



Scintimammography

Scintimammography uses small amounts of radioactive materials called radiotracers, a special camera and a computer to help investigate an abnormality discovered on mammography. Its ability to detect cancer is not limited by dense breast tissue or breast implants, and it can reduce unnecessary procedures by helping determine whether an abnormality requires biopsy.

This exam requires little to no special preparation. Tell your doctor if there is a possibility you are pregnant or you are breastfeeding, and discuss any recent illnesses, medical conditions, allergies and medications you're taking, including vitamins and herbal supplements. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.



What is scintimammography?

Scintimammography, also known as nuclear medicine breast imaging, is an examination that may be used to investigate a breast abnormality that has been discovered on mammography. Scintimammography is also known as Breast Specific Gamma Imaging (BSGI) or Molecular Breast Imaging (MBI).

Nuclear medicine is a branch of medical imaging that uses small amounts of radioactive material to diagnose and determine the severity of or treat a variety of diseases, including many types of cancers, heart disease, gastrointestinal, endocrine, neurological disorders and other abnormalities within the body. Because nuclear medicine procedures are able to pinpoint molecular activity within the body, they offer the potential to identify disease in its earliest stages as well as a patient's immediate response to therapeutic interventions.

The procedure is noninvasive and involves the injection of a radiotracer, or drug that emits radioactivity, into the patient. Because the radiotracer accumulates differently in different kinds of tissue, it can help physicians determine whether cancer could be present, thus helping determine whether a biopsy or additional follow-up is necessary.

After injection, the radiotracer eventually accumulates in the breast, where it gives off energy in the form of gamma rays. This energy is detected by a device called a gamma camera. The camera works with a computer to measure the amount of radiotracer absorbed by the body and to produce special pictures offering details on both the structure and function of organs and tissues.

What are some common uses of the procedure?

As a follow-up to physical breast exams, mammograms, and/or ultrasounds, scintimammography helps physicians determine whether a breast abnormality requires biopsy. The ability for BSGI to detect breast cancer is not decreased by dense breast tissue or breast implants.

Scintimammography is not a primary screening tool nor does it replace mammography. Some physicians have used it as an additional screening option in women who are at a higher risk for breast cancer but cannot undergo MRI screening.

How should I prepare?

No special preparation is necessary.

You will be asked to wear a gown during the exam.

Women should always inform their physician or technologist if there is any possibility that they are pregnant or if they are breastfeeding. See the Safety page for more information about pregnancy and breastfeeding related to nuclear medicine imaging.

You should inform your physician and the technologist performing your exam of any medications you are taking, including vitamins and herbal supplements. You should also inform them if you have any allergies and about recent illnesses or other medical conditions.

What does the equipment look like?

Breast specific gamma imaging (BSGI) uses high resolution gamma cameras that are placed next to the breast while in compression, similar to a mammogram. BSGI machines look something like a mammography machine.

Most nuclear medicine procedures are performed using a gamma camera, a specialized camera encased in metal that is capable of detecting radiation and taking pictures from different angles. BSGI is performed with a very specific kind of gamma camera which is much smaller than the usual camera, making it very easy to position the breasts while taking very detailed pictures.

How does the procedure work?

With ordinary x-ray examinations, an image is made by passing x-rays through the patient's body. In contrast, nuclear medicine procedures use a radioactive material, called a radiopharmaceutical or radiotracer, which is injected into the bloodstream, swallowed or inhaled as a gas. This radioactive material accumulates in the organ or area of your body being examined, where it gives off a small amount of energy in the form of gamma rays. Special cameras detect this energy, and with the help of a computer, create pictures offering details on both the structure and function of organs and tissues in your body.

Unlike other imaging techniques, nuclear medicine imaging exams focus on depicting physiologic processes within the body, such as rates of metabolism or levels of various other chemical activity, instead of showing anatomy and structure. Areas of greater intensity, called "hot spots," indicate where large amounts of the radiotracer have accumulated and where there is a high level of chemical or metabolic activity. Less intense areas, or "cold spots," indicate a smaller concentration of radiotracer and less chemical activity.

Areas of greater intensity could require further evaluation through biopsy. Breast cancer, as well as some benign lesions, can cause areas of greater intensity in the breast.

How is the procedure performed?

Nuclear medicine imaging of the breast is usually performed on an outpatient basis.

The procedure requires approximately 45 to 60 minutes to perform.

Prior to imaging, you will be injected with a small amount of radiotracer. One breast at a time will be placed next to the BSGI gamma camera and compressed with a flat plate, similar to a screening mammogram. Some machines have a gamma camera that is placed on each side of the breast. Each image takes about 10 minutes to acquire. Two images of each breast are typically obtained. More images may be obtained depending upon the size of the breast or if a potential abnormality is identified. Therefore, the examination takes 40 to 60 minutes in most cases.

What will I experience during and after the procedure?

You will feel a slight pin prick when the radiotracer is injected. After the injection, you may experience a brief metallic taste.

You will need to remain as still as possible while the camera takes each picture. Typically you will be seated while the images are acquired. The breast compression must be firm to keep the breast from moving while the image is being obtained, but is not usually as tight as for a regular mammogram.

While scintimammography itself causes no pain, there may be some discomfort from having to remain still or to stay in one particular position during imaging. If you think you may have difficulty remaining still or tolerating breast compression during the examination, you should inform your technologist before the exam begins.

When the examination is completed, you may be asked to wait until the technologist checks the images in case additional images are needed. Occasionally, more images are obtained for clarification or better visualization of certain areas or structures. The need for additional images does not necessarily mean there was a problem with the exam or that something abnormal was found, and should not be a cause of concern for you.

Unless your physician tells you otherwise, you may resume your normal activities after your nuclear medicine scan. If any special instructions are necessary, you will be informed by a technologist, nurse or physician before you leave the nuclear medicine department.

Who interprets the results and how do I get them?

A radiologist or other physician who has specialized training in nuclear medicine will interpret the images and send a report to your referring physician.

What are the benefits vs. risks?

Benefits

- Scintimammography can reduce unnecessary invasive procedures by helping physicians determine whether a breast abnormality requires biopsy.
- The ability for BSGI to detect breast cancer is not limited by dense breast tissue or breast implants.

Risks

- Because the doses of radiotracer administered are small, diagnostic nuclear medicine procedures result in relatively low radiation exposure to the patient, acceptable for diagnostic exams. Thus, the radiation risk is very low compared with the potential benefits.
- Nuclear medicine diagnostic procedures have been used for more than five decades, and there are no known long-term adverse effects from such low-dose exposure.
- The risks of the treatment are always weighed against the potential benefits for nuclear medicine therapeutic procedures. You will be informed of all significant risks prior to the treatment and have an opportunity to ask questions.
- Other imaging tests, such as mammography, ultrasound, and breast MRI, are lower in radiation dose than scintimammography and therefore may be more useful for most women. However, scintimammography may be an alternative for women that cannot undergo these examinations.
- Allergic reactions to radiopharmaceuticals may occur but are extremely rare and are usually mild. Nevertheless, you should inform the nuclear medicine personnel of any allergies you may have or other problems that may have occurred during a previous nuclear medicine exam.
- Injection of the radiotracer may cause slight pain and redness which should rapidly resolve.
- Women should always inform their physician or radiology technologist if there is any possibility that they are pregnant or if they are breastfeeding. See the Safety page for more information about pregnancy, breastfeeding and nuclear medicine exams.

What are the limitations of scintimammography?

Scintimammography is not a primary screening procedure for breast cancer. It should not be considered a replacement for mammography or ultrasound.

Nuclear medicine procedures can be time-consuming.

The image resolution of structures of the body obtained with nuclear medicine procedures may not be as clear as with other imaging techniques, such as mammography or MRI.

If an abnormality is detected on scintimammography, it may be difficult to find the lesion using other imaging modalities, thus making it difficult to perform a biopsy.

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