

NGN NCLEX 2026

HEMATOLOGY / PULMONARY

HIGH-YIELD • LIFE-THREATENING

TRALI vs TACO

Transfusion Reactions

The two life-threatening pulmonary complications of blood transfusion — one is an immune injury, the other is volume overload. Knowing which is which determines whether you give diuretics or never give them.



Diane's NGN NCLEX 2026 Study Series — Pulmonary Transfusion Complications

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DEFINITION / OVERVIEW

What Are TRALI & TACO?



TRALI

TRANSFUSION-RELATED ACUTE LUNG INJURY

An **immune-mediated**, non-cardiogenic pulmonary edema caused by donor antibodies attacking recipient WBCs in the lungs.

Onset: within **6 hours** of transfusion (often within 1–2 hrs). The leading cause of transfusion-related death.



TACO

TRANSFUSION-ASSOCIATED CIRCULATORY OVERLOAD

A **volume-mediated**, cardiogenic pulmonary edema from infusing blood faster or in greater volume than the heart can handle.

Onset: within **6 hours** of transfusion. Most common in elderly, infants, and those with cardiac/renal disease.

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PATHOPHYSIOLOGY

Two Different Roads to Wet Lungs

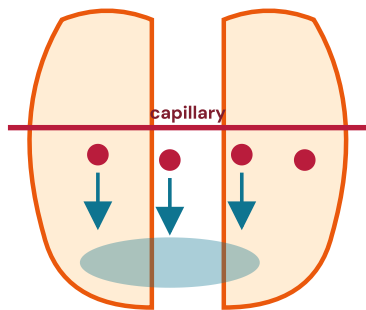
TRALI — Immune Injury

- 1 Donor blood contains **anti-HLA / anti-neutrophil antibodies**
- ↓
- 2 Antibodies bind recipient's **neutrophils (WBCs)**
- ↓
- 3 Activated neutrophils sequester in **pulmonary capillaries**
- ↓
- 4 Capillary membrane becomes **leaky** → fluid + protein leak into alveoli
- ↓
- 5 **Non-cardiogenic pulmonary edema** = ARDS-like picture

TACO — Volume Overload

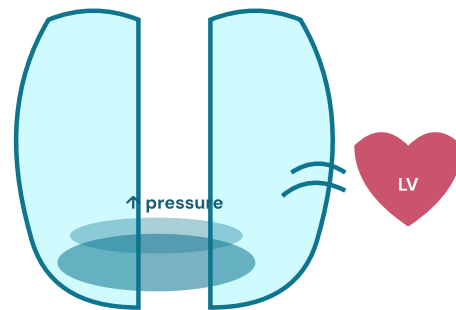
- 1 Blood infused too **fast or too much** for heart capacity
- ↓
- 2 Increased **preload** overwhelms left ventricle
- ↓
- 3 Backup of pressure into **pulmonary veins**
- ↓
- 4 **Hydrostatic pressure** forces fluid into alveoli
- ↓
- 5 **Cardiogenic pulmonary edema** + systemic volume overload (JVD, HTN)

TRALI: Leaky Capillaries



Antibodies → leaky alveoli
BP normal/low • No JVD

TACO: Pressure Overload



Volume backup → wet lungs
BP HIGH • JVD present

Mechanism comparison: leaky capillaries (TRALI) vs. pressure backup (TACO)

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SIGNS & SYMPTOMS

Side-by-Side Clinical Picture

Feature	TRALI 🫁	TACO 💧
Onset	Within 6 hrs (often 1–2 hrs)	Within 6 hrs of transfusion
Cause	Donor anti-HLA / anti-WBC antibodies → leaky pulmonary capillaries	Volume infused too fast or too much → cardiac overload
Type of edema	NON-cardiogenic (ARDS-like)	Cardiogenic (heart failure picture)
Blood Pressure	Normal or HYPOTensive ↓	HYPERtensive ↑↑
Jugular Veins (JVD)	❌ Absent / flat	✅ Distended
Temperature	Often fever / chills	Usually afebrile
Lung sounds	Bilateral crackles, frothy pink sputum possible	Bilateral crackles + wheezes; frothy pink sputum
B-type Natriuretic Peptide (BNP)	Normal	Elevated ↑
Response to diuretics	❌ NO improvement	✅ Improves with Lasix
Chest X-ray	Bilateral infiltrates, normal heart size	Bilateral infiltrates + cardiomegaly

🫁 TRALI Symptoms

- Acute **dyspnea** & tachypnea
- **Hypoxemia** ($\text{SpO}_2 < 90\%$)
- **Fever, chills, rigors**
- **HYPOTension** ↓
- Bilateral crackles
- Frothy pink sputum (sometimes)
- **NO JVD**, no peripheral edema
- Bilateral pulmonary infiltrates on CXR

💧 TACO Symptoms

- Acute **dyspnea** & orthopnea
- **HYPERtension** ↑
- **Tachycardia**
- **JVD (distended neck veins)**
- Bilateral crackles & wheezes
- Frothy pink sputum
- **Headache**, anxiety
- Peripheral edema, weight gain

 RED FLAG

Acute dyspnea + hypoxemia + **HYPOtension** within hours of transfusion = TRALI until proven otherwise. Often requires mechanical ventilation. **Leading cause of transfusion-related mortality.**

 RED FLAG

"Wet lungs + distended neck veins + HIGH BP" after transfusion = TACO. Highest risk: elderly, infants, cardiac/renal disease, and rapid infusion rates. **Most common serious transfusion complication.**

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PRIORITY NURSING INTERVENTIONS

ABCs First — Then Differentiate

A

AIRWAY

Position upright (High-Fowler's). Suction frothy sputum. Prepare for possible intubation.

B

BREATHING

Apply **high-flow O₂**. Monitor SpO₂, ABGs, RR. Prepare for mechanical ventilation if hypoxia worsens.

C

CIRCULATION

STOP transfusion FIRST. Maintain IV access with **0.9% NS** via NEW tubing. VS q15min.

TRALI Interventions

- 1 **STOP the transfusion immediately** — keep IV open with 0.9% NS via new tubing.
- 2 Place client in **High-Fowler's**; apply **high-flow O₂**; prepare for intubation/ventilation.
- 3 Notify **HCP and blood bank** at once.
- 4 Send blood bag, tubing, and patient blood/urine samples back to the blood bank.
- 5 **DO NOT give diuretics** — TRALI is not volume overload; diuretics can worsen hypotension.
- 6 Anticipate **IV fluids and vasopressors** for hypotension; consider corticosteroids per HCP.
- 7 Monitor ABGs, CXR, vital signs continuously; document onset and response.

TACO Interventions

- 1 **STOP or SLOW the transfusion** — maintain IV with 0.9% NS via new tubing.
- 2 Place client **upright with legs dependent** (decreases preload).
- 3 Apply **O₂** as ordered; monitor SpO₂.
- 4 Notify HCP — anticipate **IV diuretic (furosemide/Lasix)** and possibly morphine.
- 5 Monitor strict **I&O**, daily weights, lung sounds, JVD.
- 6 **Prevention is key**: infuse slowly (especially elderly/cardiac/renal), max 4 hours per unit.
- 7 Send blood bag, tubing, and samples to the blood bank per protocol.

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PHARMACOLOGY

Drugs You Will & Will NOT Give

Drug / Class	Use & Mechanism	Side Effects	Nursing Pearls
Furosemide (Lasix) Loop diuretic	TACO ONLY. Removes excess volume by inhibiting Na/Cl reabsorption in loop of Henle.	HYPOkalemia, ototoxicity, hypotension, dehydration	⚠️ Never in TRALI — worsens hypotension. Monitor K ⁺ , BP, urine output.
Morphine sulfate Opioid	TACO. Decreases preload via venodilation; reduces anxiety and dyspnea.	Respiratory depression, hypotension, sedation	Have naloxone available. Monitor RR closely.
Vasopressors (e.g., norepinephrine)	TRALI. Treats hypotension via vasoconstriction.	Tissue ischemia at IV site (extravasation), arrhythmias	Central line preferred. Monitor BP, perfusion, MAP.
Corticosteroids (methylprednisolone)	TRALI (per HCP). Reduces inflammatory lung injury.	Hyperglycemia, ↑ infection risk, GI upset	Monitor blood glucose; not first-line — supportive care primary.
Acetaminophen / Diphenhydramine	Premedication for at-risk clients to prevent febrile/allergic reactions (NOT TRALI/TACO).	Sedation (Benadryl), hepatotoxicity (Tylenol)	Premeds reduce some reactions but do NOT prevent TRALI or TACO.

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NCLEX TEST TRAPS ⚠️

Where Students Lose Points

Wrong "Give Lasix for any post-transfusion dyspnea."

Right Differentiate first. TACO (HIGH BP, JVD) → diuretic. TRALI (LOW BP, no JVD) → diuretics worsen shock.

Wrong "Slow the transfusion when the patient develops dyspnea and hypotension."

Right STOP the transfusion immediately — never slow it for a suspected reaction. Then keep the IV open with 0.9% NS via new tubing.

Wrong "Disconnect the IV completely after stopping the transfusion."

Right Maintain IV access with 0.9% NS via new tubing — emergency drugs may be needed.

Wrong "Both reactions present with the same vital sign changes."

Right BP is the key splitter: TRALI = HYPOtension (often with fever); TACO = HYPERtension (with JVD).

Wrong "Premedicating with Benadryl and Tylenol prevents TRALI and TACO."

Right Premeds prevent febrile and allergic reactions only. They do NOT prevent TRALI (immune-mediated lung injury) or TACO (volume overload).

Wrong "Position the dyspneic transfusion patient supine."

Right HIGH-Fowler's for both — improves oxygenation. For TACO, legs dependent further reduces preload.

Wrong "Discard the blood bag and tubing after a reaction."

Right Send the bag, tubing, and patient blood + urine samples to the blood bank for analysis.

Wrong "Reactions only happen at the start of the transfusion."

Right Most life-threatening reactions occur in the first 15 minutes, but TRALI/TACO can develop up to 6 hours after transfusion. Stay vigilant throughout.

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PATIENT & FAMILY EDUCATION

Teach Before, During, After

BEFORE TRANSFUSION

Explain the purpose, benefits, and risks. Confirm informed consent. Verify patient identity using two identifiers.

WHY WE STAY CLOSE

"I'll be at your bedside for the first 15 minutes — that's when most reactions begin. Vital signs are taken often."

FOR AT-RISK CLIENTS

Elderly, cardiac, or renal patients: explain that the blood will be given **slowly over up to 4 hours** to prevent fluid overload (TACO).

SYMPTOMS TO REPORT IMMEDIATELY

"Tell me right away if you feel: shortness of breath, chest pain, back pain, chills, fever, itching, headache, or feel anxious."

COMFORT MEASURES

Position of comfort (HOB elevated). Use the call light immediately for any new symptom — do not wait.

AFTER TRANSFUSION

Watch for delayed dyspnea, weight gain, swelling, or fever for the next 6+ hours. Report any new shortness of breath promptly.

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MEMORY BOOSTERS

Mnemonics to Lock It In

T-R-A-L-I

- T** Two-hour onset (often within 1–2 hrs)
- R** Respiratory distress + bilateral infiltrates
- A** Antibodies (donor anti-WBC) → leaky lungs
- L** LOW blood pressure (hypotension)
- I** Intubation often needed — NO Lasix!

T-A-C-O

- T** Too much volume, too fast
- A** Augmented BP (hypertension) + JVD
- C** Cardiogenic pulmonary edema (BNP ↑)
- O** Output with diuretics — **GIVE Lasix!**

The One-Question Rule: BP & JVD

If BP is LOW + NO JVD →

Think **TRALI**. The lungs are leaking, not flooding.
NEVER give Lasix. Support with O₂, fluids, vasopressors.

If BP is HIGH + JVD →

Think **TACO**. The heart is overwhelmed. **GIVE Lasix.**
Sit upright, dangle legs, decrease preload.

The TACO Tongue-Tie

"**TACO** is a **HEAVY** meal — heavy with fluid, heavy on the heart. Heavy = HIGH BP, full neck veins, and Lasix to lighten the load."

The TRALI Trap

"**TRALI** patients are '**tired and low**' — Tachypneic, Hypoxic, Hypotensive. The lungs are *leaking*, not *flooded*. Drying them out makes shock worse."

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NCJMM CLINICAL JUDGMENT MODEL

Six-Step Reasoning Through a TRALI/TACO Case

NGN NCLEX 2026 — Clinical Judgment Measurement Model

The NCJMM tests your ability to **recognize cues, analyze, prioritize, generate solutions, take action, and evaluate outcomes**. Walk through this transfusion case using all six layers.

CASE SCENARIO

"A 78-year-old client with chronic kidney disease is receiving the second unit of PRBCs for symptomatic anemia. Ninety minutes into the second unit, the client reports difficulty breathing and a headache. Vital signs: BP 178/96, HR 118, RR 28, SpO₂ 88% on room air, T 99.0°F. You hear bilateral crackles to the mid-lung fields and notice distended neck veins. The client says, 'I feel like I can't get a deep breath.'"

STEP 1

Recognize Cues

Elderly + CKD (high TACO risk). 90 min into 2nd unit. **HIGH BP, tachycardia, tachypnea, SpO₂ 88%, bilateral crackles, JVD**, dyspnea, headache. Afebrile.

STEP 2

Analyze Cues

HYPERtension + JVD + crackles in elderly CKD client mid-transfusion = TACO, not TRALI (which is hypotensive). Classic volume-overload picture.

STEP 3

Prioritize Hypotheses

Top priority: TACO with hypoxemia. Differential: TRALI (less likely — BP is high; no fever), pulmonary embolism, MI. ABCs first.

STEP 4

Generate Solutions

Stop transfusion → keep IV open with 0.9% NS via new tubing → upright with legs dependent → high-flow O₂ → notify HCP → anticipate IV furosemide → continuous monitoring → send bag/samples to blood bank.

STEP 5

Take Action

STOP transfusion. Switch to 0.9% NS via new tubing. Position upright, legs dangling. Apply O₂ at 4 L NC. Call HCP and blood bank. Administer ordered IV Lasix. VS q15min. Strict I&O.

STEP 6

Evaluate Outcomes

Expected within 30–60 min: SpO₂ > 92%, RR 16–20, BP trending toward baseline, decreased crackles & JVD, urine output ↑ post-Lasix, dyspnea improving. If **BP drops** + worsens → reconsider TRALI; do NOT give more diuretic.



THE UNIVERSAL RULE

First Action for ANY Suspected Reaction

1

STOP transfusion

Stop — never slow.

2

0.9% NS via new tubing

Maintain IV access.

3

**Notify HCP & blood
bank**

Both — together.

4

Send bag + samples

Blood + urine to lab.

Diane's NGN NCLEX 2026 Study Series

TRALI vs TACO • Transfusion Reactions • Pulmonary Complications

Companion flashcard deck available · Print-ready · Color-preserving PDF export