Evaluation of the patient with lung disease

History
Physical examination
Physiologic evaluation
Anatomic evaluation
Pathologic evaluation

History taking in patients with lung disease

Onset, duration, triggers, and severity of symptoms
dyspnea (rest, exercise)
cough (dry, productive)
chest pain (pleuritic, constant)
fever
Occupational/environmental exposures
Smoking history
Family history
Underlying illnesses (e.g. collagen vascular disease)

Environmental/occupational causes of lung disease: models

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>isocyanates</td>
<td>occupational asthma</td>
</tr>
<tr>
<td>asbestos</td>
<td>pulmonary fibrosis</td>
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<tr>
<td>chlorine gas</td>
<td>ARDS</td>
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<tr>
<td>high altitude</td>
<td>pulmonary edema</td>
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<tr>
<td>rapeseed oil</td>
<td>pulmonary hypertension</td>
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<tr>
<td>uranium</td>
<td>bronchogenic carcinoma</td>
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<tr>
<td>pigeons</td>
<td>hypersensitivity pneumonitis</td>
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<tr>
<td>homeless shelter</td>
<td>tuberculosis</td>
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<tr>
<td>dust</td>
<td>RADS/COPD</td>
</tr>
<tr>
<td>cigarette smoke</td>
<td>COPD, lung cancer</td>
</tr>
</tbody>
</table>

- Short intense exposure to inorganic dust, products of combustion, other material among those present at site of World Trade Center after attack on September 11, 2001
- Respiratory complaints common in firefighters who had been at World Trade Center site
Clinical course of WTC cough syndrome

Lung function after exposure to WTC dust

Lung disease associated with biomass fuel exposure

Condition | Setting | Assessment tool
---|---|---
Childhood asthma | Rural Guatemala | Symptom questionnaire (SAAC)
Emphysema | Turkey (eastern Anatolia) | Symptom questionnaire
ILD | Turkey | PFT, HRCT
Abnormal lung function in childhood | Ecuador | PFT
Respiratory symptoms | Rural Mexico | Questionnaire, PFT
ARI in children | Zimbabwe | Questionnaire

Physical examination in patients with lung disease

Physical examination
- respiratory rate and pattern
- shape of thoracic cage
- quality of breath sounds and percussion note (normal, dull/absent, hyperresonant)
- normal breath sounds
- wheezes
- crackle
- clubbing
- cyanosis
- peripheral edema
### Tools for the diagnosis of lung disease

<table>
<thead>
<tr>
<th>Physiologic</th>
<th>Anatomic</th>
<th>Pathologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABG</td>
<td>Chest radiograph</td>
<td>Transbronchial lung biopsy</td>
</tr>
<tr>
<td>PFTs</td>
<td>CT scan</td>
<td>Thoracentesis</td>
</tr>
<tr>
<td>V/Q scan</td>
<td>Bronchoscopy</td>
<td>Pleural biopsy</td>
</tr>
<tr>
<td>Exercise testing</td>
<td></td>
<td>Open lung biopsy</td>
</tr>
</tbody>
</table>

#### Spirogram

Flow rate (liters/sec⁻¹)

#### FEV₁ and age in healthy females
Growth and decline of lung function in healthy females. Actual values are shown in the top panel and growth velocity in the bottom panel. (Redrawn from Sherrill, DL, Camilli, A, Lebowitz, MD, Am Rev Respir Dis 1990; 141:630.)

#### FEV₁ and age in healthy males
Growth and decline of lung function in the bottom panel. (Data from Sherrill, DL, Camilli, A, Lebowitz, MD, Am Rev Respir Dis 1990; 141:630.)

#### Effect of smoking on decline of lung function
Scanlon et al. Am J Respir Crit Care Med 2000; 161:381-380
**Flow-volume patterns of lung disease**

- Restrictive lung disease
- Normal
- Obstructive Lung disease

**Spirometry in obstructive lung disease**

- normal
- mild obstruction
- severe obstruction

**Spirometry in restrictive lung disease**

- normal
- Severe restriction

**Approach to the patient with dyspnea**

An efficient stepwise method of determining the cause of chronic dyspnea using pulmonary function tests.

- VNL: within normal limits; VC = vital capacity; TLC = total lung capacity; DLO = diffusing capacity.
Anatomic, physiologic, and pathologic classification of lung disease

<table>
<thead>
<tr>
<th>Disease</th>
<th>Anatomy</th>
<th>Physiology</th>
<th>Pathology</th>
</tr>
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<tbody>
<tr>
<td>Emphysema</td>
<td>Hyperinflation</td>
<td>Obstruction</td>
<td>Loss of alveolar tissue</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>Enlarged LN, parenchymal</td>
<td>Restriction</td>
<td>Granulomatous inflammation</td>
</tr>
<tr>
<td></td>
<td>infiltrates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>Normal</td>
<td>Obstruction</td>
<td>Airways inflammation</td>
</tr>
<tr>
<td>Usual interstitial</td>
<td>Parenchymal infiltrates</td>
<td>Restriction</td>
<td>Interstitial infiltration, fibrosis</td>
</tr>
</tbody>
</table>