Lung Examination: Abnormal

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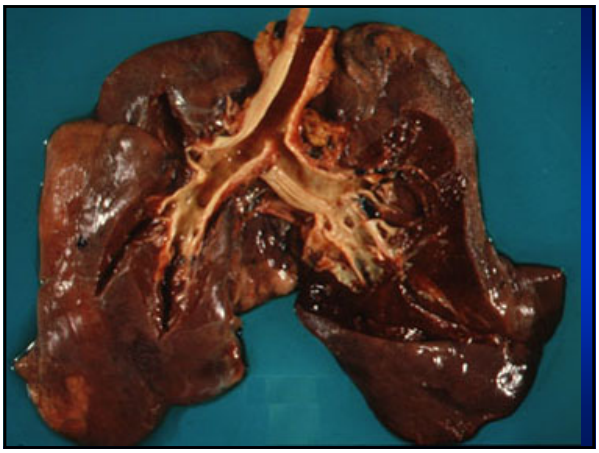
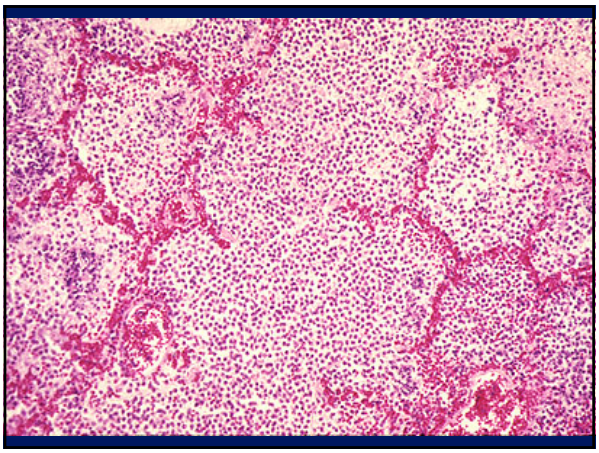
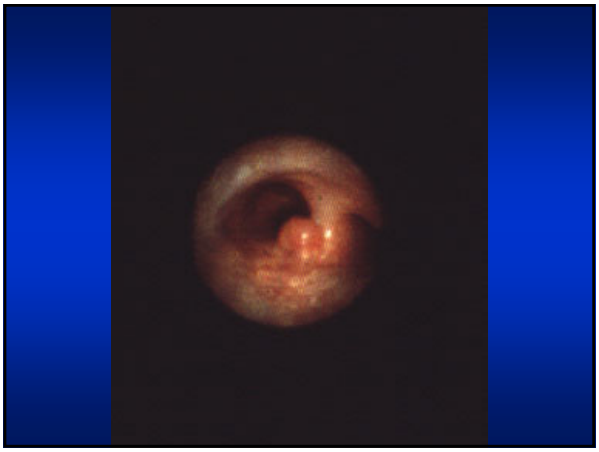
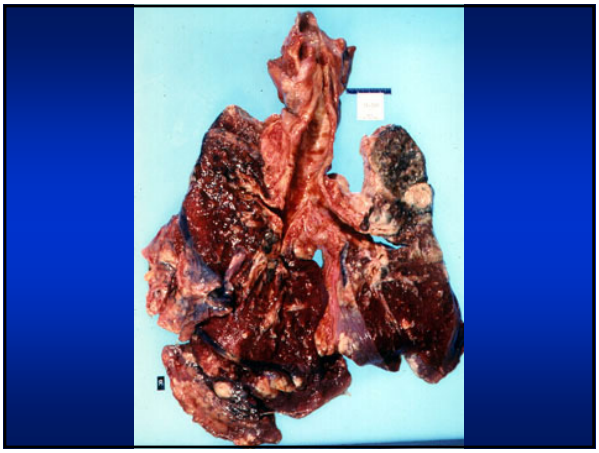


Illustrative Pathological problems

- Consolidation
- Atelectasis
- Pleural effusion
- Pneumothorax
- Mass
- Diffuse lung disease







Steps

- General Examination
- Mediastinal position
- Chest expansion
- Lung resonance
- Breath sounds
- Adventitious sounds
- Voice transmission

General Examination

- Respiratory rate
- Pattern of breathing
- Cyanosis
- Clubbing
- Weight
- Cough
- Hospital setting
- Effort of ventilation
- Shape of thorax

Respiratory Rate

- Bradypnea: rate less than 8 per minute
- Tachypnea: rate greater than 25 per minute

Pattern of Breathing

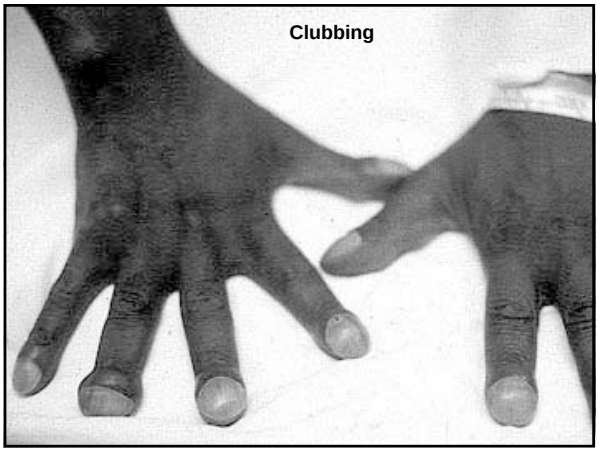
- Kussmals
- Sleep apnea
- Cheyne strokes
- Pursed lip breathing
- Orthopnoea: Short of breath in supine position, gets some relief by sitting or standing up.

Central Cyanosis

- Results from pulmonary dysfunction, the mucous membrane of conjunctiva and tongue are bluish.
- If there was chronic hypoxemia and secondary erythrocytosis, you can detect the conjunctival and scleral vessels to be full, tortuous and bluish.


Central Cyanosis

Corpulmonale



Clubbing

Clubbing

- In clubbing, there is widening of the AP and lateral diameter of terminal portion of fingers and toes giving the appearance of clubbing.
- The angle between the nail and skin is greater than 180☜.
- The periungual skin is stretched and shiny.
- There is fluctuation of the nail bed.
- One can feel the posterior edge of the nail.

Significance: Clubbing Observed In:

- Intrathoracic malignancy: Primary or secondary (lung, pleural, mediastinal)
- Suppurative lung disease: (lung abscess, bronchiectasis, empyema)
- Diffuse interstitial fibrosis: Alveolar capillary block syndrome
- In association with other systemic disorders

Gibbus

Weight

- Emaciation cachectic
  - Malignancy
  - Tuberculosis

320 lbs

Weight

- Obese: Sleep apnea syndrome

3 Layered sputum

Cough

- Productive
- Dry
- Whooping
- Bovine

2 liters of O2

Hospital Setting

- Isolation room
- Oxygen set up

Effort of Ventilation

- Person appears uncomfortable. Breathing seems voluntary.
- Accessory muscles are in use, expiratory muscles are active and expiration is not passive any more.
- The degree of negative pleural pressure is high.
- The respiratory rate is increased.

Resting Size and Shape of Thorax

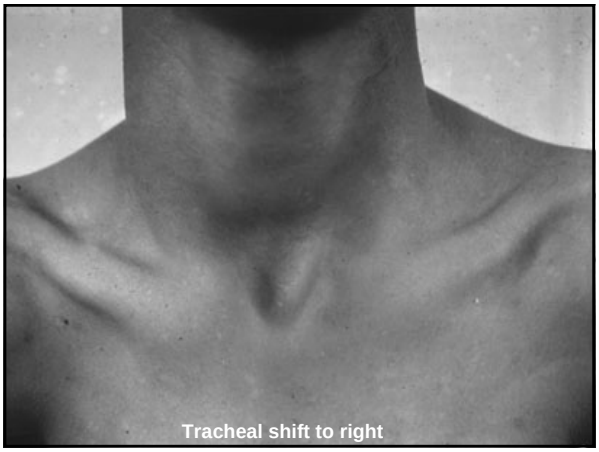
- Barrel chest
- Kyphosis
- Scoliosis
- Pectus excavatum
- Gibbus

Barrel Chest

AP Diameter = Transverse Diameter

Tracheal Position: Mediastinum

- Any deviation of the mediastinum is abnormal
- Lateral shift: The mediastinum can be either pulled or pushed away from the lesion
  - Pull: Loss of lung volume (Atelectasis, fibrosis, agenesis, surgical resection, pleural fibrosis)
  - Push: Space occupying lesions (pleural effusion, pneumothorax, large mass lesions)
  - Mediastinal masses and thyroid tumors



Tracheal shift to right

Chest Expansion

- Asymmetrical chest expansion is abnormal
  - The abnormal side expands less and lags behind the normal side
  - Any form of unilateral lung or pleural disease can cause asymmetry of chest expansion
- Global expansion decrease

Percussion: Decreased or Increased Resonance is Abnormal

- Dullness
  - Decreased resonance is noted with pleural effusion and all other lung diseases
  - The dullness is flat and the finger is painful to percussion with pleural effusion
- Hyper resonance: Increased resonance can be noted either due to lung distention as seen in asthma, emphysema, bullous disease or due to Pneumothorax
- Traube's space

- Breath sounds

Breath Sounds: Diminished or Absent

- Intensity of breath sounds, in general, is a good index of ventilation of the underlying lung.
- Breath sounds are markedly decreased in emphysema.
- Symmetry: If there is asymmetry in intensity, the side where there is decreased intensity is abnormal.
- Any form of pleural or pulmonary disease can give rise to decreased intensity.
- Harsh or increased: If the intensity increases there is more ventilation and vice versa.

Bronchial

- Bronchial breathing anywhere other than over the trachea, right clavicle or right inter-scapular space is abnormal.
- In consolidation, the bronchial breathing is low pitched and sticky and is termed tubular type of bronchial breathing.
- In cavitary disease, it is high pitched and hollow and is called cavernous breathing. You can simulate this sound by blowing over an empty coke bottle.

Bronchial breathing

Expiration as long as inspiration	
Pause between inspiration and expiration	
Quality	

Rhonchi

- Rhonchi are long continuous adventitious sounds, generated by obstruction to airways.
- When detected, note whether it is generalized or localized, during inspiration or expiration, and the pitch.
- Diffused rhonchi would suggest a disease with generalized airway obstruction like asthma or COPD.

Rhonchi

Asthmatic
Continuous

Rhonchi

- Localized rhonchi suggests obstruction of any etiology e.g., tumor, foreign body or mucous.
- Mucous secretions will disappear with coughing, so would the rhonchus.
- Expiratory rhonchi implies obstruction to intrathoracic airways.
- Asthmatics can also have inspiratory rhonchi while it is uncommon in COPD.

Pleural Rub

- Normal parietal and visceral pleura glide smoothly during respiration.
- If the pleura is roughened due to any reason, a scratching, grating sound, related to respiration is heard.
- You can hear the sound by compressing harder with the stethoscope and making the patient take deep breaths.
- It is localized and can be palpable.

Pleural rub

Scratching, Grating
Related to respiration

Stridor

- Loud audible inspiratory rhonchi is called a stridor.
- Inspiratory rhonchi in general, implies large airway obstruction.

Stridor

Asthma

Crackles

- Interrupted adventitious sounds are called crackles.
- Make a notation about timing, intensity, effect with respiration, position, coughing and character.
- Timing and Intensity Crackles heard only at the end of inspiration are called fine crackles.
  - When the surfactant is depleted, the alveoli collapse. Air enters the alveoli at the end of inspiration.
  - This sound is generated as the alveoli pop open from it's collapsed state.

Crackles

- When the crackles are heard at the end of inspiration and the beginning of expiration the fluid or secretions are probably in respiratory bronchioles: medium crackles.
- If the crackles are heard throughout it implies the secretions are in bronchi: coarse crackles.

Voice Transmission (tactile fremitus, vocal resonance)

- Asymmetrical voice transmission points to disease on one side.
- Increased:
  - Any situation where bronchial breathing is heard the sounds become loud, sharp and distinct: Bronchophony.
  - In extreme situations, the whispered words come clearly and distinctly: Whispering pectoriloquy.

Voice Transmission (tactile fremitus, vocal resonance)

- Decreased: A quantitative decrease in voice transmission could be due to any other form of lung or pleural disease.
- Qualitative alteration:
  - A qualitative alteration of voice transmission is noted over consolidation and along the upper margin of pleural effusion: Egophony
  - The sound is like a nasal twang or goat bleating.

Voice Transmission

Bronchophony

Whispering Pectoroliquy

Normal whisper

Egophony