Examination of the chest

1. Inspection
2. Palpation
3. Percussion
4. Auscultation

Inspection

A. Position of the patient

❁ sitting position (cardiac disease, COPD)

❁ sitting position leaning on hands (an attack of asthma)

❁ unable to lie flat comfortable (cardiac diseases, pulmonary edema, diseases with remaining sputum)

❁ preference for lying one side only (local pathologic processes – lung abscess).

B. Size, shape and symmetry of the chest

THORACIC DEFORMITIES:

1- bilateral or unilateral
2- Barrel chest

❁the chest wall held in hyperinflation

❁ dilatation in lateral size of the chest (A-P diameter can be greater than the lateral)

❁ 'pump handle' – up and down movements of the ribs

❁ poor expansion

❁ emphysema, in asthma

3-funnel chest

❁ developmental defect

❁ funnel-shaped depression of lower part of sternum

❁ displacement of the heart and disturbances in cardiac function

4-pigeon chest

❁ secondary to chronic respiratory diseases in childhood, may be caused by rickets (in malnutrition)

❁sternum projects beyond frontal plane of abdomen (anterior protrusion of the sternum)

ABNORMALITIES IN THE SHAPE OF THE CHEST

Asymmetry:

• Skewness of chest wall (scoliosis – lateral curvature of the spine, kyphosis – increased convexity of the spine.

C. Status of skin

(colour , turgor, cutaneous lesions),muscular development, status of nutrition, vascular anomalies .

D. Respiratory rate and rhythms

- frequency (resting rate between 10-14 breaths per minute)
- regularity (regular rhythm of breathing)
- duration of the breathing (inspiration is 1 ½ as long as expiration
- without accessory muscle use .

ABNORMALITIES OF RESPIRATORY RATE AND RYTHM

- Bradypnea : –

an abnormal slowing of respiration (central nervous system diseases, caused by drugs)

- Tachypnea: –

an abnormal increase of breathing frequency (severe pain, chronic pulmonary or cardiac diseases, anxiety)

- Apnea: –

the temporary cessation of breathing

- Hyperpnea: –

an increased depth of breathing (metabolic acidosis) .

ABNORMALITIES OF RESPIRATORY RATE AND RYTHM

use of accessory muscles during respiration: (diseases with dyspnea) .

Palpation

A. Condition of skin, character of musculatur, presence of any masses, status of costal parts .

B. Palpation for costal expansion

limited on both sides equally (muscle weakness, severe airflow limitation, extensive lung fibrosis)
unilateral reduction (plural effusion, lung collapse, pneumothorax, diaphragmatic paralysis) .

B. Palpation the intrathoracic trachea - for assessment of trachea position.
Palpation of the trachea
Normal: midline
Dislocation:
-Mass in the neck (goiter)
-Dislocation of the mediastinum
❁Toward the healthy side
1- Ptx
2- Large pleural effusion
❁Toward the side of the disease
1- Collapse of the lung due to central airway obstruction
2- Local fibrosis

C. Palpation the supraclavicular areas for lymph nodes –enlarged lymph nodes in supraclavicular area (tumor,metastases, sarcoidosis).

D. Tender areas
- pleuritis

- rib:- fracture, periostitis , metastasis

- sternum: - anemia , leukemia,, myeloma

E. Tactile Fremitus

❁ the vibrations produced by the patient's speaking are transmited the lung tissue and felt by hand

❁ normal fremitus is symmetric in the same parts of the chest

❁ two methods of examination .

CHANGES IN TACTILE FREMITUS

❁ Rhonchal fremitus – exudate in the trachea

❁ Increased fremitus - lung consolidation with patent bronchus

❁ Decreased fremitus –

unilateral - bronchial obstruction ,air or fluid in pleural space

bilateral - edematous chest wall chest wall thickening .

Percussion

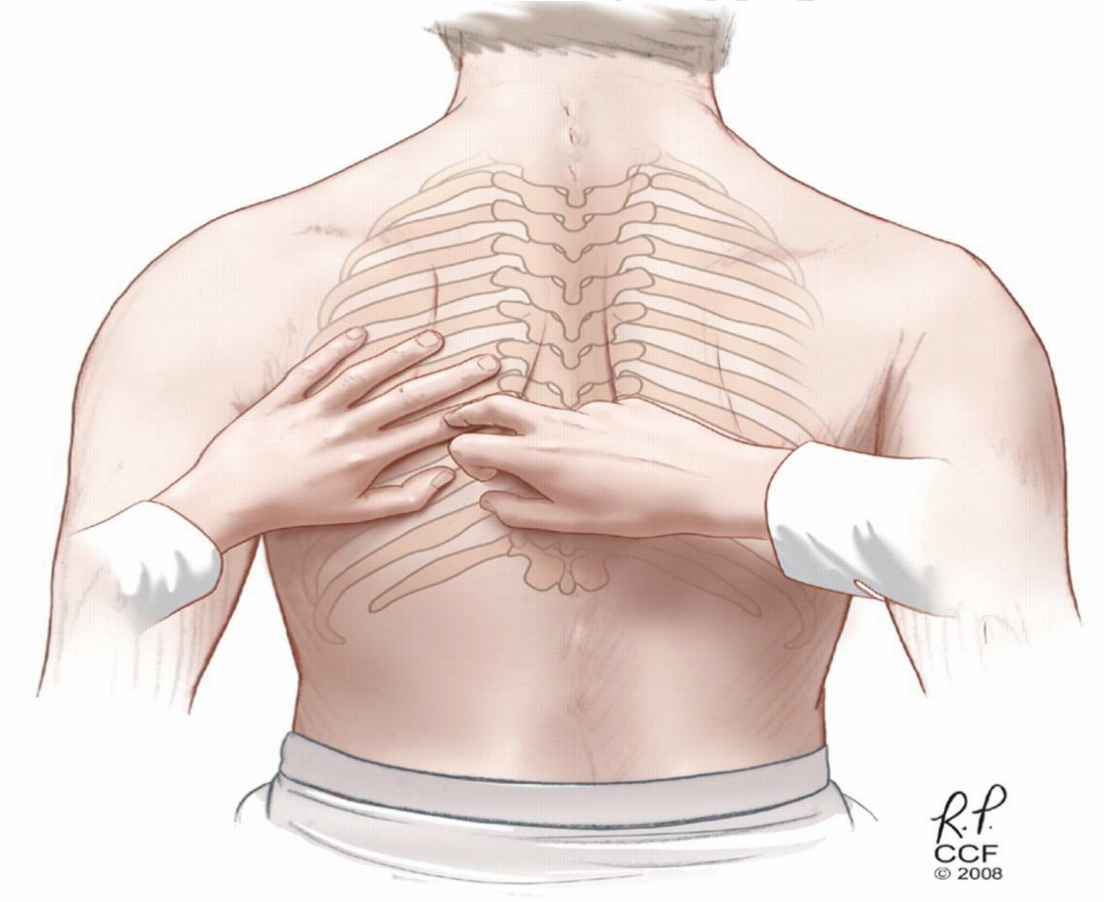
Directs percussion

used very infrequently, only for percussion the clavicle

Indirect percussion

comparing and topographic

Normal percussion note is resonant over all of the lungs except over organs (heart, liver), where dullness is detected.



CHANGES IN PERCUSSION NOTE

- Hyperresonance - emphysema
- Impaired resonance - lung consolidations
- Dullness - pulmonary infiltrations, pleural thickening
- Flattness - pleural effusion .

Auscultation

the most common technic of the chest examination

- The breath sounds are produced by the air moving through the tracheo-bronchial tree during respiration
- The turbulence in the large airways creates vibrations which are transmitted through the lungs to the chest wall
- It is never acceptable to listen through clothing, the stethoscope must be in contact with the skin
- Patient is seated upright with shoulders rotated forward in a

relaxed manner

- Ask the patient to breathe in & out through his mouth deeply, but not too fast
- Listen in sequence over the chest (anterior, lateral, posterior

chest wall) start at the apices than move down to the bases

❁ Remember to compare corresponding areas on each side

NORMAL BREATH SOUND	TRACHEAL	BRONCHIAL	BRONCHIO-VESICULAR	VESICULAR
PLACE OF AUSCULTATION	EXTRATHORACIC TRACHEA	MANUBRIUM	IN THE FIRST AND SECOND INTERSPACES ANTERIORLY AND BETWEEN SCAPULAE POSTERIORLY	MOST OF THE LUNGS FIELDS
INTENSITY	VERY LOUD	LOUD	MODERATE	SOFT
INSPIRATION /EXPIRATION RATIO	1:1	1:3	1:1	3:1
PITCH	VERY HIGH	HIGH	MODERATE	LOW
DESCRIPTION	HARSH	TUBULAR	RUSTLING BUT TUBULAR	RUSTLING

ABNORMAL BREATH SOUNDS

1. Absent (decreased) breath sound:

❁ Generalized reduction in breath sound – thick chest wall, obesity

❁ No aerated lung under the area being examined or an intrapleural process blocking the transmission of sounds

- airway obstruction:-foreign body aspiration, endobronchial tumors ,laryngospasm, laryngeal edema, a mucus obstruction a bronchus

- sugical removal of lung tissue:- lobectomy, pneumonectomy

- pleural abnormalities:- pneumothorax, pleural effusion .

VOCAL RESONANCE: –

a voice sound heard over the normal lung (ask the patient to say '99' or count '1,2,3' while auscultating him)

abnormal voice sounds

• bronchophony:-

increased clarity of the spoken word - heard over areas where alveoli are filled with fluid (liquid & solid medium transmits sounds better than an air-filled medium) – consolidations, athelectasis, partial compression of a bronchus by tumor

• whispered pectirology:-

increased transmission of the whispered word to the chest wall (often heard before other abnormal lung sounds)

• egophony:-

modified form of bronchophony (heard above upper level of

plural effusion) .

2. Bronchial breath sounds over the peripheral lung

• increase in tissue lung density: consolidation – pneumonia, lung abscess, dense fibrosis .

ADDED (ADVENTITIOUS) SOUNDS

can be heard during auscultation in addition to the normal breath sounds

1. *Wheezes* :-

(high-pitched, musical sounds)

• largely occuring on expiration, sometimes on inspiration

• are due to localized narroving within the bronchial tree (smooth muscle contraction, inflammatory changes in the chest wall)

• asthma, COPD, diseases with bronchospasm, vocal cord paralysis .

2. *Cracles* :-

(older term - rales and crepitations)

• short, discrete, non-musical sounds,

• heard mostly during inspiration,

• caused by opening of collapsed alveoli

• may be described as early or late, depending on when they are heard during inspiration (early pulmonary edema, atelectasis, resolving pneumonia)

• coars– low-pitched, are related to larger airways louder than fine rales, are rarely heard on expiration .

3. *Ronchi* :-

(lower -pitched sound, more sonorous)

• caused by mucus plugging and poor movement of airway secretion (COPD, bronchiectases, cystic fibrosis)

• heard during both phases of respiration

4. *Pleural friction rub*: -

(low-pitched, loud sound)

• result of rubbing of pleural surfaces together,

• sounds the same as rubbing the thumb and index finger to one's ear,

• heard during both phases of respiration

• inflammation of the pleura .

Extrathoracic signs of lung diseases

Cyanosis

• a blue discoloration of the skin, nail beds and mucus

membranes

• cause: elevated levels of reduced hemoglobin >5g/dL

Cyanosis:-

A- Central :-

advanced pulmonary diseases, congenital heart diseases with right-to-left shunting

B- Peripheral:-

is seen only in the extermities, ears, and lips and is caused by a reduction in the systemic blood flow resulting from a decreased cardiac output .

Clubbing

• proliferative change in soft tissues of the digits

• loss of normal angle at base of nail

• ethiology is unknown: probably caused by increased blood flow through multiple arterio-venous shunts

• COPD, lung cancer, cystic fibrosis