

KIDNEY STONES

1 in 10

people will develop a kidney stone in their lifetime

~80%

of stones are calcium oxalate or phosphate

~50%

recurrence within 5–10 years without prevention



WHAT IS IT?

Kidney stones, medically known as **nephrolithiasis** or **renal calculi**, are hard, pebble-like deposits made of minerals and salts that form inside the kidneys. They can range in size from a tiny grain of sand to a large golf ball. While they start in the kidney, they can travel through any part of your urinary tract, including the **ureters** and **bladder**.



PRESENTATION

Many stones are **"silent"** until they move. Once they start to travel, symptoms often include:

Renal Colic: Sudden, excruciating pain in the back or side (flank) that radiates toward the groin.

Hematuria: Blood in the urine, which may look pink, red, or brown.

Urinary Urgency: A frequent, intense need to urinate or a burning sensation during urination.

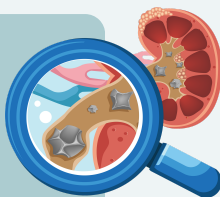
Systemic Signs: Nausea, vomiting, and sometimes fever/chills if an infection is present.



ETIOLOGY AND TYPES

Kidney stones form when urine becomes too concentrated.

Common risk factors: dehydration high-sodium or high-protein diets, obesity, and family history.



Calcium stones

Calcium Oxalate

~80%

The most common type; linked to high-oxalate foods like spinach and nuts.



Struvite stones

Struvite

~10%

"Infection stones" that can grow very large; caused by certain bacteria in the urinary tract.

Cystine

<1%

A rare type caused by a hereditary genetic disorder called cystinuria.



Uric acid stones

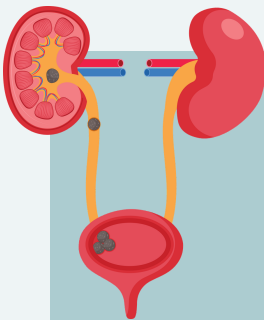
Uric Acid

5-10%

Often caused by high-protein diets or conditions like gout. Forms in acidic urine.



Cystine stones



PATHOPHYSIOLOGY

Stone formation is a three-step chemical process:

1

Supersaturation Urine contains more minerals than it can dilute

2

Nucleation Minerals stick together to form tiny crystals

3

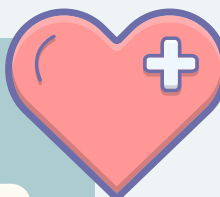
Aggregation and Growth Crystals grow into solid stones that block urine flow



DIAGNOSIS

Imaging: A non-contrast CT scan is the **gold standard** for spotting stones, but ultrasound is often used to avoid radiation. **Urinalysis:** Checking urine for blood, infection, or stone-forming minerals.

Blood Tests: To check kidney function and levels of calcium or uric acid.



TREATMENT

Small Stones

Often "pass" on their own with increased **water intake** and **pain medication**.

Medical Help

Alpha-blockers relax the ureter muscles to help the stone move through.

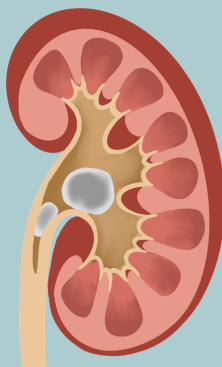
Procedures

SWL breaks stones with sound waves; **Ureteroscopy** physically removes them.

COMPLICATIONS

Obstruction and Hydronephrosis: A stone can block urine flow, causing the kidney to swell and stretch, which can be very painful. **Infection:** Stagnant urine behind a stone is a breeding ground for bacteria.

Kidney Damage: Chronic blockages can lead to permanent scarring, acute kidney injury, or even **chronic kidney disease (CKD)** over time.



REFERENCES



PRACTICE QS



Team #31 | Othman and Hussain

