

Kidney Stone (Ureterolithiasis)

A plain-English guide for you and your family

WHAT IS HAPPENING

Your kidneys make pee all day. That pee runs down two thin tubes called ureters into the bladder. Sometimes minerals in the pee stick together and form a tiny rock — a stone. The most common kind is calcium oxalate, which makes up about 80% of stones. Others are uric acid stones (which form when there is too much uric acid, like in gout or high-protein diets), struvite stones (which grow in long-lasting urinary infections), and cystine stones (which are rare and run in families). If the stone is small, it can wash out with your pee. If it gets stuck in a ureter, pee backs up and stretches the kidney. That stretch is why kidney stones are famous for one of the worst pains in medicine. Most stones pass on their own with plenty of fluids and time. Some need a small procedure to break them up or pull them out.

What you might feel

- Sudden, severe pain in the side (flank) that shoots down to the groin
- Restlessness—constantly shifting position, can't sit still or get comfortable
- Blood in the urine (pink, red, or brown pee, or only visible under a microscope)
- Nausea and vomiting
- Needing to pee often and urgently, especially when the stone is almost in the bladder
- Fever and shaking chills
- No urine coming out, and rising creatinine (a blood test showing kidney function is dropping)

Call the doctor right away if...

- Fever in a patient who has a swollen, backed-up kidney (hydronephrosis) on imaging — Start IV antibiotics immediately and call urology within hours to drain the kidney, either by placing a thin tube through the bladder up past the stone (ureteral stent) or through the skin into the kidney (nephrostomy tube).

- No urine output (anuria) and creatinine rising in the blood — Emergency CT scan to confirm obstruction and urgent urology consultation to restore urine flow, usually with stents or drainage tubes.
- Stone larger than 10 millimeters (about the width of a small pea) — Refer to urology for removal, typically with shock waves that break the stone from outside the body (extracorporeal shock wave lithotripsy, ESWL) or a thin camera and tools passed through the bladder (ureteroscopy).
- Severe pain that does not get better even with strong IV pain medicines (like ketorolac or morphine) — Admit to the hospital for continuous pain control and urology evaluation, often leading to urgent intervention to relieve the blockage.

What the care team will do

- Give scheduled + PRN analgesia early
- Strain all urine and save any stone passed
- Monitor for fever and vital-sign trends
- Push oral fluids once nausea is controlled
- Teach dietary prevention for next stone

Medicines you may be given — and why

Ketorolac (Toradol)

Blocks the body chemicals called prostaglandins that make the ureter (the tube from kidney to bladder) squeeze too hard. When the ureter relaxes, the kidney capsule (the thin wrapping around the kidney) stretches less, and the pain drops fast.

Tamsulosin (Flomax) — medical expulsive therapy

Relaxes the smooth muscle wrapped around the lower ureter and the spot where the ureter meets the bladder (called the ureterovesical junction or UVJ). That spot acts like a tight ring — stones often get stuck there. Relaxing the ring makes it easier for the stone to slide through and drop into the bladder.

Ibuprofen or Naproxen

Blocks prostaglandins (body chemicals that cause pain, swelling, and muscle spasm) in the ureter and kidney capsule. Less prostaglandin means less spasm and less stretch, so pain drops.

Opioids (morphine, hydromorphone, oxycodone)

Binds to opioid receptors in the brain and spinal cord (especially mu receptors) and blocks the pain signal before it reaches your awareness. Does not stop the kidney or ureter from hurting — it just turns down how much your brain notices and cares about the pain.

Ondansetron (Zofran)

Blocks serotonin receptors (5-HT3) in the vomiting center of the brainstem and in the gut. Serotonin is released when the gut or kidney is irritated; blocking its signal stops the nausea and vomiting that often come with severe kidney-stone pain.

Potassium citrate

Raises the pH (makes the urine less acidic) and increases citrate (a chemical that binds calcium and stops it from clumping into crystals). Used to prevent NEW stones in people with uric-acid stones or low urinary citrate, not to treat an acute stone that is already formed and stuck.

Where this information comes from

- American Urological Association (AUA) Guideline on Surgical Management of Stones, 2016 (amended 2023)
- European Association of Urology (EAU) Guidelines on Urolithiasis, 2024
- UpToDate
- American College of Emergency Physicians (ACEP) Clinical Policy on Renal Colic

Last reviewed: 2026-02-28