

NGN NCLEX 2026 · RENAL / GU SYSTEM

Kidney Stones

Nephrolithiasis · Urolithiasis · Renal Calculi — A high-yield clinical judgment reference for the Next Generation NCLEX

Pain Management

Strain All Urine

Fluid Priority

Stone Type = Diet

Urosepsis Risk

1

Definition & Overview

WHAT & WHY

WHAT IT IS

Nephrolithiasis = stones in the kidney. **Urolithiasis** = stones anywhere in the urinary tract. Formed when urine becomes supersaturated with minerals that crystallize and clump together.

WHO GETS THEM

Most common in **men 20–55**, Caucasians, obese patients, and those with a family history. Lifetime risk is ~10%. **Recurrence rate is high** — up to 50% within 5 years.

WHY IT MATTERS

Causes **severe pain** (renal colic), obstruction, hydronephrosis, infection, and potential acute kidney injury. **Obstruction + infection = urosepsis** — a true emergency.

RISK FACTORS

Dehydration, high-protein/high-sodium diet, immobility, UTIs, gout, hyperparathyroidism, family history, obesity, warm climate.

2 Pathophysiology (Simplified)

STEP-BY-STEP

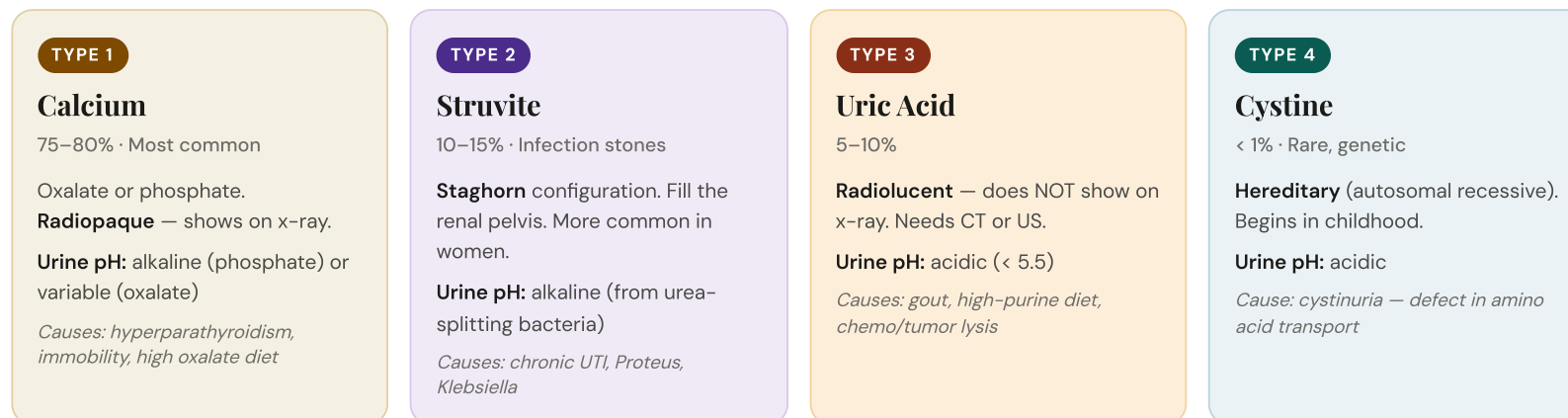


KEY CONCEPT

The **pain of renal colic** comes from ureteral spasm as the stone moves — NOT from the stone itself. Pain radiates along the path the stone is traveling (flank → groin → genitals).

3 Stone Types (Know These Cold)

TYPE = TREATMENT



4

Signs & Symptoms

ASSESSMENT CUES

RENAL COLIC

Hallmark finding. Sudden, severe, **excruciating** flank pain that radiates to the groin, lower abdomen, or genitalia. Comes in waves (colicky). Patient is **restless and writhing** — cannot find a comfortable position. Often rated 10/10.



MILD / EARLY

- ▶ Dull flank pain (stone still in kidney)
- ▶ Microscopic hematuria
- ▶ Mild nausea
- ▶ Urinary frequency / urgency
- ▶ Dysuria if near bladder
- ▶ Restlessness, anxiety
- ▶ Diaphoresis



SEVERE / LATE

- ▶ Renal colic — waves of 10/10 pain
- ▶ Gross hematuria (pink/red urine)
- ▶ Severe N/V (vagal response to pain)
- ▶ Cool, pale, clammy skin
- ▶ Tachycardia, tachypnea
- ▶ Hypotension (from severe pain)
- ▶ Decreased urine output (obstruction)



RED FLAG — UROSEPSIS: Fever, chills, flank pain, cloudy/foul urine, hypotension, confusion. Stone + obstruction + infection = **life-threatening emergency**. Notify HCP immediately.

5 Priority Nursing Interventions

ABCS · SAFETY · PRIORITIZATION

Pain Management (First!)

#1 PRIORITY

- ✓ **Administer** opioids (morphine, hydromorphone) as ordered
- ✓ **Give** NSAIDs (ketorolac/Toradol) — relieves pain + ureteral spasm
- ✓ **Assess** pain using 0–10 scale every 30 min during acute episode
- ✓ Apply **warm compress** to flank for comfort
- ✓ **Reassess** pain after intervention

Strain ALL Urine

#2 CATCH

- ✓ **Strain every void** through a urine strainer or gauze
- ✓ **Save** any stones/fragments — send to lab for analysis
- ✓ **Do NOT throw away** any urine without straining first
- ✓ Stone type determines long-term diet & treatment
- ✓ Continue until stone passes or is retrieved

Fluids to Move the Stone

#3 FLUSH

- ✓ **Push fluids** 3 L/day (unless contraindicated)
- ✓ Goal: urine output > 2 L/day
- ✓ IV fluids initially if N/V prevents oral intake
- ✓ ⚠ **Avoid forcing fluids** if complete obstruction — causes backup
- ✓ Monitor I&O strictly

Ambulation & Monitoring

#4 MOVE

- ✓ **Encourage ambulation** — gravity helps stone pass
- ✓ **Monitor** vital signs for fever (infection) & BP
- ✓ **Assess** urine color, clarity, odor each void
- ✓ **Watch** for signs of AKI: ↓ UO, ↑ BUN/Cr, edema
- ✓ Monitor for **urosepsis** (fever + chills + tachycardia)

6 Pharmacology

DRUG · MECHANISM · WATCH FOR

Morphine / Hydromorphone

OPIOID

Action: Severe pain relief

Watch for: Respiratory depression, hypotension, constipation

Nursing: Monitor RR > 12. Have naloxone available.

Ketorolac (Toradol)

NSAID

Action: Pain relief + reduces ureteral spasm/inflammation

Watch for: GI bleed, renal toxicity, bleeding

Nursing: Max 5 days. Monitor BUN/Cr. Take with food.

Tamsulosin (Flomax)

ALPHA BLOCKER

Action: Relaxes ureter smooth muscle → **helps stone pass**

Watch for: Orthostatic hypotension, dizziness

Nursing: Teach to rise slowly. Fall precautions.

Allopurinol (Zyloprim)

XANTHINE OXIDASE INHIB.

Action: ↓ Uric acid production — **for uric acid stones**

Watch for: Rash (Stevens–Johnson), hepatotoxicity

Nursing: Push fluids. Take with food. Alkalinize urine.

Hydrochlorothiazide

THIAZIDE DIURETIC

Action: ↓ Urinary calcium excretion — **for calcium stones**

Watch for: Hypokalemia, hyponatremia, hyperglycemia

Nursing: Monitor K+. Give K+ supplement if needed.

Potassium Citrate

URINARY ALKALINIZER

Action: Alkalinizes urine — **for uric acid & cystine stones**

Watch for: Hyperkalemia, GI upset

Nursing: Monitor K+. Take with full glass of water.

7 Procedures (If Stone Won't Pass)

SURGICAL / INVASIVE OPTIONS

ESWL

EXTRACORPOREAL SHOCK WAVE
LITHOTRIPSY

Shock waves **shatter stone** externally. Stones pass in fragments. **Post-op:** hematuria expected 24–48 hr; strain urine; push fluids.

URS

URETEROSCOPY W/ STONE RETRIEVAL

Scope goes up ureter; stone grabbed with basket or lasered. **Stent** often placed temporarily. Teach stent care & follow-up.

PCNL

PERCUTANEOUS NEPHROLITHOTOMY

Surgical access through back. For **large staghorn stones**. Post-op: nephrostomy tube — do NOT clamp/irrigate without order.

8 NCLEX Test Traps

WHERE STUDENTS SLIP

- ✗ **"Patient is still lying flat to reduce pain"** — This is peritonitis behavior, not kidney stones! A kidney stone patient is **restless and writhing**. A still patient = peritonitis. Distinguishing these is a classic NCLEX assessment question.
- ✗ **"Discard the urine before the next void"** — NEVER throw away urine without straining. Every single void must be strained through gauze or a strainer — **even one lost stone means no lab analysis**, which means no targeted diet or prevention plan.
- ✗ **"Restrict calcium for calcium stones"** — FALSE. Low calcium diets **increase** oxalate absorption and worsen stones. Patients should maintain **moderate calcium** intake. The real dietary restriction is **oxalate** (spinach, nuts, tea, chocolate).
- ✗ **"Give fluids first, pain meds later"** — FALSE. **Pain management is the #1 priority**. A patient in 10/10 renal colic cannot tolerate fluids and may vomit them back. Treat pain first, then push fluids.
- ✗ **Fever + flank pain + stone = Just give antibiotics** — NO. This is **urosepsis — a medical emergency**. Obstructed + infected kidney requires **immediate HCP notification** and likely emergency decompression (stent or nephrostomy). Do not wait.
- ✗ **"Uric acid stone on x-ray"** — Uric acid stones are **radiolucent** and will NOT appear on a plain KUB x-ray. Diagnosis requires CT or ultrasound. A "clear" x-ray does not rule out stones.

9 Patient Education

DIET = PREVENTION

STONE TYPE	AVOID	ENCOURAGE
Calcium Oxalate	Oxalate: spinach, rhubarb, beets, nuts, chocolate, tea, soy, strawberries	Moderate calcium intake (NOT low); fluids 2.5–3 L/day
Calcium Phosphate	High-sodium foods; excess animal protein; antacids with Ca	Fluids 2.5–3 L/day; thiazide diuretics as ordered
Struvite	UTI recurrence — treat infections promptly; acidify urine (cranberries)	Hydration; antibiotics as prescribed; follow-up cultures
Uric Acid	Purines: organ meats, red meat, sardines, anchovies, shellfish, beer	Alkaline-ash foods (dairy, fruits, veggies); allopurinol
Cystine	High-sodium & high-protein diets (especially methionine-rich)	Massive fluids (4 L/day); alkalinize urine; follow genetics

GENERAL PREVENTION

- Drink 2.5–3 L fluids/day — even more in hot weather
- Urine should be **pale yellow** (not dark)
- Limit sodium to < 2,300 mg/day
- Moderate animal protein
- Stay active — immobility ↑ stones
- Keep a urine strainer at home

WHEN TO CALL THE HCP

- **Fever or chills** — possible infection
- **Severe pain** not relieved by meds
- **Inability to urinate** — complete obstruction
- Heavy blood in urine or clots
- Persistent N/V
- Confusion, lethargy (uremia)



NCJMM Clinical Judgment Framework

NGN 2026 STANDARD

1

RECOGNIZE CUES

Sudden severe flank pain radiating to groin, restless patient, hematuria, N/V, diaphoresis. Fever = red flag.

2

ANALYZE

Obstruction + infection = urosepsis. Pain + movement pattern distinguishes stones from peritonitis. Stone type guides diet.

3

PRIORITIZE ACTION

1) Pain control, 2) Strain urine, 3) Push fluids, 4) Monitor for obstruction/infection. Fever = call HCP NOW.

4

EVALUATE

Pain ↓, stone passed/retrieved, urine output maintained, no fever, labs trending to baseline, patient verbalizes prevention plan.



Memory Boosters & Mnemonics

PATTERN RECOGNITION

PRIORITY ACTION

"PASS the STONE"

Nursing priorities in order

- P** **Pain** meds first (opioids + NSAIDs)
- A** **Ambulate** — gravity helps stone pass
- S** **Strain** all urine, every void
- S** **Save** stones for lab analysis
- T** **Take in** fluids (3 L/day)
- O** **Output** — monitor I&O closely
- N** **Notify** HCP of fever or ↓UO
- E** **Educate** on stone-specific diet

STONE TYPES

"CSU-C"

Can Stones Unblock Castles?

- C** **Calcium** — 80% · radiopaque · limit oxalate
- S** **Struvite** — infection · staghorn · treat UTIs
- U** **Uric acid** — gout · radiolucent · alkalinize
- C** **Cystine** — rare · genetic · massive fluids

PAIN PATTERN

"Flank to Groin"

Classic renal colic radiation

- ▶ Pain starts at **flank** (kidney area)
- ▶ Radiates **down the ureter**
- ▶ Ends at **groin / genitalia**
- ▶ Patient is **restless, writhing, pacing**
- ▶ Contrast with peritonitis: patient lies **completely still**

QUICK ASSOCIATIONS

"CAUSE" of Stones

Risk factor memory aid

- C** **Calcium** elevated (hyperparathyroidism)
- A** **Animal** protein & purines excess
- U** **UTI** & urinary stasis
- S** **Solute** saturation (dehydration)
- E** **Elevated** immobility / bedrest