

RESPIRATORY SYSTEM • NGN NCLEX 2026

Pleural Effusion

Abnormal accumulation of fluid in the pleural space — a **SIGN** of underlying disease, not a disease itself. Mastery of recognition, thoracentesis care, and complication prevention is high-yield for the NGN exam.



RESPIRATORY



HIGH-YIELD



CLINICAL JUDGMENT

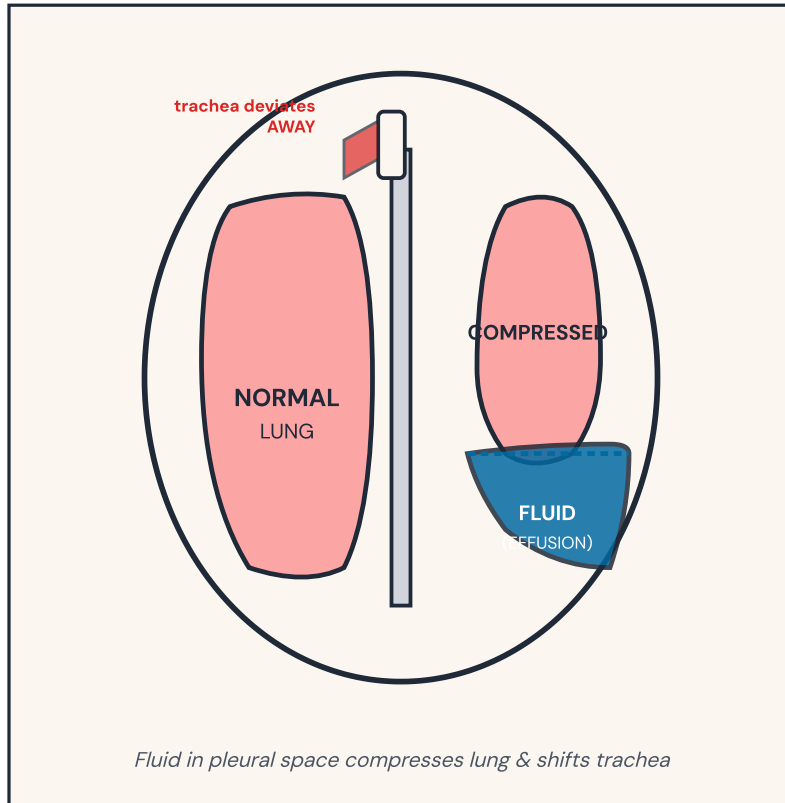


THORACENTESIS

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Definition & Overview

What it is and why it matters



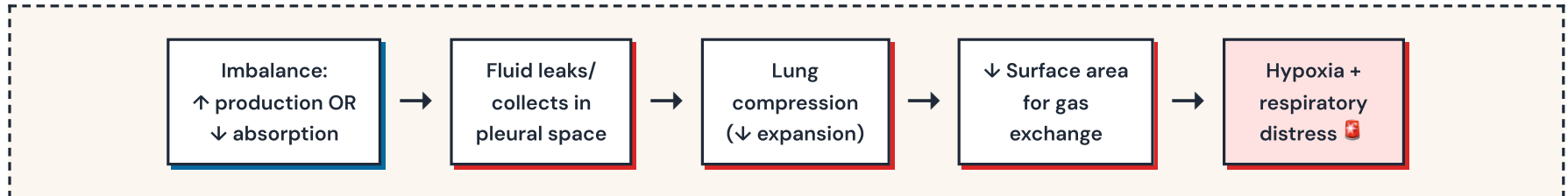
- ✓ **Pleural effusion** = abnormal accumulation of fluid between the visceral & parietal pleura (normal space holds only **5–15 mL** of lubricating fluid).
- ✓ It is **not a primary diagnosis** — always look for the underlying cause (CHF, pneumonia, cancer, PE, cirrhosis, kidney disease).
- ✓ Excess fluid **compresses the lung**, reduces ventilation, and impairs gas exchange → **hypoxia**.
- ✓ Classified by fluid type: **transudative** (pressure-driven) or **exudative** (inflammatory/infectious).

Type	Cause & Key Features
Transudate	Watery, clear. CHF, cirrhosis, nephrotic syndrome (pressure imbalance).
Exudate	Cloudy, protein-rich. Infection, cancer, PE, TB (inflammation).
Empyema	Pus in pleural space (infected effusion).
Hemothorax	Blood in pleural space (trauma, surgery).

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Pathophysiology

How fluid accumulates and damages oxygenation



Transudate Mechanism

- **↑ Hydrostatic pressure** (CHF backs blood up into pulmonary vessels)
- **↓ Oncotic pressure** (low albumin from cirrhosis, nephrotic syndrome)
- Fluid is pushed/pulled **across** intact capillaries



Exudate Mechanism

- **↑ Capillary permeability** (pneumonia, malignancy, PE)
- **Lymphatic obstruction** (tumor blocks drainage)
- Protein-rich fluid **leaks** from inflamed vessels

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Signs & Symptoms

Recognize cues — early vs. late presentation

Early / Mild

- ✓ **Dyspnea on exertion** (the earliest cue)
- ✓ Pleuritic chest pain — **sharp, worse with deep inspiration or cough**
- ✓ Dry, non-productive cough
- ✓ Mild tachypnea
- ✓ Pleural friction rub (**disappears as fluid increases**)

Late / Severe (RED FLAGS)

-  **Severe dyspnea at rest** & orthopnea
-  **Diminished or ABSENT breath sounds** on affected side
-  **Dullness to percussion** over fluid (vs. hyperresonance of pneumothorax)
-  **Decreased tactile fremitus** (fluid blocks vibration)
-  **Tracheal deviation AWAY** from affected side (large effusion)
-  Asymmetrical chest expansion — affected side lags
-  Hypoxia, cyanosis, tachycardia, hypotension
-  Fever & productive cough → suspect **empyema**

Classic Bedside Triad on Affected Side

Inspection	Palpation	Percussion	Auscultation
Asymmetric expansion ↓	Decreased tactile fremitus	DULL (fluid)	Diminished / absent breath sounds

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Priority Nursing Interventions

ABCs, safety, and clinical judgment in action

A Airway & Breathing First

- 1 **Assess** RR, depth, breath sounds, SpO₂, work of breathing, ABGs
- 2 Position in **HIGH FOWLER'S** (or semi-Fowler's) — maximizes lung expansion
- 3 **Administer O₂** as ordered; titrate to keep SpO₂ ≥ 92%
- 4 Encourage **turn, cough, deep breathe** + incentive spirometer (q1–2h)
- 5 Monitor for **worsening hypoxia**, tracheal deviation, hemodynamic instability

📌 Thoracentesis Care

- 1 Verify **informed consent**; check coags (PT/INR, platelets)
- 2 Position **sitting up, leaning forward over bedside table**, arms on pillow
- 3 Instruct: **"Do not move, cough, or talk"** during needle insertion
- 4 Limit fluid removal to **≤1,000–1,500 mL at a time** (re-expansion edema risk)
- 5 **Post-procedure**: chest x-ray, VS & breath sounds q15min × 1h, monitor for pneumothorax / bleeding
- 6 Position on **UNAFFECTED side** 1 hour post-procedure (puncture site UP to seal)

📌 Chest Tube (if placed)

- Keep drainage system **below chest level**
- Assess for **tidaling** in water seal (normal); **continuous bubbling = air leak**
- **Never clamp** a chest tube without an order (tension pneumothorax risk)
- Report drainage **> 100 mL/hr** of bright red blood
- Keep bedside: sterile occlusive dressing + clamp + sterile water

🎯 Treat Underlying Cause

- **CHF**: diuretics, fluid restriction, sodium restriction
- **Pneumonia / Empyema**: IV antibiotics, possible surgical decortication
- **Malignancy**: pleurodesis (talc) to prevent recurrence
- **PE**: anticoagulation
- Pain management — **analgesia improves deep breathing**

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Pharmacology

Drugs that target the underlying cause & symptoms

Loop Diuretics — Furosemide (Lasix)

USE:	Transudative effusion from CHF / fluid overload
ACTION:	Inhibits Na ⁺ /K ⁺ reabsorption in loop of Henle → diuresis
SIDE EFFECTS:	Hypokalemia, dehydration, ototoxicity, hypotension
NURSING:	Monitor K⁺, BP, I&O, daily weights ; give K ⁺ supplement PRN

IV Antibiotics (broad-spectrum)

USE:	Parapneumonic effusion / empyema
EXAMPLES:	Piperacillin-tazobactam, ceftriaxone, vancomycin
SIDE EFFECTS:	Nephrotoxicity (vanc), C. diff, allergy, ototoxicity
NURSING:	Obtain cultures BEFORE first dose; monitor renal labs & trough levels

Analgesics — Acetaminophen / NSAIDs / opioids

USE:	Pleuritic pain — pain limits deep breathing → atelectasis
SIDE EFFECTS:	Opioids: respiratory depression, sedation, constipation
NURSING:	Premedicate before deep-breathing & ambulation; monitor RR & SpO ₂

Intrapleural Fibrinolytics — tPA, Dornase

USE:	Loculated (walled-off) empyema to break up fibrin pockets
SIDE EFFECTS:	Bleeding at site, pleuritic pain, transient SOB
NURSING:	Clamp chest tube briefly per protocol; monitor for hemorrhage

Pleurodesis Agents — Talc, Doxycycline

USE:	Recurrent malignant effusion — induces sterile inflammation that scars pleural layers together
SIDE EFFECTS:	Severe pleuritic pain, fever, transient hypoxia
NURSING:	Premedicate for pain ; assist with position changes (q15min × 2h) so agent coats pleura evenly

Anticoagulants — Heparin / Enoxaparin

USE:	Effusion 2° to PE
SIDE EFFECTS:	Bleeding, HIT (heparin-induced thrombocytopenia)
NURSING:	Monitor aPTT, platelets, Hgb/Hct ; bleeding precautions

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NCLEX Test Traps

Common wrong-answer patterns & the correct alternative

! TRAP 1: Confusing pleural effusion with pneumothorax

Both have ↓ breath sounds — students pick the wrong one based only on that single finding.

CORRECT: Effusion = DULL to percussion (fluid). Pneumothorax = HYPERRESONANT (air). Memorize: "Fluid is dull, air rings hollow."

! TRAP 2: Trach deviation direction

Students assume trachea always deviates the same way regardless of cause.

CORRECT: Large effusion & tension pneumothorax → trachea deviates **AWAY** from the affected side (pushed). Atelectasis → trachea deviates **TOWARD** the affected side (pulled).

! TRAP 3: Wrong position for thoracentesis

Picking "supine" or "Trendelenburg" feels safe — it's wrong.

CORRECT: Patient sits **upright, leaning forward** over a bedside table with arms on a pillow. This widens intercostal spaces and keeps fluid **at the base** for easy access.

! TRAP 4: Removing too much fluid at once

Tempting to think "drain it all" relieves dyspnea fastest.

CORRECT: Limit removal to **1,000–1,500 mL** at a time. Removing too much, too fast = **re-expansion pulmonary edema** (sudden cough, pink frothy sputum, hypoxia).

! TRAP 5: Position AFTER thoracentesis

Students often pick "affected side down" thinking it helps the good lung.

CORRECT: Position on the **UNAFFECTED side** for ~1 hour so the puncture site is UP and can seal. (Different rule than "good lung down" for pneumonia/atelectasis ventilation matching.)



TRAP 6: Clamping the chest tube

Tempting when transporting or if "bubbling looks wrong."

CORRECT: NEVER clamp without an order — clamping a chest tube can cause a tension pneumothorax. Keep the system below chest level & upright.



TRAP 7: Treating the effusion, not the cause

Students stop after thoracentesis as if the problem is solved.

CORRECT: Pleural effusion is a **symptom**. Without treating the underlying cause (CHF, infection, malignancy, PE), the fluid **will recur**.

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NCJMM Clinical Judgment Framework

Six-step model applied to a pleural effusion case

1

Recognize Cues

Dyspnea, pleuritic chest pain, ↓ breath sounds, dullness on percussion, ↓ tactile fremitus, possible trach deviation, SpO₂ trending down.

2

Analyze Cues

Cluster cues = unilateral lung pathology with FLUID. Rule out pneumothorax (would be **hyperresonant**), atelectasis (trach pulled **toward**), pneumonia (consolidation, productive cough).

3

Prioritize Hypotheses

Impaired gas exchange is the #1 priority (ABCs). Risk for ineffective breathing pattern, acute pain, and risk for infection follow.

4

Generate Solutions

High Fowler's, O₂ titration, prepare for thoracentesis, IV access, bring crash cart for emergencies, plan post-procedure monitoring & CXR.

5

Take Action

Assist with thoracentesis (position, support, monitor), administer O₂ & analgesics, follow strict sterile technique, treat underlying cause (diuretics / antibiotics / etc.).

6

Evaluate Outcomes

Improved SpO₂, ↓ work of breathing, breath sounds returning bilaterally, pain controlled, no s/sx of pneumothorax or re-expansion edema, CXR confirms re-expansion.

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Patient & Family Education

Empowering safe self-management at home



At Home

- ✓ Use **incentive spirometer** 10 breaths every hour while awake
- ✓ Practice **deep breathing & controlled coughing** several times daily
- ✓ **Pace activities**; rest between tasks; sit upright when SOB
- ✓ Maintain **fluid & sodium restriction** if CHF is the cause
- ✓ Adhere to **full antibiotic course** if empyema/pneumonia
- ✓ Avoid smoking & secondhand smoke; smoking cessation referral
- ✓ Get **flu & pneumococcal vaccines**



Call HCP / Return Immediately If...

- ✘ Worsening shortness of breath, especially at rest
- ✘ New or increasing chest pain
- ✘ Fever > 100.4°F (38°C), chills, or new productive cough
- ✘ Coughing up **pink frothy sputum** or blood
- ✘ Increasing leg swelling or sudden weight gain (CHF flag)
- ✘ Redness, swelling, drainage at thoracentesis or chest tube site
- ✘ Confusion, dizziness, or fainting

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Memory Boosters & Mnemonics

Anchor priority sequences and pattern recognition

"PLEURAL" — Key Findings

- P** **P**leuritic chest pain (sharp, with breath)
- L** **L**ung sounds diminished/absent
- E** **E**xpansion asymmetric (affected side lags)
- U** **U**p in Fowler's — best position
- R** **R**esonance LOST (dull on percussion)
- A** **A**way trach deviation (large effusion)
- L** **L**imit thoracentesis to 1,000–1,500 mL

"DULL" — Effusion Bedside Exam

- D** **D**ullness on percussion (fluid)
- U** **U**nequal chest expansion
- L** **L**ess (or absent) breath sounds
- L** **L**abored breathing & ↓ fremitus

Compare: pneumothorax = HYPER (hyperresonant, ↑ air) — opposite of DULL.

Thoracentesis: "SIT & SEAL"

- **S**it upright, lean over bedside table
- **I**nformed consent + check coags
- **T**ake no more than 1,000–1,500 mL
- **S**top if cough, pain, dyspnea
- **E**valuate with post-procedure CXR
- **A**ssess for pneumothorax for 1 hr
- **L**ay on UNAFFECTED side to seal site

Quick Pattern Recognition

- **Fluid in pleural space** → DULL + ↓ sounds + ↓ fremitus
- **Air in pleural space** (pneumothorax) → HYPERresonant + ↓ sounds
- **Consolidation** (pneumonia) → DULL + **BRONCHIAL** sounds + ↑ fremitus
- **Trach AWAY** = effusion / tension pneumo (pushed)
- **Trach TOWARD** = atelectasis (pulled)