Utility of the SCOUT® reflector as an efficient tool for the identification of index lymph node following completion of neoadjuvant chemotherapy

Rebecca M. Gold, Toni Storm-Dickerson, MD, FACS

ABSTRACT

Our goal was to evaluate the utility of the SCOUT® reflector as an efficient tool for the identification of the index lymph node (node with biopsy proven metastatic involvement) following completion of neoadjuvant chemotherapy (NAC). We found that SCOUT reflectors placed before or near induction of chemotherapy allowed for rapid and accurate identification of the index lymph node following completion of NAC, allowing for decreased surgery time, disruption to surrounding tissue and the associated comorbidities, while improving confidence in appropriate axillary assessment and minimizing the lymph node harvest number.

We found that placement of the SCOUT reflector was easily performed prior to NAC and subsequently easily identified at the time of the definitive breast surgery. Axillary surgery is known to have various morbidities associated with it.[1] In our experience, the use of a SCOUT reflector to identify a previously positive lymph node after NAC allows for decreased axillary surgery, increased procedural simplicity, and extremely high confidence of correct lymph node identification.

DISCUSSION

Sentinel lymph node biopsy (SLNB) allows for accurate assessment of the axilla while limiting comorbidities associated with axillary lymph node dissection (ALND).[2] However, the reliability of SLNB to accurately identify the true first nodes that drain the breast becomes less accurate following chemotherapy, presumably secondary to scarring.[2] Furthermore, identifying the previously biopsied lymph node, in the post NAC setting, offers unique challenges. A clip placed in the axilla is commonly used to help identify a previously biopsied lymph node and evaluate the response of NAC. However, the visualization of a standard imaging guided clip must be done via x-ray, resulting in a back-and-forth procedure of lymph node removal followed by x-ray to verify if the appropriate lymph node was removed. Additionally, it may be difficult to identify. This process results in longer surgical times and the need for more nodes to be removed post NAC to have the same level of accuracy as SLNB in the prechemotherapy setting.[3,4]

Post NAC scarring can yield a false negative rate of over 21% when examining two SLNs, and just above 9% when examining 3 or more lymph nodes,[3] compared to 10% when examining two SLNs in the neoadjuvant setting.[4] However, each additional lymph node

Figure 1. SCOUT reflector in left axillary index lymph node

Figure 2. Breast MRI with SCOUT reflector

removed increases the patient's risk of developing complications and comorbidities.[5,6-8] Tethered lymphatic cords, lymphedema, and seromas affect surgical patients' physical, psychological, and emotional well-being.[9]

Lymph node status is an important prognostic indicator in breast cancer and used to guide treatment decision making.[5] SLNB has been shown to be a valid and reliable method of lymph node assessment and gives patients fewer postoperative complications compared with axillary lymph node dissection.[10] Additionally, SLNB of a previously positive node after NAC is an important indicator of treatment response.[2] However, SLNB after NAC is less accurate, yielding a false negative rate of over 10% when two or fewer lymph nodes are examined.[5] While axillary lymph node dissection overcomes the problem of false negatives, it leaves patients with unnecessary and increased comorbidities.

A SCOUT reflector can easily be placed in a positive or suspicious LN prior to NAC and subsequently readily identified at the time of SLNB, decreasing the false negative rate and number of nodes necessary for appropriate axillary sampling. With the use of SCOUT, the removal of two negative lymph nodes yields high confidence of no residual disease, while confirming removal of the index lymph node. Taback et al., showed a 100% detection rate of previously biopsied lymph nodes following NAC in their study of 19 SCOUT localized and 19 conventionally localized patients.[2] The detection rate in the conventional group was 47.3%. Additionally, the SCOUT reflector has minimal effect on imaging, causing little or no clip artifact (see figures 1 and 2).

A SCOUT reflector can easily be placed in a positive or suspicious LN prior to NAC and subsequently readily identified at the time of SLNB, decreasing the false negative rate

CONCLUSION

Our team has utilized SCOUT in 42 right breast and axilla placements and 45 left breast and axilla placements with 100% localization of the index lymph node. It is our opinion that this allows for shorter surgery times with better patient outcomes and superior oncologic assessment.

REFERENCES

1. Pilewskie M, Morrow M. Axillary nodal management following neoadjuvant chemotherapy. *JAMA Oncol* 2017; 3(4): 549-55.
2. Taback B, Jadeja P, Ha R. Enhanced axillary evaluation using reflector-guided sentinel lymph node biopsy: a prospective feasibility study and comparison with conventional lymphatic mapping techniques. *Clin Breast Cancer* 2018; 18(5):e869-e874.
3. Boughey JC, Suman VJ, Mittendorf EA, et al. Sentinel lymph node surgery after neoadjuvant chemotherapy in patients with node-positive breast cancer. *JAMA* 2013; 310(24): 1455-61.
4. Krag DN, Anderson SJ, Julian TB, et al. Technical outcomes of sentinel-lymph-node resection and conventional axillary-lymph-node dissection in patients with clinically node-negative breast cancer: results from the NSABP B-32 randomised phase III trial. *Lancet Oncol* 2007; 8(10): 881-8.
5. Boughey JC, Suman VJ, Mittendorf EA, et al. Sentinel lymph node surgery after neoadjuvant chemotherapy in patients with node-positive breast cancer: the ACOSOG Z1071 (Alliance) clinical trial. *JAMA* 2013; 310:1455-61.
6. Boughey JC, Ballman KV, Le-Petross HT, et al. Identification and resection of clipped node decreases the false-negative rate of sentinel lymph node surgery in patients presenting with node-positive breast cancer (T0-T4, N1-N2) who receive neoadjuvant chemotherapy: results from ACOSOG Z1071 (Alliance). Ann Surg 2016; 263:802-7.
7. Boughey JC, McCall LM, Ballman KV, et al. Tumor biology correlates with rates of breast-conserving surgery and pathologic complete response after neoadjuvant chemotherapy for breast cancer: findings from the ACOSOG Z1071 (Alliance) pro- spective multicenter clinical trial. Ann Surg 2014; 260:608-14 [discussion: 614-616].
8. Boughey JC, Suman VJ, Mittendorf EA, et al. Factors affecting sentinel lymph node identification rate after neoadjuvant chemotherapy for breast cancer patients enrolled in ACOSOG Z1071 (Alliance). *Ann Surg* 2015; 261:547-52.
9. Taghian NR, Miller CL, Jammallo LS, O'Toole J, Skolny MN. *Crit Rev Oncol Hematol* 2014; 92(3): 221-34.
10. Gherghe M, Bordea C, Blidaru A. Sentinel lymph node biopsy (SLNB) vs. axillary lymph node dissection (ALND) in the current surgical treatment of early stage breast cancer. *J Med Life* 2015; 8(2): 176-180.

Toni Storm-Dickerson, MD, FACS
Department of Surgical Oncology
Compass Oncology
210 SE 136th Ave
Vancouver, WA 98664

Rebecca M. Gold
Elson S. Floyd College of Medicine
Washington State University

406138001_001 ID 080719