

Ultrasound-Guided Breast Biopsy

An ultrasound-guided breast biopsy uses sound waves to help locate a lump or abnormality and remove a tissue sample for examination under a microscope. It is less invasive than surgical biopsy, leaves little to no scarring and does not involve exposure to ionizing radiation.

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 and aspirin. You will be advised to stop taking aspirin or blood thinner three days before your procedure. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown. If you are to be sedated, plan to have someone drive you home afterward.

What is Ultrasound-Guided Breast Biopsy?

Physical, mammography, and other exams often detect lumps or abnormalities in the breast. However, these tests cannot always tell whether a growth is benign or cancerous.

Doctors use breast biopsy to remove a small amount of tissue from a suspicious area for lab analysis. The doctor may perform a biopsy surgically. More commonly, a radiologist will use a less invasive procedure that involves a hollow needle and image-guidance. Image-guided needle biopsy does not remove the entire lesion. Instead, it obtains a small sample of the abnormality for further analysis.

Image-guided biopsy uses ultrasound, MRI, or mammography imaging guidance to take samples of an abnormality.

In ultrasound-guided breast biopsy, ultrasound imaging is used to help guide the radiologist's instruments to the site of the abnormal growth.

What are some common uses of the procedure?

An ultrasound-guided breast biopsy can be performed when a breast ultrasound shows an abnormality such as:

- a suspicious solid mass
- a distortion in the structure of the breast tissue
- an area of abnormal tissue change

There are times when your doctor may decide that ultrasound guidance for biopsy is appropriate even for a mass that can be felt.

Ultrasound guidance is used in four biopsy procedures:

- fine needle aspiration (FNA), which uses a very small needle to extract fluid or cells from the abnormal area.
- core needle (CN), which uses a large hollow needle to remove one sample of breast tissue per insertion.
- vacuum-assisted device (VAD), which uses a vacuum powered instrument to collect multiple tissue samples during one needle insertion.



- wire localization, in which a guide wire is placed into the suspicious area to help the surgeon locate the lesion for surgical biopsy.

How should I prepare?

Wear comfortable, loose-fitting clothing. You may need to remove all clothing and jewelry in the area to be examined.

You may need to change into a gown for the procedure.

Prior to a needle biopsy, tell your doctor about all the medications you take, including herbal supplements. List any allergies, especially to anesthesia. Your doctor may advise you to stop taking aspirin, blood thinners, or certain herbal supplements three to five days before your procedure. This will help decrease your risk of bleeding.

Also, inform your doctor about recent illnesses or other medical conditions.

You may want to have someone drive you home afterward, especially if you receive sedation.

What does the equipment look like?

Ultrasound machines consist of a computer console, video monitor and an attached transducer. The transducer is a small hand-held device that resembles a microphone. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out inaudible, high-frequency sound waves into the body and listens for the returning echoes. The same principles apply to sonar used by boats and submarines.

The technologist applies a small amount of gel to the area under examination and places the transducer there. The gel allows sound waves to travel back and forth between the transducer and the area under examination. The ultrasound image is immediately visible on a video monitor. The computer creates the image based on the loudness (amplitude), pitch (frequency), and time it takes for the ultrasound signal to return to the transducer. It also considers what type of body structure and/or tissue the sound is traveling through.

The doctor will use one of four instruments:

- A fine needle attached to a syringe, smaller than needles typically used to draw blood.
- A core needle, also called an automatic, spring-loaded needle, which consists of an inner needle connected to a trough, or shallow receptacle, covered by a sheath and attached to a spring-loaded mechanism.
- A vacuum-assisted device (VAD), a vacuum-powered instrument that uses pressure to pull tissue into the needle.
- A thin guide wire, which is used for a surgical biopsy.

This procedure may use other sterile equipment, including syringes, sponges, forceps, scalpels, and a specimen cup or microscope slide.

How does the procedure work?

Ultrasound imaging uses the same principles as the sonar that bats, ships, and fishermen use. When a sound wave strikes an object, it bounces back or echoes. By measuring these echo waves, it is possible to determine how far away the object is as well as its size, shape, and consistency. This includes whether the object is solid or filled with fluid.

Doctors use ultrasound to detect changes in the appearance of organs, tissues, and vessels and to detect abnormal masses, such as tumors.

In an ultrasound exam, a transducer both sends the sound waves and records the echoing (returning) waves. When the transducer

is pressed against the skin, it sends small pulses of inaudible, high-frequency sound waves into the body. As the sound waves bounce off internal organs, fluids and tissues, the sensitive receiver in the transducer records tiny changes in the sound's pitch and direction. A computer instantly measures these signature waves and displays them as real-time pictures on a monitor. The technologist typically captures one or more frames of the moving pictures as still images. They may also save short video loops of the images.

Using an ultrasound probe to visualize the location of the breast mass, distortion or abnormal tissue change, the radiologist inserts a biopsy needle through the skin, advances it into the targeted finding and removes tissue samples. If a surgical biopsy is being performed, ultrasound may be used to guide a wire directly into the targeted finding to help the surgeon locate the area for excision. With continuous ultrasound imaging, the physician is able to view the biopsy needle or wire as it advances to the location of the lesion in real-time.

How is the procedure performed?

Image-guided, minimally invasive procedures such as ultrasound-guided breast biopsy are most often performed by a specially trained radiologist.

Breast biopsies are usually done on an outpatient basis.

You will be positioned lying face up on the examination table or turned slightly to the side.

The doctor will inject a local anesthetic into the skin and more deeply into the breast to numb it.

Pressing the transducer to the breast, the sonographer or radiologist will locate the lesion.

The doctor will make a very small nick in the skin at the site where they will insert the biopsy needle.

The radiologist, monitoring the lesion site with the ultrasound probe, will insert the needle and advance it directly into the mass.

The doctor removes tissue samples using one of three methods:

- In a fine needle aspiration, a fine gauge needle and a syringe withdraw fluid or clusters of cells.
- In a core needle biopsy, the automated mechanism is activated, moving the needle forward and filling the needle trough, or shallow receptacle, with “cores” of breast tissue. The outer sheath instantly moves forward to cut the tissue and keep it in the trough. The doctor repeats this process three to six times.
- With a vacuum-assisted device (VAD), vacuum pressure pulls tissue from the breast through the needle into the sampling chamber. Without withdrawing and reinserting the needle, it rotates positions and collects additional samples. Typically, the doctor will collect eight to 10 samples of tissue from around the lesion.

After this sampling, the doctor will remove the needle.

If a surgical biopsy is to be performed, the doctor will insert a wire into the suspicious area as a guide for the surgeon.

The doctor may place a small marker at the biopsy site so they can locate it in the future if necessary.

Once the biopsy is complete, 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 needed.

The doctor may use mammography to confirm that the marker is in the proper position.

This procedure is usually completed within an hour.

What will I experience during and after the procedure?

You will be awake during your biopsy and should have little discomfort. Many women report little pain and no scarring on the breast. However, certain patients, including those with dense breast tissue or abnormalities near the chest wall or behind the nipple, may be more sensitive during the procedure.

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 from the local anesthetic. You will likely feel some pressure when the doctor inserts the biopsy needle and during tissue sampling. This is normal.

The area will become numb within a few seconds.

You must remain very still while the doctor performs the imaging and the biopsy.

As tissue samples are taken, you may hear clicks or buzzing sounds from the sampling instrument. These are normal.

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 breast.

If a marker is left inside the breast to mark the location of the biopsied lesion, it will cause no pain, disfigurement, or harm. Biopsy markers are MRI compatible and will not cause metal detectors to alarm.

Avoid strenuous activity for at least 24 hours after the biopsy. Your doctor will outline more detailed post-procedure care instructions for you.

Who interprets the results and how do I get them?

A pathologist examines the removed specimen and makes a final diagnosis. Depending on the facility, the radiologist or your referring physician will share the results with you. The radiologist will also evaluate the results of the biopsy to make sure that the pathology and image findings explain one another. In some instances, even if cancer is not diagnosed, surgical removal of the entire biopsy site and imaging abnormality may be recommended if the pathology does not match the imaging findings.

You may need a follow-up exam. If so, your doctor will explain why. Sometimes a follow-up exam further evaluates a potential issue with more views or a special imaging technique. It may also see if there has been any change in an issue over time. Follow-up exams are often the best way to see if treatment is working or if a problem needs attention.

What are the benefits vs. risks?

Benefits

- The procedure is less invasive than surgical biopsy, leaves little or no scarring, and can be performed in less than an hour.
- Ultrasound imaging uses no ionizing radiation.
- Ultrasound-guided breast biopsy reliably provides tissue samples that can show whether a breast lump is benign or malignant.
- Compared with stereotactic breast biopsy (<https://www.radiologyinfo.org/en/info/breastbixr>) , the ultrasound method is faster and avoids the need for ionizing radiation exposure.
- With ultrasound it is possible to follow the motion of the biopsy needle as it moves through the breast tissue.
- Ultrasound-guided breast biopsy is able to evaluate lumps under the arm or near the chest wall, which are hard to reach with stereotactic biopsy.

- Ultrasound-guided biopsy is less expensive than other biopsy methods, such as open surgical biopsy or stereotactic biopsy.
- Recovery time is brief and patients can soon resume their usual activities.

Risks

- There is a risk of bleeding and forming a hematoma, or a collection of blood at the biopsy site. The risk, however, appears to be less than one percent of patients.
- An occasional patient has significant discomfort, which can be readily controlled by non-prescription pain medication.
- Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- Depending on the type of biopsy or the design of the biopsy machine, a biopsy of tissue located deep within the breast carries a slight risk that the needle will pass through the chest wall. This could allow air around the lung and cause the lung to collapse. This is extremely rare.
- There is a small chance that this procedure will not provide the final answer to explain the imaging abnormality.

What are the limitations of Ultrasound-Guided Breast Biopsy?

Breast biopsy procedures will occasionally miss a lesion or underestimate the extent of disease present. If the diagnosis remains uncertain after a technically successful procedure, surgical biopsy will usually be necessary.

The ultrasound-guided biopsy method cannot be used unless the lesion can be seen on an ultrasound exam. Clustered calcifications are not shown as clearly with ultrasound as with x-rays.

Very small lesions may be difficult to target accurately by ultrasound-guided core biopsy.

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