

MELANOMA INSTITUTE AUSTRALIA SENTINEL NODE BIOPSY PROCEDURE

PATIENT INFORMATION



WHAT IS SENTINEL NODE BIOPSY?

Sentinel node biopsy is a procedure that provides very important information to help predict the risk of melanoma spread in the future.

SENTINEL NODE BIOPSY

Lymph is fluid that escapes from blood vessels into the tissues. It travels in a network of lymphatic vessels that eventually returns this fluid to the blood stream. Lymph nodes are glands or filters found along these lymphatic vessels that help the body to mount a response to infection or cancer. Lymph nodes are commonly found clustered together, particularly in the neck, armpit (axilla) and groin.

Nearly all parts of the body have lymphatic drainage to a specific lymph node or several lymph nodes. The pattern of lymph fluid drainage is different for each individual. The sentinel node(s) is the first lymph node(s) along the lymphatic vessels that drains lymph fluid from the part of the skin that has a melanoma on it.

Surgically removing the sentinel lymph node(s) (sentinel node biopsy) enables the pathologist to examine the lymph node(s) very carefully under the microscope to see if the melanoma has spread to that area. Sentinel node biopsy provides very important information that helps predict the risk of melanoma spread in the future. At present the only reliable way of telling whether sentinel node(s) contain malignant cells is by surgically removing them so a pathologist can fully assess the lymph node(s) with specialised techniques.

Overall, a sentinel node contains melanoma (i.e. the sentinel node biopsy is positive) in around 16% of the procedures we perform. The chance of a sentinel node being positive varies depending on the nature of the primary melanoma. Sentinel node biopsy is not recommended for patients with low-risk melanoma. A large international study has shown that there may be long-term benefits from removing sentinel nodes when they contain minimal disease. The study reached this conclusion by comparing the survival of patients randomly allocated to have sentinel node biopsy to the survival of patients who didn't have sentinel node biopsy and developed positive (mostly palpable) lymph nodes later. Nearly all these patients developed a lump at the site where the sentinel node would have been*.

* (Morton DL, Thompson JF, Cochran AJ, et al. Sentinel-Node Biopsy or Nodal Observation in Melanoma. *N Engl J Med.* 2006; 355(13):1307-17)

It is important to remember that sentinel node biopsy is a diagnostic test. As with many other medical tests there is an error rate. This means one or two in 10 positive cases are missed by the test and the melanoma could still develop in the adjacent lymph nodes in the future. We are working very hard on technical improvements to minimise the error rate.

THE PROCEDURE

There are three steps to the sentinel node biopsy procedure:

1. A pre-operative lymphoscintigram.
2. Intraoperative lymphatic mapping with blue dye.
3. Selective biopsy of sentinel nodes.

1. LYMPHOSCINTIGRAM

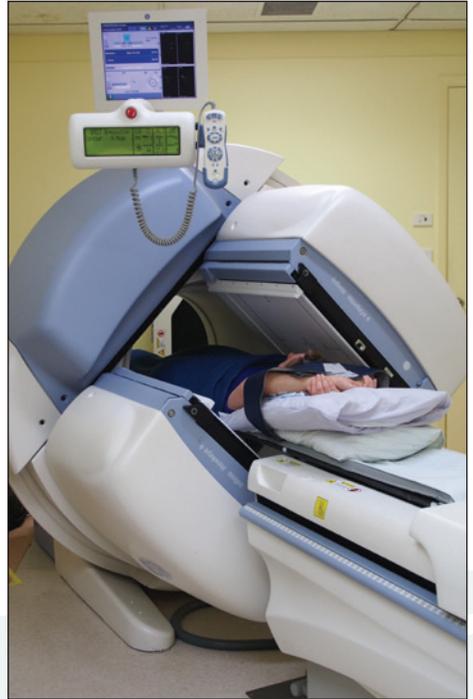
This is a nuclear medicine scan, also referred to as a 'lymphatic drainage scan' or a 'lymphatic mapping test'.

This procedure is often done the day before the operation or on the morning before an afternoon operation. There is no need to fast (no food or drink) specifically for this test but you must be fasted for 6 hours before the due time for the operation.

The first step in performing a lymphoscintigram is a small injection of radioactive 'tracer' around the site of the melanoma. This injection stings for a few seconds. The procedure then involves lying quietly under a scanning machine for several periods of time over 2–2.5 hours.

Scans are done with several different cameras to pin-point the exact location of the sentinel node(s). This may include a SPECT/CT camera that shows the tracer in the sentinel node while the CT scan shows the anatomy of the area. These two technologies can be fused into the one image for more accuracy.

Although the tracer is radioactive, there is no significant risk to you from its use. This is because the radiation dose is very small and it loses radioactivity very quickly. In addition, nearly all the entire residual radioactivity is removed when the melanoma is widely excised (within 24 hours).



Figures 1 and 2: The location of sentinel nodes is determined using an isotope-detecting gamma camera and SPECT/CT scanners by Nuclear Medicine Physicians.

In the Nuclear Medicine Department, lymphoscintigraphy is used to find the location of the first lymph nodes on the lymph drainage pathway. These nodes from the primary melanoma site are identified as the sentinel nodes. The site(s) will be marked on the skin with indelible ink as a cross.

Often a small (permanent) tattoo dot is also used to mark each sentinel node site for future reference during check ups. If crosses have been marked on your skin please do NOT wash them off. If you feel strongly that you do not want the tattoo marks tell the nuclear medicine technician.

Once the sentinel nodes have been marked you may also have an ultrasound examination of the sentinel nodes. If ultrasound shows a tiny 'lump' on a sentinel node this will be biopsied with a fine needle. A positive biopsy for melanoma will influence the surgery you have.

Most patients, however, will have a normal ultrasound examination and will then proceed to the operation where the sentinel node is removed so that the lymph node can be carefully examined under a microscope. If the ultrasound is normal it does not exclude the presence of microscopic deposits of melanoma in the sentinel node.

Figure 3: Location of sentinel nodes can be marked with washable ink (X) and/or a small tattoo dot.



WHY IS THIS TEST NECESSARY?

The lymphatic drainage from a given site on the skin varies quite markedly from one person to the next. This test is a reliable way of demonstrating exactly where your sentinel nodes are located. The SPECT/CT pictures may also help the surgeon to plan the surgical removal of the sentinel node/s and speed up the procedure.

SIDE EFFECTS

There will be slight pain at the injection site during and shortly after the tracer injection – the injections may sting about as much as the local anaesthetic you most likely had when the melanoma was removed. You may also experience some redness at the injection site for an hour or so.

2. INTRA-OPERATIVE LYMPHATIC MAPPING WITH BLUE DYE

The second stage in the sentinel node biopsy procedure is an injection with a special blue dye at the time of the surgery. When you are under anaesthetic an injection of Patent Blue V dye is placed around the melanoma site. This blue dye travels in the lymphatic vessels to the sentinel nodes in the same way as the radioactive isotope during lymphoscintigraphy. The blue dye is used to make it easier for the surgeon to find the lymph nodes identified by the lymphoscintigram by staining them blue. It provides the surgeon with extra certainty that each correct sentinel node has been identified.

SIDE EFFECTS

The procedure may be accompanied by discolouration of the injected skin and discolouration of the lymphatic channels leaving the injection site. This discoloured tissue is normally removed completely as part of the wide local excision procedure but it can leave some staining of the surrounding skin. Usually any discolouration washes off but it may take a few weeks to disappear in some cases. There may be blue/green discolouration of the urine lasting no more than 48 hours. There is a possibility of having an allergic reaction, which can be serious, but this is very rare and will be treated immediately.

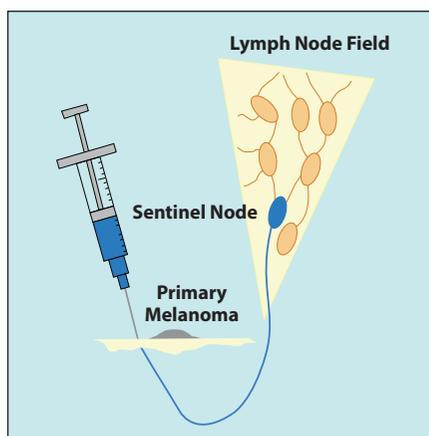


Figure 4: Diagram of lymphatic mapping (Courtesy of D. Morton).

3. SELECTIVE BIOPSY OF LYMPH NODES IDENTIFIED AS SENTINEL NODES

After the intra-operative lymphatic mapping procedure is performed, the selective surgical removal of the sentinel lymph node(s) will be done. This also happens whilst still under anaesthetic. The procedure is normally performed at the same time as the wider excision of the original melanoma site. Selective biopsy of sentinel lymph nodes involves an incision over the area(s) of the marked lymph nodes that have been identified by the lymphoscintigram.

Any lymph nodes with significant radioactivity from the lymphoscintigraphy or blue dye in them are identified as sentinel nodes. They will be surgically removed and sent to the pathologist for very careful examination.

If melanoma cells are found to be present in a sentinel lymph node when the pathologist examines it, you will often be recommended to have further surgery within 4–6 weeks. In most cases a completion lymph node dissection will be performed.

SIDE EFFECTS OF SELECTIVE BIOPSY OF SENTINEL LYMPH NODES

The side effects that might accompany a sentinel lymph node operation may include the following:

- Pain and/or discomfort at the site of the incision.

- Loss of sensation in and around the site of the incision as well as in the area immediately adjacent to the site.
- Occasionally a swelling associated with a fluid collection at the incision site. This might be accompanied by a local infection and/or problems with the wound not healing.
- Occasionally some swelling of the limb or the area nearest the incision site.
- In a small percentage of cases there may be permanent limb swelling (lymphoedema) after a sentinel node biopsy. It is nearly always with groin sentinel node biopsy and is usually mild.

COMPLETION LYMPH NODE DISSECTION

Completion regional lymph node dissection is the thorough removal of all the remaining lymph nodes in the area where the sentinel node biopsy was done – usually the neck, armpit or groin. If this operation is required it is usually performed 2–4 weeks after the sentinel node biopsy. You will not wake up from a sentinel node biopsy and find that you have had a completion regional lymph node dissection. Completion lymph node dissection may be recommended for one of two reasons:

1. If, after your sentinel node biopsy one of those lymph nodes is found to contain melanoma cells, OR
2. If your doctor is concerned that your lymph nodes might be involved with melanoma at some stage in the future.

SIDE EFFECTS

The side effects that might occur after a completion lymph node dissection may include the following:

- Problems with wound healing.
- Wound infection.
- Swelling in the area of the wound (indicating a collection of lymph fluid) that may require needle aspiration after the surgical drains are removed.
- Permanent or fluctuating swelling in the limb nearest the complete lymph node dissection. This is called lymphoedema and

may require specialised treatment with compression garments and massage techniques.

- Loss of sensation in and around the site of the surgery. Some loss of sensation may be permanent but it may take several years to know if this is the case.
- Distortion of the natural anatomy of the operative site. This is a consequence of performing adequate surgery to remove any potential residual melanoma. Deformity sometimes cannot be avoided, but your surgeon will make every attempt to minimise deformity and disability without compromising the effectiveness of the surgery.
- Increased susceptibility to infection of the involved limb if injury occurs. This will require more attention to skin cuts or abrasions of the limb in the future.

Note *More detailed explanations about neck, groin and axillary lymph node dissection are available in information brochures on our website.*