

Ultrasound-Guided Breast Biopsy

This procedure is reviewed by a physician with expertise in the area presented and is further reviewed by committees from the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), comprising physicians with expertise in several radiologic areas.

What is Ultrasound-Guided Breast Biopsy?

Ultrasound is an excellent way to evaluate breast abnormalities detected by mammography, the patient or her doctor, but in some cases it is not possible to tell from the imaging studies alone whether a growth is benign or cancerous. Ultrasound-guided breast biopsy is a highly accurate way to evaluate suspicious masses within the breast that are visible on ultrasound, whether or not they can be felt on breast self-examination or clinical examination. The procedure prevents the need to remove tissue surgically and also eliminates the radiation exposure that comes from using x-rays to locate a mass. After placing an ultrasound probe over the site of the breast lump and using local anesthesia, the radiologist guides a biopsy needle directly into the mass. Tissue specimens are then taken using either an automatic spring-loaded or vacuum-assisted device (VAD).

What are some common uses of the procedure?

Ultrasound is most often used to guide breast biopsy when a breast abnormality is visible on ultrasound. It may be performed with either a large hollow needle (automated core breast biopsy) or a vacuum-powered instrument. When it is necessary to do an open surgical biopsy, a guide wire first is passed directly into the mass. This procedure also may be guided by ultrasound.

Ultrasound-guided biopsy is most useful when there are suspicious changes on the mammogram that can also be seen on an ultrasound exam but no abnormality can be felt on breast self-examination or clinical examination by your primary care physician. However, there are times when your doctor decides that ultrasound guidance for biopsy is appropriate even for a mass that can be felt.

How should I prepare for the procedure?

Although ultrasound-guided breast biopsy is minimally invasive there is a risk of bleeding whenever the skin is penetrated. For this reason if you are taking aspirin or a blood thinner your physician may advise you to stop three days before the procedure. A breast biopsy always raises concern about cancer. You may want to have a relative or friend come with you to lend support and also to drive you home afterward.

What does the equipment look like?

Before the radiologist arrives to do the biopsy, staff will set up sterile materials, including syringes, local anesthetic, sponges, forceps, scalpels and a specimen cup. The radiologist holds an ultrasound device in one hand while using the other to guide the needle into the lesion.



How does the procedure work?

Ultrasonography uses sound waves at very high frequency to image internal structures, including those deep within the body. Either pulsed or continuous sound waves are directed at the area of interest using a hand-held device called a transducer. The transducer also receives echoes of the sound waves in a pattern that reflects the outlines of the internal structure mass. The transducer changes electrical signals into ultrasound waves and converts the reflected sound waves back to

electrical energy. Unlike radiological procedures, the ultrasound method requires no exposure to x-rays.

When ultrasound is chosen to guide a breast biopsy, one of the biopsy instruments used is a VAD. Nodules of tissue less than about an inch in size can be totally removed using this equipment. These systems use vacuum pressure to pull tissue into a needle and remove it without having to withdraw the probe after each sampling—as is necessary when the core needle method is used. Biopsies are obtained in an orderly manner by rotating the needle, ensuring that the entire region of interest will be sampled.

The core needle method is used most commonly because it is the least expensive, easy to perform and highly accurate for many lesions. An inner needle with a trough extending from it at one end is covered by a sheath and attached to a spring-loaded mechanism. When the mechanism is activated, the needle moves forward, filling the trough with breast tissue. The outer sheath instantly moves forward to cut the tissue and keep it in the trough. It takes only a fraction of a second to obtain a sample and for each sample it is necessary to withdraw the needle to collect the tissue.

How is the procedure performed?

With the patient lying on her back or turned slightly to the side, the ultrasound probe is used to locate the lesion. Enough local anesthesia is injected to be sure that she will feel no discomfort during the procedure. Ultrasound also is used to guide the injection of anesthetic along the route to the lesion and about the mass. A very small nick is made in the skin at the site where the biopsy needle is to be inserted. The radiologist, constantly monitoring the lesion site with the ultrasound probe, guides a hollowcore biopsy needle or the vacuum-assisted needle directly into the mass and obtains specimens. Usually at least four samples are taken. In some cases it may be difficult to visualize the needle in the breast tissue and considerable skill is needed to coordinate movements of the ultrasound transducer with needle insertion. If the lesion is nearly or completely removed during the biopsy procedure, a clip is placed where the lesion was located to ensure that the site can be easily located for additional surgery if the lesion proves to be malignant.

What will I experience during the procedure?

You will be awake during your biopsy and should have little or no discomfort. Generally the biopsy is completed in less than an hour. It is not necessary to close the tiny skin incision with sutures; a small compression dressing

will do. Most patients are able to resume their usual activities later the same day.

Who interprets the results and how do I get them?

The pathologist will examine the tissue specimens after they are processed. A definite diagnosis will be available within a few days, the main question being whether the breast mass is benign or cancerous. When the final biopsy findings are available you may have a session with your physician to discuss the results and decide together on the next step. If cancer is diagnosed you probably will be referred to a tumor specialist or surgeon.

What are the benefits vs. risks?

Benefits

- Ultrasound-guided breast biopsy reliably provides tissue samples that can show whether a breast lump is benign or malignant. When using the VAD it may be possible to remove the entire lesion.
- Ultrasound-guided core biopsy, using either the core method or the VAD, takes much less time than surgical biopsy, causes less tissue damage and is far less costly.
- Compared with x-ray or stereotactically guided breast biopsy, 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 takes place.
- Ultrasound-guided breast biopsy is able to evaluate lumps under the arm or near the chest wall, which are hard to assess by the x-ray-guided (stereotactic) method.
- Ultrasound-guided biopsy is somewhat less expensive than the x-ray-guided (stereotactic) method.

Risks

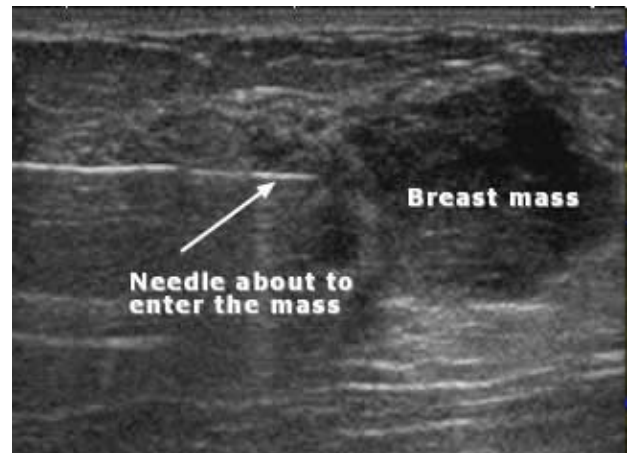
- When the VAD is used for ultrasound-guided breast biopsy, large pieces of tissue are removed and there is a risk of bleeding and formation of a hematoma, a collection of blood at the biopsy site. The risk, however, appears to be less than 1 percent of patients.

- An occasional patient has significant discomfort, which can be readily controlled by non-prescription pain medication.
- Infection can occur whenever the skin is penetrated, but the chance of infection requiring antibiotic therapy is less than one in 1,000.
- Doing a biopsy of tissue deep in the breast carries a slight risk that the needle will pass through the chest wall, allowing air around the lung that could collapse a lung. This is a rare occurrence.

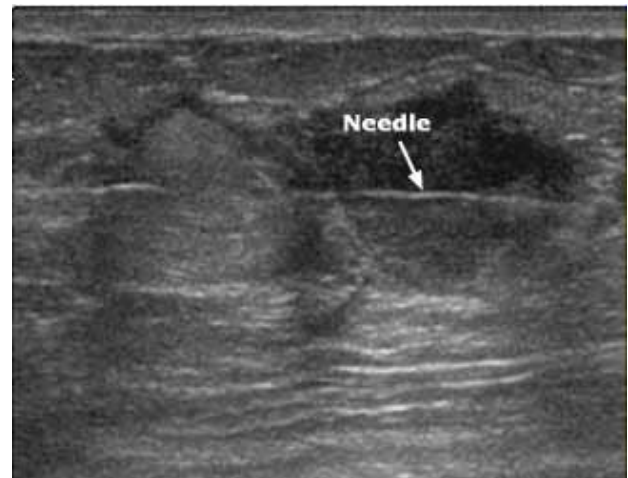
What are the limitations of Ultrasound-Guided Breast Biopsy?

Like x-ray-guided breast biopsy, ultrasound-guided biopsy occasionally will miss a lesion or underestimate the extent of disease. If the diagnosis remains uncertain after a technically successful procedure, surgical biopsy will be necessary. The ultrasound-guided method cannot be used unless the mass can be seen on an ultrasound exam. Calcifications within a cancerous nodule are not shown as clearly by this approach as when x-rays are used.

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



Ultrasound-guided biopsy of a solid breast mass shows biopsy needle about to enter the mass.



Ultrasound-guided biopsy of a solid breast mass shows biopsy needle has passed through the mass.



A simple benign cyst in the right breast - biopsy is not necessary.

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