TEST

Retrograde cystography

Retrograde cystography uses bladder contrast and X-ray or CT imaging to find leaks.

WHAT IT MEASURES
Contrast leakage from the bladder and bladder shape

SAMPLE
None; imaging test

FASTING NEEDED?
No, unless sedation or another test requires it

HOW LONG IT TAKES
Usually 30 to 60 minutes

RESULTS IN
Often same day; turnaround varies by radiology service

USED FOR
Diagnosing bladder leaks and monitoring healing

MAIN LIMITATION
Underfilling the bladder can hide a small leak

Overview

Retrograde cystography is an imaging test of the bladder. It is often called a cystogram.

A thin tube called a catheter is passed through the urethra, the channel that carries urine out of the body. Contrast liquid is put through the catheter to fill the bladder. Images are then taken using regular X-rays, fluoroscopy-continuous or pulsed X-ray imaging-or a CT scanner.

"Retrograde" means the contrast travels in the opposite direction to normal urine flow. It is placed directly into the bladder rather than injected into a vein.

The main purpose is to see whether contrast escapes through a tear or surgical opening in the bladder. The test can also show the bladder's shape and whether it connects abnormally with another structure.

Why the test is ordered

Retrograde cystography is most often used to look for a bladder injury or confirm that a known injury has healed.

It may be ordered:

It is not a routine screening test. Other tests are usually better for bladder stones, bladder lining changes, tumours or problems involving the kidneys and ureters.

- After a pelvic injury when there are signs that the bladder may be damaged
- When blood in the urine occurs with certain pelvic fractures
- After bladder, prostate, pelvic or urinary tract surgery
- Before removing a catheter that was left in while a bladder injury healed
- To investigate a possible abnormal connection, called a fistula
- When another scan suggests fluid or urine is leaking near the bladder

Who should have the test

The test may be suitable if your clinician needs to confirm or rule out a bladder leak. The decision is based on your injury, operation, symptoms and other imaging results.

Tell the imaging team if you may be pregnant. X-rays and CT scans use ionising radiation, so the team will consider whether the test is necessary and how to limit exposure.

Also tell them about a known urethral injury or difficulty passing a catheter. If urethral damage is suspected, the urethra may need to be examined with a different test before a catheter is inserted.

A previous reaction to iodinated contrast is important to report. Contrast used inside the bladder enters the bloodstream much less than contrast injected into a vein, but the team still needs to know about past reactions.

How to prepare

You can usually eat and drink normally. Fasting may be required if you will receive sedation or if another test is planned at the same appointment.

Take your usual medicines unless your healthcare team gives you different instructions. Do not stop blood thinners or other prescribed medicines on your own.

Before the appointment, tell the team if you have:

You may be asked to change into a gown and remove metal objects near your pelvis. If you already have a urinary catheter, it may be used for the test.

- A possible pregnancy
- Fever, burning when urinating or other signs of a urinary infection
- A contrast allergy or previous contrast reaction
- A known urethral narrowing or injury
- Recent bladder, prostate or pelvic surgery

What happens during the test

You will usually lie on an X-ray or CT table. If you do not already have a catheter, the area around the urethra is cleaned and lubricating gel is applied. The catheter is then guided into the bladder.

Urine is drained before contrast is added. The contrast is normally allowed to flow into the bladder by gravity. Filling the bladder properly is important because a partly filled bladder may hide a small leak.

You may feel pressure, fullness or a strong need to urinate. Tell the radiographer or radiologist if you have sharp pain or cannot tolerate the filling.

Images are taken while the bladder is full. You may be asked to turn into different positions. For CT cystography, the table moves through the CT scanner while detailed cross-sectional images are recorded.

The contrast is then drained. Further images may be taken after drainage because some leaks are easier to see at that stage. The catheter may be removed or left in place, depending on why you are having the test.

Understanding your results

A normal result means no contrast was seen escaping from the bladder. The bladder's outline may also be described as normal or appropriate for your recent operation or injury.

An abnormal result may show contrast outside the bladder. The report may describe where the leak is and whether it extends into the abdominal cavity or stays within the tissues around the bladder. This distinction can affect treatment.

The test may also show an unusual bladder outline or a connection between the bladder and another organ. These findings need to be interpreted alongside your symptoms, operation notes and other scans.

There is no universal numerical reference range for retrograde cystography. Interpretation can differ with imaging technique, age, sex, pregnancy status, medicines, recent surgery and the wider clinical context. Many of these factors affect why or how the test is performed rather than whether contrast is visibly leaking.

What affects the results

Technique is the main influence on this test. A normal laboratory process cannot correct for a bladder that was not filled enough during imaging.

Important factors include:

For CT cystography, simply clamping a catheter and waiting for contrast previously injected into a vein to collect in the bladder may not expand the bladder enough. Direct retrograde filling is needed when the aim is to look reliably for a leak.

Kidney function, meals, coffee, exercise and most medicines have little direct effect because the contrast is placed into the bladder. A recent blood transfusion does not alter the result. Kidney function matters if intravenous contrast is also planned for a separate CT scan.

Pregnancy does not create a false result, but it changes how the radiation risks and benefits are assessed.

- Inadequate bladder filling: A small tear may stay closed until the bladder is properly expanded.
- Bladder spasm: Sudden tightening can limit filling or push contrast around the catheter.
- Missing drainage images: Some small leaks become clearer after the contrast is emptied.
- Catheter position: The catheter or its balloon can hide part of the bladder neck.
- Movement or metal: Motion and metal implants can reduce image quality, especially on CT.
- Recent surgery: Expected postoperative changes can make images harder to interpret.
- Residual contrast: Contrast left from an earlier study can sometimes confuse the appearance.

Accuracy and limitations

When the bladder is filled correctly and the right images are obtained, conventional and CT retrograde cystography are reliable tests for bladder rupture. CT cystography is often useful

after major trauma because it can be performed with CT imaging of other injuries.

The test can miss a leak if the bladder is underfilled, the tear is temporarily sealed, drainage images are not taken or movement reduces image quality. Very small or intermittent leaks may also be difficult to show.

A result can appear abnormal when spilled contrast lies on the skin or table, or when contrast from an earlier procedure remains nearby. Reviewing the full image series usually helps distinguish these situations from a true leak.

Retrograde cystography does not examine the bladder lining as directly as cystoscopy, in which a small camera is passed into the bladder. A CT urogram may be better for the kidneys and ureters. A voiding cystourethrogram is used when images during urination are needed, such as when assessing urine flowing backward toward the kidneys.

Risks and complications

Catheter insertion can cause brief discomfort, minor bleeding or a urinary infection. Some people feel faint during catheter placement.

The test uses ionising radiation. The imaging team limits exposure to what is needed for useful images.

A reaction to iodinated contrast placed in the bladder is uncommon because much less reaches the bloodstream than with an intravenous injection. The risk may be higher if contrast is absorbed through a damaged bladder, so previous contrast reactions should still be reported.

Rarely, catheter insertion can injure the urethra. This is why suspected urethral trauma must be considered before placing a catheter.

What happens next

A radiologist reviews the images and sends a report to the clinician who requested the test. In urgent trauma care, the images may be discussed immediately. Routine results may be available later the same day or within a few days.

If no leak is seen, your team may consider removing the catheter or continuing the existing recovery plan. If a leak remains, the catheter may need to stay in longer, or further treatment may be discussed. The next step depends on the leak's location, size, cause and whether you have other injuries.

After the test, mild burning with urination or a small amount of blood may occur briefly if the catheter was removed. Follow the instructions given by your care team.

Seek urgent medical advice if you develop fever, worsening pelvic pain, increasing blood in the urine, difficulty urinating or inability to pass urine. Call emergency services for trouble breathing, facial or throat swelling, collapse or another severe reaction.

Common questions

Can I drink coffee before retrograde cystography?

Usually, yes. Coffee does not change whether a bladder leak appears, although it may increase urinary urgency. Follow any fasting instructions if sedation or another procedure is planned.

Does the time of day matter?

No. The test's accuracy is not usually affected by the time of day.

Can I exercise beforehand?

Exercise does not directly change the result. However, follow any activity limits given because of a recent injury or operation.

Does the test hurt?

Catheter insertion may sting or feel uncomfortable. Filling the bladder commonly causes pressure and an urge to urinate, but severe pain is not expected and should be reported immediately.

Can I drive home afterward?

Most people can drive after a cystogram if they have not received sedation and their injury or operation does not restrict driving. Arrange transport if sedation is planned.

Will the contrast be injected into a vein?

Not for retrograde cystography itself. The contrast is put directly into the bladder through a catheter. Intravenous contrast may be used separately if other CT imaging is needed.

Sources

- American College of Radiology and Society for Pediatric Radiology. ACR-SPR Practice Parameter for the Performance of Cystography
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