

# Breast sentinel lymph node biopsy - a step forward

M van der Walt B Rad (D) [UFS]; B Rad Hons (O) [UFS], N Dip Rad (NM) [CUT Free State]

## Abstract

This article provides practical information on a safe, accurate procedure for detecting nodal metastasis in early breast cancer [1-5].

**Keywords:** Radioactive tracer, dye, gamma-probe

## Introduction

For someone diagnosed with breast cancer, one of the most important ways to determine the extent of the cancer, appropriate treatment and long-term outlook, is by looking at the lymph nodes closest to the affected breast. Breast cancers may be localised to being within the lining of the endothelial cells along the breast duct (in-situ cancers) or the cancer may spread beyond the breast duct (invasive cancers) via the blood vessels and lymph vessels to metastasise.

Lymph vessels drain into tissues of the body through lymph nodes. The lymph vessels of the breast drain into the axillary lymph nodes and sometimes into the lymph nodes above the clavicle or along the sternum. This paper provides information and practical guidelines on breast sentinel lymph node localisation and biopsy.

## Sentinel node localisation and biopsy

The traditional approach to establish the possibility of spread of cancer cells in the lymph nodes with invasive breast cancer was to perform a lymph node dissection [1]. With early-stage breast cancer the patient is offered two options for lymph node removal, namely:

- a standard axillary lymph node dissection, or
- a 'sentinel lymph node' localisation and biopsy.

The latter is a new and alternative technique developed to determine if breast cancer has spread to the lymph ducts or lymph nodes. Experience has shown the lymph ducts of the breast usually drain to one lymph node first, before draining through the rest of the lymph nodes underneath the arm. The first lymph node is called the sentinel lymph node. The dictionary defines sentinel as guard, watchdog or protector. Thus it is the lymph node guarding the rest of the lymph nodes which filters fluid that drains away from the area of the breast containing cancer.

Lymph node mapping identifies the sentinel lymph node. A sentinel lymph node biopsy removes only that lymph node most likely to be affected. Breast cancer surgeons use a technique where the sentinel lymph node is identified by a radioactive dye, namely technetium labelled sulphur colloid, which is measured by a hand-held intra-operative probe, and a blue dye called isosulfan or patent blue that stains the lymph tissue a bright blue so that it becomes visible.

A sentinel lymph node biopsy can assist in a more accurate assessment of whether the cancer has spread to the lymph nodes. In cases who have a traditional axillary dissection the pathologist receives at least 10 lymph nodes or more. Thus there is no way of telling which one is the sentinel lymph node.

The pathologist therefore makes one cut in each of the lymph nodes to confirm a positive or negative diagnosis. When the pathologist receives only one or a few lymph nodes from a sentinel lymph node procedure several cuts can be made through that lymph node to determine whether there is evidence of cancer. A negative sentinel lymph node(s) indicates a >95% chance that the remaining lymph nodes in the axilla are also cancer free. This reduces the risk of long term complications and side effects from an axillary dissection which include *iner alia* swelling of the arm due to lymph-oedema, pain or discomfort, reduced shoulder mobility, seroma formation and residual numbness under the inside of the arm.

The sentinel lymph node procedure is a good option for early-staged, invasive breast cancer patients with a low to moderate risk of lymph node involvement [2].

## The procedure

On the morning of the surgical procedure, a nuclear medicine specialist or radiologist administers radionuclide injections peritumourally and / or around the nipple-areolar complex of the breast by means of ultrasound guidance. The patient then is instructed to gently massage the breast and to move her arms to encourage lymphatic movement.

The radioactive tracer migrates through the lymphatic capillaries and reaches the first lymph node (the sentinel lymph node) about 30 minutes post-administration of the injection. Scintigraphic images are then obtained at various time intervals, namely at 15, 60, 120, 240 and 360 minutes post administration of the radioactive tracer. The skin projection of the sentinel lymph node is marked with a suitable pen.

In the operating theatre the surgeon injects a patent blue dye in the same area of the breast a few minutes before surgery to stain the lymph nodes for visual identification. An incision is then made underneath the arm in the area of the axillary lymph tissue. A hand-held sterile intra-operative gamma ray detection probe aids the surgeon to locate and verify the position of the sentinel lymph node and guide its isolation. When found the node emitting the highest radioactivity is removed and sent for histological examination. The pathologist microscopically analyses the sentinel lymph node. After obtaining the histology results the surgeon then performs the procedure most appropriate for the outcome.

Unfortunately sentinel lymph node biopsy procedure cannot be performed on a person with an invasive breast cancer. A history of previous radiation therapy and/or previous breast surgery or, large tumours, may render this technique inaccurate.

A full axillary lymph node dissection is considered the standard of care in patients who have positive sentinel lymph node in terms of treatment options [3].

## Some other considerations to note

This is a fairly new procedure and should only be performed by an experienced team. Even when an experienced team performs this procedure it is not fool-proof.[4] In approximately 5%

of the cases no particular sentinel node takes up the tracer or dye during the procedure. The blue dye used in the procedure stays in the body for quite some time. Some women may note their urine is blue/green and that there is a blue stain under the skin of their of breasts immediately after the surgery.

## Questions to ask a breast cancer surgeon

- Am I a good candidate for a sentinel lymph node localisation and dissection?
- How many sentinel node dissections have you performed?
- What are my treatment options if the lymph node shows cancer?

## Conclusion

Sentinel lymph node procedure is an intelligent way to identify the node(s) that are at highest risk for involvement in patients with breast cancer [5]. There are several good reasons why women want to minimise the number of underarm lymph nodes that are removed. The high probe-guided identification rate, and ease of sentinel node dissection, indicate that the procedure represents an important step forward in the staging of the axilla involvement in breast cancer.

## Acknowledgements

I wish to thank my family for their support and encouragement.

Dr Hesta Friederich-Nel for her continual help and advice.

## References

1. Alex JC , Krag DN. Gamma- probe guided localization of lymph nodes. *Surg Oncol* 1993, 2 : 137 - 143.
2. Anon. Sentinel Lymph Node Biopsy in Breast Cancer - Not Yet the Standard of care, *The New England Journal of Medicine*, October 1, 1998.
3. Veronesi U, Paganelli G, Galimberti V, Luini A, Zurrada S, *et al.* Sentinel lymph node biopsy and axillary dissection in breast cancer: results in a large series. *J Natl Cancer Inst*, 91 (4): 368 - 373, 1999.
4. Abstract from the medical report 'Sentinel Node Biopsy in Breast Cancer: Results of 103 Cases', *Australian And New Zealand Journal of Surgery*, February 2000
5. Manaswi A. *Sentinel lymph node biopsy using gamma - probe in early breast cancer*, unpublished paper read at 2nd SAARC Conference on Clinical Oncology [A Manaswi, Nehru Cancer Hospital and Research Center, Bhopal, India]