Lung & Thorax Exams

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Lung Exam

• Includes Vital Signs & Cardiac Exam

• 4 Elements (cardiac & abdominal too)
  • Observation
  • Palpation
  • Percussion
  • Auscultation
Pulmonary Review of Systems

- All organ **systems** have an ROS
- Questions to uncover problems in area
- Need to know right questions & what the responses might mean!
- An example: [http://meded.ucsd.edu/clinicalmed/ros.htm](http://meded.ucsd.edu/clinicalmed/ros.htm)
Exposure Is Key – You Can’t Examine What You Can’t See!
Anatomy Of The Spine

Cervical: 7 Vertebrae
Thoracic: 12 Vertebrae
Lumbar: 5 Vertebrae
Sacrum: 5 Fused Vertebrae
Note gentle curve ea segment

Anatomic Images courtesy Orthospine.com

Spine Exam As Relates to the Thorax

• W/patient standing, observe:
  • shape of spine.
  • Stand behind patient, bend @ waist
  • w/Scoliosis (curvature) one shoulder appears “higher”
Pathologic Changes In Shape Of Spine – Can Affect Lung Function

Scoliosis (curved to one side)

Thoracic Kyphosis (bent forward)
Observation

• ? Ambulates w/out breathing difficulty?
• Readily audible noises (e.g. wheezing)?
• Appearance → ? sitting up, leaning forward, inability to speak, pursed lips → significant compromise
• ? Use of accessory muscles of neck (sternocleidomastoids, scalenes), inter-costals → significant compromise

Accessory Muscles
American Massage Therapy Association
http://www.amtamassage.org/
Make Note of Chest Shape: Changes Can Give Insight into Underlying Pathology

Barrel Chested (hyperinflation secondary to emphysema)
Examine Nails/Fingers: Sometimes Provides Clues to Pulmonary Disorders

Cyanosis

Nicotine Staining

Clubbing
Assorted Other Hand and Arm Abnormalities: Shape, Color, Deformity

Swelling

Deformity

Discoloration
Palpation

• Patient in **gown** → chest **accessible** & **exposed**
• **Explore** painful &/or abnormally appearing areas
• **Chest expansion** – position hands as below, have patient inhale deeply → hands lift out laterally
Palpation – Assessing Fremitus

- **Fremitus** = normal vibratory sensation w/palpating hand when patient speaks
- Place **ulnar** aspect (pinky side) of **hand** firmly against **chest** wall
- Ask patient to say “Boy”
- You’ll feel transmitted **vibratory sensation** → fremitus!
- Assess **posteriorly** & **anteriorly** (i.e. lower & upper lobes)
- * Not Performed in the absence of abnormal findings *
Lung Pathology - Simplified

- **Lung** = sponge, **pleural cavity** = plastic container
- **Infiltrate** (e.g. pneumonia) = fluid within lung tissue
- **Effusion** = fluid in pleural space (outside of lung)
Fremitus - Pathophysiology

- Fremitus:
  - Increased *w/consolidation* (e.g. pneumonia)
  - Decreased in *absence of air filled* lung tissue (e.g. effusion).
Percussion

- **Normal** lung filled w/air
- **Tapping** generates **drum-like** sound → **resonance**
- When no longer over **lung**, percussion → **dull** (decreased resonance)
- Work in “**alley**” between vertebral column & scapula.
Percussion - Technique

• Patient **crosses arms** in front, grasping opposite shoulder (pulls scapula out of way)

• Place **middle finger** of **flat** against **back**, other fingers off

• **Strike distal** phalanx w/middle finger of other hand - strike 2-3 times @ each spot
Percussion (cont)

- Use **loose, floppy wrist** action – percussing finger = s hammer

- Start @ top of one side → then move across to same level, other side → R to L (as shown)

- @ Bottom of lungs, detect **diaphragmatic excursion** → difference between diaphragmatic level @ full inspiration v expiration (~5-6cm)
  **Done when patients have suggestive symptoms or other findings**

- Percuss laterally

- Percuss upper lobes (anterior)

- Cut nails to limit bloodletting!
Percussion (Cont)

• **Difficult** to master technique & detect tone changes - expect to be frustrated!

• **Practice** – on friends, yourself (find your stomach, tap on your cheeks, etc.)
  • Detect **fluid** level in **container**
  • Find **studs** in **wall**
Percussion: Normal, Dull/Decreased or Hyper/Increased Resonance

• Causes of **Dullness**:
  • Fluid outside of lung (**effusion**)
  • Fluid or soft tissue filling parenchyma (e.g. pneumonia, tumor)

• Causes of **hyper-resonance**:
  • COPD → **air trapping**
  • Pneumothorax (air filling pleural space)
Auscultation

• **Normal** breathing creates sound → appreciated via stethoscope over chest → “*vesicular breath sounds*”

• Note sounds w/both expiration & inspiration – inspiration typically more apparent

• Pay attention to:
  • quality
  • inspiration v expiration
  • location
  • intensity
Lobes Of Lung

Where you listen dictates what you’ll hear!

Posterior View

Anterior View

UC San Diego
School of Medicine
Lobes Of The Lung (cont)

Lateral Views
Right Lateral View

Left Lateral View
Trachea
Auscultation - Technique

- **Stethoscope** - ear pieces directed away from you, **diaphragm** engaged
- Patient **crosses arms**, grasping opposite shoulders

  **Areas To Auscultate**

- **Posteriorly** (lower lobes) ~ **6-8 places** - Alternate R → L as move down (comparison) - ask patient to take **deep breaths** thru mouth
- **Right middle lobe** – listen in ~ 2 spots – lateral/anterior
- **Anteriorly** - Upper lobes – listen ~ **3 spots** each side
- Over **trachea**
Pathologic Lung Sounds

- **Crackles (Rales):** “Scratchy” sounds associated with fluid in alveoli & airways (e.g. pulmonary edema, pneumonia); finer crackles with fibrosis

- **Ronchi:** “Gurgling” type noise, caused by fluid in large & medium-sized airways (e.g. bronchitis, pneumonia)

- **Wheezeing:** Whistling type noise, loudest on expiration, caused by air forced thru narrowed airways (e.g. asthma) – expiratory phase prolonged (E>>>I)

- **Stridor:** Inspiratory whistling type sound due to tracheal narrowing → heard best over trachea
Pathologic Lung Sounds (cont)

- **Bronchial Breath Sounds:** Heard *normally* when listening over the *trachea*. If *consolidation* (e.g. severe pneumonia) upper airway sounds transmitted to periphery & apparent upon auscultation over affected area.

- **Absence of Sound:** In chronic severe emphysema, often small tidal volumes & thus *little air movement*.
  - Also w/very severe asthma attack, effusions, pneumothorax
Pathologic Lung Sounds (cont)

- **Egophony**: in setting of suspected *consolidation*, ask patient to say “eee” while auscultating. *Normally*, sounds like “eee”.

- Listening over *consolidated* area generates a nasally “aaay” sound.
  - Not a common finding (but interesting)
Normal Lung Sounds

**Bronchial Breath Sounds**: Normal sounds when listening over large airways, like the trachea. Can be present as well in the setting of dense consolidation (i.e. air completely replaced by fluid – as occurs with a severe pneumonia).

**Lung Sound Simulation Site (for practice)**:
Normal Lung Sounds

Vesicular Breath Sounds: Sounds heard over any lobe of the lung with inspiration and expiration
Common Abnormal Lung Sounds

Crackles (Rales):
- Sounds associated with fluid filled alveoli & airways
- Commonly associated with congestive heart failure or pneumonia
- Finer crackles associated w/fibrosis
Wheezing:
• Sound of air being forced through narrowed airways, loudest upon expiration.
• Most commonly associated with exacerbation of asthma or chronic obstructive pulmonary disease.
A Not So Common (but interesting) Abnormal Sound

**Egophony:** Nasal sounding ‘ayyyyy’ heard over an area of consolidation (air completely replaced by fluid – as occurs with a severe pneumonia) when the patient says ‘eeeee’e’

![Normal 'e' + Egophony](image)
Putting It All Together: Few findings are Pathognomonic → Put ‘em Together to Paint Best Picture.

- **Effusion**
  - Auscultation → decreased/absent breath sounds
  - Percussion → dull
  - Fremitus → decreased
  - Egophony → absent

- **Consolidation**
  - Auscultation → bronchial breath sounds
  - Percussion → dull
  - Fremitus → increased
  - Egophony → present
Summary of Skills

- Wash hands, Gown & drape

Observe & Inspect Hands
- Nails, fingers, hands, arms
- Respiratory rate

Lungs and Thorax
General observation & Inspection
- Patient position, distress, accessory muscle use
- Spine and Chest shape

Palpation
- Chest excursion
- Fremitus

Percussion
- Alternating R & L lung fields posteriorly top → bottom
- R antero-lateral (RML), & Bilateral anteriorly (BUL)
- *Determines diaphragmatic excursion

Auscultation
- R & L lung fields posteriorly, top → bottom, comparing side to side
- R middle lobe
- Anterior fields bilaterally
- Trachea

- Wash hands
* Done in selected circumstances

Time Target: < 10 minutes
Web Sites and Apps For Sound Simulations

- Easy Auscultation  Heart and Lung Sounds
- NEJM: Fundamentals of Lung Auscultation
- Heart Sounds and Murmurs, University of Washington School of Medicine
- Heart Sounds Tutorial, Blaufuss Medical
- Auscultation Assistant, University of California, Los Angeles