

Blood in urine

Blood in urine — sometimes you can see it, sometimes only a test finds it — but either way, you have to hunt down the cause, because it might be cancer.

THE ONE-LINE TRUTH

Blood in urine is never normal and always needs a doctor to find out why.

The chain — how it unfolds

1. Blood appears in the urine, either visible to the eye (gross blood in the urine (hematuria), making urine pink, red, tea-colored, or brown) or found on dipstick or microscopy (microscopic blood in the urine, ≥ 3 red blood cells per high-power field). — why: The kidney filter normally keeps red blood cells locked inside blood vessels, so when they show up in urine, it means something upstream is broken — a torn lining (stone, infection, trauma), a leaky filter (kidney disease), a bleeding tumor (cancer), or blood that is too thin to clot (blood thinner, clotting disorder). The kidneys keep making urine and flushing the blood out, so the visible sign is the urine itself changing color or the lab finding cells that should not be there.
2. The amount, color, timing, and associated symptoms give the first clues about where the break is and how serious it is. — why: Bright red blood or clots suggest bleeding close to the bladder or urethra (because the blood has not had time to mix with urine and change color). Tea-colored or cola-colored urine suggests the blood came from higher up (kidney), where it mixed with acidic urine and turned brown. Painless visible blood, especially if it comes and goes over weeks, is the hallmark of bladder or kidney cancer. Blood plus sudden severe flank pain radiating to the groin means kidney stone. Blood plus burning, frequency, fever, and cloudy urine means infection. Blood in someone on warfarin or aspirin, with no pain, might be from the medicine, but it still needs full work-up because the blood thinner may have simply unmasked a tumor that was bleeding too little to notice before.

3. Initial testing confirms blood in the urine (hematuria) is real (not a false positive from myoglobin, hemoglobin, or menses contaminating the sample) and starts to narrow the cause: urinalysis with microscopy, urine culture if infection is suspected, and often imaging (ultrasound, CT scan, or CT urogram). — why: Dipstick can be positive from free hemoglobin (muscle breakdown, transfusion reaction) or myoglobin (rhabdomyolysis from crushed muscle), so microscopy is needed to actually see intact red blood cells and confirm it is true blood in the urine (hematuria). Dysmorphic red cells and red cell casts point to glomerular disease (kidney filter break). Normal-shaped red cells point to bleeding somewhere in the urinary tract (bladder, ureter, kidney pelvis, urethra). White cells plus bacteria plus nitrites suggest infection; urine culture grows the germ and guides antibiotic choice. CT scan without contrast finds kidney stones. CT urogram (CT with IV contrast plus delayed images) lights up the kidneys, ureters, and bladder to look for tumors, blockages, or structural problems.
4. If initial work-up does not find infection, stone, or obvious trauma, the next step is cystoscopy (a flexible camera passed through the urethra into the bladder) to look directly at the bladder lining for tumors, inflammation, or other lesions. — why: Imaging can miss small bladder tumors, especially flat ones (carcinoma in situ), so cystoscopy is the gold standard for ruling out bladder cancer in anyone with unexplained blood in the urine (hematuria), especially adults over 35, smokers, or anyone with occupational exposure to chemicals (dyes, rubber, leather industries are bladder cancer risk factors). If cystoscopy and imaging are both normal, and there are no casts or protein in the urine to suggest glomerular disease, the blood in the urine may be labeled with no known cause (idiopathic) (no cause found), but these patients still need repeat urinalysis every 6–12 months, because small cancers can take time to grow large enough to see.
5. If glomerular disease is suspected (dysmorphic red cells, red cell casts, proteinuria, high blood pressure, or low kidney function), referral to a nephrologist and possibly kidney biopsy is needed to diagnose the specific type of kidney disease. — why: Glomerulonephritis can be from post-infectious causes (usually resolves on its own), IgA nephropathy (needs monitoring and sometimes immunosuppression), lupus (needs steroids and immunosuppression), or Alport syndrome (genetic, no cure but needs monitoring for hearing loss and eye problems). A kidney biopsy takes a tiny core of kidney tissue with a needle and looks at it under a microscope (including immunofluorescence and electron microscopy) to see exactly what is attacking the filter, which guides treatment and predicts prognosis.

6. Treatment depends entirely on the cause: antibiotics for infection, fluids and pain control for stone (plus lithotripsy or ureteroscopy if the stone is too large to pass), stopping or adjusting the dose of blood thinners if they are the culprit (but still complete the cancer work-up), surgery or immunotherapy for cancer, and monitoring or immunosuppression for glomerular disease. — why: You cannot treat what you have not diagnosed, and treating the wrong thing wastes time and lets the real problem get worse. For example, giving antibiotics for blood in the urine (hematuria) from bladder cancer does nothing to stop the tumor and delays the surgery that could cure it. Stopping a blood thinner because of blood in the urine without looking for cancer means you might miss a tumor, and restarting the blood thinner later makes it bleed again, and now it is bigger and harder to cure.
7. The most critical risk is missing bladder or kidney cancer, because painless gross blood in the urine (hematuria) is often the only early symptom, and early-stage cancer is curable with surgery, but once it spreads to lymph nodes, bones, liver, or lungs, it is much harder to treat and survival drops sharply. — why: Bladder cancer (especially transitional cell carcinoma) is the fourth most common cancer in men, and smoking, age over 50, and chemical exposure are the biggest risk factors. Kidney cancer (renal cell carcinoma) often shows no symptoms until it is large or has spread, but blood in the urine (hematuria) is one of the earliest signs. That is why guidelines say that any adult over 35 with unexplained blood in the urine (even one episode, even if it goes away) needs cystoscopy and imaging, because waiting to see if it happens again gives cancer time to grow and spread.
8. Even after the cause is found and treated, follow-up is essential: repeat urinalysis to confirm the blood is gone, repeat imaging if there was a tumor or stone to make sure it has not come back, and long-term monitoring for people with with no known cause (idiopathic) blood in the urine (hematuria) or a history of bladder cancer (because bladder cancer recurs in up to 50% of cases, so surveillance cystoscopy every 3–6 months for years is standard). — why: Blood in the urine (Hematuria) that clears up completely and stays gone is reassuring, but blood in the urine that comes back, or blood in the urine that never fully resolves, means the underlying problem is still there or has returned, and it needs to be investigated again. The goal is not just to stop the bleeding, but to find and fix the broken part before it causes permanent damage or spreads beyond the point where it can be cured.

Spot it — what you see, and why

- Blood you can see in the urine (urine looks pink, red, or cola-colored): Red blood cells leak from somewhere along the urinary tract—kidneys, ureters (tubes from kidneys to bladder), bladder, or urethra (tube out)—and mix into the urine, making it visibly colored.
- Blood you cannot see (found only on a urine test): Small numbers of red blood cells leak into urine but not enough to change the color; a dipstick or microscope picks them up during routine testing.

- Pain or burning when you pee: Inflamed or irritated lining of the bladder or urethra (often from infection or a stone scraping the wall) sends pain signals when urine touches it.
- Needing to pee often or urgently: Irritation or inflammation in the bladder makes the bladder wall twitchy and triggers the urge signal even when the bladder isn't full.
- Pain in the side or lower back (flank pain): A kidney stone blocking the ureter or kidney inflammation (glomerulonephritis) stretches the kidney capsule (the thin outer shell), which has pain nerves; you feel it as a steady or sharp ache in your side or back.
- Fever and chills: Infection (such as pyelonephritis—kidney infection) triggers the immune system to release cytokines (alarm proteins) that reset the body's thermostat in the hypothalamus (the brain's temperature-control center) higher, causing fever and shaking chills.

Red flags — act now

- Visible blood in urine plus fever, severe back or side pain, or shaking chills (may mean kidney infection or blockage)
- Blood in urine plus sudden weakness, dizziness, very pale skin, or fast heart rate (may mean serious bleeding inside)
- New swelling in legs or face along with blood in urine (may mean kidney damage letting protein leak out)
- Blood in urine in someone over 35, especially if they smoke or have smoked, work with chemicals (dyes, rubber, leather), or have lost weight without trying (raises concern for bladder or kidney cancer)

Treat it — in this order

1. Treat confirmed urinary tract infection with antibiotics (e.g., nitrofurantoin 100 mg twice daily for 5 days, or ciprofloxacin 500 mg twice daily for 7 days if pyelonephritis) → Kills the bacteria (usually *E. coli*) infecting the bladder or kidney lining. Stops the inflammation and lets the tissue heal so bleeding stops. Blood in the urine (Hematuria) from infection should clear within a few days of starting the antibiotic.
2. Pain control and hydration for small kidney stones (<5 mm); plan ureteroscopy or lithotripsy for larger or stuck stones → Helps the stone pass naturally by keeping urine flowing. NSAIDs (like ibuprofen or ketorolac) ease the pain from the ureter spasming around the stone. Once the stone passes or is removed, the bleeding stops because the lining is no longer being cut.

3. Adjust or temporarily hold blood thinner (warfarin, apixaban, rivaroxaban, dabigatran) in consultation with the prescribing doctor → Lowers how easily blood leaks through small breaks in the urinary tract lining. Lets minor bleeding stop. Must balance against the risk of stroke or clot if the blood thinner is stopped.
4. Refer to urology for cystoscopy and possible biopsy in high-risk patients (age ≥ 35 , smoking history, occupational chemical exposure, gross blood in the urine (hematuria), or microscopic blood in the urine that persists) → Catches bladder cancer, kidney cancer, or upper-tract urothelial cancer early, when cure is still possible. Cystoscopy is the only way to see inside the bladder directly and biopsy suspicious areas. Early-stage bladder cancer (Ta, Tis, T1) has a 5-year survival over 90% if treated promptly.
5. Nephrology referral if there are signs of glomerular disease (red cell casts, proteinuria >500 mg/day, low eGFR, high blood pressure) → Identifies and treats inflammatory kidney diseases like IgA nephropathy, lupus nephritis, or post-infectious glomerulonephritis. May start immunosuppression (steroids, cyclophosphamide) if biopsy confirms active inflammation, which can slow kidney damage.

Your top priorities at the bedside

1. Check vital signs including temperature, blood pressure, and heart rate every 4 hours — why: Fever signals infection needing antibiotics. Low blood pressure or fast heart rate suggests significant blood loss causing hypovolemia (low fluid volume in blood vessels). Sepsis (blood infection) from kidney infection causes unstable vitals.
2. Obtain clean-catch midstream urine sample for urinalysis and urine culture before giving antibiotics — why: Urinalysis detects red blood cells, white blood cells, bacteria, and protein to distinguish infection from stones or cancer. Culture identifies which bacteria is growing and which antibiotic will kill it. Antibiotics before collection give false negative results.
3. Measure and record urine output every shift and describe urine color and any clots — why: Tracking output monitors kidney function and bleeding severity. Large clots can block the urethra (tube from bladder out) causing urinary retention (cannot empty bladder). Dark or decreasing output suggests worsening bleeding or dehydration.