
Stereotactic (Mammographically Guided) Breast Biopsy

This information 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 Stereotactic (Mammographically Guided) Breast Biopsy?

Lumps or abnormalities in the breast are often detected by physical examination, mammography, or other imaging studies. However, it is not always possible to tell from these imaging tests whether a growth is benign or cancerous.

A breast biopsy is performed to remove some cells—either surgically or through a less invasive procedure involving a hollow needle—from a suspicious area in the breast and examine them under a microscope to determine a diagnosis. Image-guided needle biopsy is not designed to remove the entire lesion, but most of a very small lesion may be removed in the process of biopsy.

Image-guided biopsy is performed when the abnormal area in the breast is too small to be felt, making it difficult to locate the lesion by hand (called palpation).

In stereotactic breast biopsy, a special mammography machine uses ionizing radiation to help guide the radiologist's instruments to the site of the abnormal growth.

What are some common uses of the procedure?

A stereotactic breast biopsy is performed when a mammogram shows a breast abnormality such as:

- a suspicious solid mass
- microcalcifications, a cluster of tiny calcium deposits
- a distortion in the structure of the breast tissue
- an area of abnormal tissue change

Stereotactic breast biopsy is also performed when the patient or physician strongly prefers a non-surgical method of assessing a breast abnormality.

Stereotactic guidance is used in two biopsy procedures:

- 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.

How should I prepare?

You will be asked to remove some or all of your clothes and to wear a gown during the exam. You may also be asked to remove jewelry, eye glasses and any metal objects or clothing that might interfere with the x-ray images.

Women should always inform their physician if there is any possibility that they are pregnant. Some procedures using image-guidance are typically not performed during pregnancy because radiation can be harmful to the fetus.

You should not wear deodorant, powder, lotion or perfume under your arms or on your breasts on the day of the exam.

Prior to a needle biopsy, you should report to your doctor all medications that you are taking, including herbal supplements, and if you have any allergies, especially to anesthesia. Your physician will advise you to stop taking aspirin or a blood thinner three days before your procedure.

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

You may want to have a relative or friend accompany you and drive you home afterward. This is recommended if you have been sedated.

What does the equipment look like?

The specialized mammography machine used in this procedure is similar to the mammography unit used to produce diagnostic mammograms.

A mammography unit is a rectangular box that houses the tube in which x-rays are produced. The unit is used exclusively for x-ray exams of the breast, with special accessories that allow only the breast to be exposed to the x-rays. Attached to the unit is a device that holds and compresses the breast and positions it so images can be obtained at different angles.

At most facilities, a specially designed examination table will allow you to lie face down with your breast hanging freely through an opening in the table. The table is then raised and the biopsy procedure is performed beneath the table. At other facilities, the procedure may be performed while you sit in a chair.

One of two instruments will be used:

- 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.

Other sterile equipment involved in this procedure includes syringes, sponges, forceps, scalpels and a specimen cup or microscope slide.

How does the procedure work?

Mammography is a low-dose x-ray system designed to examine breasts. The special mammography unit used to perform a stereotactic breast biopsy is a digital mammography machine. In digital mammography, as in digital photography, film is replaced by electronic detectors. These convert x-rays into electrical signals, which are used to produce images of the breast that can be immediately seen on a computer screen.

Stereotactic mammography pinpoints the exact location of a breast mass by using a computer and x-rays taken from two different angles. Using these computer coordinates, the radiologist inserts the needle through the skin, advances it into the lesion and removes tissue samples.

How is the procedure performed?

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

Breast biopsies are usually done on an outpatient basis.

You will lie face down on a moveable exam table and the affected breast or breasts will be positioned into openings in the table.

The table is then raised and the procedure is then performed beneath it. If the machine is an upright system, you may be seated comfortably next to the stereotactic mammography unit.

The breast is compressed and held in position throughout the procedure.

A local anesthetic will be injected into the breast to numb it.

Several stereotactic pairs of x-ray images are taken.

A very small nick is made in the skin at the site where the biopsy needle is to be inserted.

The radiologist then inserts the needle and advances it to the location of the abnormality using the x-ray and computer generated coordinates. X-ray images are again obtained to confirm that the needle tip is actually within the lesion.

Tissue samples are then removed using one of two methods.

- 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. This process is repeated three to six times.
- With a vacuum-assisted device (VAD), vacuum pressure is used to pull 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, eight to 10 samples of tissue are collected from around the lesion.

After the sampling, the needle will be removed.

A final set of images will be taken.

A small marker may be placed at the site so that it can be located in the future if necessary.

Once the biopsy is complete, pressure will be applied to stop any bleeding and the opening in the skin is covered with a dressing. No sutures are needed.

A mammogram will usually be performed 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 or no discomfort. Most women report little or no pain and no scarring on the breast.

Some women find that the major discomfort of the procedure is from lying on their stomach for the length of the procedure, which can be reduced by strategically placed cushions.

When you receive the local anesthetic to numb the skin, you will feel a slight pin prick from the needle. You may feel some pressure when the biopsy needle is inserted.

The area will become numb within a short time.

You must remain still while the biopsy is performed.

As tissue samples are taken, you may hear clicks from the sampling instrument.

If you experience swelling and bruising following your biopsy, you may be instructed to take an over-the-counter pain reliever and to use a cold pack. Temporary bruising is normal.

You should contact your physician 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.

You should avoid strenuous activity for 24 hours after returning home, but then usually will be able to resume normal activities.

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.

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.
- Stereotactic breast biopsy is an excellent way to evaluate calcium deposits or tiny masses that are not visible on ultrasound.
- Stereotactic core needle biopsy is a simple procedure that may be performed in an outpatient imaging center.
- Compared with open surgical biopsy, the procedure is about one-third the cost.
- Generally, the procedure is not painful and the results are as accurate as when a tissue sample is removed surgically.
- No breast defect remains and, unlike surgery, stereotactic needle biopsy does not distort the breast tissue and make it difficult to read future mammograms.
- Recovery time is brief and patients can soon resume their usual activities.
- No radiation remains in a patient's body after an x-ray examination.
- X-rays usually have no side effects in the diagnostic range.

Risks

- Because the vacuum-assisted device removes slightly larger pieces of tissue than other types of needles, 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 1 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.
- Doing a biopsy of tissue located deep within 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 very rare occurrence.
- There is always a slight chance of cancer from excessive exposure to radiation. However, the benefit of an accurate diagnosis far outweighs the risk.

- Women should always inform their doctor or x-ray technologist if there is any possibility that they are pregnant.

What are the limitations of Stereotactic Breast Biopsy?

Lesions accompanied by diffuse calcium deposits scattered throughout the breast are difficult to target by stereotactic breast biopsy. Lesions near the chest wall also are hard to evaluate by this method. If the mammogram shows only a vague change in tissue density but no definite mass or nodule, this method may not be successful.

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.

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