

MEDICAL SURGICAL MIDTERM REVIEWER

1. PNEUMOTHORAX

Definition

Pneumothorax occurs when air enters the pleural space, causing the normally negative pressure to become positive. This can cause the lung or part of the lung to collapse.

Why does the lung collapse?

Normally:

Pleural pressure is negative

Negative pressure helps keep the lung expanded.

When the pleura is breached → air enters

Negative pressure is lost → lung collapses

Types of Pneumothorax

Type	Main Cause	Important Point
Simple/Spontaneous	Ruptured bleb, lung disease	May occur without trauma
Traumatic	Chest injury/procedure	Air enters pleural space because of injury
Open	Open chest wound	Air moves in and out through wound
Tension	Air enters but cannot escape	Medical emergency

A. Simple/Spontaneous Pneumothorax

Air enters the pleural space because of a rupture in the pleura.

Possible causes:

Ruptured bleb

Bronchopleural fistula

Severe emphysema

A spontaneous pneumothorax can occur even without trauma.

Remember: > Spontaneous = can happen without an external injury.

B. Traumatic Pneumothorax

Caused by:

Rib fracture

Stab wound

Gunshot wound

Blunt chest trauma

Thoracic procedures

- It can also occur accidentally during procedures such as

Thoracentesis

Lung biopsy

Subclavian line insertion

It may occur together with blood in the pleural space:

Hemopneumothorax = air + blood

Hemothorax = blood in pleural space

C. Open Pneumothorax

An open chest wound allows air to move freely into and out of the chest during breathing.

Classic finding:

“Sucking” sound from the chest wound

Emergency priority - The opening must be covered/sealed to stop air from entering.

Your notes emphasize that stopping the air flow through the wound is a lifesaving intervention.

D. Tension Pneumothorax

This is the most dangerous type. Air enters the pleural space but cannot escape.

Therefore, Air trapped → pressure increases → lung collapses → mediastinum shifts → venous return decreases → cardiac output decreases

The increased pressure can compress:

Affected lung

Other lung

Heart

Great vessels

Major signs

Severe dyspnea

Tachypnea

Tachycardia

Hypotension

Diminished/absent breath sounds

Tracheal deviation away from affected side

Unilateral decreased chest expansion

Hyperresonance

Cyanosis

Anxiety/restlessness

Exam Alert: Tension pneumothorax + tracheal deviation = emergency

The treatment focuses on rapid decompression and chest tube drainage to relieve pressure and restore circulation.

Pneumothorax Assessment

Assess:

T-C-B-P

T = Tracheal alignment

C = Chest expansion

B = Breath sounds

P = Percussion

Simple Pneumothorax

Trachea: midline

Chest expansion: decreased

Breath sounds: diminished

Percussion: may be hyperresonant

Tension Pneumothorax

Trachea: away from affected side

Breath sounds: diminished/absent

Chest expansion: decreased/fixed

Percussion: hyperresonant

Medical Management

Main goal: Remove air or blood from the pleural space and allow the lung to re-expand.

Possible interventions:

Needle aspiration/decompression

Chest tube

Thoracostomy

Thoracotomy in severe cases

- The slides describe smaller chest tubes for pneumothorax and larger tubes for hemothorax.

Nursing Interventions

Apply dressing over open chest wound

Administer oxygen as prescribed

Place patient in High Fowler's

Monitor respiratory status

Monitor for subcutaneous emphysema

Assist with chest tube insertion

Maintain water-seal drainage system

Monitor respiratory pattern

Manage pain

2. PNEUMONIA

Definition

Pneumonia is an inflammatory disease of the lungs. It can involve the alveoli and may cause:

Consolidation

Pleural effusion

Empyema

It may be caused by:

Bacteria

Viruses

Fungi

Chemicals

Aspiration of gastric contents

Classification

Community-Acquired Pneumonia (CAP)

Acquired in the community.

Hospital-Acquired Pneumonia (HAP)

Develops in a healthcare setting.

Risk Factors

Patients at higher risk include:

Smokers

Altered consciousness

Immunosuppressed patients

Chronically ill patients

Prolonged immobility

Why is altered consciousness dangerous?

The patient's protective airway reflexes may be decreased. This increases the risk of:

Aspiration → pneumonia

Pathophysiology of Pneumonia

Simple sequence:

Infection/inflammation

↓

Alveolar inflammation

↓

Fluid/exudate enters alveoli

↓

Consolidation

↓

Reduced oxygen diffusion

↓

Hypoxemia

↓

Difficulty breathing

Consolidation

The alveoli become filled with inflammatory material instead of air. This interferes with normal gas exchange.

Stages of Pneumonia

1. Congestion

Inflammation begins - Blood vessels become wider and more permeable.

Vascular congestion occurs - The blood vessels in the lungs become engorged with blood.

Exudate forms - Fluid, proteins, and inflammatory cells leak from the blood vessels into the lung's air spaces.

- Oxygen diffusion becomes difficult

2. Consolidation

Neutrophils - fight the infection

RBCs - leak into the affected lung tissue

Fibrin - helps form a thick, solid material

- accumulate in the exudate, producing a solid area.

3. Resolution

RBCs break down

Macrophages remove exudate

Material is expectorated or reabsorbed

Signs and Symptoms

Common findings:

Fever

Chills
Sweating
Cough
Sputum
Dyspnea
Chest pain
Headache
Possible hemoptysis

Bacterial Pneumonia - is a lung infection caused by bacteria. The infection causes inflammation and fluid to build up inside the alveoli (air sacs).

Usually:
Abrupt onset
Severe chills
Sharp chest pain
Productive cough
Rust-colored sputum

Viral Pneumonia - Viral pneumonia is a lung infection caused by a virus. Unlike bacterial pneumonia, the inflammation often affects the airway lining and lung tissue, and the immune response can cause swelling and fluid accumulation.

May have:
Burning/searing sternal chest pain
Dry/hacking cough
Small amount of whitish sputum
Headache

Diagnostic Tests

Chest X-ray
May show:
Consolidation
Diffuse patches

Laboratory

Increased WBC
Increased ESR
Decreased PaO₂

Sputum culture - Helps identify the causative organism.

Nursing Interventions

1. Promote ventilation

Give oxygen as ordered
Fowler's position
Frequent repositioning
Assess breath sounds
Monitor ABGs

2. Remove secretions

Encourage fluids if not contraindicated
Deep breathing
Coughing
Ambulation
Suctioning when needed

Chest physiotherapy
Nebulization
Humidification

3. Nutrition

Give:
High-calorie
High-protein
Small frequent meals

4. Rest

Pneumonia can cause significant fatigue.
Provide:
Adequate rest
Limited activity
Uninterrupted rest periods
Cluster nursing care

Important Nursing Diagnoses

Ineffective Airway Clearance Related to:
Increased sputum
Thick secretions
Ineffective cough

Nursing actions:

- Encourage coughing
- Deep breathing
- Reposition every 2 hours
- Chest physiotherapy
- Suction if needed
- Monitor sputum

Impaired Gas Exchange Possible because edema and secretions interfere with gas exchange.

Watch for:

- Restlessness
- Tachycardia
- Tachypnea
- Abnormal ABGs
- Cyanosis

Interventions:

- Elevate HOB
- Give oxygen
- Monitor ABGs
- Mobilize secretions

Aspiration Pneumonia

Aspiration = inhalation of food, fluid, saliva, or gastric contents into the airway. Accidentally enter the lungs instead of going into the esophagus. This can introduce bacteria or cause chemical irritation and inflammation.

Prevention

- Keep patient upright
- Elevate HOB during enteral feeding
- Keep suction available

- Use appropriate consistency of liquids when indicated
- Monitor feeding residuals according to facility protocol
- Your slides specifically emphasize upright positioning and HOB elevation during enteral feeding.

3. BRONCHIAL ASTHMA

Bronchial asthma is a chronic inflammatory disease of the airways. The bronchi become sensitive and can narrow, swell, and produce more mucus, making it difficult for air to move in and out.

Bronchial asthma involves: Chronic airway inflammation + airway narrowing + mucus production

→ difficulty breathing.

Asthma is generally an inflammatory, noninfectious airway disorder.

Types of Asthma

1. **Extrinsic/Atopic Asthma** - Associated with external allergens. (nalalanghap)

Examples:

- Dust
- Smoke
- Perfumes
- Chemicals
- Soaps
- Food
- Sudden temperature changes

2. **Intrinsic/Non-Atopic Asthma** - Not directly related to external allergens. (nararamdaman)

Triggers include:

- Stress
- Fatigue
- Lack of sleep
- Anxiety

3. **Mixed Asthma** - Combination of extrinsic and intrinsic triggers.

Asthma Signs and Symptoms

- Cough
- Wheezing
- Chest tightness
- Dyspnea
- Tachypnea
- Tachycardia
- Prolonged expiration
- Increased mucus
- Restlessness
- Anxiety/apprehension
- Diaphoresis

Severe attacks may cause:

- Hypoxia

- Weak pulse
- Altered level of consciousness

Classic asthma finding: Expiratory wheezing

Asthma Goals

1. Liquefy secretions
2. Promote expectoration
3. Relieve bronchospasm
4. Decrease airway swelling

Nursing Interventions - To loosen secretions

- Encourage fluids if appropriate
- Nebulization
- Humidification
- Mucolytics as ordered

To remove secretions

- Deep breathing
- Coughing
- Vibration
- Percussion
- Postural drainage

To relieve bronchospasm - Administer prescribed:

- Bronchodilators
- Other appropriate respiratory medications

Bronchodilators - Bronchodilators relax airway smooth muscle and help open narrowed airways.

Beta-2 agonists

Examples:

- Salbutamol
- Salmeterol
- Formoterol
- Vilanterol

Anticholinergics

Examples:

- Ipratropium
- Tiotropium

Theophylline

A bronchodilator listed in the slides.

Nursing alert

Some bronchodilators can cause:

- Tachycardia
- Tremors
- CNS stimulation

Asthma Emergency

Severe asthma can cause:

Bronchospasm → airway obstruction → poor ventilation → hypoxemia → respiratory failure

Nursing priorities:

1. Assess airway and breathing.
2. Position in Fowler's/orthopneic position.

3. Administer oxygen as ordered.
4. Give prescribed bronchodilators.
5. Monitor ABGs and respiratory status.
6. Prepare for advanced airway support if respiratory failure develops.

- The slides specifically identify oxygen, Fowler's/orthopneic positioning, ABG monitoring, bronchodilators, and possible ventilation.

4. COPD – EMPHYSEMA

Chronic Obstructive Pulmonary Disease involves progressive airflow limitation and chronic changes in the lungs. The file discusses COPD in relation to:

- Emphysema
- Chronic bronchitis
-
- Asthma

Common features:

- Smoking
- Dyspnea
- Chronic cough
- Frequent respiratory infections
- Hypoxia
- CO₂ retention

Causes/Risk Factors

Most important:

Cigarette smoking

Other factors:

- Air pollution
- Occupational dust/gas exposure
- Chronic airway inflammation
- Genetic factors
- Aging

EMPHYSEMA

Definition

Emphysema is characterized by damage to the alveoli.

The alveoli:

- Become enlarged
- Lose elasticity
- Have destruction of surrounding capillaries
- Trap air
- This decreases effective gas exchange.

Easy way to remember: Emphysema = damaged alveoli + loss of elasticity + air trapping

Pathophysiology

Smoking/genetic factors

↓
Inflammation
↓
Alveolar wall destruction
↓
Loss of elastic fibers
↓
Air trapping
↓
Hyperinflation
↓
Poor gas exchange
↓
Hypoxia + CO₂ retention

- The slides also discuss the balance between elastase and alpha-1-antitrypsin.

Alpha-1 Antitrypsin

Alpha-1 antitrypsin helps protect lung tissue from destructive enzymes such as elastase.

Low alpha-1 antitrypsin → increased tissue destruction → increased risk of emphysema.

Why is expiration difficult?

In emphysema:

Loss of elasticity → small airways collapse during expiration → air becomes trapped
Therefore, the patient can inhale, but has difficulty completely exhaling.

Signs and Symptoms

- Gradual/insidious onset
- Dyspnea, initially with exertion
- Prolonged expiration
- Use of accessory muscles
- Hyperinflation
- Barrel chest
- Fatigue
- Weight loss
- Poor appetite
- Clubbing
- Pursed-lip breathing

Pink Puffer

The slides describe emphysema as the “pink puffer” pattern.

Why?

Because the patient often has:

- Significant work of breathing
- Labored breathing
- Relatively preserved/pink appearance earlier in the course

Easy memory: Emphysema = Pink Puffer

Diagnostic Tests:

Chest X-ray

May show:

- Hyperinflation

Pulmonary Function Tests

May show:

- Increased residual volume
- Increased total lung capacity
- Decreased forced expiratory volume
- Decreased vital capacity

ABG

May show:

Hypoxemia

- CO₂ retention
- Respiratory acidosis

Treatment

Main goals:

- Reduce symptoms
- Improve breathing
- Prevent infections
- Improve activity tolerance
- Slow progression

Treatment/supportive measures include:

- Stop smoking
- Avoid respiratory irritants
- Pulmonary rehabilitation
- Breathing exercises
- Adequate nutrition
- Adequate hydration
- Bronchodilators
- Antibiotics when infection is present
- Oxygen therapy when prescribed

PURSED-LIP BREATHING

Very important for emphysema.

How:

1. Inhale slowly through the nose.
2. Purse the lips as if blowing out a candle.
3. Exhale slowly through pursed lips.
4. Exhalation should last about twice as long as inhalation.

Why? It helps:

- Keep small airways open longer
- Reduce air trapping
- Improve expiration
- Decrease dyspnea

5. DRUG THERAPY FOR RESPIRATORY CONDITIONS

A. Decongestants

Function: Decongestants cause vasoconstriction of nasal blood vessels, reducing mucosal swelling.

Example:

- Pseudoephedrine/Sudafed

Important adverse effect: Increased blood pressure

Use caution in patients with:

- Hypertension
- Heart disease
- Hyperthyroidism

B. Antitussives

Antitussives = suppress cough reflex

Examples:

- Codeine
- Dextromethorphan

Nursing Alert

Do not automatically suppress every cough. A productive cough can help remove secretions.

Nonproductive, painful cough → suppression may be appropriate.

C. Antihistamines

Antihistamines are H1 blockers. They reduce the effects of histamine involved in allergic symptoms.

First generation

Example:

Diphenhydramine/Benadryl

Possible effects:

- Drowsiness
- Dry mouth
- Constipation
- Blurred vision
- Urinary retention
- Dizziness

Second generation

Example:

Loratadine/Claritin

Generally causes less drowsiness than many first-generation antihistamines.

D. Expectorants

Function: Thin respiratory secretions so they can be coughed up more easily.

Remember: Expectorant = expectoration = helps remove mucus

E. Antimicrobials

Antimicrobials inhibit or kill microorganisms.

- + The slides emphasize that antibiotics generally treat bacterial infections, not viral infections.

Important nursing point: Culture and sensitivity can help identify the organism and guide appropriate antimicrobial selection.

F. Bronchodilators

Function: Relax airway smooth muscle → open the airways
Used commonly in:

- Asthma
- COPD

Possible concern:

Some can cause:

- Cardiac stimulation
- CNS stimulation
- Increased heart rate

G. Corticosteroids

Function: Anti-inflammatory

They reduce:

- Airway inflammation
- Edema

Can be administered:

- Orally
- Parenterally
- By inhalation

Important: Do NOT abruptly discontinue long-term steroid therapy.

H. Mast Cell Stabilizers

Used mainly to prevent asthma attacks.

Examples listed:

- Cromolyn/Intal
- Tilade

Important: They are not rescue medications. They do not stop an acute asthma attack after it begins.

I. Leukotriene Inhibitors

Leukotrienes participate in allergic/inflammatory responses.

Examples:

- Montelukast/Singulair
- Zafirlukast/Accolate
- Zileuton/Zyflo

They help prevent asthma symptoms but do not function as immediate rescue treatment for an acute attack.

J. Mucolytics

Function: Reduce the viscosity/thickness of mucus.

Example:

- Acetylcysteine/Mucomyst

Hydration is important to help keep secretions easier to clear.

K. Thrombolytics

Function: Dissolve blood clots

Examples listed:

- Streptase

- Abbokinase
- Alteplase/Activase

HIGH-YIELD COMPARISON

Condition	Key Problem	Classic Finding
Pneumothorax	Air in pleural space	Decreased/absent breath sounds
Tension pneumothorax	Trapped air + increased pressure	Tracheal deviation + hypotension
Open pneumothorax	Open chest wound	Sucking sound
Pneumonia	Infection/inflammation	Fever + cough + sputum
Asthma	Reversible airway narrowing/inflammation	Wheezing
Emphysema	Alveolar destruction + air trapping	Barrel chest + pursed lips
COPD	Chronic airflow limitation	Progressive dyspnea

MUST-REMEMBER FOR EXAMS

Pneumothorax: Air in pleural space → lung collapse

Tension pneumothorax: Air trapped → pressure ↑ → venous return ↓ → cardiac output ↓

Open pneumothorax: Open wound + sucking sound

Pneumonia: Alveoli filled with inflammatory material → impaired gas exchange

Asthma: Bronchospasm + inflammation + mucus → airway narrowing

Emphysema: Alveolar destruction → loss of elasticity → air trapping

Pursed-lip breathing: Inhale through nose → exhale slowly through pursed lips

Bronchodilator: Opens/narrows airway by relaxing smooth muscle

Expectorant: Helps bring mucus out

Mucolytic: Makes mucus thinner

Antitussive: Suppresses cough

Corticosteroid: Reduces inflammation

Antihistamine: Blocks histamine effects

Antibiotic: Treats susceptible bacterial infection, not viral infection

QUICK MEMORY TRICKS

PNEUMO = AIR

Pneumothorax → air in pleural space

HEMO = BLOOD

Hemothorax → blood in pleural space

EMPHYSEMA = TRAPPED AIR

Damaged alveoli → loss of elasticity → air trapping

ASTHMA = TIGHT AIRWAYS

Bronchospasm → wheezing/difficulty breathing

PNEUMONIA = INFECTED/INFLAMED LUNGS

Fever + cough + sputum + impaired gas exchange

EXPECTORANT = GET IT OUT

Helps clear mucus

MUCOLYTIC = MAKE IT THIN

Thins mucus

ANTITUSSIVE = STOP COUGH

Suppresses cough reflex

BRONCHODILATOR = OPEN AIRWAY

STEROID = REDUCE INFLAMMATION

TENSION PNEUMOTHORAX = EMERGENCY

FLAIL CHEST

Definition

Flail chest is a serious complication of blunt chest trauma. It happens when 3 or more adjacent ribs are fractured in 2 or more places, creating a section of the chest wall that becomes free-floating.

Easy way to remember:

Flail chest = broken ribs + free-floating chest segment + paradoxical movement

Pathophysiology

Normally:

Inspiration → chest moves OUT

Expiration → chest moves IN

With flail chest:

Inspiration → flail segment moves IN

Expiration → flail segment moves OUT

This is called paradoxical breathing

Why does this happen?

The broken rib segment is no longer firmly connected to the rest of the chest wall.

Therefore, when pressure changes during breathing, the damaged section moves in the opposite direction.

Signs and Symptoms

Remember:

D-T-C = Dyspnea, Tachycardia, Cyanosis

Severe dyspnea

Rapid, shallow breathing

Paradoxical chest movement

Tachypnea

Tachycardia

Cyanosis

Diminished breath sounds

Severe chest pain

Hypotension

Possible neck vein distention

Diagnosis

CT scan – preferred test according to the presentation

Chest assessment and respiratory findings

Management

The main goal is to support breathing and stabilize the chest.

100% oxygen

Pain control

Intercostal nerve block

Epidural nerve block

Careful use of IV opioids because they can cause respiratory depression

Severe cases:

Endotracheal intubation

Mechanical ventilation

Chest tube may be required when indicated

Nursing Interventions

Maintain airway

Suction secretions when necessary

High-Fowler's position

Administer humidified oxygen

Monitor respiratory distress

Give prescribed pain medication

Prepare for intubation/mechanical ventilation

Encourage coughing and deep breathing when appropriate

Monitor for shock:

Hypotension

Tachycardia

Tachypnea

Remember:

FLAIL = "Floating ribs → Lung problem → Airway support → Intensive monitoring"

II. PULMONARY EMBOLISM (PE)

Definition

A pulmonary embolism occurs when a blood clot blocks a pulmonary artery or one of its branches. Most commonly, the clot comes from the deep veins of the legs

Think of it this way:

DVT → clot travels → pulmonary artery → PE

This is why prolonged immobility is dangerous: blood can become stagnant in the legs and form a clot.

Risk Factors

Important risk factors from the presentation:

Prolonged immobilization

Advanced age

Multiple trauma

Long-bone fracture
Previous thromboembolism
Abdominal surgery
Hypercoagulability
CHF
Obesity
Pregnancy

Pathophysiology

Clot blocks pulmonary blood flow → decreased blood supply to part of lung → impaired gas exchange → hypoxia

If severe:

Right heart strain → right ventricular failure → decreased cardiac output → shock

Assessment Findings

Restlessness is listed as an initial/cardinal sign in your presentation.

Other findings:

Sudden dyspnea
Stabbing/pleuritic chest pain
Tachycardia
Tachypnea
Cyanosis
Wheezing
Cough
Blood-tinged sputum
Hypotension
Diaphoresis
Shallow respirations
Hypoxia
Dysrhythmias
Fear/apprehension

Diagnostic Tests

Ventilation-perfusion scan
Pulmonary arteriography
Chest X-ray
ECG
ABG

Nursing Interventions

Priority = Oxygenation
Oxygen therapy immediately
High-Fowler's position
Monitor lung sounds
Monitor pulse oximetry
Pain management
Prepare for intubation/mechanical ventilation if severe hypoxemia
Monitor PT/PTT when anticoagulant therapy is used
Administer prescribed anticoagulants

Prevention

Early ambulation

Active leg exercises
Avoid prolonged sitting
Avoid crossing legs for prolonged periods
Use prescribed compression devices/stockings
Adequate fluid intake

Memory tip:

PE = "Pain + Emergency breathing problem"

If a patient suddenly develops dyspnea + chest pain + tachycardia, think about PE.

III. ACUTE RESPIRATORY FAILURE

Definition

Acute respiratory failure occurs when the respiratory system can no longer provide adequate oxygenation and/or remove carbon dioxide effectively.

Causes

CNS depression
Head trauma
Sedatives
Chest trauma
Pneumothorax
Smoke/fumes
Metabolic problems
MI
CHF
Pulmonary embolism
Respiratory muscle disorders such as Guillain-Barré syndrome and myasthenia gravis

Signs and Symptoms

Restlessness
Tachycardia
Dyspnea
Headache
Abnormal respiratory pattern
Abnormal breath sounds
Cyanosis
Confusion
Decreased level of consciousness
Cardiac arrhythmias
Respiratory arrest

Important concept

Restlessness and confusion can be early warning signs of inadequate oxygenation. As oxygenation worsens, the patient's mental status may deteriorate.

Treatment

Intubation
Mechanical ventilation
Antibiotics when infection is involved
Steroids when indicated

Bronchodilators

Nursing Priorities

ABC!

A – Airway

Maintain patent airway

Suction when necessary

B – Breathing

Oxygen

High-Fowler's

Deep breathing

Bronchodilators

C – Circulation

Monitor vital signs

Monitor cardiac status/electrolytes

IV. ARDS

Acute Respiratory Distress Syndrome

ARDS is a severe lung response to different pulmonary or non-pulmonary injuries.

Your presentation describes:

Interstitial infiltrates

Alveolar hemorrhage

Atelectasis

Decreased lung compliance

Fluid in the alveoli

Think:

ARDS = damaged lungs + fluid in alveoli + very difficult oxygenation

The alveoli become filled with fluid, making it difficult for oxygen to move into the blood.

V. HISTOPLASMOSIS

Definition

Histoplasmosis is a fungal disease caused by inhaling dust contaminated with *Histoplasma capsulatum*. The presentation specifically notes association with pigeon and chicken manure.

Important:

It is not spread from person to person according to the presentation.

Symptoms

Cough

Fever

Joint pain

Malaise

Sometimes asymptomatic

Symptoms can resemble TB or pneumonia.

Diagnosis

Chest X-ray

Histoplasmin skin test

Treatment

Amphotericin B

Possible toxicity:

Nephrotoxicity

Fever

Chills

Headache

Anorexia

Adrenal problems

VI. PNEUMOCONIOSIS

Definition

An occupational respiratory disorder caused by prolonged inhalation of high concentrations of industrial dust.

Examples

Examples	
Disease	Exposure
Asbestosis	Asbestos
Silicosis	Silica/silicon dust
Bagassosis	Hay/bagasse dust
Coal worker's pneumoconiosis	Coal dust

Memory Tip:

A-S-B-C

Asbestos → Asbestosis

Silica → Silicosis

Bagasse → Bagassosis

Coal → Coal worker's pneumoconiosis

VII. RESPIRATORY PATTERNS & BREATH SOUNDS

Adventitious Breath Sounds

These are abnormal sounds heard in addition to normal breath sounds.

1. Crackles / Rales

Sounds like: "crackling / bubbling"

Usually associated with fluid in the small airways.

2. Rhonchi

Sounds like: "snoring / gurgling"

Associated with air moving through airways containing mucus or fluid.

3. Stridor

High-pitched sound, usually associated with an obstructed upper airway.

Important: Stridor can indicate an airway emergency.

4. Wheeze

High-pitched sound caused by narrowed airways.

The presentation notes it is commonly heard during expiration.

VIII. ABNORMAL RESPIRATORY PATTERNS

Biot's Breathing

Pattern:

Deep breaths → apnea → deep breaths → apnea

Associated in the presentation with conditions such as stroke and trauma.

Kussmaul Breathing

Deep + rapid breathing

Associated with severe metabolic acidosis, particularly diabetic ketoacidosis.

Why? The body tries to remove excess CO₂, which helps reduce acidity.

Cheyne-Stokes

Pattern:

Breathing gradually becomes deeper → gradually becomes shallower → apnea → repeats

The presentation associates it with MI.

Easy memory:

Kussmaul = deep + fast

Cheyne-Stokes = crescendo → decrescendo → apnea

Biot's = groups of breaths + irregular apnea

IX. CLUBBING

Definition

Clubbing is an abnormal increase in the angle between the nail and nail base. The nail base becomes softer and the angle increases.

Why is it important?

It can be associated with chronic conditions affecting oxygenation, especially chronic pulmonary or cardiac diseases.

X. PULMONARY TUBERCULOSIS (PTB)

Definition

Pulmonary tuberculosis is an infectious and inflammatory disease of the lungs caused by: *Mycobacterium tuberculosis*

It is transmitted through infectious respiratory droplets/airborne particles.

Think:

TB = Tubercle formation + chronic infection + airborne transmission

Pathophysiology

Infection begins with a primary lesion.

The lesion may undergo:

Necrosis → fibrosis → calcification

The infection can become dormant for years

Transmission

Coughing

Sneezing

Close and prolonged exposure to infected persons

Respiratory secretions

Clinical Manifestations

Remember:

Cough + Fever + Sweat + Weight loss

Frequent cough

Dry or productive cough

Afternoon fever

Night sweats

Malaise

Anorexia

Weight loss

Dyspnea

Hoarseness

Hemoptysis

Chest pain

Positive sputum for AFB

Important:

Hemoptysis is highlighted in the presentation as a characteristic finding.

XI. TB DIAGNOSTIC TESTS

1. Sputum examination

The presentation identifies sputum microscopy as a confirmatory/case-finding test. It describes collection of **three** specimens

1. On the spot

2. Early morning at home

3. On the spot at healthcare facility

2. Chest X-ray

May show characteristic lesions/cavitation.

3. Tuberculin/Mantoux Test

The Mantoux test is an intradermal test used to detect exposure/infection. The site is assessed after 48–72 hours.

Important exam point

Do not confuse:

Erythema = redness

Induration = hard/swollen area

The measurement for the Mantoux reaction is based on the induration, not simply redness.

XII. ANTI-TB DRUGS

The presentation uses the mnemonic:

RIPE

R – Rifampicin

I – Isoniazid

P – Pyrazinamide

E – Ethambutol

There is also Streptomycin (S) in the presentation.

1. Rifampicin

Important adverse effects:

Orange-colored urine

GI upset

Jaundice

Renal problems

Thrombocytopenia

Remember:

Rifampicin = RED/ORANGE body fluids

2. Isoniazid (INH)

Important adverse effects:

Peripheral neuritis

Hepatotoxicity

Rash

Jaundice

Psychosis

Important nursing point:

INH + Vitamin B6 (Pyridoxine)

Vitamin B6 helps prevent peripheral neuritis.

Remember:

INH → Nerve problems → Give B6

3. Pyrazinamide

Important:

Hepatotoxic

Increases uric acid

May cause gout symptoms

Remember:

PZA → "Pee" / uric acid → Gout

4. Ethambutol

Major concern:

Optic neuritis

Watch for:

Decreased visual acuity

Difficulty distinguishing red and green

Baseline and periodic eye examinations are important.

Remember:

E = Eyes**

5. Streptomycin

Important adverse effects:

Ototoxicity

Hearing problems

Tinnitus

Dizziness

Nephrotoxicity

Remember:

S = Sound/hearing

XIII. TB NURSING MANAGEMENT

Maintain respiratory isolation

Administer medications as prescribed

Monitor sputum

Teach proper disposal of secretions

Encourage adequate rest

Encourage balanced nutrition

Watch for drug reactions

Stress medication adherence

Encourage follow-up

Use appropriate respiratory precautions

Teach smoking cessation

Key concept:

TB treatment requires multiple medications and consistent adherence

Stopping medications incorrectly can contribute to drug resistance.

XIV. CYSTIC FIBROSIS (CF)

Definition

Cystic fibrosis is a chronic inherited disorder affecting the exocrine glands and multiple body systems.

It is inherited as an:

Autosomal recessive disorder

CFTR

CF involves mutations in the:

CFTR gene

A person normally inherits one CFTR gene from each parent.

Abnormal + abnormal → CF

Abnormal + normal → carrier

Normal + normal → unaffected

What happens in CF?

The body produces thick, sticky mucus.

This mucus can block:

Airways

Pancreatic ducts

Other glandular ducts

Clinical Manifestations

Chronic cough

Recurrent respiratory infections

Thick mucus

Salty sweat

Meconium ileus

Steatorrhea

Abdominal distention

Malabsorption

Poor growth

Failure to meet growth milestones

Very important:

Salty sweat = classic clue for CF
Meconium ileus = possible early sign

XV. CF DIAGNOSTIC TESTS

Sweat test
Stool examination for fat
Trypsin testing
Pulmonary function tests
Chest X-ray
ABG

Treatment

High-calorie diet
Adequate sodium intake as prescribed
Postural drainage
Pancreatic enzyme supplementation
Oxygen when needed
Lung transplant as a last resort

XVI. DRUG THERAPY FOR RESPIRATORY CONDITIONS

1. Decongestants

Function:

Cause vasoconstriction of nasal blood vessels → decrease mucosal swelling.

Example from your presentation:

Sudafed

Important:

Because they can cause systemic vasoconstriction, they may increase blood pressure.

Be cautious in patients with:

Hypertension
Heart disease
Hyperthyroidism

XVII. ANTITUSSIVES

Function:

Suppress the cough reflex.

Examples:

Codeine

Dextromethorphan

Important nursing concept:

Coughing is normally a protective mechanism that helps remove secretions. Therefore, don't automatically suppress every cough.

Antitussives are more useful when a cough is:

Nonproductive
Painful
Preventing sleep
Interfering with wound healing

XVIII. ANTIHISTAMINES

Function:

Block the effects of histamine, reducing allergic symptoms.

First-generation example:

Benadryl

Possible effects:

Drowsiness
Dizziness
Dry mouth
Constipation
Blurred vision
Urinary retention
Tachycardia
Impaired judgment

Second-generation example:

Claritin - Less likely to cause drowsiness according to the presentation.

Remember: 1st generation = more sleepy

XIX. EXPECTORANTS

Function: Thin respiratory secretions so mucus can be moved and coughed out more easily.

Easy difference:

Expectorant = helps you get mucus OUT.

XX. ANTIMICROBIALS

Function: Kill or inhibit microorganisms.

The presentation emphasizes that antibiotics generally treat bacterial infections, not viral or fungal infections.

Important:

Culture and sensitivity can help identify the appropriate antimicrobial.

XXI. BRONCHODILATORS

Function: Relax bronchial smooth muscle → open the airways.

Commonly used in:

Asthma
COPD

Important adverse effects:

Because some bronchodilators stimulate the cardiovascular and CNS systems, patients may experience effects such as:
Increased heart rate
Tremors/restlessness

Remember:

Bronchodilator = bronchus opens

XXII. CORTICOSTEROIDS

Function: Reduce inflammation and edema in the respiratory tract.

Can be administered:

Orally

Parenterally

By inhalation

Important:

Do NOT stop long-term steroid therapy abruptly unless directed by the healthcare provider.

XXIII. MAST CELL STABILIZERS

Purpose: Used to prevent acute asthma attacks.

Examples listed:

Intal

Tilade

Important: They are not useful for stopping an asthma attack after it has already started.

Remember: Mast cell stabilizer = PREVENTION

XXIV. LEUKOTRIENE INHIBITORS

Examples:

Accolate

Zyflo

Singulair

Function: Help reduce allergic/inflammatory responses involved in asthma.

Important: Used to prevent/control asthma, not to immediately stop an acute attack.

XXV. MUCOLYTICS

Function: Reduce the thickness/viscosity of mucus.

Example:

Mucomyst

Important: Adequate hydration helps keep respiratory secretions easier to clear.

Easy difference:

Mucolytic = breaks/thins thick mucus

Expectorant = helps move mucus out

XXVI. THROMBOLYTICS

Function: Dissolve blood clots.

Examples in the presentation:

Streptase

Abbokinase

Alteplase

Activase

Connection:

This is important when thinking about conditions involving dangerous blood clots, such as certain cases of pulmonary embolism.

XXVII. PLEURISY / PLEURITIS

Definition

Inflammation of the:

Visceral pleura

Parietal pleura

When these inflamed membranes rub together, they cause sharp pleuritic pain.

Classic finding: Pain becomes worse when the patient:

Takes a deep breath

Coughs

Sneezes

- The pain may decrease when the patient holds their breath.

Diagnosis

Chest X-ray

Sputum analysis

Thoracentesis

Pleural biopsy

Nursing

Treat underlying cause

Monitor lung sounds

Administer analgesics

Encourage coughing/deep breathing as appropriate

Position on the affected side to splint the chest when indicated

Remember: Pleurisy = pleura rubbing = sharp pain with breathing

XXVIII. BRONCHIECTASIS

Definition: Permanent abnormal dilation and damage of the bronchi.

Possible causes include:

Recurrent respiratory infections

Pneumonia

Pertussis

TB

Foreign body obstruction

Congenital defects

Lung tumors

Clinical Manifestations

Chronic cough
Large amounts of mucopurulent sputum
Hemoptysis
Dyspnea on exertion
Wheezing
Fatigue
Anorexia
Weight loss

Remember: Bronchiectasis = permanently widened/damaged bronchi + lots of mucus

XXIX. EMPYEMA / PYOTHORAX

Definition: Collection of pus in the pleural cavity.

The fluid is described as:

Thick
Opaque
Foul-smelling
-Commonly associated with pulmonary infection.

Signs

Fever
Night sweats
Chest pain
Cough
Dyspnea
Anorexia
Weight loss
Chills
Malaise
Decreased chest movement
Pleural exudate

Diagnosis

Chest CT
Thoracentesis

Treatment

Main goals: Drain the pus + re-expand the lung + control infection

May include:

Antibiotics
Thoracentesis
Chest tube drainage
Surgical drainage/decortication when indicated

Remember: EMPYEMA = pus in pleural space

XXX. ATELECTASIS

Definition: Collapse or airless condition of part or all of a lung.

Causes

Airway obstruction
Tumor
Bronchospasm
Foreign body
Enlarged lymph nodes
Compression
Bronchogenic carcinoma
Inflammatory disorders

Signs

Dyspnea
Diminished breath sounds
Decreased respiratory excursion
Dullness on percussion
Cyanosis
Tachycardia
Tachypnea
Weakness
Pain

Nursing Interventions

Very important:

Reposition every 1–2 hours
Deep breathing
Coughing
Incentive spirometer
Chest physiotherapy
Postural drainage
Suction if unable to clear secretions
Encourage fluids
Early ambulation

Remember:

Atelectasis = collapsed lung → expands the lung. That's why deep breathing + coughing + incentive spirometry + early ambulation are important..

XXXI. PLEURAL EFFUSION

Definition

Pleural effusion = excess fluid in the pleural space. Normally, only a small amount of fluid is present to lubricate the pleural surfaces.

Possible causes include:

Heart failure
TB
Pneumonia
Pulmonary embolism
Pulmonary infections
Malignancy

Assessment

Decreased/absent breath sounds
Decreased fremitus
Dull/flat percussion

Dyspnea
Dry cough
Pleural pain
Possible tracheal deviation away from affected side in significant effusion

Diagnosis

Chest X-ray
CT
Thoracentesis
Pleural biopsy when indicated
Lateral decubitus X-ray may show layering of fluid

Treatment

Thoracentesis
Purpose: Remove fluid
Obtain specimen
Relieve dyspnea/respiratory compromise

Nursing Interventions

Prepare for thoracentesis
High-Fowler's
Encourage coughing/deep breathing
Give prescribed pain medications
Assist with pleural procedures
Monitor respiratory status

XXXII. LARYNGEAL CANCER

Common Type

Most laryngeal tumors described in the presentation are: Squamous cell carcinoma

Risk Factors

Cigarette smoking
Secondhand smoke
Air pollution
Asbestos
Chronic respiratory infections
Heavy alcohol consumption
Voice strain

Clinical Findings

Important: Hoarseness

Other findings:

Sore throat
Dyspnea
Dysphagia
Weakness
Weight loss
Enlarged cervical lymph nodes
Foul breath

XXXIII. LARYNGEAL CANCER TREATMENT

Treatment options

Radiation
Chemotherapy
Partial laryngectomy

Total laryngectomy
Radical neck dissection
Laser treatment
Partial Laryngectomy
Part of the larynx is removed.
Used in earlier-stage disease according to the presentation.
Total Laryngectomy
The entire larynx is removed, with creation of a: Permanent tracheal stoma

Important: After a total laryngectomy, the patient breathes through the stoma, not through the nose/mouth.

XXXIV. NURSING CARE AFTER LARYNGECTOMY

Airway
Watch for:
Mucus plugs
Edema
Blood
Dyspnea
Cyanosis
Gurgling

Keep the head elevated.
Hemorrhage

Watch for:

Increased pulse
Decreased BP
Cold, clammy skin
Blood on dressing
Frequent swallowing

Communication

Establish a communication method before surgery, such as:
Writing
Sign language
Electronic communication
Esophageal speech

Important patient teaching

Because the normal upper airway is bypassed:
Humidification is important
Keep secretions loose
Protect the stoma
Avoid water entering the trachea
Avoid swimming
Protect the stoma during showers
Avoid dust and irritating substances
Avoid tight collars
Speech therapy may be needed

XXXV. THORACOTOMY

Definition

Thoracotomy = surgical opening into the thoracic/chest cavity.

Types of Thoracic Surgery

Procedure	Meaning
Exploratory thoracotomy	Opens chest to examine/treat thoracic problems
Lobectomy	Removes one lung lobe
Pneumonectomy	Removes an entire lung
Segmental resection	Removes one or more lung segments
Wedge resection	Removes a small portion/lesion

XXXVI. POSTOPERATIVE POSITIONING

Very important for exams

Lobectomy

UNOPERATIVE SIDE

Pneumonectomy

Often OPERATIVE SIDE, according to the presentation/surgeon’s orders.

Memory:

Lobectomy → good lung down

Pneumonectomy → follow surgeon's order; commonly operative side

XXXVII. THORACIC SURGERY NURSING CARE

Preoperative

Complete lung assessment

Establish baseline

Explain oxygen therapy

Explain suctioning

Explain chest tubes when applicable

Teach splinting

Teach coughing and deep breathing

Teach ROM exercises

Chest physiotherapy

Postoperative

Monitor oxygenation

Monitor pulse oximetry

Assess lung sounds

Auscultate every 1–2 hours as indicated

Encourage turning/coughing/deep breathing

Suction if needed

Monitor chest drainage system when applicable

Monitor ABGs

Semi-Fowler's position

Pain management

Splint incision during coughing/deep breathing

Discharge Teaching

Continue coughing/deep breathing

Continue ROM exercises

Gradually increase activity

Adequate rest

High-protein diet

Adequate fluids

Chest physical therapy

Good oral hygiene

Avoid people with respiratory infections

Avoid crowded/poorly ventilated areas

HIGH-YIELD DRUG MEMORY TABLE			
Drug/Class	Main Action	Remember	
Decongestant	Decreases nasal swelling	Can ↑ BP	
Antitussive	Suppresses cough	Don't suppress useful cough unnecessarily	
Antihistamine	Blocks histamine	1st gen → drowsiness	
Expectorant	Helps mobilize secretions	Get mucus OUT	
Bronchodilator	Opens airways	Asthma/COPD	
Corticosteroid	Decreases inflammation	Don't abruptly stop long-term therapy	
Mast cell stabilizer	Prevents asthma attacks	Not for acute attack	
Leukotriene inhibitor	Prevents allergic/inflammatory response	Asthma control	
Mucolytic	Thins mucus	Hydration helps	
Thrombolytic	Dissolves clot	Think blood clot	

COMPARISON OF DISEASES

Flail chest	Multiple rib fractures	Paradoxical chest movement
Pulmonary embolism	Blood clot blocks pulmonary artery	Sudden dyspnea + chest pain
Respiratory failure	Inadequate oxygenation/ventilation	Hypoxia + altered mental status
ARDS	Severe lung injury + alveolar fluid	Severe oxygenation problem
TB	Mycobacterium tuberculosis	Cough + night sweats + weight loss
Cystic fibrosis	Thick sticky secretions	Salty sweat
Pleurisy	Inflamed pleura	Sharp pain with breathing
Bronchiectasis	Permanently damaged/widened bronchi	Chronic productive cough
Empyema	Pus in pleural space	Infection + pleural pus
Atelectasis	Collapsed lung/airless area	Diminished breath sounds
Pleural effusion	Fluid in pleural space	Dull percussion + decreased breath sounds
Laryngeal cancer	Tumor of larynx	Persistent hoarseness
Pneumoconiosis	Occupational dust disease	Long-term dust exposure

CONCEPTS ON OXYGENATION

Diagnostic Studies/Therapies - are procedures used to assess the respiratory system, identify problems, determine their severity, and sometimes provide treatment.

The major diagnostic studies discussed are:

- Chest X-ray
- Bronchography
- Bronchoscopy
- Pulmonary Function Test
- Thoracentesis

These procedures help healthcare providers determine what is happening in the lungs, airways, and pleural cavity.

CHEST X-RAY

Chest X-ray - Radiographic visualization of the chest. Instruct the client to hold his breath and remove metals from the chest. Understanding It - A chest X-ray uses X-rays to produce an image of structures inside the chest.

It can help visualize:

- Lungs

- Heart
- Ribs and other bones
- Diaphragm
- Some abnormalities such as pneumonia, fluid, or collapsed lung

Important Nursing Instruction -

- Hold the breath → helps prevent movement and produces a clearer image.
- Remove metal objects → jewelry, necklaces, or other metal objects can interfere with the image.

Easy to Remember: Chest X-ray = Picture of the chest

BRONCHOGRAPHY - Radiopaque medium is instilled directly to the trachea or any part of the bronchial tree to be visualized through X-ray. A radiopaque medium is placed into the airways so that the bronchial tree can be seen more clearly on X-ray.

Nursing Intervention Before the Procedure

- Secure informed consent
- Check for allergy to food, iodine, anesthesia
- NPO for 6–8 hrs
- Pre-op medications:
 - Atropine SO₄
 - Valium
 - Topical anesthesia
 - Anesthesia to be injected into the larynx
 - Secure O₂
 - Antispasmodic agents at bedside

Understanding It: NPO means nothing by mouth. The client is kept in NPO because the procedure involves the airway and anesthesia, which can affect protective reflexes such as coughing and gagging.

- Check allergies because contrast/radiopaque substances and medications may cause allergic reactions.
- O₂ and antispasmodic agents at bedside are prepared in case the client experiences respiratory difficulty or airway spasm.

After Bronchography

- Side-lying position
- NPO until cough and gag reflex return
- Cough and deep-breathing exercises
- Low-grade fever is common

Understanding It - The most important point is: Do NOT give food or fluids until the gag reflex returns.

Why? Because anesthesia may temporarily decrease the gag reflex. Giving food or fluids too early can increase the risk of aspiration.

Easy Memory: Bronchography AFTER = Side → NPO → Cough/Deep breathe → Observe fever

BRONCHOSCOPY

Direct inspection and observation of the larynx, trachea and bronchi through flexible or rigid scope.

Diagnostic Uses

- Collect secretion
- Determine location of pathologic process
- Collect specimen

Therapeutic Uses

- Remove foreign object
- Excise lesions

Understanding It: A bronchoscope is a tube/scope inserted through the airway so the healthcare provider can directly see the respiratory passages.

Think: Bronchoscopy = LOOK INSIDE THE AIRWAY

It can be used for both:

Diagnostic

- Find the problem
- Get secretions
- Obtain specimens

Therapeutic

- Remove a foreign object
- Remove/excise lesions

BRONCHOSCOPY: BEFORE THE PROCEDURE

- Informed consent
- Atropine and Valium as premeds
- Topical and local anesthesia
- NPO for 6–8 hrs
- Remove dentures, prosthesis, contact lens

Understanding It: The client is prepared for the procedure by:

- Consent → confirms that the client agrees to the procedure.
- Premedications → help prepare and relax the client.
- Anesthesia → reduces discomfort and suppresses airway reflexes.
- NPO → decreases aspiration risk.
- Remove dentures/prosthesis/contact lenses → prevents complications or damage during the procedure.

BRONCHOSCOPY: AFTER THE PROCEDURE

- Side-lying position
- Check for coughing and gag reflex prior to oral intake
- Watch for signs of perforation of the bronchial tree:
 - Cyanosis
 - Hypotension
 - Tachycardia
 - Hemoptysis
 - Dyspnea

Understanding It: The gag reflex must return before oral intake because anesthesia may temporarily interfere with swallowing and airway protection.

Signs to Watch For

Sign	Meaning/Concern
Cyanosis	Possible inadequate oxygenation
Hypotension	Low blood pressure
Tachycardia	Increased heart rate
Hemoptysis	Coughing/spitting blood
Dyspnea	Difficulty breathing

These can indicate serious complications and require immediate attention.

Easy Memory: Bronchoscopy After = Position + Gag reflex + Watch for complications

PULMONARY FUNCTION TEST

Volume	Symbol	Measurement	
Tidal Volume (about 500 mL at rest)	TV	Amount of air that moves into and out of the lungs with each breath.	
Inspiratory Reserve Volume (approximately 3000 mL)	IRV	Maximum amount of air that can be inhaled from the point of maximum inspiration.	
Expiratory Reserve Volume (approximately 3000 mL)	ERV	Maximum volume of air that can be exhaled from the resting end-expiratory level.	
Residual Volume (approximately 1200 mL)	RV	Volume of air remaining in the lungs after maximum expiration.	

1. **Tidal Volume — TV** - About 500 mL at rest
- TV = normal breath

Example: You breathe normally → the amount of air entering/exiting is your tidal volume.

2. **Inspiratory Reserve Volume** — **IRV** - Approximately 3000 mL

- IRV = extra air you can breathe IN

Think:

Normal breath → then take the deepest possible breath. The extra air you inhaled is the IRV.

3. **Expiratory Reserve Volume** — **ERV** - Approximately 3000 mL

- ERV = extra air you can breathe OUT

Normal exhalation → then forcefully exhale more air.

4. **Residual Volume** — **RV** - Approximately 1200 mL

- RV = air LEFT in the lungs

Even after you exhale as much as possible, some air remains in the lungs.

Important - The lungs are never completely empty because residual air remains.

OTHER LUNG CAPACITIES

- Functional Residual Capacity — FRC: Approximately 2300 mL. Volume of air remaining in the lungs at end-expiration.
- FRC = RV + ERV
- Inspiratory Capacity — IC
- IC = IRV + TV
- Vital Capacity — VC: Maximum amount of air that can be exhaled from the point of maximum inspiration.
- Total Lung Capacity — TLC: Total amount of air that the lungs can hold.
 - The sum of all the volume components after maximal inspiration.
 - 20–25% less in females.

LUNG VOLUME FORMULAS — IMPORTANT FOR EXAMS

- FRC

- FRC = RV + ERV

Functional Residual Capacity = Residual Volume + Expiratory Reserve Volume

- IC

- IC = IRV + TV

Inspiratory Capacity = Inspiratory Reserve Volume + Tidal Volume

- VC

- VC = IRV + TV + ERV

Vital Capacity represents the maximum amount of air that can be exhaled after maximum inspiration.

- TLC

- TLC = TV + IRV + ERV + RV

Total Lung Capacity represents the total amount of air the lungs can hold.

Easy Memory

- Volumes:
 - TV = normal breathing
 - IRV = extra IN
 - ERV = extra OUT
 - RV = remains
- Capacities:
 - IC = TV + IRV
 - FRC = ERV + RV
 - VC = IRV + TV + ERV
 - TLC = everything

THORACENTESIS

Aspiration of fluid or air from the pleural cavity, May be used for diagnosis or therapy.

Understanding It: Thoracentesis involves inserting a needle into the pleural space to remove fluid or air.

It can be:

- Diagnostic → fluid can be obtained and examined.
- Therapeutic → removal of fluid or air can help improve breathing.

Simple Meaning: Thoracentesis = remove fluid/air from pleural space

THORACENTESIS: BEFORE THE PROCEDURE

- Secure consent
- Take initial VS
- Position: upright leaning on over-bed table
- Instruct to remain still during the procedure
- Pressure sensation is felt upon needle insertion

Understanding It

Position - The client sits upright and leans forward over an over-bed table. This position helps provide access to the pleural area and promotes proper positioning during the procedure.

Important Nursing Action

- Instruct the client to remain still. - Movement while the needle is inserted can increase the risk of injury.

VS - Take initial vital signs so you have a baseline for comparison after the procedure.

THORACENTESIS: AFTER THE PROCEDURE

- Turn on unaffected side to prevent leakage from the thoracic cavity
- Bed rest

- Check for expectoration of blood
- Monitor VS

Understanding It: After thoracentesis, monitor the client closely for complications.

Pay attention to:

- Respiratory status
- Vital signs
- Blood in secretions
- Changes in breathing

Important

- Monitor VS after the procedure because changes may indicate a complication.

PHYSIOLOGIC RESPONSES TO RESPIRATORY DYSFUNCTION

Respiratory dysfunction means that the respiratory system is not functioning properly.

The body may respond with:

- Hypoxia
- Cyanosis
- Dyspnea
- Increased work of breathing
- Tachypnea
- Cough
- Fatigue
- Pain
- Abnormal respiratory patterns
- Clubbing of fingertips

HYPOXIA: Refers to inadequate cellular oxygenation.

May result from:

- Insufficient oxygen intake
- Insufficient perfusion of oxygen in the pulmonary system or in the peripheral organs and tissues
- Inability of blood to transport oxygen
- Insufficient oxygen-carrying capacity of the blood

Understanding It: Hypoxia = not enough oxygen reaching the cells/tissues. The cells need oxygen to produce energy. If oxygen delivery becomes inadequate, normal body functions can become impaired.

Easy Memory - Think of oxygen delivery as: Oxygen enters → lungs → blood → tissues. A problem at any point can contribute to hypoxia.

CYANOSIS

Bluish discoloration of the skin indicates hypoxia; it results when oxygenation does not occur and carbon dioxide does not leave blood.

Understanding It: Cyanosis = bluish discoloration associated with inadequate oxygenation.

It may be noticed particularly around the:

- Lips
- Nail beds
- Skin

Easy Memory: CYANOSIS → BLUE

DYSPNEA / SHORTNESS OF BREATH

Difficult breathing.

Understanding It: Dyspnea = difficulty breathing or feeling short of breath.

The client may describe it as:

- “Nahihirapan akong huminga.”
- “Parang kulang ang hangin.”
- “Hinihingal ako.”

INCREASED WORK OF BREATHING

Occurs when energy expenditure for respirations is excessive and great effort is required for breathing.

Understanding It : The body is working harder than normal to breathe.

You may observe:

- Greater effort when breathing
- Use of accessory muscles
- Difficulty speaking because of breathlessness
- Increased respiratory rate

The important idea is:

- Breathing requires too much effort.

TACHYPNEA

Rapid breathing with respiratory rates more than 20 cpm.

Understanding It: Tachypnea = fast breathing.

- RR > 20 cycles/minute

Easy Memory: TACHY = FAST

COUGH

If effective, it allows the body to expel excess mucus, keeping the airway clear. If ineffective, it compromises airway clearance by preventing mucus from being expelled. Along with the mucociliary system, cough is a defense mechanism of the respiratory system.

Understanding It: A cough is normally a protective mechanism.

Effective cough: Moves mucus out → keeps airway clear

Ineffective cough: Cannot remove mucus → secretions remain → airway clearance becomes compromised

Important - The mucociliary system + cough work together as respiratory defenses.

FATIGUE

Feelings of tiredness and exhaustion that usually result when energy requirements for breathing become excessive.

Understanding It: Breathing normally requires energy. When breathing becomes difficult, the respiratory muscles have to work harder.

Over time: Increased effort → increased energy use → fatigue. This is why a person with respiratory problems may become very tired.

PAIN

May or may not be present. Due to rib-cage injury, infection or chest surgery.

Understanding It: Respiratory problems do not always cause pain.

Pain may occur because of:

- Rib-cage injury
- Infection
- Chest surgery

Pain can also affect breathing because a person may avoid taking deep breaths when it hurts.

RESPIRATORY PATTERNS

1. Cheyne-Stokes

↑ and ↓ depth, with periods of apnea (DKA)
Understanding: Breathing becomes progressively deeper, then becomes shallower, followed by a period of apnea.

2. APNEUSTIC BREATHING

Prolonged inspiration followed by 2–3 seconds apnea. (Medulla Oblongata dysfunction)

Understanding: The person takes a prolonged inspiration, followed by a short period of apnea.

Remember: Apneustic = prolonged inspiration

3. CLUSTER BREATHING

Clusters of irregular breaths with apnea at irregular intervals. (Medulla Oblongata dysfunction).

Understanding: Breaths occur in groups or clusters, followed by periods of apnea. The pattern is irregular.

Easy Memory: Cluster = breaths grouped together

4. BIOT'S OR ATAXIC BREATHING

Completely irregular breathing pattern. (Medulla Oblongata dysfunction)

Understanding - Biot's/ataxic breathing is completely irregular. There is no predictable rhythm.

Easy Memory: Biot's = irregular, irregular, irregular.

CLUBBING OF FINGERTIPS

Clubbing refers to changes in the shape of the fingertips and nails, commonly associated with chronic oxygenation problems and some cardiopulmonary conditions.

For studying, remember: Clubbing → think chronic respiratory/cardiac problem

HIGH-YIELD COMPARISON

Diagnostic Procedure	Main Purpose	Important Nursing Care
Chest X-ray	Radiographic visualization of chest	Hold breath; remove metal
Bronchography	Visualize bronchial tree using radiopaque medium	Check allergies; NPO; monitor after
Bronchoscopy	Directly inspect airway; obtain specimens/treatment	NPO; remove dentures; check gag reflex afterward
Pulmonary Function Test	Measure lung volumes/capacities	Know TV, IRV, ERV, RV and formulas
Thoracentesis	Remove air/fluid from pleural cavity	Upright position; remain still; monitor VS afterward

MUST-MEMORIZE LUNG VOLUMES

- TV = 500 mL
→ normal breath
- IRV = 3000 mL
→ extra air inhaled
- ERV = 3000 mL
→ extra air exhaled
- RV = 1200 mL
→ air remaining after maximum expiration
- FRC = RV + ERV = about 2300 mL
- IC = IRV + TV
- VC = IRV + TV + ERV
- TLC = TV + IRV + ERV + RV

These values and formulas are directly presented in the PowerPoint.

MUST-MEMORIZE TERMS

RESPIRATORY

- Hypoxia - Inadequate cellular oxygenation
- Cyanosis - Bluish discoloration associated with inadequate oxygenation

- Dyspnea - Difficulty breathing
- Tachypnea - Rapid breathing
- Increased work of breathing - Breathing requires excessive effort
- Cough - Defense mechanism that helps clear mucus
- Fatigue - Tiredness caused by excessive energy requirements for breathing
- Clubbing - Abnormal changes of fingertips associated with chronic cardiopulmonary/oxygenation problems

QUICK MEMORY GUIDE

- Diagnostic procedures - X-ray → SEE
- Bronchography → CONTRAST + X-RAY
- Bronchoscopy → SCOPE + SEE INSIDE
- PFT → MEASURE AIR
- Thoracentesis → REMOVE AIR/FLUID

NURSING CARE

- Bronchoscopy aftercare - GAG FIRST → FOOD LATER. Never forget to check the cough and gag reflex before oral intake.
- Thoracentesis: SIT → STAY STILL → MONITOR
 - Sit upright/lean forward
 - Stay still
 - Monitor vital signs afterward
- Respiratory patterns
- Cheyne-Stokes → increasing/decreasing depth + apnea
- Apneustic → prolonged inspiration + apnea
- Cluster → irregular groups of breaths + apnea
- Biot's/Ataxic → completely irregular