

## Adoption of Sentinel Node Biopsy as an Adjunct to Breast Cancer Screening at Largo Medical Center

Objective: To evaluate the use of sentinel node biopsy at Largo Medical Center from 1999 to 2004.

During the majority of the Twentieth Century regional staging of primary breast cancer was accomplished through the technique of radical axillary lymph node dissection. When utilized with the standard radical mastectomy the extent of axillary dissection generally involved removal of Level I, II, and III nodes. This, coupled with removal of the pectoral muscles, most often resulted in significant long-term morbidity. With the advent of the modified radical mastectomy, the extent of axillary node removal was typically confined to Level I and II nodes. Morbidity, in the form of lymphedema and parasthesias, although considerably reduced, still remained a problem for many patients. In order to reduce the extent of dissection and morbidity, many surgeons turned to "axillary sampling" in which some or all of the Level I nodes were removed. This was associated with less morbidity, but left many practitioners with concerns about the accuracy of the staging.

In 1982 Boova and associates suggested that metastatic nodal status tended to be, on the surface, random. "Skip metastases," that is, tumor found in nodes at either Level II or III and not in Level I, were found in 3.5% of their patients. (Table 1)

Morton and his associates, during this period, investigated the potential for identifying tumor involvement in regional nodes by either dye or radionuclide transit studies. Although transit studies had been pursued intermittently, no investigator had conclusively demonstrated the existence of a non-random pathway for regional centripetal lymphatic flow. Using a feline model, Morton demonstrated the existence of a reproducible node or group of nodes to which tumor cells would preferentially migrate.

The presumption on which Morton's and subsequent studies is based is that –

- 1) Cancer cells spread in an orderly fashion within the axillary lymph node basin.
- 2) Effluent lymphatic channels from the breast preferentially flow to one to three nodes prior to dissemination to other nodes in the lymphatic bed.
- 3) If these "sentinel nodes" are negative for tumor, then it is unlikely that downstream nodes will harbor tumor cells. On the other hand, if the sentinel node or nodes are positive, then a reasonable chance exists that additional nodes will be positive as well.

The initial clinical studies were performed on patients with malignant melanoma. In the studies by Morton, the sentinel node was identified 95% of the time with a predictive value of 97%. Once the validity of the concept was established, attention was directed at translating the technique to breast cancer patients.

Giuliano and associates confirmed a non-random lymphatic pathway in the axilla.(2). Their studies also demonstrated that the location of the sentinel node in the axilla is variable, with 23.7% of sentinel nodes residing in Level II. These and other studies suggested a minimally invasive method of staging breast cancer with accuracy and minimal morbidity.

At Largo Medical Center the technique is performed by one of three methods:

- a) Technetium Sulfur Colloid injection
- b) Isosulfan Blue Dye injection
- c) Both

When the Technetium Sulfur Colloid is utilized the injection is performed by a certified practitioner prior to surgery. The patient is then scanned to determine if a “hot spot” appears in the axilla. The hot spot is considered the putative location of the sentinel node and the location is marked on the skin. At surgery the surgeon employs a small gamma-detecting probe (Neoprobe) to localize the node so that it can be removed. If the Isosulfan blue dye is used, it is injected by the surgeon at the beginning of the procedure. Our preferred method of injection is intradermally at four quadrants of the skin-areolar interface. The surgeon then tracks the dye path to the sentinel node or nodes.

The pathologist examines the sentinel node using two (and occasionally three) techniques:

- a) Routine H&E stains
- b) Immunohistochemical methods
- c) Polymerase Chain Reaction

If metastatic tumor is seen on the H&E stain, an axillary dissection is usually performed. If no tumor is seen the patient is then spared further axillary surgery. The proper conduct for a patient who is H&E negative but Immunohistochemically positive remains unclear. This question is under study by NSABP-32 and the ACOSOG study.

In this study we review the incidence of Lymph Node Mapping and Sentinel Node Biopsy in the staging and treatment of breast cancer at Largo Medical Center during the period from 1999 to 2004. Table 2 demonstrates the number and percentages of breast cancer patients undergoing Lymph Node Mapping and Sentinel Node Biopsy at this institution. The increase in utilization is progressive and is demonstrated in Figure 1.

It was our intention in this study to compare the use of Sentinel Node Biopsy at our institution with usage at the state and national levels. This information does not reside in either the Florida Registry Database or in the National Cancer Database in a retrievable form. Therefore, comparisons cannot be made at the present time.

Conclusion: Lymph Node Mapping and Sentinel Node Biopsy have enjoyed progressive utilization at Largo Medical Center over a recent six year period. Data is not presently available to compare our utilization with state and national patterns of use.

Respectfully submitted,

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1. Boova RS, Roseann B, Rosato F, Patterns of Axillary Nodal Involvement in Breast Cancer. *Ann Surg* – 196: 642 – 644, 1982
2. Giuliano AE, Dale PS, Turner RR, Morton DL et al: Improved Axillary Staging of Breast Cancer With Sentinel Lymphadenectomy. *Ann Surg* 222 (3): 394 – 401, 1995

Table 1

<u>Nodal Status</u>	<u>% of Patients</u>
All levels negative	60%
Level I positive	19.5%
Levels I and II positive	9.5%
Levels I, II, and III positive	5.5%
Only Level II positive *	2.5%
Only Level III positive*	0.5%
Only Levels II and III positive*	0.5%

\* Skip metastases

Table 2

Sentinel Node Biopsies Performed at LMC  
1999-2004

Year of Diagnosis	Total Cases	Number of Sentinel Biopsies Performed	Number Positive	Percent Positive	Number Negative	Percent Negative	Percentage of Malignant Breast Cases using Sentinel Biopsies
1999	115	2	0	0%	2	100%	2%
2000	110	3	1	33%	2	66%	2%
2001	116	9	1	12%	8	88%	8%
2002	93	15	1	7%	14	93%	16%
2003	105	31	5	16%	26	84%	30%
2004	83	34	3	9%	31	91%	41%
Totals	622	94	11	12%	83	88%	15%

Figure 1

Sentinel Node Biopsies Performed at LMC  
1999-2004

