



Introduction to Clinical Medicine



Lecture : 3

Physical Examination - RS



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Examination

- The physical examination

- The thorax is fully exposed
- 45° sitting position
- hands must be beside him (not on chest)

- General inspection

— When you enter the room, you have to take a general look on the patient

Is the patient conscious, alert, or oriented?

↳ why do you ask?

I know that a CNS patient, if he has CVA he may have low consciousness (also a brain stem infarction patient or a meningoencephalitis patient can have ↓ consciousness)

- But a Respiratory patient may develop low consciousness due to Respiratory acidosis / hypercapnic respiratory failure
hypercapnia $\xrightarrow{\text{cause}}$ ↓ consciousness

patient that came to ER with ↓ consciousness with signs and symptoms of COPD or in a home oxygen therapy

You have to rule out hypercapnia

By doing the arterial blood gas test

(Normal CO_2 35-45) (COPD / hypercapnia $\text{CO}_2 = 70-90$)

70-90 CO_2 level is at risk of developing decreased consciousness and hypercapnic Respiratory failure

- Other Respiratory cause to developing loss of consciousness an elderly patient with pneumonia that may also cause confusion

SO CONSCIOUS, ALERT, ORIENTATION

You look in patients with COPD / hypercapnic Respiratory failure that they may develop decreased level of consciousness

(So if you saw a low conscious patient you sure won't give benzodiazepene nor morphine cause they would cause more respiratory depression, accumulating more CO_2 leading to mechanical ventilation)

- hypercapnia is a cause of ↓ level of consciousness in a COPD patient or morphine overdose hypoventilation or a lung infection that lead to it, specially in elderly
- Most common infection that lead to ↓ in consciousness is UTI but here a respiratory infection can cause it

— Mention if he's sitting or lying flat

— Note signs of Respiratory distress

- If the patient is using accessory muscles indicates he's in respiratory distress so you have to mention if he use or not the accessory muscles
- tripod position seen in
 - COPD
 - emphysema (most likely)
 - Chronic bronchitis
- pursed lip
 - patient trying to keep in respiratory pressure to prevent alveolar collapse
 - usually in COPD is seen (COPD is either emphysema or Chronic bronchitis)
 - ↳ most likely

— You have to mention the Rate of Respiratory movement

— Notice (not ask) if he have an inhaler, nebulizer or O₂ therapy

— Note if he have Cyanosis

— Note audible sounds (wheez, stridor, hoarsness)

— mention Respiratory Rate

— note Chest deformity

— Note breathing pattern

- male have abdominothoraco breathing
- female have thoracoabdominal breathing

● Respiratory Distress Signs

- tachypnea
- intercostal space indrawing
- use of accessory muscles

● Tripod Position

- patient is trying to increase lung volume and achieving (-) intrathoracic pressure to help him inhale
- so patient have shortness of breath sitting like this.
The Name of this sign? Tripod position
The underlying issue? severe COPD or Emphysema

● Pursed Lip

- he do that to keep end-expiratory pressure usually in severe COPD or Emphysema
- so IF I gave you this picture and asked, is it due emphysema or chronic bronchitis?
- trying to keep (+) pressure in his alveoli to prevent its collapse in this emphysema patient

● Respiratory pattern

→ a type of breathing : Cheyne - stoke breathing

- seen in adults at high altitude due to increased ^① rate and depth of breathing followed by diminishing ^② respiratory effort and rate, ^③ ending in a period of apnoea / hypopnea (severely decreased respiratory rate) and the cycle repeats ...

↳ why?

high altitude induce lung injury
when he goes up ... ↓ in O_2 . ↓ O_2 partial pressure
so he'll compensate by increasing rate and depth of breathing, hyperventilation,
then he'll have severely CO_2 washing, developing low CO_2 cause of increased respiratory rate,
then because of increased respiratory weight the respiratory center will be suppressed by low CO_2 suppressing / decreasing respiratory rate

So cause respiratory rate is decreased the CO_2 will increase



Again

- when respiratory rate decrease due to hypocapnea till we reach hypopnoea / apnoea
- in apnoea / hypopnea accumulation of CO_2
- $\uparrow \text{CO}_2$ will motivate RS center increasing Respiratory Rate and Depth of breathing leading to hypocapnea

→ Kussmaul breathing

type of breathing that lungs emergency respond to acidosis

- patient with DKA develop shortness breath and deep breathing rate
- know the difference of Normal and deep breathing in slide
- Young patient with shortness of breath and labored breathing / deep breathing rate came in
You have to think of Kussmaul breathing and Rule out DKA or any cause of metabolic acidosis
- metabolic acidosis include:
 - end-stage renal disease
 - Chronic kidney ds
 - DKA (most common to induce Kussmaul)

● Chest deformity

● Hands and Arms

- Examine cyanosis

when we say peripheral cyanosis as in hands (fingers) and feet

central cyanosis You'll look at the tongue and under the tongue

- nail discoloration

Yellow nail syndrome

- Yellow nail with exudate pleural effusion

- muscle wasting

assymetrical wasting

- Right hand wasting indicate horner syndrome
- horner syndrome associated with pancoast tumor
- pancoast tumor is apical lung consolidation ds

— finger clubbing

- . You have to look for hypertrophic pulmonary osteoarthropathy
 - ↳ a painful tender swelling on wrists and ankles associated with clubbing caused by lung cancer

— examine for fine tremor and flapping tremor

- . fine tremor (due to medications)
ask patient if he have a history of asthma or is taking B-agonist / Theophylline
- . Flapping tremor (asterixis)
is due to CO₂ retention

— Check for pulse, BP, RR

- . CO₂ retention will lead to bounding pulse

⊙ How can you differentiate the cyanosis is due to cardiac ds or CO₂ retention / COPD?

- . usually CO₂ retention cyanosis will induce warm periphery
- . heart failure cyanosis due to low cardiac output so we'll have cold periphery

- tar staining, on the finger they smoke with is the discoloration
- Yellow nail syndrome, all the nails are yellow (Picture)
the underlying etiology if this finding is associated with pleural effusion?
Yellow nail syndrome
- Asterixis, flapping tremor
a wide range of tremor happen
seen in CO₂ retention², hepatic encephalopathy due to cirrhotic³, uremia
- Hypertrophic pulmonary osteoarthropathy
. Patient with finger clubbing associated with wrist and ankle tenderness, swelling
Diagnosis is lung cancer
- Pulsus paradoxus
. In Normal, during inspiration the systolic BP will decrease less than 10 mmHg
. In pulsus paradoxus, the decrease of BP during inspiration is more than 10 mmHg
↳ so it exaggerate the Normal findings or the fall of BP
. causes :
 - cardiac tamponade
 - constrictive and restrictive pericarditis
 - Severe lung diseases as severe asthma
 - tension pneumothorax
 - large pleural effusion
 - large pulmonary embolism

it would cause obstructive shock
- . so severe lung diseases would cause it
But more specific with cardiac diseases

● Face

- look for anemia and conjunctiva hemorrhage
- look if there is congestion in the conjunctiva and plethoric face indicating patient have superior vena cava obstruction
- Superior vena cava obstruction may happen due to lymphoma or lung mass that compress it OR thrombus internal SVC

— Check for central cyanosis

— Check for pupil asymmetry
why? Horner Syndrome

— Plethoric face / complexion

- think about polycythemia (In COPD lead to Secondary polycythemia) or any cause that lead to type 2 Respiratory failure
- in Respiratory think of ① secondary polycythemia ② CO₂ retention ③ SVC obstruction
- out of RS think of ④ true polycythemia

② Patient with conjunctiva hemorrhage^①, plethoric face^②, absent abdominojagular reflex^③ would have SVC obstruction

● Horner syndrome findings: (caused by T1 congition)

- ① myosis
- ② ptosis
- ③ enophthalmos
- ④ anhidrosis in the same side

• Associated with apical lung pathology, usually pancoast tumor

● SVC obstruction

- look for distended abdominojagular
- abdominojagular Reflex is absent
- plethoric face
- dilated veins (picture)

● Neck

- examine JVP and Lymph Node
- Enlarged Scatene Lymph Node in any cancer, matted in TB

● Thorax

Inspection :

- . You have to look for symmetrical chest expansion
in pneumothorax , he'll have asymmetrical chest movement and restricted chest movement on the Right side
So he'll have a pathology in the Right side cause its restricted
if the chest is depressed on this side You'll think of collapse and pneumothorax
if the chest is distended You'll think of pleural effusion , pneumothorax
- . It may be bilateral effusion, bilateral fibrosis , COPD ... etc
Most of lung diseases cause bilateral decrease chest expansion
But symmetry pathology is in one side as when
depressed at the Right side and decrease expansion at the Right side You'll think of pneumothorax or collapse
decrease expansion but inflated lung on the Right You'll think of pleural effusion or pneumothorax
- . You have to look for chest deformity , AP diameter Ex: parallel chest

✳ We have same finding in A lung collapse with obstructed airway and in pneumothorax or lobectomy
what pneumothorax from a lung collapse is thoractomy scar
So Both will have :

- ↓ air entry
- ↓ chest expansion
- depressed lung on the lobectomy / collapsed lung

So , if you see thoractomy scar and findings that suggest lung collapse with obstructed airway it would be pneumothorax due to thoractomy

(Picture = thoractomy Scar)

- ↳ examiner ask to examine post chest , examine post. and lateral
if told anterior , examine ant. and lateral chest

Palpation :

- . look for any upper mediastinum deviation by looking at the trachea
- . look for any lower mediastinum deviation by looking at the apex beat examination
- . we have to palpate for Right ventricular heave
The Right ventricular heave is seen in pulmonary hypertension
Then we'll look for loud beat

● Examination of Trachea

- . You have to detect if the patient have deviated trachea
- . trachea is normally in the center, mildly deviated to the Right side .
- . we have to look for 3 things
 - tracheal tug (pic)
 - ↳ if we have it , it would be associated with severe COPD , malnutrition patient
 - ↳ the Sternal Node would be depressed in a COPD patient
Your finger would depress and move down in the Sternal Notch

- cricosternal distance

- ↳ will decrease in COPD, or any cause of hyperinflated chest
- ↳ usually > 5 cm from cricoid cartilage to sternal notch

- tracheal deviation (pic)

- ↳ toward the side of the lesion, something attracts the trachea as:
 - . upper lobe collapse, lung will shrink, trachea deviates to the same side
 - . upper lobe fibrosis, attraction to trachea
 - . pneumotomy
- ↳ away from the side of lesion
 - . tension pneumothorax
 - . massive pleural effusion
 - . lung cancer / large lung masses

@ why do we check for apex beat in RS-examination?
to check for deviation

- ↳ in RS, you have to think as if for example a patient with:
 - COPD
 - emphysema
 - obese
 - pleural effusion
 - hyperinflated chest
 - pneumothorax

would have decreased apex beat impulse

↳ deviation to the right and left in RS view

- . pleural effusion in the left, move the cardiac to right
- . collapse, pneumothorax in left, move the cardiac to the right
(trachea will align on cardiac)

- ↳ some patients have dextrocardia as Kartagener Syndrome or primary ciliary dysfunction
You won't feel his heart in the left, so you have to palpate the right side
- . if you palpate the apex beat on the right side and the patient came with signs / symptoms of bronchiectasis, think about Kartagener Syndrome

📌

● Tactile vocal fremitus

↳ think about symmetrical chest examination

- . put the palm of your hand on patient chest and ask him to say one-one-one (بالأردنية: نحكي أربعة وأربعين)
- . Some diseases would increase / decrease tactile vocal fremitus
- . Increased:

- transmission increased from lung to the chest wall
- consolidation like pneumonia or lung cancer would cause decreased air entry to lung, so this mass will lead to increased sound transmission from the lung to chest wall
- the increased tactile vocal fremitus when he says one-one-one you'll feel more vibration in your hand if there is consolidation as in pneumonia, severe dense pulmonary fibrosis, lobar collapse with patent major bronchus (patent airway would increase transmission), lung cancer

يعني نحسب اشي باليمين طول بفتح أخوه الشمال
X ما بفتح كل جهة لخال بل مع بفتح

• Decreased :

as in pleural effusion , obesity , pneumothorax , COPD , asthma

collapsed lung with obstructed major bronchus (O_2 won't enter collapsed lobe so transmission of any vibration would decrease

∴ the vocal resonance is as same as tactile vocal fremitus

↳ by stethoscope

↳ By hand

You should do both examination , you'd find the same findings

● Chest Expansion

- decreased in Fibrosis , pneumothorax

● percussion

- put your left hand on the patient's chest and tap by your Right Middle finger

الحركة بمستوى الـ wrist و الـ elbow

tap 2 times on each symmetrical position

● percussion Note

- Resonant : Normal lung

- hyperresonant : pneumothorax

- Dull : collapse , severe pulmonary fibrosis , consolidation

(consolidation ; think about pneumonia " chest infection " + Cancer

- Stony dull : pleural effusion , haemothorax

● Diaphragmatic excursion is not Required

● Oscultation

- must be symmetrical

- use diaphragm stethoscope to listen : (slide)

- cover 3 areas lateral , 4 areas ant , 4 areas post chest

● Breathing Sounds

- vesicular is Normal

• inspiration longer than expiration

• No Gap between inspiration and expiration

• soft

• low

- Branchial

• expiration longer than inspiration

• نفس بإخذه ، يوقف شوي ، يرجع يتنفس

• loud

• High

• most likely with pneumonia , consolidation , top pleural effusion

● Causes of Diminished vesicular breathing

- 1) Reduced conduction , anything that prevent sound to transmit to stethoscope
 - pleural effusion
 - pneumothorax
 - Obesity / thick chest wall
- 2) Reduced flow
 - usually COPD , always think about wheeze chest and reduced air entry / flow
 - occluded major bronchus collapsed lung , No air enter alveolus lead to ↓ air flow

● Bronchial breathing Sounds Causes : حذرا

- 1) most likely consolidation pneumonia
- 2) common bronchial breathing dense pulmonary fibrosis (Not idiopathic pulmonary fibrosis)
- 3) collapsed lung (patent major bronchus)
- 4) top of pleural effusion (there will be decreased air entry but at the top of pleural effusion you'd hear bronchial breathing , same thing with pneumonia and patent bronchus)

● wheeze

- . if it was wheezy chest, think about asthma, COPD, bronchiectasis
- . if it was localized wheezy chest , think about cancer or foreign body
- . heard during expiration

● CRACKLES

- . heard during inspiration either early inspiration, middle inspiration, late inspiration
- . biphasic coarse ; inspiratory expiratory coarse seen in bronchiectasis
- . early inspiration seen in small airway ds bronchiolitis
- . middle seen in pulmonary oedema
- . late seen in pulmonary fibrosis

- So when I say late biphasic pulmonary edema ,
fine late bilateral inspiratory crackle think about pulmonary fibrosis
حذرا
- pulmonary fibrosis is associated with clubbing

ⓐ Patient with ① clubbing and on chest Examination you find ② fine ③ late ④ bilateral inspiratory crackle
He'd have idiopathic pulmonary fibrosis

- a patient with COPD developed pneumonia may come with coarse crackle

ⓑ a patient with long-stand History of COPD , Now came with finger clubbing . Diagnosis ?
He developed lung Cancer
So COPD don't cause finger clubbing

Finger Clubbing , think about :

- lung cancer
- empyema
- lung fibrosis
- bronchiectasis
- lung abscess
- cystic fibrosis
- sarcoidosis

- Pleural Rub

- . accompanied by pleuratic chest pain
- . pleural Rub + pleuratic chest pain indicate thromboembolism (pulmonary embolism)

- After completing Chest Examination , look for Signs of pulmonary hypertention

- . If the patient have Chest ds as for example idiopathic pulmonary fibrosis , lung cancer , PE all would do pulmonary hypertention

- . pulmonary hypertention will lead to Right ventricular strain then eventually Right Sided HF
- . Right - Sided HF on base of pulmonary hypertention is called Cor pulmonale

- . Cor pulmonale Signs :

- Lower limb edema
- hepatomegally
- Renomegally
- ascitis
- elevated JVP
- sacral edema
- Splenomegally

- . in Right HF usually there is no crackle due to HF , no lung congestion (left HF, the patient come with orthopnea , shortness of breath give diuretic to relieve it)

- . And we have to look for Signs of DVT :

- unilateral Swelling
- blue or white discoloration
- erythema nodosum

- . Erythema Nodosum , think about in Rs ds :

- Sarcoidosis
- TB
- Streptococcus pneumonia

مريض
من
السؤال

erythema nodosum must collerate with symptoms

- . patient with night sweat , 2-3 months history of productive cough , came from Syria resently
i'll think about TB
- . Shortness of breath , female , Young , dry cough , Chest tightness
i'll think of sarcoide

سؤال

- Strider is inspiratory + expiratory and loud noisy sound
whezy chest is fine , expiratory