



# Sentinel Lymph Node Biopsy in the Sultanate of Oman

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## Mini Abstract

Twenty five patients with Breast cancer and melanoma, had axillary sentinel lymph nodes (SLN) detection by blue dye alone or with radioisotope, followed by axillary dissection to confirm the histological findings of the SLN. This is the beginning of SLN biopsy in Oman. The histological staging of axillary lymph nodes is the best predictor of survival in patients with breast cancer. Axillary lymph nodes dissection (ALND) is being replaced by SLN biopsy in many centers. In this article we present our experience in the SLN biopsy and announce the start of it in the Sultanate of Oman.

## Abstract

### Objective

To establish the feasibility of newly started sentinel lymph node (SLN) biopsy in our center at the Royal Hospital in the Sultanate of Oman.

### Methods

Twenty five patients with Breast cancer and melanoma were staged with sentinel lymph node (SLN) biopsy, followed by Axillary

lymph Node Dissection (ALND). Axillary SLN were detected by injection of blue dye alone or with radioisotope. Intraoperatively, a gamma probe detector identified the isotope-labeled SLN. Two patients underwent pre-operative lymphoscintigraphy. The SLNs were examined histologically by hematoxylin-eosin staining and, if negative by this method an immunohistochemical staining (IHC) was done.

### Results

The only failure to detect inguinal SLN was one case after neoadjuvant chemotherapy. Total detection rate of SLN was of 96%. Metastatic spread occurred in 11 patients of these 9 had other lymph node (LN) involved. Nine patients had no SLN involvement and no other LNs involved.

### Conclusions

Ethically, according to the international recommendations and looking to the statistics of the Sultanate all clinical N0 should have the choice of SLN biopsy prior to ALND.

### Key words

*Breast Cancer, Axillary Lymph Node Dissection, and Sentinel Node Biopsy.*

## Introduction

Breast cancer in the world and in Oman is the first cancer affecting females. In order to treat it, staging of it is mandatory. Information about regional nodal status is crucial for staging, prognosis and treatment. The histological staging of axillary lymph nodes is an important predictor of survival in patients with breast cancer <sup>(1)</sup>. Axillary lymph nodes dissection (ALND) was the gold standard for detection of nodal involvement. ALND is a major operation.

So Sentinel lymph nodes biopsy (SLN) has rapidly emerged in the last decade as an alternative to ALND for the staging of the breast cancer.

This technology was initially developed for nodal staging of malignant melanoma by Morton. That is, if the SLN is negative for metastatic disease, the remaining lymph nodes are also likely to be negative <sup>(2)</sup>.

Techniques for assessing node status without resorting to radical clearance is lymphatic mapping and sentinel node biopsy, which was developed by Morton et al. for malignant melanomas of the limbs <sup>(3-5)</sup>. It is currently used to evaluate the node status of many solid

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tumors such as breast tumors<sup>(6-12)</sup>. It has also been used to avoid unnecessary inguinal lymph node dissection in cancers of the penis<sup>(13,14)</sup> and vulva<sup>(15-17)</sup>.

It has been introduced in the Sultanate of Oman first time in 2003. The first 25 cases had axillary dissection following the SLN biopsy to ascertain the histological representation of the SLN to the axillary lymph nodes.

**Materials & Methods**

*Patients*

From January 2003 up to January 2006, 25 patients with breast cancer and melanoma had axillary SLN biopsy at the Royal Hospital. Two males and 23 females, age 27-82 (mean 54 years). Twenty were included in the study 5 excluded. All included patients were clinically clinical N0 (assessed by clinical examination). Four cases had blue detection only, 21 had both blue and radioactive. In 2 cases lymphatic mapping were done preoperatively.

*Lymphatic mapping technique*

Twenty one patients had preoperative injection of radioactive tracer to determine the SLN (Fig. 1), 4 patients, had blue dye method only in the detection of the SLN.

Methylene blue (of 2cc diluted in 3cc of normal saline) was injected sub-dermal injection pre-tumoral 30 minutes before surgery, followed by gentle massage for 3 min (Fig. 2).

In 21 patients, we detected SNs intraoperatively with a hand-held gamma-probe detector (Fig.3) after injection of 1 mCi of filtered 99m labeled sulfure colloid (0.2 ml). Patient had peritumoral intradermal injection 2 hours prior to surgery.



**Fig. 1: Radiosotope injection prior to surgery**

2 patient had preoperative lymphatic mapping to determine the draining basin (cases of melanoma, anterior chest wall and shoulder).



**Fig. 2: Blue Dye Injection**



**Fig. 3: Intraoperative Sentinel Lymph Nodes Detection**

*Surgical technique*

Prior to surgery the hot LN location was determined by the gamma probe detector and skin mark was put to indicate the incision level (Fig.3). A 2cm incision was made over the marked hottest area, and with the guide of the gamma probe the blue lymphatics was searched. The stained lymphatic was located by fine dissection and traced to the SN which was either stained entirely or at the level of the efferent sinus only (Fig. 4). The concordance between stained and radioactive SN was ascertained and the SN was then excised (Fig. 5). The probe was retested ex vivo for



**Fig. 4: Blue LN detection A: Blue Lymphatic, B: Blue LN**

effective isotope detection and the wound was explored for other labeled SLNs. The rest of the axilla was checked for radioactivity (Fig.6) If no activity registered then closure or standard level I & II axillary dissection was done.



**Fig.5: Ex-Vivo Confirmation of Blue Node's Radioactivity**



**Fig. 6: Checking for any more Radioactivity in the axilla**

**Histological examination**

The SN(s) were fixed in Formalin. In the laboratory, they were individualized and cut into 3 µm sections. The sections were embedded in paraffin, stained with hematoxylin-eosin stain and examined.

When no tumor invasion was noted by this method, immunohistochemical staining was performed using immunohistochemistry Cam 5.2 (cytokeratin).

**Results**

Out of the total 25 patients, 20 pts. were included and 5 excluded (4 breast carcinoma and 1 melanoma). Exclusion was because 2 refused dissection, 2 had neo-adjuvant treatment & one was clinical N1. Of these one case of melanoma post neo-adjuvant treatments we failed to locate the SLN.

In the included 20 cases 16 had one SLN biopsy and in 4 cases 2 SLNs were removed. All included patients regardless of SLN result had further axillary dissection.

Out of 20 cases included in the study, metastatic nodes were present in 11 of the 20 patients 55%, (1 T1 & 10 T2). Of these 11 patients axillary dissection showed 2 axillae free of other malignant LN and the rest were involved [Table 1].

Nine patients (45%) had no metastatic SLN and axillary dissection reflected for 100% the SLN status as all other LN were free of malignancy.

The axillary LN (level I & II) removed ranged between 9-21 LNs (mean 11.64 LN). The axillary LN dissection was done usually at the same sitting, only in 3 cases it was done within 21 days.

Drain was put only after dissection. The stay in Hospital ranged between 5-7 days (mean 5.9 days).

Follow up from 37-42 months (mean 13.2 months). No patient had axillary relapses. One patient had contralateral malignancy (4%), one had lung metastasis (4%) and one local breast recurrence (4%), all from the group with malignant SLN.

Ten patient had left breast carcinoma and 9 right breast carcinoma. One patient had melanoma right scapular region.

Total included in study	20/25	80%
Total malignant SLN	11/20	55%
Other involved lymph nodes in patients with positive SLN	9/11	82%
Non metastatic SLN	9/20	45%
Other involved lymph nodes in patients with negative SLN	0/9	0%

**Table 1: Result of the Sentinel Lymph node biopsy**

**Discussion**

The histological staging of axillary lymph

nodes is the best predictor of survival in patients with breast cancer. Information about regional nodal status is crucial for staging, prognosis and treatment<sup>(18-20)</sup>. The presence of nodal metastases decreases the five-year survival by approximately 40%. ALND was the gold standard for detection of nodal involvement.

ALND is a major operation that requires general anesthesia and produces long term morbidity in a small but significant percentage of patients. The acute complication rate can be as high as 20%, and the rate of chronic lymphedema can reach 20-30%<sup>(21-27)</sup>.

So SLN biopsy has rapidly emerged in the last decade as an alternative to ALND for the staging of the breast cancer. This technique was initially developed for nodal staging of malignant melanoma. Morton and colleagues devised a procedure that permits intraoperative identification of the first lymph node in the lymphatic basin at highest risk for metastasis called the SLN. The SLN in melanoma patients is reflective of the histology of the lymph nodes in the regional basin. That is, if the SLN is negative for metastatic disease, the remaining lymph nodes are also likely to be negative<sup>(4)</sup>. Krag<sup>(28)</sup> in 1993 used radiolocalization and Giuliano<sup>(29)</sup> used blue dye alone. A combination of the two techniques was first introduced by Albertini<sup>(5)</sup> which reduced the learning curve and increased the accuracy of detection. The sentinel lymph node biopsy has started to have more and more place in the surgical oncology practice replacing other axillary surgeries. It is a safe and effective alternative to routine axillary dissection for nodal staging in early-stage breast cancer. Compared with standard axillary treatment, sentinel lymph node biopsy was associated with reduced arm

morbidity and better quality of life sentinel lymph node biopsy results in less postoperative morbidity compared with axillary lymph node dissection for breast cancer<sup>(24)</sup>.

Some surgeons are performing axillary sampling ALNS as alternative of ALND to reduce the morbidity, Numerous recent studies<sup>(30-32)</sup> has proven that ALNS has no advantage to SLN biopsy but it has higher false negative rate and it is better replaced by SLN biopsy. Most international centers which practice SLN biopsy now has abundant the ALNS, because of it's poor outcome and higher morbidity. ALNS is replaced now with SLN biopsy.

In Oman SLN biopsy has been introduced recently and these 25 cases are the first cases done. We have learned a lot from the experience of other centers but we think that multi-centric studies with regional centers in the area of the Arabic Gulf will be useful. During last year we had 89 newly diagnosed breast cancer cases, 40% of them were cN0. All these patients cases can benefit from SLN biopsy and avoid the ALND complications.

### Conclusion

In our series we had 55% of positive SLN of which was reflected in to the axillary findings. The most important was that we had 45% of patients with negative SLN reflected for 100% in the axillary status, patient who might benefit of SLN biopsy and avoid ALND complications.

Ethically, according to the international recommendations and looking to the statistics of the Sultanate of Oman all cN0 should have the choice of SLN biopsy prior to ALND. ALNS should be abundant as a procedure.

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