SCOUT Report

News and Views on Surgical Guidance and Breast Tumor Localization

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Neoadjuvant Chemotherapy and Solving the Challenge of Localization

by Dr. Barry Rosen MARRYING THE TRIED AND TRUE WITH THE NEW: NEOADJUVANT CHEMOTHERAPY AND RADAR-BASED TUMOR LOCALIZATION PROVIDE A ONE-TWO PUNCH IN ADVANCING PERSONALIZED, PRECISION BREAST CANCER TREATMENT.

Neoadjuvant chemotherapy (NAC), the delivery of chemotherapy prior to tumor removal surgery, is a common approach to treating locally advanced or inflammatory breast cancer and its applications are being expanded in the era of precision medicine. Radar-based localization of breast tumors prior to NAC helps to identify the region of tissue targeted for subsequent excision surgery, especially in cases where the tumor has shrunk in response to NAC and may be very difficult to visualize by conventional means. Similarly, placement of a radar reflector at the site of a lymph node biopsy prior to NAC can help to ensure that the lymph node is removed during surgery, even if it shrinks below the level of detection using ultrasound. The combination of NAC and radar-based breast tumor localization can help usher breast cancer therapy into the era of personalized, precision medicine while reducing patients' treatment burden.

New Trends in Breast Cancer Neoadjuvant Chemotherapy

Historically, chemotherapy was administered after surgery because information gleaned from post-surgical pathology was essential to determining the optimum treatment regimen. NAC was typically used primarily to shrink tumors in patients in whom surgery was complicated or not feasible due to large tumor volume. Today, new molecular approaches to diagnosing and characterizing breast tumors provide information that informs chemotherapy decisions before surgery and enables the development of personalized, precision regimens optimized for the genetic and genomic profiles of each patient's tumor. New approaches, such as preoperative axillary ultrasound, also make it feasible to assess lymph node status prior to surgery, which may reduce the need for axillary lymph node dissection (ALND).

There are several benefits to NAC in the treatment of breast cancer. First, NAC-induced tumor shrinkage can reduce the amount of tissue that needs to be excised surgically. This makes it possible to perform lumpectomy rather than mastectomy and sentinel node biopsy rather than ALND, which can result in long-term side effects. It enables a longer window of time for improved surgical planning and decision-making and allows more timely delivery of systemic therapy, which may be important for reducing the risk of metastasis. Importantly, NAC allows evaluation of a patient's response to chemotherapy, which may impact overall chemotherapy strategy. For example, NAC provides critical prognostic information, as patients with a pathological complete response (PCR) to chemotherapy have improved prognoses, especially those with HER2+ or triple negative breast cancer. Additionally, NAC qualifies for novel chemotherapy approaches, such as dual-agent chemotherapy for HER2+ cancers. In patients with temporary contraindications for surgery, such as pregnancy, recent cardiovascular events or recent anticoagulant use, NAC allows immediate initiation of therapy. As a result of these benefits, patients who are likely to receive chemotherapy at some point during their treatment are increasingly being treated with NAC.

Magnetic resonance imaging (MRI) is playing an increasingly important role in preoperative breast cancer therapy. MRI conducted before and after NAC provides information to assess a patient for potential breast conserving therapy based on the degree to which the tumor has shrunk in response to chemotherapy. MRI may also be useful for interim monitoring of response to therapy and potential adjustment of chemotherapy regimens to achieve optimal responses. Given the importance of MRI in this setting, it is essential that tissue markers placed in the tumor should not impede MR imaging.

The Role of Sentinel Lymph Node Biopsy (SLNB) in Guiding Cancer Therapy

Sentinel lymph node biopsy is important at time of diagnosis for staging and guiding treatment recommendations and is a valuable tool for assessing response to therapy after NAC. Significantly, accurate post-NAC SLNB data is important for clinical decision-making and can reduce the need for ALND, an invasive procedure with potential for long-term side effects including lymphedema, chronic pain and axillary web, which occur in approximately 25%, 5-10% and 30-50% of patients, respectively. With current technologies it is difficult during excision surgery to identify and ensure removal of the node that was biopsied and marked prior to initiation of NAC.

One study found that only 47% of clipped nodes were recovered after NAC, resulting in a false-negative detection rate of 33%. Additionally, marked or 'clipped' nodes are not always identified during sentinel lymph node mapping. Lack of clarity around sentinel lymph node status post NAC may require ALND in order to ensure effective removal of residual tumor cells, putting patients at risk of side effects.

The Benefits of Radar-Based Localization

Radar-based localization offers important benefits compared with wire-based and other wireless breast tumor localization technologies. Unlike these other technologies, the reflector used in radar-based localization produces a clinically insignificant MRI artifact that does not interfere with ability to see target tissue. This allows the reflector to be placed prior to NAC when the target lesions are easily imaged. In some cases, the ability to place the reflector at time of biopsy and can eliminate the need for a secondary localization procedure, reducing the patient's treatment burden.

A key benefit of radar-based localization is that it overcomes the historic challenges of identifying previously biopsied nodes. A clinical study demonstrated that 100% of nodes localized with radar could be recovered following NAC, with 0% false negative rate.

This provides greater confidence in post-NAC sentinel node assessment, which may reduce the need for ALND in some patients, potentially eliminating an invasive procedure. Accurate sentinel node information also helps to guide decisions about post-surgical radiation therapy.

Conclusions

NAC is becoming an increasingly valuable component of breast cancer therapy. Radar-based localization technology gives physicians maximum flexibility for interim MRI monitoring during NAC and has the potential to reduce the number of procedures that patients must undergo, if localization is performed at the time of biopsy, thus reducing their treatment burden. Radar-based localization technology enables more accurate post-NAC sentinel lymph node assessments, potentially eliminating the need for ALND.

Combined with new advances in diagnostic, therapeutic and prognostic technologies, radar-based tumor and node localization supports data-driven clinical decision-making that can improve clinical outcomes as well as the patient experience.

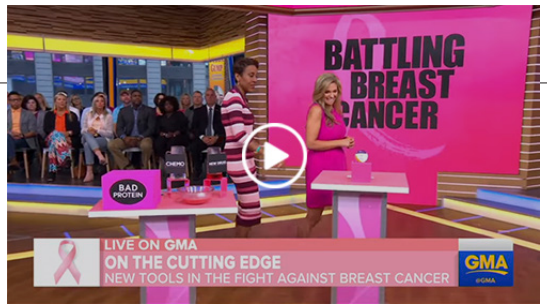
References

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. *Clinical Breast Cancer.* 2018.

Good Morning America features SAVI SCOUT®

The SCOUT® Radar Breast Localization System was featured as the 2018 cutting-edge technology for breast cancer patients as Good Morning America kicked off Breast Cancer Awareness Month.

Kristi Funk, MD, noted breast surgeon at Pink Lotus Breast Center, Beverly Hills, CA, demonstrated the SCOUT radar technology to the program's estimated 4.2 million viewers, highlighting key patient benefits to a wire-free solution for breast tumor and lymph node localization including better outcomes with reduced re-excision rates, improved cosmetic results and a better overall patient experience.



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