What you should know about Sentinel Lymph Node Biopsy
What Is Sentinel Lymph Node Biopsy?

Many advances in breast cancer care are taking place. One of these advances is called **Lymph Node Mapping with Sentinel Node Biopsy**. The presence or absence of cancer cells in the lymph nodes is one of the most important signposts your doctor will use to determine the best treatment for you.

Using this procedure, the surgeon can do a more accurate biopsy and gain information that may reduce the amount of surgery needed. Sentinel node biopsy may be a good option for patients with a low to moderate risk of having lymph nodes that contain cancer.

The dictionary defines “sentinel” as a guard, watchdog, or protector. Likewise, the sentinel lymph node is the first node “standing guard” for your breast. In other words, the sentinel nodes are the gatekeepers to the rest of the lymph nodes in the underarm area. The underarm is also called the axilla and contains the axillary lymph nodes. The traditional surgery is called a complete axillary lymph node dissection in which most of the axillary lymph nodes are removed. This procedure continues to play an important role in breast cancer care.

What Is a Lymph Node?

The lymph vessels are small channels that drain all the tissues of the body. Lymph vessels drain excess fluid back into your bloodstream. As the lymph fluid drains back into your circulation, it goes through lymph nodes. A lymph node is a round piece of tissue about the size of a pea or bean. Lymph nodes are found all over the body but are clustered in certain areas like the underarm (Figure 1). The lymph nodes examined and removed during breast cancer surgery are most commonly located in the underarm. The lymph nodes act as filters for the body. The main purpose of the lymph nodes is to filter out bacteria, excess fluid, and cancer cells before they enter the bloodstream and travel to other parts of the body.

What Are Sentinel Lymph Nodes?

**Sentinel lymph nodes** are the first nodes to receive lymph drainage from the breast and the first lymph nodes to receive cancer cells from the breast tumor. There commonly is a limited set of 1 to 3 sentinel lymph nodes in the underarm. If the sentinel nodes do not show any cancer, it is likely that no other axillary lymph nodes contain cancer.
The Biopsy Procedure

Because temperatures in the hospital can vary, it is fine to wear some comfortable pants and socks, slippers or shoes in addition to the hospital gown. You may wear these additional garments until you leave for surgery. Also, warm blankets are available in most hospital departments.

- Approximately 3 hours prior to surgery a breast radiologist will inject a radioactive liquid (tracer) into the breast tissue around the breast tumor. If the tumor has already been removed, the injections are made around the incision. If a wire has been placed, the injections may be near the wire. The radiologist usually does 6 separate injections so the tumor or surgery area is completely surrounded by the radioactive tracer. This causes temporary discomfort from the needle sticks and/or a burning sensation from the tracer. The main goal is to inject into the normal breast tissue to allow the absorption of the radioactive tracer. The injections usually take place in the Nuclear Medicine department but may possibly be done at the Center for Breast Health. The radiologist will massage the breast area after injecting the tracer. You will also be asked to massage the breast area off and on for the next 1 1/2 hours. Massage improves the chance that the tracer will be absorbed by the breast tissue lymph vessels and drain away properly towards the lymph nodes.

- Following the tracer injection you will return to the Outpatient Care Center for 1 1/2 hours. During this time you will be asked to do the breast massage as directed by the radiologist.

- Depending on the area of the breast the tracer was injected, most patients will return to the Nuclear Medicine department. There you will lie on a table and a camera will be placed over your chest area. The camera is basically a large Geiger counter and will show the radioactive areas in your body. This is called lymphoscintigraphy (Figure 2). After two 5 minute pictures are completed, the breast radiologist reviews the pictures. The areas of the original radioactive tracer injections are seen and possibly another radioactive area in the underarm. This may be the sentinel lymph node area. Not all sentinel lymph nodes are seen on the pictures. A radioactive lymph node area does not mean cancer has spread to the lymph nodes only that the tracer has traveled to the lymph nodes.

*Figure 2*
• If a radioactive area is seen in the underarm the breast radiologist will mark that area on the skin surface with an ink marker. Your surgeon will be able to look at this area during surgery. If no area is marked, it does not mean your surgeon will not be able to locate a sentinel lymph node during surgery.

• Next, you will go back to the Outpatient Care Center to continue your surgery preparations.

• Once you are asleep in surgery, your surgeon will inject a blue dye into the same area of the breast tumor. This blue dye will also move through the lymph system and stain lymph nodes blue. The surgeon will be able to see the blue stained “sentinel nodes.” The surgeon will be able to find the radioactive lymph nodes by using a handheld geiger counter called a gamma probe. The radioactive lymph nodes and blue lymph nodes are called sentinel lymph nodes. Your surgeon will remove other non-sentinel lymph nodes if there is a concern that these other nodes may contain cancer (Figure 3).

• These nodes are completely removed from the body and examined under a microscope for cancer cells by pathology doctors. If the sentinel nodes are free of cancer cells then the surgery is complete. If cancer cells are present in the sentinel nodes you may need a complete axillary lymph node dissection to make sure all possible cancer cells are removed. It is possible you may need to return to surgery for this procedure at a later date.

• Without the radiation tracer or blue dye marking the sentinel lymph nodes, the surgeon cannot accurately tell which lymph nodes are the sentinel nodes. If your surgeon is not able to find any radioactive or blue sentinel lymph nodes then a complete axillary lymph node dissection will be performed.

• After surgery your urine will be blue or green-blue for 24-48 hours. Your breast tissue will be stained blue for quite some time (weeks to months). These effects are harmless.
Commonly Asked Questions

What are the risks or side effects associated with the injection of the radioactive tracer and the blue dye?
An allergic reaction to the radioactive tracer or the blue dye may occur in patients but this is rare. This could be a minor reaction, such as itching, or in rare cases, could be life threatening. If an allergic reaction occurs, you will be given a medication to treat the reaction. You may experience a mild irritation of the breast from the radioactive tracer. There is also a small risk of bruising and infection from the injections.

Can the radioactive tracer harm the patient?
The amount of radiation exposure from this injection is less than the radiation exposure from a chest x-ray. The radioactive tracer disappears from your body in within 48 hours.

Will the sentinel node surgery increase the risk of infection?
There is no known increased risk of infection with removal of sentinel nodes. The risk for infection is no greater than the risk of infection with a complete axillary lymph node dissection.

How will I look and feel after the sentinel lymph node biopsy?
You will have a small scar under your arm. Initially there will be some swelling and discomfort.

Will the surgery take longer if a sentinel node biopsy is performed?
It may take your surgeon an additional 20-30 minutes to locate the sentinel node(s). This will add time to your surgery if you need a complete axillary lymph node dissection. Due to the information from the sentinel node biopsy, you may not need to have additional lymph nodes removed. In that case, there is less time in surgery.

How can the sentinel node results predict if there are cancer cells in other lymph nodes around the breast?
It is believed that tumor cells leave the breast and travel to the sentinel lymph nodes first and if the sentinel nodes do not contain cancer cells, most likely the remaining lymph nodes around the breast will also be free of cancer cells. This may eliminate the need to perform a traditional complete axillary lymph node dissection in which all or almost all of the lymph nodes under the arm are removed.

What if the surgeon does not identify all the sentinel nodes?
If a patient has only the sentinel nodes removed, there is a small risk (3 out of 100 cases) that cancer cells may be present in the other nodes in the underarm. If these lymph nodes were not identified as sentinel nodes, they would not be removed and could potentially be a source of cancer re-growth in the underarm. If re-growth occurs, it is recommended that all of the lymph nodes in the underarm be removed.
Advantages to the Sentinel Lymph Node Biopsy

• No need to stay overnight in the hospital unless your breast surgery requires a longer stay.

• No need for a drain at the surgery site.

• Recuperation from the procedure is faster.

• Smaller incision.

• Possible avoidance of long-term complications. Approximately 5-10% of the patients who undergo a traditional complete axillary lymph node dissection experience chronic problems related to the dissection such as arm swelling (lymphedema), or pain or discomfort in the area of the dissection. Almost all patients will have some residual numbness under the inside of the arm.

• A sentinel lymph node biopsy can lead to a more accurate assessment of whether the cancer has spread to the lymph nodes. In a traditional complete axillary lymph node dissection, the pathologist receives at least 10 lymph nodes or more; there is no way of telling which one is the sentinel lymph node. So the pathologist makes one cut in each lymph node and looks for cancer. When the pathologist receives only one, or a few lymph nodes from a sentinel lymph node biopsy, he or she can make many cuts through that lymph node to look for cancer. A negative sentinel lymph node(s) indicates a greater than 95% chance that the remaining lymph nodes in the axilla are also cancer free.

• The sentinel lymph node biopsy can be done in combination with a lumpectomy, a mastectomy or as a separate procedure if your breast surgery has already been completed.

When Should Sentinel Lymph Node Biopsy NOT Be Performed?

Unfortunately, the sentinel lymph node biopsy procedure cannot be performed on everyone with breast cancer.

• People who have had radiation therapy or surgery in their breast or axilla may not be a candidate for the technique, as changes in the breast and axilla from the radiation therapy or surgery may make the results inaccurate. It is possible to undergo sentinel lymph node biopsy after a recent breast biopsy or lumpectomy.

• People who have enlarged lymph nodes underneath their arm, or people who are already known to have breast cancer cells to their axillary lymph nodes should undergo a traditional complete axillary lymph node dissection.

• People who already have had a mastectomy cannot undergo the procedure because there is no accurate way to inject the tracer and dye to identify the lymph node.
• People with large tumors (greater than 5 cm) have a higher incidence of lymph node spread of their cancer, and may be better served by a traditional complete lymph node dissection. They should discuss this with their surgeon.

• People in whom it will be difficult to accurately inject the dye, also would likely be better served by a complete axillary lymph node dissection. This includes those people in whom we are unable to find the primary breast tumor (an “occult” malignancy), and people in whom the tumor is present through more than one area of the breast (a multifocal tumor).

• Some people with breast or chest implants may not be suitable for sentinel node biopsy because of the implant location or incision placement.

Who Should Do the Procedure?

Doctors recommend that sentinel lymph node biopsy is done only by a team known to have experience with this technique. This team includes the surgeon, breast radiologist, and pathologist. It is important that the healthcare institution have an established protocol for all aspects of the procedure. While this procedure has been proven by multiple studies to provide valid information, it is important that the surgeon involved be experienced in performing the technique so that the results are accurate and useful.

Genesis has followed an established protocol since April 1998. The surgeons at Genesis who perform this technique have been credentialed by the Medical Affairs Department for their experience at Genesis and/or through their medical education or other previous experience.

In the 1970’s, a radical mastectomy was at that time the standard treatment for even the smallest tumors. Then we did not have the technology or statistics to assure us that a more conservative approach would be as effective as a complete mastectomy. Yet today, breast-sparing lumpectomy has become the surgery of choice for most breast cancers as it has proven itself to be as safe and effective for the majority of patients with breast cancer. Today, the sentinel lymph node biopsy has become the procedure of choice in many institutions across the nation for these same reasons.

Please ask your surgeon about their experience with this procedure and if it is an option for your breast cancer care.

For additional information about breast cancer and its treatment, call us at the Center for Breast Health.
Resources

This brochure was researched and written by Kim Turner RN, MSN, OCN, Cancer Services Specialist for Genesis Cancer Program. Resources used in the preparation of this brochure were:

- www.mdanderson.org
- www.cancernews.com
- www.vh.org (Virtual Hospital)
- www.oncolink.upenn.edu
- www.hersource.com
- www.cancer.org (American Cancer Society)
- www.breastcancer.org
- www.sentinelnodes.org
- www.imaginis.com
- Cure, Summer 2002
- Cure, Fall 2003
- Redbook, January 1999

Contact Genesis Cancer Center at 563-421-1900 or see us online at www.genesishealth.com