**In the name of Allah**
**The most gracious, The most merciful**

**Master The**

# MEDICINE VIVA

**Part-1**


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# Dedicated to

## DR REZOANA NASRIN RIA

**My beloved wife**

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## PREFACE TO FIRST EDITION

Viva is the most important part of examinations in medical life. Result is largely influenced by viva performance. But most of the time throughout the years, we keep preparing from our conventional guidebooks which are least made for viva exam. As a result, we read much but viva performance is poor almost always.

Keeping all these in mind, I have tried to make a better note for viva which is largely designed according to question patters of examiners and the pattern of answers they like.

I will humbly accept any constructive criticism of this manual.

Dr. Md. Mehedi Hasan Lemon

## PREFACE TO SECOND EDITION

After excellent response from 1st edition of this book, I have come with this 2nd edition. This book is updated according to latest textbook editions, guidelines, and viva trends. Besides being a viva book, it will provide an excellent guideline for written preparation also.

I will humbly accept any constructive criticism of this manual.

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# RESPIRATORY SYSTEM

# INTRODUCTION

**Name some respiratory diseases that you have seen in ward?**

1. Bronchial asthma
2. COPD
3. Pleural effusion
4. Pneumonia
5. Pulmonary TB
6. Pneumothorax
7. Bronchial carcinoma

**Name some respiratory emergencies.**

1. Tension pneumothorax
2. Acute severe asthma
3. Acute exacerbation of COPD

**What are the common presentations respiratory diseases?**

1. Cough
2. Breathlessness
3. Wheeze
4. Hemoptysis
5. Chest pain

# BREATHLESSNESS

**Define breathlessness/dyspnoea.**

Breathlessness or dyspnoea can be defined as the feeling of an uncomfortable need to breathe.

**[Davidson's-24th-489]**

**What are the common causes of acute dyspnoea/breathlessness?**

A. **CVS:** Acute pulmonary oedema
B. **Respiratory:**
   1. Acute severe asthma
   2. Acute exacerbation of COPD
   3. Pneumothorax
   4. Pneumonia
   5. Laryngeal oedema (e.g., anaphylaxis)
   6. Diabetic ketoacidosis
C. **Others:** Psychogenic hyperventilation

**[Davidson's-24th-489]**

**What are the common causes of chronic dyspnoea/breathlessness?**

**A. CVS:**
   1. Chronic heart failure
   2. Myocardial ischaemia

**B. Respiratory:**
   1. COPD
   2. Chronic asthma
   3. Bronchial carcinoma
   4. Interstitial lung disease
   5. Large pleural effusion(s)

**C. Others:** Severe anaemia, obesity

**[Davidson's-24th-489]**

**A 50-year-old patient presented with severe breathlessness for 2 days (Or sudden onset with short duration). What will be your DDs?**
**DDs:**

1. AVLF (Pulsus alternans, gallop rhythm, bilateral basal crepitations)
2. Acute exacerbation of COPD (Smoker >40 years of age, recurrent, vesicular with prolonged expiration +, ronchi+)
3. Tension pneumothorax (Sudden chest pain with silent resonant hemithorax)
4. Acute severe asthma (Recurrent attack with seasonal and diurnal variations, wheeze+, ronchi+)
5. DKA (Kussmaul breathing with normal chest examination)
6. Pulmonary embolism (Chest pain, cyanosis, hypotension, tachycardia)

**Investigations:**

1. ECG
2. Trop I
3. CXR PA view
4. RBS
5. Oxygen saturation

**A 25-year-old female (Young male/female) presented with sudden severe respiratory distress. What are the possible DDs?**

1. Tension pneumothorax
2. Acute severe asthma
3. ALVF
4. Metabolic acidosis: e.g., DKA
5. Psychogenic hyperventilation

## COUGH

**What is cough?**
**Cough is a characteristic sound caused by a forced expulsion against an initially closed glottis.**
**Acute cough**: **Lasting less than 3 weeks**
**Chronic cough: Lasting more than 8 weeks**

**What is the most common cause of acute cough**?
**Acute upper respiratory tract viral infection.**

**What are the 'Red flag' symptoms associated with cough?**

1. Haemoptysis
2. Breathlessness
3. Fever
4. Chest pain
5. Weight loss

**What are the common causes of cough**?

A. **Acute cough:** (<3 weeks)
**Normal chest Xray:**
1. Viral respiratory tract infection
2. Bacterial infection (acute bronchitis)

**Abnormal chest Xray:** Pneumonia

B. **Chronic cough:** (>8 weeks)
1. Asthma
2. COPD

3. Bronchiectasis
4. Lung cancer
5. Gastro-oesophageal reflux disease (GERD)
6. Persisting bronchial hyperreactivity
7. Drugs: e.g., ACE inhibitors
8. DPDL

**[Macleod's-14th-78-79 + Other Sources]**

**A 65-year-old male presented with cough for 3 months. What will be your DDs? How will investigate him?**

**DDs:**

1. Tuberculosis
2. Bronchial carcinoma
3. Bronchiectasis
4. DPLD
5. **Drug:** e.g., ACEi

**Clinical approach:**

**A. History:**
1. Fever
2. Weight loss
3. Sputum: If present: Amount, colour
4. Hemoptysis
5. Drug: e.g., ACE inhibitor

**B. Examination:**
1. Temperature
2. Anemia
3. Clubbing
4. Lymphadenopathy
5. Examination of respiratory system

**Investigation:**

1. CBC
2. MT
3. CXR PA view
4. Sputum for AFB, gene expert and malignant cell
5. **FNAC / biopsy from lymph node:** If present
6. **Other tests according to clinical suspicion and investigation report:** Bronchoscopy, pleural fluid study, CT/HRCT chest

## SPUTUM

**What is Sputum?**

Airway lining fluid coating the tracheobronchial tree and upper respiratory tract secretions are mixed with accumulation of neutrophils, mucus and proteinaceous secretions when expectorated with cough are called sputum.

**[Macleod's-14th-79]**

**What is the clinical information can you have from sputum?**

**A. Color:**
1. **Clear (Mucoid):** COPD, bronchiectasis without infection, rhinitis
2. **Yellow (Mucopurulent):** Acute RTI, asthma
3. **Green (Purulent):** Current infection- acute disease or exacerbation of chronic infection e.g., COPD

4. **Red/brown (Rusty):** Pneumococcal pneumonia
5. **Pink (Serous/ frothy):** Acute pulmonary edema

**B. Volume:** Volume in 24 hours e.g., small amount into a tissue or enough to fill a spoon or cup.

**C. Consistency:**

1. **An increase in stickiness (Viscosity):** Exacerbation of bronchiectasis
2. **Large volume of frothy secretions over weeks/months:** Bronchoalveolar cell carcinoma
3. **Sputum like firm pugs in patient with asthma**: Allergic bronchopulmonary aspergillosis

**[Macleod's-14th-79]**

## HEMOPTYSIS

**A 45-year-old man comes to you with haemoptysis. What will you do?**

1. At first, I will do resuscitation of this patient
2. I'll examine pulse, BP & urine output
3. Immediate open an IV channel and give a fluid (Inf. Hartsol/Normal saline 1000 IV 20 drops/min)
4. Blood grouping & cross matching
5. Give one unit of blood
6. After resuscitation try to find out the cause: For this I will take history, do clinical examinations, and perform some investigation when the patient is stable.

**What are the common causes of hemoptysis?**

1. PTB
2. Bronchogenic Ca
3. Bronchiectasis
4. Acute/chronic bronchitis
5. Acute pulmonary edema due to acute LVF

**[Davidson's-24th-493]**

**How will you approach after resuscitation of the patient?**

**History:**

1. H/O low grade fever with evening rise of temperature, cough, weight loss: TB
2. Voice change + Smoker+ Weight loss: Bronchial carcinoma
3. H/O breathlessness & cough: Bronchitis
4. Fever & cough with productive, foul smell sputum: Bronchiectasis
5. HTN, chest pain& H/O heart disease, orthopnea: Acute LVF

**Examination:**

1. Clubbing, lymphadenopathy, or SVCO & Horner's syndrome: Bronchial carcinoma
2. Cyanosis, clubbing, coarse creps: Bronchiectasis
3. Vesicular breath sound with prolong expiration with cough: Bronchitis
4. Cyanosis, tachycardia, gallop rhythm, bilateral basal crepitations: Acute LVF

**Next, I do investigation:**

1. TC, DC, ESR→ ESR raised in TB, Bronchial carcinoma
2. Sputum for AFB: TB
3. Sputum for malignant cell: Bronchogenic carcinoma
4. MT: Positive TB
5. CXR PA view
6. **If lymph node palpable:** FNAC, Biopsy
7. **ECG:** To exclude to LVF

**[Ward Class]**

**Suppose an old patient came to you with hemoptysis with clubbing. What will be your DDs?**

1. **Bronchial carcinoma**
2. **Bronchiectasis**
3. **Lung abscess**

**History:**

1. **Cough**
2. **Weight loss (Bronchial Ca, lung abscess)**
3. **H/O smoking (Bronchial Ca)**
4. **Chest pain (Bronchial Ca)**
5. **Fever (For lung abscess and bronchiectasis)**
6. **H/O PTB or childhood measles (For bronchiectasis)**

**Examination:**

1. **Temperature**
2. **Clubbing**
3. **Lymphadenopathy (Cervical)**
4. **Chest examination: For features of mass lesion, effusion (Bronchial Ca, lung abscess) or consolidation (Lung abscess), coarse crepitation altered by cough (Bronchiectasis)**
5. **Hepatomegaly (To see metastasis of bronchial Ca)**

**Investigations:**

1. **CBC**
2. **CXR PA view**
3. **Sputum for gram stain, C/S and malignant cell**
4. **HRCT chest: If bronchiectasis is suspected**
5. **If effusion present: Pleural fluid study**

## RESPIRATORY FAILURE

**What is respiratory failure?**

The term 'respiratory failure' is used when pulmonary gas exchange fails to maintain normal arterial oxygen and carbon dioxide levels.

**[Davidson's-24th-496]**

**What are the types of respiratory failure?**

1. **Type I:** Hypoxia and Normal or low $PaCO_2$
2. **Type II:** Hypoxia and Raised $PaCO_2$

**[Davidson's-24th-496]**

**What are the common causes of respiratory failure?**

**Type I respiratory failure:**

1. Acute asthma
2. Pulmonary oedema
3. Pneumonia
4. Pneumothorax
5. Lobar collapse
6. ARDS
7. Lung fibrosis

**Type II respiratory failure:**

1. Acute severe asthma
2. Acute exacerbation of COPD
3. Acute neuropathies/ paralysis
4. Ankylosing spondylitis
5. Upper airway obstruction
6. Flail chest injury

**[Davidson's-24th-498]**

***How will you treat acute respiratory failure?***

1. Prompt diagnosis and management of the underlying cause
2. **$O_2$ therapy:**
   - ✓ **In type I respiratory failure:** High flow oxygen (40–60% by mask)
   - ✓ **In type II respiratory failure:** Low flow oxygen (24-28%)

**[Davidson's-24th-498-99]**

**Nice to know:**

**Normal level of oxygen in air:** About 21%

**1L/min increases fraction of inspired oxygen ($FiO_2$):** Approximately 4%

e.g., 1L/min Oxygen means 25% $O_2$, 2L/min oxygen means 29% $O_2$

**Oxygen delivering devices with their capacity:**

| Name of device | Amount of oxygen to be delivered | Achievable $FiO_2$ |
|---|---|---|
| **Nasal canula** | 1-6 L/min | 24-40% |
| **Simple face mask** | 5-10 L/min | 35-55% |
| **Non-rebreather mask** | 10-15 L/min | 95-100% |
| **Partial rebreather mask** | 10-15 L/min | 80% |
| **Venturi mask** | 5-15 L/min | 28-100% |
| **High-flow nasal cannula** | 5-15 L/min | 100% |
| **Non-invasive ventilation (BiPAP and CPAP)** | 5-15 L/min | 90% |
| **Artificial ventilation** | 5-15 L/min | 90-100% |

## PLEURAL EFFUSION

**What is pleural effusion?**

The accumulation of serous fluid within the pleural space is termed pleural effusion.

**[Davidson's-24th-494]**

A pleural effusion is present when there is excess quantity of fluid in pleural space.

**[Harrison's-20th-2006]**

Normally, the pleural space contains a small amount of fluid which allows the lungs to inflate and deflate with minimal friction.

**What is the definitive sign of pleural effusion?** Stony dullness and reduced/absent breath sound

**How can you confirm pleural effusion in bed side?** By aspiration of fluid

**Minimum amount of fluid necessary for detection:**

1. Clinical detection: 500 mL
2. CXR PA view in the erect posture: 200 mL
3. CXR lateral decubitus view with the affected side down: 100-150 mL
4. Ultrasonography: Less than 100 ml

**What are the common causes of pleural effusion?**

1. Pneumonia ('Parapneumonic effusion')
2. TB
3. Pulmonary infarction
4. Malignant disease
5. Cardiac failure

6. Subdiaphragmatic disorders (subphrenic abscess, pancreatitis etc.)

**[Davidson's-24th-496]**

**What is transudative pleural effusion? What are the common causes?**

- ✓ Protein content is <30g/L.
- ✓ Occurs when systemic factors that influence the formation and absorption of pleural fluid are altered.

**Causes:**

1. Heart failure
2. Hypoproteinemia e.g., NS
3. Constrictive pericarditis
4. Hypothyroidism
5. Meig's syndrome

**What is Exudative pleural effusion?**

- ✓ Protein content is >30g/L.
- ✓ Occurs when local factors that influence the formation and absorption of pleural fluid are altered results from increased capillary permeability.

**Causes:**

1. Bacterial pneumonia
2. TB
3. Ca bronchus
4. Pulmonary infarction
5. SLE
6. Acute pancreatitis (Rare)

**[Harrison's-20th-2006+ Kumar and Clark's-9th-1134+ Other sources]**

**What is Light's criteria for distinguishing pleural transudate from exudate?**

Exudate is likely if one or more of the following criteria are met:

1. Pleural fluid protein: serum protein ratio >0.5
2. Pleural fluid LDH: serum LDH ratio >0.6
3. Pleural fluid LDH > two-thirds of the upper limit of normal serum LDH

**[Davidson's-24th- 497]**

**What will you find on examination of Chest?** (Right sided pleural effusion)

**Inspection:** Restricted movement on right side

**Palpation:**

↓Expansion on R

Trachea and apex may be shifted to L

**Percussion:** Stony dull R mid- and lower zones

**Auscultation:**

Absent breath sounds and vocal resonance R base

Bronchial breathing or crackles above effusion

**How will you differentiate it from pneumothorax clinically?**

By percussion note-

In pneumothorax: Hyper resonant

In pleural effusion: Stony dull

**What investigations will you advice?**

1. **CXR PA view:** A curved shadow at the lung base, blunting the costophrenic angle and ascending towards the axilla
2. **CBC with ESR:** High ESR in TB

3. **Pleural aspiration:** At least 50 mL of pleural fluid should be withdrawn.
    a. **Appearance:**
        Straw: TB
        Hemorrhagic: Pulmonary infarction, malignancy but may result from a traumatic tap.
    b. **Biochemical:** Sugar, Protein
    c. **Cytological examination**
    d. **Microbiological examination:** Gm stain, AFB
    e. **Malignant cell** (Exfoliative cytology)
    f. **ADA:** Elevated in TB
4. **Sputum:** Gm stain, AFB and malignant cell
5. **Pleural biopsy:** With Abrams needle
6. **FNAC/biopsy of lymph node:** If lymph node is palpable
7. **USG of chest:**
    - ✓ More accurate than plain chest X-ray for determining the presence of fluid.
    - ✓ A clear hypoechoic space is consistent with a transudate
    - ✓ Presence of moving, floating densities suggests an exudate.
8. **CT scan of chest:** Is indicated where malignant disease is suspected.

**What is the importance of ADA in pleural fluid?**

- ✓ **ADA in pleural fluid ≥40 U/ml:** Highly suggestive of tubercular pleural effusion
- ✓ **ADA in pleural fluid <40 U/ml:** Doesn't exclude TB

**N.B.:** In Pleural fluid >40, ascitic and pericardial fluid >30, CSF>15

**How will you treat pleural effusion?**

1. **Therapeutic aspiration:** To palliate breathlessness
2. **Treatment of the underlying cause:** e.g., TB (Anti-TB and steroid), heart failure, pneumonia.

**[Davidson's-24th-496]**

**How much fluid can aspirate per day at maximum? Why?**

- ✓ 1.5 L
- ✓ If >1.5L fluid is aspirated in single episode, there is a small risk of re-expansion pulmonary oedema.

**What is mechanism?**

Exact reason is not known.

1. Sudden onset of ventilation and reperfusion of a previously collapsed lung may lead to an inflammatory response, with production of reactive oxygen species and superoxide radicals, which results in increased capillary permeability.
2. Increased pulmonary hydrostatic pressure caused by enhanced venous return.
3. Pressure-induced mechanical disruption of alveolar capillaries causing fluid leakage.

**What are the causes of hemorrhagic pleural effusion?**

1. Bronchial carcinoma
2. Pleural mesothelioma
3. Lymphoma (Common in young)
4. Trauma
5. Pulmonary infarction
6. Acute pancreatitis

**Suppose a patient was presented to you with severe abdominal pain. You found left sided pleural effusion on examination. What is the Dx?**

Acute pancreatitis

**What are the common causes of predominantly left sided pleural effusion?**

1. Acute pancreatitis

2. RA
3. Dressler's syndrome
4. Dissecting aneurysm
5. Oesophageal rupture

**What are the common causes of predominantly right sided pleural effusion?**

1. Liver abscess
2. Dengue hemorrhagic fever
3. Meigs's syndrome (Triad of benign ovarian tumor with ascites and pleural effusion)

**Recurrent pleural effusion (reappearance after thoracentesis):**

1. Bronchial carcinoma
2. Pleural mesothelioma
3. SLE
4. Lymphoma

**Red flag signs in pleural effusion:**

1. Trachea shifted to the side of effusion
2. Developing into empyema thoracis

**Why there is dyspnoea in pleural effusion?**

1. Massive collection and / or
2. Rapid collection.

Pleural effusion produces (compression) collapse of the lung with shifting of the mediastinum to opposite side which leads to reduction in the vital capacity.

**What are the complications of pleural effusion?**

1. Thickened pleura
2. Empyema thoracis
3. Collapse followed by fibrosis later on
4. Spread of infection (tuberculosis) to pericardium or peritoneum.
5. Cardio-respiratory embarrassment: As a result of massive pleural effusion
6. Hydropneumothorax: May develop after pleural aspiration.

**A 60-year-old man presented with low grade fever and cough for 3 months and recent onset of heaviness of right side of chest. You found features of pleural effusion on examination. What are the possibilities? How can you differentiate them clinically?**

**DD:**

1. Tubercular pleural effusion
2. Bronchial carcinoma

**For differentiation:**

1. H/O contact with TB patient (In favor of TB)
2. **Cervical lymph node:** Matted in TB, hard, fixed in bronchial carcinoma
3. Nicotine staining and clubbing (In favor of bronchial carcinoma)
4. Features of SVCO (Plethoric face, hoarseness of voice etc.) (In favor of bronchial carcinoma)

**A young patient came to you with pleural effusion. What DDs will come to your mind?**

1. Parapneumonic effusion
2. Tuberculous pleural effusion
3. Lymphoma
4. **If right sided:** Dengue, liver abscess
5. **If left sided:** Acute pancreatitis

6. **If female:** RA, SLE

## PNEUMOTHORAX

**A young male patient comes to ward with sudden severe respiratory distress with chest pain. What is your diagnosis?**
**Sir, I have DDs**
1. **Tension pneumothorax**
2. **Acute LVF**

**A young smoker patient came to you with the complaints of sudden onset of severe chest pain for few hours. On examination you found absent breath sound and hyper-resonant on right side? What is your Dx?**
Right sided Pneumothorax

**What are the definite signs of tension pneumothorax?**
1. Diminished/absent breath sound
2. Hyper resonant percussion node

**How will tension pneumothorax present?**
1. Sudden onset of unilateral pleuritic chest pain
2. Breathlessness
3. Marked tachycardia
4. Hypotension
5. Cyanosis
6. Tracheal displacement to opposite side
7. Silent hemithorax
8. Resonant percussion note

**[Davidson's-24th-653-54]**

**In which position tension pneumothorax patient come?** In sitting position

**How will you treat tension pneumothorax?**
1. $O_2$ inhalation
2. Insertion of a blunt cannula into 2nd intercostal space in midclavicular line
3. Chest drain insertion with water seal drainage

**[Davidson's-23rd-626-627+ Other sources]**

**How intercostal drain is given?**
- ✓ Inserted in the fourth, fifth or sixth intercostal space in the mid-axillary line
- ✓ Connected to an underwater seal or one-way Heimlich valve, and secured firmly to the chest wall.

**[Davidson's-23rd-628]**

**How will you manage a patient with IT tube?**
1. Observe if bubbling present or not
2. If bubbling ceased: Perform CXR PA view 24 hours later
3. If lung is fully expanded: Remove IT tube
4. If bubbling persist after 5-7 days: Thoracotomy
5. If bubbling had ceased before lung fully inflated: Check the tube for any obstruction, kinking or displacement.

**When to remove the drain tube?**

The morning after (e.g., 24 hours after) the lung has fully re-inflated, and bubbling has stopped.

**Indication for surgery:** Continued bubbling after 5–7 days

**What advice should be given to a patient with tension pneumothorax?**

1. Stop smoking
2. Not to fly for 6 weeks after normal CXR
3. Diving is permanently avoided

**What is pneumothorax?**

Pneumothorax is the presence of air in the pleural space, which can either occur spontaneously, or result from iatrogenic injury or trauma to the lung or chest wall.

**[Davidson's-24th-553]**

**How will you classify pneumothorax?**

**A. Spontaneous**

**1. Primary:**

- ✓ No evidence of overt lung disease
- ✓ Air escapes from the lung into the pleural space through rupture of a small pleural bleb, or the pulmonary end of a pleural adhesion

**2. Secondary:** Underlying lung disease. e.g.

a. COPD
b. TB
c. Asthma
d. Lung abscess
e. Pulmonary infarcts
f. Lung cancer
**g.** All forms of fibrotic and cystic lung disease

**B. Traumatic:** Iatrogenic (e.g., following thoracic surgery or biopsy) or chest wall injury.

**[Davidson's-24th-553]**

**Nice to know:**

**Types of spontaneous pneumothorax:**

1. **Closed pneumothorax:** Communication between the airway and the pleural space seals off as the lung deflates and does not re-open.
2. **Open pneumothorax:** Communication fails to seal, and air continues to pass freely between the bronchial tree and pleural space.
3. **Tension pneumothorax:**

- ✓ Communication between the airway and the pleural space acts as a one-way valve, allowing air to enter the pleural space during inspiration but not to escape on expiration.
- ✓ This causes mediastinal displacement towards the opposite side, with compression of the opposite normal lung and impairment of systemic venous return, causing cardiovascular compromise.

**[Davidson's-24th-554]**

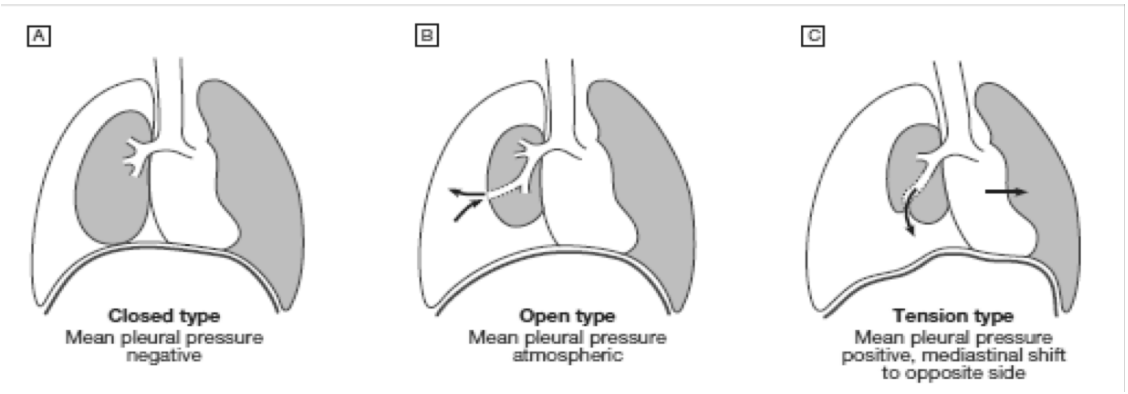


**Figure:** Types of spontaneous pneumothorax

**How does a patient with pneumothorax present?**
**Symptoms:**

1. Sudden-onset unilateral pleuritic chest pain
2. Breathlessness

**Signs:** Normal in small pneumothorax. A larger pneumothorax (> 15% of the hemithorax) results in following changes in affected side: e.g. right side

**Inspection:** Tachypnoea (pain, deflation reflex)
**Palpation:**
↓Expansion R side
Deviation of trachea to opposite side
**Percussion:** Resonant or hyper-resonant on R
**Auscultation:** Absent breath sounds on R

****[SILENT RESONANT HEMITHORAX]***

**What investigation will you perform?**

**CXR PA view:** Sharply defined edge of the deflated lung with complete translucency (no lung markings) between this and the chest wall.

**How will you treat?**

1. **No intervention:** Primary pneumothorax, in which the lung edge is less than 2 cm from the chest wall and patient is not breathless.
2. **Percutaneous needle aspiration of air:** In young patients presenting with a moderate or large spontaneous primary pneumothorax,
3. **Intercostal drain:** If
    a. Tension pneumothorax
    b. Significant underlying chronic lung disease
    c. Over 50 years old and those with respiratory compromise.
4. **In tension pneumothorax:** Insertion of a blunt cannula into 2nd intercostal space in midclavicular line allowing time to prepare for chest drain insertion.

**[Davidson's-24th-554 + Other sources]**

**Name some causes of recurrent spontaneous pneumothorax.**

1. Subpleural bullae
2. Emphysematous bullae
3. Cystic fibrosis
4. Alpha 1 anti-trypsin deficiency

**Treatment:**

1. **Surgical pleurodesis:** By pleural abrasion or parietal pleurectomy at thoracotomy or thoracoscopy.

**Indications:**

a. Second pneumothorax
b. First episode of secondary pneumothorax if low respiratory reserve makes recurrence hazardous.

2. **Chemical pleurodesis**: By Inj. Tetracycline, Kaolin, or Talc via IT tube

**70-year-old patient presented with severe breathlessness for last 4 hours. Patient is cyanosed. What are your DDs? How will you differentiate them clinically?**

**DDs:**

1. Tension pneumothorax
2. Acute exacerbation COPD
3. ALVF

| Traits | Tension pneumothorax | Acute exacerbation of COPD | ALVF |
|---|---|---|---|
| **Chest pain** | Present | Absent | May be present |
| **Trachea** | Shifted to opposite side | Central | Central |
| Percussion note | Hype resonant in affected side | Normal | Normal |
| Breath sound | Absent in affected side | Vesicular with prolonged expiration | Normal |
| Added sound | Absent | Ronchi | Bilateral basal crepitations |

## PNEUMONIA

**40 years old male presented in ward with fever, chest pain and cough. On examination, you found bronchial breath sound and dull percussion note. What may be the Dx?**

**Pneumonia/ Pneumonic consolidation/ CAP**

**What is pneumonia?**

Pneumonia is as an acute respiratory illness associated with recently developed radiological pulmonary shadowing that may be segmental, lobar or multilobar.

**[Davidson's-24th-512]**

**How will you classify pneumonia?**

1. Community acquired
2. Hospital acquired
3. Pneumonia in immunocompromised
4. Suppurative and aspiration pneumonia

**Anatomical classification:**

1. **Lobar pneumonia:** A radiological and pathological term referring to homogeneous consolidation of one or more lung lobes, often with associated pleural inflammation
2. **Bronchopneumonia:** Refers to more patchy alveolar consolidation associated with bronchial and bronchiolar inflammation, often affecting both lower lobes.

**[Davidson's-24th-513]**

**What are the stages of pneumonia?**

1. Stage of acute exudation: 1-2 days
2. Red hepatisation: 2-4 days
3. Grey hepatisation: 4-8 days

4. Resolution: 8-9 days or more.

**[Davidson's-24th-513]**

**What are the factors that predispose to pneumonia?**

1. Cigarette smoking
2. Upper respiratory tract infections
3. Alcohol
4. Glucocorticoid therapy
5. Old age
6. Recent influenza infection
7. Pre-existing lung disease
8. HIV
9. Indoor air pollution

**[Davidson's-24th-513]**

**What are common organisms causing community-acquired pneumonia?**

1. *Streptococcus pneumoniae*
2. *Mycoplasma pneumoniae*
3. *Legionella pneumophila*
4. *Chlamydia pneumoniae*

**<u>For more curiosity:</u>**

**Organism causing CAP:**

**A. Bacteria:**

1. *Streptococcus pneumoniae*
2. *Mycoplasma pneumoniae*
3. *Legionella pneumophila*
4. *Chlamydia pneumoniae*
5. *Haemophilus influenzae*
6. *Staphylococcus aureus*
7. *Chlamydia psittaci*
8. *Coxiella burnetii* (Q fever)
9. *Klebsiella pneumoniae* (Freidlander's bacillus)

**B. Viruses:**

1. Influenza, parainfluenza
2. Measles
3. Herpes simplex
4. Varicella
5. Adenovirus
6. Cytomegalovirus
7. Coronaviruses (SARS-CoV and MERS-CoV)

**[Davidson's-24th-513]**

**<u>Nice to know:</u>**

**Most likely organism in some specific situations:**

*Streptococcus pneumoniae*: Most common
*Mycoplasma pneumoniae*: Young people
*Haemophilus influenzae*: Elderly
*Legionella pneumophila:* Local outbreaks centered in hotels, hospitals, and other industries.
*Staph. aureus:* Following an episode of influenza.
*Klebsiella* pneumonia: Alcohol abuse

**How does a patient of pneumonia present?**

**Symptoms:** *(Mention the main points only)*

1. **Fever:** With rigors, shivering
2. **Cough:**

- ✓ At first is dry, short, painful followed by mucopurulent sputum.
- ✓ Rust-coloured sputum in *Strep. pneumoniae* infection
- ✓ Occasionally haemoptysis.

3. **Chest pain:** Pleuritic
4. Malaise, loss of appetite, headache, delirium

**Signs:**

**On general examination:**

1. Temperature: Raised
2. Tachypnoea
3. Tachycardia
4. Hypotension
5. Cyanosis
6. Confusion

**On Respiratory system examination:**

**Inspection:** Tachypnoea, Restricted movement on affected side, cyanosis (if severe)
**Palpation:** ↓Expansion on affected side**,** increased vocal fremitus
**Percussion:** Dull (Woody)
**Auscultation:** Bronchial breath sounds**,** ↑Vocal resonance over consolidation, Crackles: Present in resolution stage

**How will you investigate a case of pneumonia?** (Mention the points initially and let the examiner ask further)

1. **CBC with ESR and CRP:** Neutrophilic Leucocytosis
2. **Sputum for Gram stain and C/S**
3. **CXR PA view**
4. **Serum urea and electrolytes: (**Urea > 7 mmol/L, Hyponatremia: Marker of severity)

**[Davidson's-24th-515]**

**What in your expected finding in Xray?**

- ✓ **Lobar pneumonia:** Dense homogeneous opacity with air bronchogram
- ✓ **Bronchopneumonia:** Patchy and segmental shadowing

- ❖ Time taken to appear Radiological shadow: 12-18 hours
- ❖ Time taken to appear consolidation: 2 days

**How will you treat pneumonia?**

1. **Oxygen:**
   - ✓ To all patients with tachypnoea, hypoxemia, hypotension or acidosis
   - ✓ Maintaining *Pa*O2 ≥ 8 kPa (60 mmHg) or *Sa*O2 ≥ 92%.
2. Fluid balance
3. **Antibiotic:** Write according to your patient's CURB-65 score
   **Low severity CAP (CURB-65 score 0-1):** Amoxicillin
   **Moderate severity CAP (CURB-65 score 2):** Amoxicillin + Clarithromycin
   **Severe CAP (CURB-65 score 3-5):** Co-amoxiclav + Clarithromycin
4. **Treatment of pleural pain:** Paracetamol, co-codamol or NSAIDs.

**[Davidson's-24th-525+ Other sources]**

**A patient came to you, and you found increased breath sound and increased vocal resonance. After 2 days breath sound became diminished/absent and dull percussion note. What may be the explanation of this?**

Pneumonic consolidation turns into parapneumonic effusion or empyema.

**What are the other common complications of pneumonia?**

1. Para-pneumonic effusion: Common
2. Empyema
3. Pneumothorax (Particularly with *Staphylococcus aureus*)

4. Suppurative pneumonia/lung abscess
5. Hepatitis, pericarditis, myocarditis, meningoencephalitis

**[Davidson's-24th-516]**

**How will you assess severity of community acquired pneumonia?**

**CURB-65:**

**Any of-**

1. **C**onfusion
2. **U**rea>7mmol/L
3. **R**espiratory rate >30/min
4. **B**lood pressure (Systolic <90 mm of Hg or diastolic <60 mm of Hg)
5. **A**ge>**65** years

**CURB-65 score 0 or 1:** Home treatment

**CURB-65 score 2:** Consider hospital supervised treatment. Options are-

a. Short-stay inpatient
b. Hospital supervised outpatient

**CURB-65 score 3 or more:**

a. Manage in hospital as severe pneumonia
b. Assess for ICU admission specially if CURB-65 score= 4 or 5

**[Davidson's-24th-514-15]**

**What are the indications for referral to ITU?**

1. CURB score of 4–5, failing to respond rapidly to initial management
2. Persisting hypoxia (*Pa*O2 < 8 kPa (60 mmHg)), despite high concentrations of oxygen
3. Progressive hypercapnia
4. Severe acidosis
5. Circulatory shock
6. Reduced conscious level

**[Davidson's-24th-515]**

**Suppose during follow up of a patient with pneumonic consolidation in ward, you got creps on auscultation. What may be the Dx?**

Patient is in resolution stage

**Will you advice CXR before discharge? Why?**

- ✓ No
- ✓ As it takes 4 weeks for radiological resolution

**How much time does it take for clinical resolution?** Usually, 2 weeks

**How will follow-up after discharge?**

1. **Clinical review:** Around 6 weeks later
2. If persistent symptoms, physical signs or reasons to suspect malignancy: Perform CXR

**[Davidson's-24th-517]**

**Does breathlessness occur in CAP? If occurs, why?**

- ✓ Yes, can occur.
- ✓ Because alveoli become filled with pus and debris, impairment of gas exchange occur.

**How will you differentiate bacterial and viral pneumonia?**

| Traits | Bacterial pneumonia | Viral pneumonia |
|---|---|---|
| 1. Onset | Abrupt | Less abrupt |
| 2. H/O URTI | Absent | May be present |
| 3. Cough | Initially dry, then purulent or rusty | Usually, dry |

| | | |
|---|---|---|
| 4. Pleuritic chest pain | Common | Less common |
| 5. Systemic features | High grade fever with chills and rigor | Low grade fever, malaise, headache, myalgia |
| 6. On examination | Well-marked features of consolidation | Features of consolidation are less commonly found |
| 7. CBC | Leukocytosis | Normal or leucopenia |
| 8. CXR | Homogenous opacity with air bronchogram in a lobe or segment | Mottling or reticular or patchy or streaky opacity |
| 9. Sputum for CS | Organism found | Not found |

**A 50-year-old male presented with fever and chest pain for 3 days. CXR showed consolidation. Now he is confused, cyanosed, RR 24/min and systolic BP is 85 mm of Hg. What's your Dx? Assess severity and Rx.**
**Dx: Community acquired pneumonia (CAP) with sepsis**
**Severity and Rx: According to CURB-65 score**

**Moderate severity CAP (CURB-65 score 2):** Amoxicillin + Clarithromycin

**For advanced learners:**

**What is delayed resolution? What are the common causes?**

If physical signs persist more than 2 weeks and radiological findings persist beyond 4 weeks after proper antibiotic therapy.

**Causes of slow or delayed resolution:**

1. Incorrect clinical or microbiological diagnosis
2. Inappropriate selection of antibiotic or inadequate dose
3. Development of complications
4. Hidden bronchial obstruction e.g., bronchial carcinoma, bronchial adenoma etc.
5. Immunosuppression e.g., DM, HIV, leukaemia, lymphoma etc.
6. Fungal or atypical pneumonia
7. Tuberculous pneumonia

**What is non-resolution?**

When radiological findings persisting beyond 8 weeks after proper antibiotic therapy.

**What is massive consolidation? What are the causes?**

Consolidation involving more than 1 lobe.

**Causes:**

1. Atypical pneumonia: Pneumonia caused by *Mycoplasma*, *Legionella*, *Chlamydia* and *Coxiella*
2. *Klebsiella*
3. *S. Aureus*
4. Fungal infection

**What is recurrent pneumonia? What are the causes?**

≥3 separate attacks of pneumonia is called recurrent pneumonia.

**Causes:**

1. Chronic bronchitis, bronchiectasis, cystic fibrosis, lung abscess
2. Bronchial obstruction e.g., bronchial carcinoma, bronchial adenoma etc.
3. Immunosuppression e.g., DM, HIV, leukaemia, lymphoma etc.
4. Recurrent aspiration
5. SLE

**Organism causing upper lobe consolidation:** *Klebsiella pneumonia*
**Suppuration and abscess:** Common in pneumonia caused by *Stph. aureus* and *Klebsiella pneumonia*

**What are the other markers of severe pneumonia?**

1. CXR: >1 lobe involved
2. Pao2: <8 kPa
3. Low albumin: <35 g/L
4. White cell count: < 4 × 109/L or >20 × 109/L
5. Blood culture: Positive

**[Kumar and Clark-7th- 862]**

**What are the indications of blood culture in pneumonia?**

1. Patient with neutropenia secondary to pneumonia
2. Asplenia
3. Complement deficiency
4. CLD
5. Severe CAP

**[Harrison's-20th-911]**

**What are the discharge criteria?**

A. Clinically stable plus

**B. Not >1 clinical signs of below:**

1. Temperature >37.8$^0$C
2. Heart rate >100/min
3. RR>24/min
4. Systolic BP <90 m
5. m of Hg
6. $SaO_2$ <90%
7. Abnormal mental status
8. Inability to maintain oral intake