeze

- You diagnose mild persistent asthma and prescribe
  - Albuterol PRN
  - Low dose inhaled steroid
  - Avoidance of dogs and other triggers

- On follow up, the patient reports dyspneic episodes once or twice a month, no nighttime awakening

Mr. Hack

72 year old man complaining of 2 years of progressively worsening dyspnea and cough productive of white sputum.

50 pack year smoking history.

On exam, diffuse expiratory wheeze is heard.
Chronic Obstructive Pulmonary Disease

Risk Factors

- Smoked tobacco
- Particulate air pollutants
- Indoor wood burning stoves or open fires
- Occupational chemicals
- α1–antitrypsin deficiency (<1%)

Diagnosis and Severity

<table>
<thead>
<tr>
<th></th>
<th>FEV1/FVC</th>
<th>FEV1</th>
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<tbody>
<tr>
<td>Mild</td>
<td>&lt;70%</td>
<td>≥ 80%</td>
</tr>
<tr>
<td>Moderate</td>
<td>&lt;70%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>≤FEV1&lt;80%</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>&lt;70%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>≤FEV1&lt;50%</td>
<td></td>
</tr>
<tr>
<td>Very Severe</td>
<td>&lt;70%</td>
<td>&lt;30%</td>
</tr>
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With emphysema, will see a greater ↓ in DLCO

- Vaccine: flu, pneumonia
- Smoking cessation
- PRN short acting bronchodilator
- Long acting bronchodilator: anticholinergic or beta agonist
- Inhaled steroid
- Consider surgery
Mr. Hack

- PFTs: FEV1/FVC = 64%, FEV1 = 53%.
- Diagnosis: Moderate COPD

You discuss smoking cessation with the patient, who enrolls in a smoking cessation group. You initiate albuterol PRN and tiotropium daily. You provide a pneumococcal and flu vaccine. On his return visit, the patient notes much improved dyspnea and the ability to walk to the grocery store without difficulty.

Ms. Pant

58 year old woman presents with 3 years of slowly progressive dyspnea on exertion and 1 year of nonproductive cough. She tires easily, and is able to walk only 1.5 blocks before resting. Exam reveals dry rales throughout bilateral lung fields and clubbing of the digits.

Interstitial Lung Disease

- Progressive dyspnea on exertion
- Non-productive cough
- Fatigue, malaise
- History of occupational exposure
- Time course is variable, depending on diagnosis
Exam
• Dry crackle or “velcro rales”
• May be best heard in the posterior axillary line or bases
• Signs of cor pulmonale may be present in advanced cases
  – Accentuated S2
  – Right sided heave
• Clubbing may be present

Categories of interstitial lung disease
• Environmental/Occupational exposure
• Autoimmune disorders
  – polymyositis/dermatomyositis
  – rheumatoid arthritis,
  – systemic lupus erythematosus
  – scleroderma
  – mixed connective tissue disease
• Drug induced, particularly antineoplastic
• Idiopathic

Diagnostic testing
• Plain chest radiograph variable, but in most cases
  – reduced lung volumes
  – bilateral reticular or reticulonodular opacities

Reticulonodular opacities
Diagnostic Testing

- **Spirometry: Restrictive Pattern**
  - Reduced TLC and FVC
  - Normal FEV1/FVC
- **HRCT sensitive and specific**
  - can be diagnostic or guide biopsy
- **Biopsy diagnostic**
  - not always recommended for mild, non-progressive disease

Treatment

- Avoid exposures
- Tobacco cessation
- Corticosteroids for some
- Immunosuppressive and cytotoxic therapy for some
- O₂ and Bronchodilators

Ms. Pant

Spironometry shows FVC of 46% predicted and FEV1/FVC of 86%, which is normal.

You obtained a HRCT, which shows reticular abnormalities with traction bronchiectasis and honeycombing in a peripheral and basilar predominance consistent with Usual Interstitial Pneumonia, a type of idiopathic ILD.

Mr. Spot

49 yo man requires chest x-ray for a physical exam for work. No cough, dyspnea, or chest pain.

Chest radiograph shows 1 cm nodule in right upper lobe with central calcification

ppd negative

No prior films for comparison
Solitary pulmonary nodules

Solitary mass <3cm surrounded by normal lung tissue

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Size</th>
<th>Appearance</th>
<th>Interval change</th>
<th>Smoking</th>
<th>Other</th>
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<tbody>
<tr>
<td>Low Risk</td>
<td>&lt;30 yo</td>
<td>&lt;2.5cm</td>
<td>popcorn appearance</td>
<td>No growth over 2 years</td>
<td>No smoking history</td>
<td>Upper lobe location</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Diffuse, laminar or central calcification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Risk</td>
<td>&gt;30 yo</td>
<td>&gt;2.5cm</td>
<td>Spiculated</td>
<td>Growth on serial imaging</td>
<td>Smoking history</td>
<td>Prior history of cancer</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>No calcium</td>
<td></td>
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Management

- There are many algorithms and little agreement
- If low risk, serial x-ray or CT scans to assess for change.
  - If unchanged for 2 years, likely benign
- If moderate risk, immediate CT scan and then either
  - Serial CT
  - PET scan
- If high risk, biopsy

Mr. Spot Continued

- Has a history of smoking and, because he is 49 years old, has 2 high risk features. Moderate risk.
- You order a CT scan, but the patient does not follow up and is lost to care.

- Two years later, he returns complaining of fatigue, weight loss and occasional hemoptysis

Lung Cancer
Risk Factors

- Tobacco
- 2nd hand smoke
  - Dose response
- Radon
- Asbestos
- COPD, pulmonary fibrosis, TB
- Family history

Screening

- Recent RCT showed mortality benefit of
  - Low dose CT
  - Annually
  - In high risk cohort
    - 30 pack year history
    - If quit, <15 years ago
    - Age 55-74

Diagnosis

- Biopsy
- Four types:
  - Small-cell carcinoma
  - Adenocarcinoma
  - Squamous cell carcinoma
  - Large-cell carcinoma

Non-small cell lung cancer (NSCLC)

Small Cell Lung Cancer

- SCLC is considered systemic from the outset
- TNM staging not used
- Surgery not an option

Abbreviations:
- RCT: Randomized Controlled Trial
- CT: Computed Tomography
- COPD: Chronic Obstructive Pulmonary Disease
- TB: Tuberculosis
Limited SCLC

- Confined to one half of the chest and ipsilateral supraclavicular nodes
- Treatment: Combination Radiation and Chemotherapy
  - 80-90% Response
  - 50-60% Remission
  - 30-40% 2-yr Survival
  - 10-15% 5-yr Survival
  - Median Survival 15-18 months

Extensive SCLC

- Disease spreading beyond one hemithorax
- Treatment: Chemotherapy only
  - 60-80% Response
  - 20-30% Remission
  - <10% 2-yr Survival
  - Rare 5-yr Survival
  - Median survival 9-10 months

Non small cell lung cancers

- Adenocarcinoma
- Squamous cell carcinoma
- Large cell carcinoma

- Treatment similar for all three

Non small cell lung cancers

Determine TNM stage
- Chest and liver CT and, if resectable, PET scan to look for metastases
- Brain MRI
- Bone scan

- If no metastases, and resectable, surgical cure may be possible
Mr. Spot

- A CT shows that the nodule has grown to 3cm.
- Percutaneous biopsy shows NSCLC, and TNM staging shows that the tumor is stage 2.
- The patient has the tumor resected and begins chemotherapy.