PROCEDURE

Percutaneous kidney procedures

Percutaneous kidney procedures use a small skin opening to examine, drain, sample, or treat a kidney.

PURPOSE
Sample tissue, drain urine, remove stones, or treat tumors

PROCEDURE TYPE
Diagnostic and therapeutic; minimally invasive or surgical

WHERE IT IS DONE
Interventional radiology suite or operating theatre

ANAESTHESIA
Local with sedation, or general for larger procedures

HOW LONG IT TAKES
30 minutes to 3 hours, based on procedure

PREPARATION
Fasting and blood-thinner plan; tests and imaging may be needed

RECOVERY
Same day or overnight; no driving after sedation or anaesthesia

MAIN RISKS
Bleeding, infection, nearby organ injury, tube problems

RESULTS
Technical result immediately; biopsy pathology usually takes several days

Overview

A percutaneous kidney procedure is performed through a small opening in the skin. "Percutaneous" means through the skin. A doctor uses ultrasound, X-ray imaging, or CT scans to guide a needle, tube, scope, or treatment probe toward the kidney.

This term covers several procedures. The procedure you are offered should be named in your consent discussion. Common examples include:

These procedures differ in purpose, anaesthesia, recovery, and risk. A needle biopsy may be completed with local anaesthetic, while stone surgery is usually performed under general anaesthesia.

- Kidney biopsy: removing tiny tissue samples for examination

- Nephrostomy: placing a tube into the kidney to drain urine
- Percutaneous nephrolithotomy, or PCNL: removing large or complex kidney stones
- Abscess or fluid drainage: draining an infected or unwanted fluid collection
- Tumor ablation: using heat or extreme cold to destroy selected kidney tumors

Why the procedure is performed

A kidney biopsy may help explain abnormal kidney function, blood or protein in the urine, or problems affecting a transplanted kidney. The laboratory examines the sample under a microscope.

A nephrostomy may be needed when urine cannot flow normally from the kidney to the bladder. Causes can include a stone, scar tissue, a tumor, or a problem after surgery. Drainage can protect the kidney and help manage an infection caused by blockage.

PCNL is mainly used to remove kidney stones that are large, complex, or unlikely to respond well to less invasive treatment.

A drainage procedure may remove pus, blood, or another fluid collection. Tumor ablation may be considered for selected small kidney tumors when removing part or all of the kidney is not the preferred option.

Who should and should not have it

You may be offered a percutaneous procedure when it is expected to provide information or treatment that cannot be obtained as safely or effectively another way. Your team should explain the exact goal and how the result may change your care.

The procedure may need to be delayed or changed if you have:

An infected, blocked kidney is different: urgent drainage may be part of treating the infection rather than something that can wait.

Tell your team if you may be pregnant, have allergies to contrast dye or medicines, or have had a previous reaction to anaesthesia. Pregnancy, reduced kidney function, or a contrast allergy does not always rule out treatment, but the imaging or medicines may need to be adjusted.

- A blood-clotting problem that has not been corrected
- Blood-thinning medicine that cannot yet be safely interrupted

- An infection that should be treated before an elective procedure
- No safe route from the skin to the kidney
- A medical condition that makes sedation or anaesthesia temporarily unsafe

How to prepare

Your treating facility's own instructions take priority because preparation differs between a biopsy, nephrostomy, stone operation, and tumor treatment.

You may need blood tests to check kidney function, blood counts, and how well your blood clots. Urine testing or updated imaging may also be required.

Give the team a complete list of your medicines and supplements. This is especially important for anticoagulants and antiplatelet medicines, often called blood thinners. Do not stop these on your own. The prescriber and procedure team should give you a safe plan.

If sedation or general anaesthesia is planned, you will usually be told when to stop eating and drinking. Follow the stated times closely. Ask which regular medicines you should take that morning.

Arrange for an adult to take you home if you will receive sedation or general anaesthesia. You may also need someone to stay with you for the first night.

What happens during the procedure

Before starting, the team confirms your identity, the planned procedure, allergies, and consent. You may have an intravenous line placed for fluids, sedation, antibiotics like amoxicillin or doxycycline , or other medicines.

You will usually lie on your stomach or side, although some procedures use a different position. Monitoring equipment checks your blood pressure, pulse, and oxygen level. The skin is cleaned and covered with sterile drapes.

For local anaesthesia, medicine is injected to numb the skin and deeper tissues. This can sting briefly. Sedation may make you relaxed and sleepy. PCNL and some ablation procedures are normally done under general anaesthesia, so you are unconscious.

The doctor guides the equipment using ultrasound, live X-ray imaging, or CT:

Some tubes remain in place after the procedure. They are secured to the skin with a dressing and sometimes a stitch or fixation device.

- During a biopsy, a spring-loaded needle removes several tiny tissue samples
- During nephrostomy, a flexible tube is placed into the kidney and connected to a drainage bag
- During PCNL, the opening is widened so a small scope can reach and remove or break up stones
- During ablation, one or more probes deliver heat or cold to the target

Recovery and what to expect afterward

Pain: Mild soreness around the puncture site is common. A nephrostomy tube can cause pulling or pressure. PCNL generally causes more discomfort than a biopsy. Take only the pain medicine recommended by your team. Pain should gradually improve rather than become more severe.

Eating: You can usually drink and eat once you are awake and not feeling sick. After general anaesthesia, starting with light food may be more comfortable.

Activity: You may need several hours of observation, including checks of your blood pressure, urine, dressing, and pain. Avoid heavy lifting and strenuous exercise for the period given by your facility. If you have a drainage tube, keep the bag below kidney level and avoid pulling or kinking the tubing.

Driving: Do not drive, cycle on roads, operate machinery, or make important decisions for at least the period specified after sedation or general anaesthesia. You must not drive yourself home.

Work: Return depends on the procedure and your job. Desk work may be possible within a few days after an uncomplicated biopsy or nephrostomy. Stone removal or ablation may require more time, especially if your work involves lifting.

Risks and possible complications

Your individual risk is influenced by the exact procedure, your health, the reason for treatment, and the route used to reach the kidney.

Possible complications include:

Pink or lightly blood-stained urine can occur for a short time. Heavy bleeding, clots, faintness, or worsening symptoms need prompt assessment. Some complications require antibiotics, a blood transfusion, another drainage procedure, or surgery.

- Bleeding into the urine, around the kidney, or from the skin opening
- Infection, including infection entering the bloodstream
- Injury to the kidney or a nearby organ, such as the bowel, liver, spleen, or lung
- Urine leaking around the kidney or tube
- A nephrostomy tube becoming blocked, kinked, leaking, or dislodged
- An incomplete biopsy or treatment requiring another procedure
- Reactions to contrast dye, sedation, antibiotics, or anaesthesia

Results and follow up

For drainage, stone removal, or ablation, the doctor can usually tell you the immediate technical result after the procedure. Follow-up imaging may be needed to confirm drainage, check for remaining stones, or see how an ablated area changes over time.

Biopsy samples are processed by a pathology laboratory. Results commonly take several days and may take longer if special tests are needed. Ask when and how you will receive them.

If you have a nephrostomy tube, your team will explain dressing care, emptying the bag, and whether the tube needs routine exchange. Keep planned appointments even when the tube is draining well.

Alternatives

The practical alternatives depend on why the procedure has been proposed.

For a kidney biopsy, blood tests, urine tests, and imaging avoid a puncture but may not identify the exact pattern of kidney damage. Sometimes monitoring without biopsy is reasonable if the result would not change treatment.

For kidney drainage, a ureteric stent can sometimes be passed from the bladder up to the kidney. It avoids an external drainage bag but may be difficult to place through a tight blockage and can cause bladder discomfort. Surgery can bypass or repair a blockage but is more invasive. Waiting may be unsafe when an obstructed kidney is infected or losing function.

For stones, shock-wave treatment breaks stones without a skin incision, but it may require repeat treatment and fragments must pass naturally. Ureteroscopy reaches the stone through the urinary passage, avoiding a back incision, but may be less suitable for a large stone burden. Observation avoids a procedure but leaves the stone in place.

For a kidney tumor, options may include monitoring with scans, surgery to remove the tumor or kidney, or other cancer treatment. Ablation uses smaller openings and may offer a shorter recovery, but follow-up imaging is essential and repeat treatment may be needed.

When to call your healthcare team

Contact your procedure team urgently if you develop:

Call emergency services for severe breathing difficulty, chest pain, fainting, confusion, uncontrollable bleeding, or symptoms that are rapidly worsening.

Mild soreness, a small spot of blood on the dressing, or lightly pink urine may be expected early in recovery. Mention symptoms that continue or concern you at routine follow-up, even if they are not urgent.

- Fever or chills
- Increasing pain, redness, swelling, pus, or leakage at the site
- Bright red urine, large clots, or bleeding that is increasing
- Much less urine than expected
- A nephrostomy that stops draining, falls out, or becomes disconnected
- Persistent vomiting or inability to drink
- New shortness of breath

Common questions

Will I be asleep?

For a biopsy or nephrostomy, you may be awake with local anaesthetic and sedation. PCNL and some tumor treatments usually use general anaesthesia. Your team should tell you the plan beforehand.

Can I drive home?

No if you received sedation or general anaesthesia. Arrange for an adult to take you home. Follow any additional restriction given for pain medicines or tube management.

How painful is it?

The numbing injection can sting, followed by pressure or brief discomfort. Soreness afterward is common. PCNL usually causes more pain than a needle biopsy. Tell the team if pain is severe

or increasing.

When will I know the result?

Drainage or stone-removal findings are often discussed soon afterward. Biopsy results usually take several days. Ablation requires later scans to assess the treated area.

Will I go home with a tube?

You may after nephrostomy, PCNL, or drainage of a fluid collection. Some tubes are removed before discharge; others remain until the blockage, leak, or infection has improved.

Will the procedure damage my kidney?

The procedure is planned to preserve kidney function or obtain important information. Some kidney tissue can be injured, and bleeding or infection can affect function, but imaging guidance is used to limit these risks.

Sources

- National Institute of Diabetes and Digestive and Kidney Diseases. Kidney Biopsy
- American College of Radiology and Radiological Society of North America. Percutaneous Nephrostomy
- American College of Radiology and Radiological Society of North America. Image-Guided Biopsy
- European Association of Urology. EAU Guidelines on Urolithiasis
- National Institute for Health and Care Excellence. Percutaneous Cryotherapy for Renal Cancer