TEST

Urinary casts

A urinary casts test examines urine under a microscope for particles formed inside the kidney's small tubes.

WHAT IT MEASURES
Microscopic tube-shaped particles formed inside the kidney

SAMPLE
Fresh urine

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually five to ten minutes

RESULTS IN
Same day to two days; varies by laboratory

USED FOR
Diagnosing and monitoring kidney and urinary conditions

MAIN LIMITATION
Casts break down quickly and may be missed

Overview

Urinary casts are tiny, tube-shaped particles that form inside the kidney's small drainage tubes. They are made when proteins and sometimes cells collect in the shape of a tube. They then pass into the urine.

A laboratory looks for casts during a microscopic urinalysis. The urine is usually spun in a centrifuge so that cells and other particles settle at the bottom. A trained laboratory professional examines this sediment under a microscope. Some laboratories also use automated instruments.

The type and number of casts can provide clues about what is happening inside the kidneys. However, casts do not give a diagnosis by themselves. Your result must be considered alongside your symptoms, medical history, medicines, kidney function and other urine findings.

Why the test is ordered

A urinary casts examination may be included when a standard urinalysis finds blood, protein, white blood cells or other unexpected results. It can help show whether these findings may come from the kidneys rather than the bladder or urethra.

The test may be ordered to investigate:

Repeat testing may be used to monitor a kidney condition or to check whether an earlier finding remains present.

- Changes in kidney function blood tests
- Blood or protein in the urine
- A possible kidney infection or inflammation
- Reduced urine production, swelling or high blood pressure
- A condition that can affect the kidneys, such as diabetes or an autoimmune illness
- A possible reaction to a medicine
- Recovery from a known kidney problem

Who should have the test

You may need microscopic urine testing if your symptoms, blood tests or initial urine results suggest a possible kidney or urinary problem. It may also be part of monitoring if you already have a condition that can affect kidney function.

Urinary casts are not usually tested as a stand-alone screening test. A routine urinalysis may be used for screening in some settings, but microscopy is often added only when there is a clinical reason or an abnormal initial result.

An isolated cast result does not necessarily mean that you have kidney disease. Your healthcare professional can decide whether repeat urine testing or other tests would be useful.

How to prepare

Fasting is not needed. You can usually eat and take your usual medicines unless you have been given different instructions for another test being done at the same time.

Avoid unusually strenuous exercise before collection if possible. Hard exercise can temporarily change urine findings, including the number of hyaline or granular casts.

Do not deliberately drink a large amount of water. Very dilute urine can make casts harder to

find. Normal drinking is appropriate unless you have been told to limit fluids.

Tell the person who ordered the test about your medicines and supplements. Also mention if you are menstruating, have vaginal bleeding or have recently had a urinary procedure. These details can help with interpretation.

What happens during the test

You will usually provide a clean-catch, midstream urine sample. Wash your hands and clean around the urinary opening using the materials provided. Begin urinating into the toilet, then collect some urine in the container without touching its inside.

Finish urinating into the toilet and secure the lid. The sample should reach the laboratory promptly because casts can break down after collection.

A first-morning sample may be requested because it is often more concentrated. In hospitals, urine may occasionally be collected through a catheter, but this is not normally needed solely to look for casts.

The laboratory concentrates the sample and examines it under a microscope. You do not feel this part of the test.

Understanding your results

Results may report the number of casts seen per low-power field, meaning the area visible under low microscope magnification. They may also name the cast type. Reporting methods and expected findings differ between laboratories.

Common descriptions include:

A result must be interpreted with the rest of the urinalysis. Blood, protein, white blood cells, bacteria and crystals can add important context. Blood tests such as creatinine may also be needed to assess kidney function.

There is no single universal reference range for all casts. Ranges and interpretation vary by laboratory, test method, age, sex, pregnancy status, medicines and clinical context.

- Hyaline casts: Made mainly from a normal kidney protein called uromodulin. Small numbers may occur without kidney disease, especially after exercise, fever or dehydration.

- Red blood cell casts: Contain red blood cells. They support bleeding or inflammation within the kidney's filtering units, but further testing is needed to identify the cause.
- White blood cell casts: Contain infection-fighting white blood cells. They can occur with inflammation or infection inside the kidney.
- Renal tubular epithelial cell casts: Contain cells from the kidney's small tubes and may indicate injury to those tubes.
- Granular casts: Contain broken-down cells or proteins. Coarse, dark "muddy brown" casts can be associated with tubular injury, but granular casts are not always specific.
- Fatty casts: Contain fat droplets and may appear when large amounts of protein are leaking through the kidneys.
- Waxy or broad casts: May form when urine moves slowly through widened kidney tubules and can be seen with long-standing kidney dysfunction.

What affects the results

Casts are fragile. A long delay before analysis can cause them to dissolve, particularly when urine is dilute or alkaline. This can produce a normal-looking result even when casts were present at collection.

Drinking much more fluid than usual can dilute the sample. Dehydration has the opposite effect and can increase harmless hyaline casts.

Recent strenuous exercise, fever and physical stress can temporarily increase hyaline or granular casts. If an unexpected result follows intense exercise, repeat testing under usual conditions may be considered.

Menstrual blood, vaginal discharge and skin cells can contaminate a sample. These do not usually create true kidney casts, but they may make the sediment harder to interpret.

Medicines do not generally create a false cast under the microscope. However, some medicines can affect the kidneys and lead to genuine changes in the urine. Diuretics like furosemide or hydrochlorothiazide , which increase urine production, may also affect urine concentration.

Storage temperature, urine acidity and laboratory processing can change how well casts are preserved. Crystals, mucus strands, cell clumps and other debris may sometimes resemble casts.

Accuracy and limitations

Microscopy can provide valuable evidence that a finding comes from inside the kidney. Red or white blood cells enclosed within a cast are generally more informative than the same cells floating freely in urine.

The test can still miss casts. This is more likely when only a few are present, when they are released intermittently, when urine is very dilute or when the sample is not examined promptly. One normal sample cannot always exclude a kidney problem.

The test can also appear positive when the identified structure is actually mucus, a crystal cluster or another type of debris. Results can differ between observers, especially for damaged or partly formed casts. Automated systems may not classify every cast correctly, so manual review can be useful when an important abnormality is suspected.

There is no single reliable percentage for how often cast examination misses a problem or gives a misleading positive result. Performance differs by cast type, specimen quality, equipment and laboratory experience.

Other tests may answer different questions more accurately. These can include a urine protein-to-creatinine or albumin-to-creatinine ratio, a urine culture, blood tests of kidney function, imaging or, in selected cases, a kidney biopsy.

Risks and complications

Providing a urine sample is painless and has no direct medical risk. Cleaning the area and collecting midstream urine may cause minor inconvenience.

If a catheter is required for another clinical reason, insertion can cause brief discomfort and carries a small risk of irritation or infection. A catheter is rarely needed just for this test.

What happens next

If no concerning casts are found and your other results are normal, no special follow-up may be needed. A mildly unexpected result may be checked with another fresh urine sample, particularly after dehydration, fever or strenuous exercise.

Abnormal cellular casts may lead to blood tests, measurement of urine protein, a urine culture or kidney imaging. Referral to a kidney specialist may be considered when the overall findings suggest kidney inflammation or reduced function.

A cast result by itself is not usually an emergency. Arrange routine follow-up to discuss an

unexpected report if you otherwise feel well.

Seek prompt medical advice if urine changes occur with fever, pain in your side or back, visible blood, new swelling, or much less urine than usual. Seek emergency care if you cannot pass urine, develop severe breathing difficulty, become confused or faint, or feel seriously unwell.

Common questions

Can I drink coffee before the test?

Usually, yes. Fasting is not required. Avoid excessive coffee or other fluids because a very dilute sample may contain fewer visible casts.

Does the time of day matter?

Sometimes. A first-morning sample is more concentrated and may preserve casts more clearly. Use the collection time requested by your laboratory.

Can I exercise beforehand?

Gentle activity is unlikely to matter. Strenuous exercise can temporarily increase hyaline or granular casts, so avoid an unusually hard workout before collection if possible.

Can I give a sample during my period?

You can, but menstrual blood may contaminate the sample. Tell the laboratory or person who ordered the test. They may suggest collecting it later if the test is not urgent.

How quickly must the sample reach the laboratory?

As soon as the instructions specify. Casts can dissolve while urine stands, especially in warm, dilute or alkaline urine. Do not store the sample unless you have been told how.

Does finding a cast mean my kidneys are damaged?

Not necessarily. Small numbers of hyaline casts can occur after exercise, fever or dehydration. The cast type, quantity and other urine and blood results determine its significance.

Sources

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