TEST

Citric acid urine test

A urine test that measures citrate to help assess kidney stone risk.

WHAT IT MEASURES
Citrate, a natural substance that helps prevent kidney stones

SAMPLE
Urine, usually collected over 24 hours

FASTING NEEDED?
No, unless your laboratory gives special instructions

HOW LONG IT TAKES
24 hours for a standard collection

RESULTS IN
Usually several days; laboratory turnaround varies

USED FOR
Evaluating and monitoring kidney stone risk

MAIN LIMITATION
Incomplete collection can make citrate appear falsely low

Overview

A citric acid urine test measures citrate in your urine. Citrate binds to calcium, leaving less available to form certain kidney stones. It may also slow calcium crystal growth. A low urine citrate level is called hypocitraturia .

The test usually measures all urine passed over 24 hours because urine chemistry changes with meals, fluids, activity, and time of day.

Some laboratories offer a one-time, or "spot," urine test. The citrate result may be compared with urine creatinine to partly account for urine concentration. Although convenient, a spot test may not represent your usual daily citrate excretion as well as a complete 24-hour collection.

This test cannot show whether a kidney stone is currently present. Imaging, such as ultrasound or CT, is used for that purpose.

Why the test is ordered

The test is often part of a metabolic kidney stone evaluation, which uses urine and blood tests to identify factors that may encourage stones.

It may be ordered if you:

Citrate is often measured alongside urine volume, calcium, oxalate, uric acid, sodium, creatinine, and pH. These results are more useful together than citrate alone.

Low citrate may occur with ongoing diarrhea, some bowel conditions, low blood potassium, certain kidney tubule disorders, or particular medicines. The result does not identify the cause by itself.

- Have had kidney stones, especially more than once
- Have multiple stones or stones in both kidneys
- Developed stones at a younger age
- Have a condition that changes urine chemistry
- Are being monitored after diet changes or treatment

Who should have the test

Not everyone with a single kidney stone needs this test. Its usefulness depends on your stone history and type, health conditions, family history, imaging, and previous laboratory results.

Testing may help when a detailed evaluation could change advice about diet, fluids, medicines, or follow-up. It can also monitor a previously low citrate level.

Children and pregnant people can have the test when appropriate, but results must be interpreted according to age, body size, pregnancy, and other urine findings.

How to prepare

Fasting is not usually required. Follow your laboratory's instructions because containers and storage requirements vary.

Ask whether to continue your usual diet and medicines. Do not stop prescribed medicine unless the clinician managing it tells you to. Potassium citrate and other alkali treatments can raise urine citrate, while some medicines can lower it.

Unless instructed otherwise, follow your usual eating and drinking pattern. Major changes may produce a result that does not reflect an ordinary day.

Before starting, make sure you have:

Do not empty or touch a preservative because some can irritate skin. If instructed, urinate into a clean smaller container and transfer the urine carefully.

- The correct collection container
- Written start and finish instructions
- A way to keep the container cool, if required
- Information about any preservative

What happens during the test

For a typical 24-hour collection, choose a morning start time.

Urinate into the toilet at the start and record the time. Do not collect this first urine. Then collect every urination for the next 24 hours, including overnight.

At the same time the following morning, urinate once more and add it to the container. This completes the collection.

Store the container as instructed. It may require refrigeration, a cool place, or a preservative. Do not mix urine with toilet paper, stool, or toilet water.

If you miss a sample, spill urine, collect for too long, or forget the final sample, tell the laboratory. You may need to restart because an incomplete collection can make citrate appear falsely low.

A spot test requires one urine sample and takes only a few minutes.

Understanding your results

The report may show the total citrate passed in 24 hours. A spot test may report citrate concentration or a citrate-to-creatinine ratio.

Low citrate means less is available to limit calcium crystal formation. This may increase the risk of calcium-based kidney stones, particularly with other risk factors.

A result within the expected range does not rule out stone risk. Low urine volume, high calcium or oxalate, urine acidity, diet, anatomy, and other factors may still contribute.

High citrate is not usually a kidney stone risk by itself. It may reflect diet, alkali treatment, medicines, or other aspects of body chemistry.

Reference ranges vary by laboratory and clinical context. Results should be considered with collection volume, urine creatinine and pH, other stone-risk measurements, and any available

stone analysis.

What affects the results

Collection problems are the main source of misleading results. Missing urinations may make the result falsely low, while collecting beyond 24 hours may make it appear higher.

Other influences include:

A blood transfusion does not usually affect citrate directly, but related illness, intravenous fluids, kidney function changes, or altered eating may affect the wider assessment.

- Diet: Fruit, vegetables, animal protein, salt, and major dietary changes affect urine chemistry.
- Medicines and supplements: Alkali products can raise citrate. Topiramate and acetazolamide can lower it. Diuretics like furosemide or hydrochlorothiazide may affect potassium levels.
- Diarrhea or vomiting: These alter hydration, electrolytes, and acid balance.
- Kidney function: Reduced function may change citrate handling and interpretation.
- Pregnancy: Changes in kidney filtration and urine chemistry may affect results.
- Day-to-day variation: One day may not reflect your usual habits.
- Storage and timing: Incorrect storage, delayed delivery, or inaccurate timing can reduce reliability.
- Urinary infection: Infection may alter urine chemistry.
- Recent treatment changes: These can make comparison with earlier results difficult.

Accuracy and limitations

Laboratories can measure citrate accurately when urine is collected, stored, and transported correctly. Collection quality is often the main limitation.

An unusual collection day, temporary diet change, or citrate-raising treatment may hide a usual low-citrate pattern. Incomplete collection may falsely suggest low citrate. Laboratories may use urine creatinine to assess completeness, but creatinine varies with age, body size, muscle mass, diet, pregnancy, and kidney function.

Citrate results cannot confirm or exclude a current stone. Imaging finds stones, while stone analysis identifies the material in a passed or removed stone. Other blood and urine tests

assess additional contributors.

Risks and complications

Urine collection is painless and has no direct physical risk. Possible problems include spills, inconvenience, preservative exposure, or needing to repeat an incomplete collection.

If the container contains a chemical preservative, keep it away from children and follow safety instructions. Rinse exposed skin with water and contact the laboratory or poison information service if the label advises it.

What happens next

A low or unexpected result usually leads to routine follow-up. Your clinician may review the collection, diet, and medicines; compare other urine measurements; or request another 24-hour collection.

Next steps depend on the full stone-risk assessment. They may include fluid or dietary advice, further tests, stone analysis, or treatment for a specific abnormality.

Seek urgent medical care for severe or persistent side or back pain, repeated vomiting, inability to pass urine, or visible blood with clots. Fever or chills with possible kidney stone symptoms may indicate infection with a blockage and requires urgent assessment.

Common questions

Can I drink coffee during the collection?

Usually, if it is part of your normal routine and you have not been told otherwise. Avoid unusually large amounts because caffeine and extra fluid can change urine volume.

Does the time of day matter?

Yes. Record clear start and finish times. Collect all urine after the discarded first sample, including the final sample at the same time the next morning.

Can I exercise during the test?

Normal activity is usually acceptable. Avoid strenuous exercise, heavy sweating, or dehydration that would make the day unusual.

Can I take my medicines and supplements?

Usually, but confirm beforehand. Citrate, bicarbonate, topiramate, acetazolamide, diuretics, and some supplements may affect results. Do not stop prescribed treatment on your own.

Can I collect urine while menstruating?

Often, but blood may contaminate the sample. Ask whether to delay collection or take specific precautions.

What if I forget one sample?

Contact the laboratory. A missed urination can make the result falsely low, so you may need to restart.

Sources

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