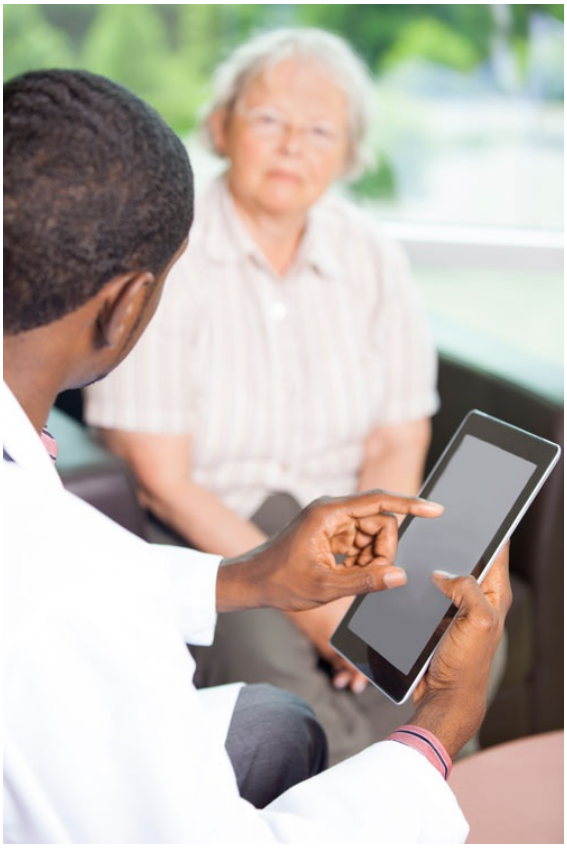
Kidney Biopsy



Kidney (renal) biopsy uses imaging guidance and a needle to remove a small amount of kidney tissue for lab analysis.

Tell your doctor about any recent illnesses or medical conditions and whether you have any allergies, especially to anesthesia. Discuss any medications you're taking, including herbal supplements. Your doctor may tell you to stop taking aspirin or blood thinners prior to your biopsy. Leave jewelry at home and wear loose, comfortable clothing. You may need to wear a gown. If your doctor will use sedation or anesthesia during your biopsy, plan to have someone drive you home afterward.

What is Kidney Biopsy?

Doctors perform a kidney biopsy to remove tiny samples of kidney tissue for lab testing. Most commonly, the doctor will use ultrasound imaging to help guide a hollow needle to the kidney. The doctor will remove several samples before the biopsy is complete.

In some cases, doctors may use CT guidance or perform the biopsy surgically. These options may be necessary if the patient:

- is obese
- has abnormal kidneys.
- has a history of bleeding problems.
- has a kidney with multiple cysts
- has a kidney that is close to another organ like the bowel.

While ultrasound and CT biopsies may only use sedation, surgical biopsy requires general anesthesia. *For more information, see the Anesthesia Safety (https://www.radiologyinfo.org/en/info/safety-anesthesia) page*.

What are some common uses of the procedure?

Doctors perform kidney biopsy to assess:

- *blood in the urine (https://www.radiologyinfo.org/en/info/hematuria)*
- protein in the urine
- excessive waste products in the blood
- kidney disease with no clear cause
- unexplained *kidney failure (https://www.radiologyinfo.org/en/info/kidneyfailure)*
- a kidney tumor.

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A kidney biopsy may also help determine:

- whether you are responding to treatment
- if a treatment is hurting your kidneys
- how much damage the kidney has
- how healthy a transplanted kidney is
- why a transplanted kidney is not working properly
- whether other unusual or special conditions exist.

Not everyone with these problems needs a kidney biopsy. Your doctor will choose biopsy based on your signs and symptoms, test results, and overall health.

How should I prepare?

Inform your doctor about recent illnesses or other medical conditions. Tell your doctor about all the medications you take, including herbal supplements. List any allergies, especially to anesthesia and medications. Your doctor may advise you to stop taking aspirin, blood thinners, or certain herbal supplements multiple days before your procedure. This will help decrease your risk of bleeding.

Wear comfortable, loose-fitting clothing. You may need to remove all clothing and jewelry and change into a gown. If your doctor will use anesthesia or sedation, plan to have someone drive you home afterward.

- **Ultrasound-guided kidney biopsy**
  Ultrasound-guided procedures require little to no preparation.

- **CT-guided kidney biopsy**
  CT-guided procedures require additional preparation. Tell your doctor and technologist if there is any chance you are pregnant. *See the CT Safety During Pregnancy (https://www.radiologyinfo.org/en/info/safety-ct-pregnancy) page for more information*.

  Metal objects, including jewelry, eyeglasses, dentures, underwire bras, body piercings, and hairpins, may affect the CT images. Leave them at home or remove them prior to your exam.

  A CT-guided biopsy may use contrast material or light sedation. Therefore, your doctor may tell you to fast for a few hours before your exam. If you have a known allergy to contrast material, your doctor may prescribe a steroid medication to reduce the risk of an allergic reaction. Inform your doctor if you have had any adverse reactions to sedation in the past (*see the Anesthesia Safety (https://www.radiologyinfo.org/en/info/safety-anesthesia) page for more information*). To avoid unnecessary delays, talk with your doctor about any issues well before the date of your exam.

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What does the equipment look like?

Kidney biopsy uses a handheld device consisting of a long hollow needle extending from a metal tube or plastic case. The biopsy may use other sterile equipment, including syringes, sponges, scalpels, and a specimen cup or microscope slide. The doctor will use ultrasound or CT imaging equipment to help guide placement of the needle.

How does the procedure work?

- **Ultrasound-guided kidney biopsy**
  Ultrasound machines consist of a computer console, video monitor and an attached transducer (http://www.radiologyinfo.org) . The transducer is a small hand-held device that resembles a microphone. The transducer sends sound waves into the body and listens for the returning echoes.

  The doctor applies a small amount of gel to the kidney area and places the transducer there. The gel allows sound waves to travel back and forth between the transducer and the kidney. The ultrasound image is immediately visible on a video monitor. For most kidney biopsies you will be laying on your stomach or side. For biopsy of transplant kidneys, you often lay on your back.

- **CT-guided kidney biopsy**
  The CT scanner is typically a large, donut-shaped machine with a short tunnel in the center. You will lie on a narrow table that slides in and out of the unit. Rotating around you, the x-ray tube and electronic x-ray detectors are located opposite each other in a ring called a gantry. The computer workstation that processes the imaging information is in a separate control room. This is where the technologist operates the scanner and monitors your exam in direct visual contact.

  For most kidney biopsies you will be laying on your stomach or side. For kidney biopsy of transplant kidneys, you often lay on your back. The table will move in and out of the CT scan machine a few times. The CT imaging may use an intravenous injection of contrast material to better see the kidney during needle insertion.

How is the procedure performed?

An interventional radiologist most often performs ultrasound- and/or CT-guided kidney biopsies on an outpatient basis. A surgical biopsy may involve an overnight hospital stay.

You will usually lie on your stomach but may turn slightly up on your side depending on what is the easiest and safest position for

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the doctor to perform the procedure. A biopsy of a transplanted kidney may involve lying on your back during the procedure.

The doctor will inject a local anesthetic into the skin and down to the kidney to numb the area. They will perform the biopsy with a handheld device that contains a needle that takes a small sample. The size of the sample is thinner than a piece of spaghetti and 1-2cm in length.

Using ultrasound or CT imaging, the doctor will locate the kidney that is easiest to see and safest to sample. The doctor may biopsy a specific place on the kidney, such as a tumor or mass. Imaging will help localize the lesion for biopsy.

The doctor will make a tiny nick in the skin at the site where they will insert the biopsy needle. This nick will only need a Band-Aid when the procedure is over.

The radiologist will insert the needle and advance it directly into the kidney while monitoring with imaging. The doctor will then take several small samples of kidney tissue.

After sampling, the doctor will remove the needle. The doctor may administer some material through the biopsy needle once sampling is complete. This helps seal off the area from bleeding and can help decrease the risk of bleeding after the procedure.

The doctor or nurse will apply pressure to stop any bleeding. They will cover the opening in the skin with a dressing. No sutures are necessary.

The procedure usually takes about an hour. You will remain in bed after the procedure while staff monitor your vital signs. Staff will check your blood and urine to make sure your kidneys are working properly before discharge.

What will I experience during and after the procedure?

You will be awake during your biopsy and should have little discomfort. When you receive the local anesthetic to numb the skin, you will feel a pin prick from the needle followed by a mild stinging sensation. The area will become numb within a few seconds.

As the doctor takes the tissue samples, you may hear clicks or buzzing sounds from the sampling instrument. These are normal. You will likely feel some pressure when the doctor inserts the biopsy needle and during tissue sampling. This is normal. You must remain very still while the doctor performs the imaging and the biopsy.

Pediatric patients may require anti-anxiety medication or general anesthesia to help stay still during the biopsy.

If you experience swelling and bruising following your biopsy, your doctor may tell you to take an over-the-counter pain reliever and to use a cold pack. Temporary bruising is normal. Call your doctor if you experience excessive swelling, bleeding, drainage, redness, or heat in the kidney.

You will need to stay in bed for a brief time immediately after the biopsy to allow a clot to form at the biopsy site. This helps with the healing process.

You will be able to eat and drink after the procedure. Avoid strenuous activity for at least the next 24 hours. Your doctor will provide you with more detailed post-procedure care instructions if necessary.

Who interprets the results and how do I get them?

A pathologist will examine the tissue samples and make a final diagnosis. The doctor doing the biopsy will also evaluate the results to make sure that the pathology and image findings explain one another. Your kidney doctor will share the results with you.

What are the benefits vs. risks?

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Benefits

Ultrasound-guided kidney biopsy

- Ultrasound-guided kidney biopsy with a needle is less invasive than surgical biopsy. It leaves little or no scarring and can take less than an hour to perform.
- Ultrasound imaging does not use radiation.
- Ultrasound-guided kidney biopsy reliably provides tissue samples that can provide important information.
- Ultrasound allows the doctor to closely monitor the biopsy needle as it moves through the kidney tissue.

CT-guided kidney biopsy

- CT scanning is painless, noninvasive, and accurate. CT exams are fast and simple.
- CT imaging provides real-time imaging, making it useful for guiding needle biopsies.
- No radiation remains in a patient's body after a CT exam.
- The x-rays used for CT scanning should have no immediate side effects.

Risks

Ultrasound-guided kidney biopsy

- There is a small risk of bleeding and forming a hematoma (collection of blood) at the biopsy site.
- An occasional patient has significant discomfort. Non-prescription medication can ease the pain.
- Any procedure that penetrates the skin carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- There is a small chance that the biopsy will not provide a final diagnosis for a kidney issue or imaging abnormality.

CT-guided kidney biopsy

- There is always a slight chance of cancer from excessive exposure to radiation. However, the benefit of an accurate diagnosis far outweighs the risk.
- The radiation dose for this procedure varies. *See the Radiation Dose (https://www.radiologyinfo.org/en/info/safety-xray) page for more information.*
- Doctors do not generally recommend CT scanning for pregnant patients unless medically necessary because of potential risk to the unborn baby.
- The risk of serious allergic reaction to contrast materials that contain iodine is extremely low, and radiology departments are well-equipped to deal with them. If you had prior allergic reactions to CT contrast materials, it is important to tell your doctor in advance. They may prescribe medication prior to the CT scan to minimize the risk of allergic reaction.
- Because children are more sensitive to radiation, they should have a CT exam only if it is essential for making a diagnosis. They should not have repeated CT exams unless absolutely necessary. CT scans in children should always use low-dose technique.
- Radiology departments tailor the radiation dose for CT scans, especially when scanning children. This helps ensure that the benefits of the scan far outweigh any possible risks from the exposure to diagnostic radiation.

What are the limitations of Kidney Biopsy?

A kidney biopsy provides only a cross-sectional snapshot of the kidney. It does not evaluate kidney function. It is not necessarily representative of the whole kidney.

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If the diagnosis remains uncertain after a technically successful procedure, surgical biopsy may be necessary.

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