

● NGN NCLEX 2026 • ENDOCRINE SYSTEM • HIGH-YIELD VISUAL STUDY CARD

Hyper vs Hypo Parathyroidism

Two opposite disorders of PTH — one gland, mirror-image pathology. Master the calcium & phosphorus see-saw and the classic assessment findings that separate them.

 Calcium & Phosphorus Imbalance

 Clinical Judgment Focus

 Airway Priority (Hypo)

 Post-Thyroidectomy Risk

01 / Definition & Overview

what the parathyroids do

The Parathyroid Glands

Four small glands sit behind the thyroid in the neck. They secrete **Parathyroid Hormone (PTH)** — the body's primary **calcium regulator**.

PTH works on **bones** (pulls Ca^{2+} out), the **kidneys** (reabsorbs Ca^{2+} , excretes PO_4^{3-}), and the **gut** (activates Vitamin D to absorb Ca^{2+}).

PTH = The Calcium "Raiser"

WHEN PTH IS RELEASED:

↑ Serum Calcium • ↓ Serum Phosphorus

CALCIUM & PHOSPHORUS = INVERSE

Ca^{2+} ↔ PO_4^{3-} (one up, one down)

02 / Pathophysiology

mirror-image disease

• TOO MUCH PTH

Hyperparathyroidism

Parathyroid adenoma · hyperplasia · secondary to CKD

- 1 ↑ PTH secretion from overactive gland(s)
- 2 Calcium is **pulled out of bone** → osteoporosis, fractures
- 3 Kidneys **reabsorb more Ca^{2+}** → hypercalcemia + stones
- 4 Phosphorus is **dumped by kidneys** → hypophosphatemia
- 5 Result: ↑ Ca^{2+} · ↓ PO_4^{3-} · brittle bones

• TOO LITTLE PTH

Hypoparathyroidism

Accidental removal (thyroidectomy) · autoimmune · radiation

- 1 ↓ PTH secretion (often post-surgical)
- 2 Calcium **stays stuck in bone**, not released
- 3 Kidneys **fail to reabsorb Ca^{2+}** → hypocalcemia
- 4 Phosphorus **builds up** → hyperphosphatemia
- 5 Result: ↓ Ca^{2+} · ↑ PO_4^{3-} · neuromuscular irritability

03 / Signs & Symptoms

assessment cues

HYPERCALCEMIA (SERUM CA > 10.5 MG/DL)

The "Slow & Stony" Patient

Stones Kidney stones, flank pain, hematuria, polyuria

HYPOCALCEMIA (SERUM CA < 9.0 MG/DL)

The "Twitchy & Tight" Patient

Convulsions Seizures (low Ca lowers seizure threshold)

Bones	Bone pain, pathological fractures, osteoporosis
Groans	Abdominal pain, anorexia, constipation, N/V
Moans	Fatigue, depression, confusion, lethargy
Thrones	Polyuria (sitting on the toilet), dehydration
Muscle	Weakness, hyporeflexia (sluggish DTRs)
Cardiac	Shortened QT interval, dysrhythmias

REMEMBER

**STONES · BONES · GROANS ·
MOANS · THRONES**

- S** Kidney **S** tones
- B** Brittle **B** ones
- G** Abdominal **G** roans (pain, constipation)
- M** Psychic **M** oans (confusion, depression)
- T** **T** hrones — polyuria



RED FLAG: Severe hypercalcemia (>14 mg/dL) → cardiac arrest, coma. Short QT on ECG is a priority finding.

Arrhythmias	Prolonged QT interval, torsades
Tetany	Muscle cramps, carpopedal spasm, stiffness
Spasms	Laryngospasm, bronchospasm → airway emergency
Trousseau	BP cuff inflated → hand & wrist spasm
Chvostek	Tap facial nerve → facial twitch
Paresthesia	Numbness/tingling around mouth & fingertips

REMEMBER

C · A · T · S

- C** Convulsions (seizures)
- A** Arrhythmias (prolonged QT)
- T** Tetany (muscle cramps)
- S** Spasms & Stridor (laryngospasm)



RED FLAG: Laryngospasm & stridor = AIRWAY EMERGENCY. Keep tracheostomy tray & IV calcium gluconate at bedside.

Hyperparathyroidism • Goal: LOWER Calcium

★ **Priority:** IV 0.9% Normal Saline — dilutes Ca^{2+} & promotes renal excretion

- **Administer Loop diuretic** (Furosemide) — excretes calcium
- **Encourage ambulation** — weight-bearing keeps Ca^{2+} in bones
- **Strain all urine** for kidney stones; push fluids 3–4 L/day
- **Fall precautions** — osteoporosis → fracture risk
- **Low-calcium diet**; limit dairy, antacids with Ca
- **Monitor ECG** for shortened QT & dysrhythmias
- **AVOID** Thiazide diuretics — they *retain* calcium
- **AVOID** immobility — *accelerates bone resorption*

Hypoparathyroidism • Goal: RAISE Calcium

★ **Priority:** Maintain patent airway — laryngospasm = emergency

★ **Priority:** IV Calcium Gluconate (slow push) for acute tetany

- **Seizure precautions**; pad rails, suction at bedside
- **Tracheostomy tray** at bedside, especially post-thyroidectomy
- **Oral Calcium + Vitamin D** supplements (lifelong)
- **High Ca / LOW phosphorus diet** — limit dairy, meat, cola
- **Monitor ECG** for prolonged QT
- **Quiet environment** — stimulation can trigger tetany
- **Check Trousseau & Chvostek** signs every shift

05 / Pharmacology

drugs, mechanisms, nursing care

DRUG / CLASS	USE	MECHANISM	KEY NURSING CONSIDERATIONS
Calcium Gluconate IV HYP0	Acute tetany, laryngospasm, seizures	Rapid replacement of serum Ca^{2+}	Give slow IV push ; monitor ECG for bradycardia; extravasation causes tissue necrosis; never mix with bicarb or phosphate

DRUG / CLASS	USE	MECHANISM	KEY NURSING CONSIDERATIONS
Calcium Carbonate / Vit D (PO) HYP0	Chronic hypocalcemia maintenance	Replaces calcium; Vit D improves gut absorption	Give with meals for absorption; monitor serum Ca weekly initially; teach signs of toxicity (thirst, N/V)
Furosemide (Loop) HYPER	Lower serum calcium	Inhibits Ca reabsorption at loop of Henle → calcium loss in urine	Monitor K ⁺ (hypokalemia), daily weights, I&O; pair with IV NS to prevent dehydration
Calcitonin (Miacalcin) HYPER	Lower serum calcium	Inhibits bone resorption; opposes PTH	Give SQ or nasal spray; skin test first (salmon-derived); rotate nares for nasal form
Bisphosphonates (Pamidronate, Alendronate) HYPER	Reduce bone resorption in hypercalcemia & osteoporosis	Inhibit osteoclast activity	PO: full glass water, upright 30 min , empty stomach; IV forms for acute hypercalcemia
Cinacalcet (Sensipar) HYPER	Secondary hyperparathyroidism (CKD)	Calcimimetic — tricks gland into sensing "enough" Ca, ↓ PTH	Monitor Ca levels closely — can drop too low ; take with food
Phosphate Binders HYP0	Lower phosphorus to raise Ca indirectly	Bind PO ₄ ³⁻ in gut to block absorption	Give with meals ; watch for constipation
AVOID: Thiazide Diuretics HYPER	Contraindicated in hyperparathyroidism	Thiazides retain calcium — worsens hypercalcemia	Classic NCLEX trap — choose loop over thiazide when Ca is high

TRAP 01

Which diuretic for high calcium?

Loop (Furosemide) — it DUMPS calcium. Thiazides RETAIN calcium and make hypercalcemia worse. Mnemonic: "**Loop = Lose, Thiazide = Take.**"

TRAP 02

Post-thyroidectomy priority assessment?

Watch for **hypoparathyroidism** — parathyroids may be accidentally removed. Check for tingling, Chvostek's, Trousseau's. **Airway & calcium gluconate at bedside.**

TRAP 03

Hyper or Hypo — which causes seizures?

HYPO (low Ca). Low calcium = excitable neurons = seizures, tetany, spasms. High calcium causes lethargy & coma, not seizures.

TRAP 04

Trousseau's & Chvostek's are positive in...?

HYPOcalcemia / hypoparathyroidism. Twitchy muscles signal LOW calcium. Students flip these — "**C & T tap for low.**"

TRAP 05

Immobile hypercalcemic patient — the danger?

Bed rest **worsens** hypercalcemia (bone resorption). Ambulate the client — weight-bearing drives calcium BACK into bone.

TRAP 06

QT interval cue on ECG?

Short QT = HIGH Ca (hyper). Long QT = LOW Ca (hypo). Long QT in a hypo patient → torsades risk.

TRAP 07

Reflexes in hypercalcemia?

Hyporeflexia & muscle weakness. Hypo-parathyroidism = hyper-reflexia. Opposite disorder = opposite reflexes.

TRAP 08

Diet for hypoparathyroidism?

HIGH calcium, **LOW phosphorus.** Limit dairy, processed meats, colas — they are high in phosphorus and will drop Ca further.

Scenario: A 54-year-old client returns to the unit 6 hours after a total thyroidectomy. The nurse notes the client is anxious, reports tingling around the mouth and fingertips, and has a positive Chvostek's sign. HR 110, RR 22, Ca^{2+} 7.2 mg/dL, phosphorus 5.8 mg/dL. What does the nurse do?

STEP 1

Recognize Cues

Circumoral paresthesia + positive Chvostek's + low Ca (7.2) + elevated PO_4 + recent thyroidectomy = **acute hypocalcemia from hypoparathyroidism**.

STEP 2

Analyze & Prioritize

Airway is the priority — laryngospasm can occur quickly. Seizure risk is present. ABC > everything else.

STEP 3

Take Action

Notify HCP. Prepare **IV Calcium Gluconate**. Place trach tray & suction at bedside. Institute seizure precautions. Reduce stimulation.

STEP 4

Evaluate Outcomes

Ca^{2+} trending to 8.5–10.5 · Chvostek's/Trousseau's negative · No laryngospasm · Airway patent · Client reports tingling resolved.

08 / Patient Education

discharge teaching

Hyperparathyroidism

STONES · BONES · GROANS

- ✓ Drink **3–4 liters of fluid daily** to prevent kidney stones
- ✓ Report **flank pain, blood in urine**, or decreased urine output
- ✓ Engage in daily **weight-bearing exercise** (walking) to protect bones
- ✓ **Limit calcium-rich foods:** dairy, sardines, antacids with Ca
- ✓ Prevent falls: clear walkways, use night lights, fall-proof the home

Hypoparathyroidism

TETANY · SPASMS · LONG QT

- ✓ Take **calcium + Vitamin D supplements lifelong**, with meals
- ✓ Eat foods high in calcium: **dark leafy greens, fortified plant milks**
- ✓ **Limit high-phosphorus foods:** dairy, processed meats, colas
- ✓ Report tingling around mouth, muscle cramps, or **difficulty breathing immediately**
- ✓ Wear a **medical alert bracelet**

- ✓ Follow up for **routine calcium & bone density** testing
- ✓ Post-parathyroidectomy: watch for **signs of low Ca** (tingling, twitches)

- ✓ Keep follow-up labs — calcium, phosphorus, magnesium
- ✓ Never stop calcium abruptly — tetany can return rapidly

09 / Memory Boosters

pattern recognition

5 × S

HYPERCALCEMIA

- Stones** · kidney stones
- Bones** · brittle bones
- Groans** · abdominal pain
- Moans** · depression, confusion
- Thrones** · polyuria

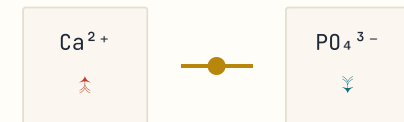
C·A·T·S

HYPOCALCEMIA

- Convulsions
- Arrhythmias (long QT)
- Tetany
- Spasms / Stridor
- Twitchy cats have low Ca.*

See-Saw

CA & PHOSPHORUS



Ca & PO₄ are **inverse**. One rises as the other falls.

Hyper: **↑Ca · ↓PO₄**

Hypo: **↓Ca · ↑PO₄**

QUICK ASSOCIATIONS

▲ **HYPER = HIGH calcium** → slow, stony, constipated, confused

💊 **Loop = Lose Ca** (give in HYPER)

🔪 **After thyroidectomy** → watch for HYPO

▼ **HYPO = LOW calcium** → twitchy, tingling, tetany, seizure

💊 **Thiazide = Take Ca** (AVOID in HYPER)

📄 **Short QT = HIGH Ca · Long QT = LOW Ca**

