Physical Examination of the Respiratory System

Sources: UST-FMS Med1 Lecture (January 5&7, 2015)
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Just remember IPPA:
- Inspection
- Palpation
- Percussion
- Auscultation

1. First thing we do: Check for signs of respiratory distress!

   Check for signs of respiratory distress:
   - Irritable/Anxious
   - Tachypnea
   - Upright position
   - Tripod Position
   - Speaks in phrases
   - Alar Flaring
   - Prominence of SCM/ accessory muscles
   - Abdominal paradox
   - Cyanosis
   - Altered sensorium

2. Once respiratory distress is ruled out, proceed with the PE

   Preparation:
   1. Wash hands
   2. Greet the patient
   3. Explain the procedure
   4. Ask patient to remove shirt and provide drape if needed

3. INSPECTION: Chest Expansion, Trachea

   a. If the patient is seated, have arms folded across his/her chest
   b. If patient is unable to sit up, roll the patient from side to side

Respiratory system
- Normal rate: 14-20
- Normal IE ratio: 1:2, 1:3
- Normal pattern: chest synchronous with abdomen

Landmarks of the chest
- Anterior: sternal angle of Louis
- Posterior: inferior border of the scapula
- Also check for kyphosis, scoliosis

4. PALPATION: Tactile fremitus

   Tactile Fremitus
   1. Have patient cross arms on his chest
   2. Put the ulnar surface of your hand on the upper posterior chest, medial to the scapula
   3. Have patient say “99” or “tres-tres”
4. Then, move down (lower posterior chest), repeat “99”
5. Once below the 7th ICS, put ulnar surface of hand horizontally on the scapular lines and posterior axillary lines, repeat “99”

**Notes on palpation:** Have a systematic way of doing your palpation. Always compare one side to the other. Check diagram below.

**5. PERCUSSION: Resonance/ Percussion notes**

<table>
<thead>
<tr>
<th>Flat:</th>
<th>Muscle/Bone</th>
</tr>
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<tbody>
<tr>
<td>Dull:</td>
<td>Solid organs</td>
</tr>
<tr>
<td>Tympany:</td>
<td>Air filled intestines</td>
</tr>
<tr>
<td>Resonance:</td>
<td>Air-filled lungs</td>
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<tr>
<td>HyperR:</td>
<td>Hyperinflated lungs</td>
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</table>

**Chest Percussion (Posterior Chest)**

1. Keep arms crossed!
2. Put your pleximeter (distal 3rd of one finger) along ICS, paravertebral line
3. Strike your plexor on the pleximeter, listen for the sound
4. Compare both sides
5. Percuss other lung fields (follow systematic pattern used in palpation)

**Chest Percussion (Anterior Chest)**

1. Same with above, but percuss until you hear a dull note.
2. Percussion notes going down:
   a. Resonance → lung fields
   b. Dull → liver
   c. Tympanic → intestines

**Diaphragmatic excursion**

1. When the patient is having a normal quiet breathing, percuss along scapular line and locate area of dullness (at the level of diaphragm, mostly T10)
2. Then, make the patient inhale deeply. Percuss for area of dullness once again.
3. Normally, the area of dullness would shift downward, one ICS, because the diaphragm is pushed downwards when the patient inhales to the fullest.
4. This test (diaphragmatic excursion) is usually done on the right side of the patient

**6. AUSCULTATION: Vocal Fremitus**

Normal Breath sounds ***see table below***

- **Tracheal:** trachea (Darth Vader sounds)
- **Bronchial:** manubrium sterni
- **Bronchovesicular:** 2nd ICS parasternal; interscapular
- **Vesicular:** rest of lung fields

**Breath sounds**

1. Arms crossed!
2. Take slow deep breaths through the mouth
3. Auscultate (follow systematic pattern used in palpation and percussion)
4. Listen to 2-3 respiratory cycles before moving to the next area
5. State adventitious sounds

**Principles of Sound Transmission**

1. Vibrations & sounds are transmitted to the chest wall through **OPEN AIRWAYS**
   - If airway is obstructed, there will be no transmission of sounds
2. Anything which **increases the distance** between the airway/lungs and the chest wall will **DECREASE transmission of sounds**
3. Vibrations and sounds are **transmitted best** through **SOLID> liquid> air** FOR AS LONG AS THE AIRWAYS ARE OPEN

**Physical Manifestations associated with Pulmonary Diseases**

- Clubbing
- Horner’s syndrome – ptosis, miosis, anhydrosis
- Superior vena cava syndrome – prominence of veins in the anterior chest, dilated JV, facial edema (lung malignancy obstructing the SVC)

- Obesity – restrictive lung disease, increased risk for obstructive sleep apnea syndrome and DVT (unilateral leg edema → thrombus dislodge → pulmonary embolism)

**Vocal fremitus**

1. Say “99” or “tres-tres” instead of taking deep breaths
2. The right side is usually louder because of the position of the bronchi

**PULMONARY DISEASES**

<table>
<thead>
<tr>
<th></th>
<th>Pal</th>
<th>Per</th>
<th>Aus</th>
<th>Mid</th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Principle 3, solid with open airways, thus inc. transmission</td>
</tr>
</tbody>
</table>
| (Consolidation) | (-) lag | ↑ | Dull | ↑ | Mid | Principle 2, pushing away of lungs from the chest wall due to fluid, thus dec. transmission
- (+) lag → lungs cannot expand
- Contra → pushed to other side because of fluid |
| Effusion       | (+) lag | ↓ | Dull | ↓ | Contra | Principle 2, air filled, same findings with effusion except it’s HyperR because of air |
| Pneumothorax   | (+) lag | ↓ | HyperR | ↓ | Contra | Principle 2, increased distance due to hyperinflation of alveoli |
| Emphysema      | (-) lag | ↓ | HyperR | ↓ | Mid | Principle 1, collapsed bronchus, thus no OPEN airway
- Ipsi → pulled to side of defect |
| Atelectasis    | (+) lag | ↓ | Dull | ↓ | Ipsi | Principle 1, collapsed bronchus, thus no OPEN airway
- Ipsi → pulled to side of defect |