

Time is Money: Improving the Cost and Efficiency of Breast Cancer Care Using Radar Localization

By Mary K. Hayes, MD

Reducing healthcare costs and driving positive patient outcomes are increasingly becoming key mandates throughout the U.S. medical and hospital communities.

Healthcare utilization and costs are critical factors that impact patient care and must be considered when seeking strategies for making optimal care accessible to all patients. While there are many challenges to simultaneously holding down healthcare costs and providing optimal care, innovative technologies are enabling novel solutions to this increasingly important objective. A recent clinical study conducted at Memorial Healthcare System (MHS) in Hollywood, FL demonstrates how a new, radar-based technology for preoperative localization of nonpalpable breast lesions can help to reduce the cost of care while providing outcomes that meet the needs of healthcare providers and their patients.

Breast-conserving surgery in the treatment of early-stage breast cancer

Breast-conserving surgery is an effective and commonly used method to treat early stage breast cancer. The goal of breast-conserving surgery is to carefully remove the tumor, and

target tissue and minimize the need for resection of healthy breast tissue. The treatment goals for breast-conserving surgery focus on minimizing adverse surgical outcomes, such as the need for secondary excision procedures if tumor tissue remains following the first surgery, and improving cosmetic outcomes for patients. Successful breast-conserving treatment programs require multi-disciplinary communication and planning among surgeons, radiologists and other specialists.

Preoperative localization of non-palpable breast cancer lesions is essential for effective breast-conserving surgery

Improved breast cancer screening technologies are enabling the identification of earlier-stage disease and smaller lesions. These smaller lesions may be difficult for the surgeon to locate during excision surgery, increasing the need for effective localization methods that can ensure complete excision of tumor tissue while preserving as much healthy tissue as possible. For more than 30 years, pre-operative image-guided wire localization (WL) has been a standard of care to assist surgical excision of non-palpable breast cancer lesions, but the technology landscape is evolving,

and several approaches are now available.

With WL, a needle is inserted into the area of abnormal tissue in the breast, and a small wire is threaded through the needle and taped in place on the outside of the patient's breast. Accurate placement of the needle and wire is checked by mammogram after the localization procedure. The surgeon then uses the wire to locate and remove the abnormal lesion during the excision procedure. Because the wire protrudes out of the breast, there is the potential for it to move out of position between the localization and surgery, which could make it difficult for the surgeon to accurately locate the tumor and increases the chance that additional surgery may be needed. A WL is performed the same day as the breast surgery, which requires close coordination of the radiology and surgery schedules. Logistical problems in either department, such as surgical emergencies related to other cases, delays in the radiology suite, or migration of the wire as the patient is transported from radiology to the operating room (OR), can cause delays in the start time of breast surgeries. In some cases, these delays may result in cancellation of the surgery. Due to these challenges, alternative approaches to WL that uncouple the radiology

and surgery schedules could help to decrease the logistical complexity of localization and excision procedures while improving patient comfort.

Radioactive seed localization (RSL) has also shown promise in preoperative localization of non-palpable breast tumor lesions. In contrast to WL procedures, the radioactive seed can be placed up to five days prior to surgery. This affords an opportunity to uncouple the localization schedule from the surgery schedule for increased convenience and efficiencies. However, RSL creates challenges due to strict state and federal regulations associated with handling radioactive materials.

Radar-based localization is a recent addition to the portfolio of localization approaches. In 2015, the U.S. Food and Drug Administration approved SAVI SCOUT (SCOUT), a radar-based localization technology that offers a wire-free and nonradioactive alternative to WL and RSL. In a 2016 clinical study, radiologists reported a better patient experience with SCOUT compared with WL and surgeons rated their SCOUT experience as better than WL due to ease of localization and lesion excision.⁽¹⁾ Additionally, 93 percent of patients in the study indicated that they would recommend SCOUT to other patients.

Features of the SCOUT radar localization system

The SCOUT wire-free, radar localization system allows radiologists to implant the SCOUT device (known as a reflector), which is about the size of a grain of rice, into the breast under imaging guidance up to 30 days prior to surgery. The surgeon then scans the breast using a magic marker-sized SCOUT guide that emits a radar signal to locate the reflector. Real-time audible and visual indicators help the surgeon to accurately locate and remove the SCOUT reflector,

along with the target tissue in which it has been placed. The SCOUT reflector can be imaged with magnetic resonance imaging after placement and before surgery. This can help to ensure the accuracy of placement and surgical planning in patients who have chemotherapy prior to surgery in order to shrink the tumor as well as in patients with breast implants.

The ability to place the SCOUT reflector up to 30 days before surgery uncouples the radiology and surgery schedules, enabling greater flexibility in coordinating patient, radiologist and surgeon schedules. This flexibility increases operational efficiency and has the potential to reduce OR start time delays and reduce costs. Any delay in which the OR is not being used as scheduled imposes significant costs on the system. Patients delayed in the radiology department while undergoing WL may arrive late to the OR, delaying OR start times and increasing the overall OR cost for the excision surgery.

The SCOUT system has been used at Memorial Healthcare System (MHS) for two years, and we recently conducted a study to examine OR start time delays in non-palpable breast lesion excision procedures conducted by two breast surgeons from January 1, 2015, to October 1, 2016. The data set included 159 patients who had localization of non-palpable breast lesions (30 WL and 129 SCOUT). The number of minutes of the delayed start time for any cause was recorded, and minutes of delay per patient were compared for pre-operative WL and pre-operative localization with SCOUT.

The results of the study, which were presented this spring at the American Society of Breast Surgeons 18th Annual Meeting, show that SCOUT significantly reduces average OR start time delays and improves workflow compared with WL (average OR

start delay was 40 minutes for wire and 11 minutes for SCOUT, 95%CI $P < .001$). The 29-minute difference was statistically significant (95%CI $P < .001$) and reflects a 72.5 percent decrease in delay time at one busy trauma/transplant hospital.

While OR costs may vary by geography, these data are significant because OR delays can be costly. For example, in the eastern United States, the basic OR set-up fee is \$3,000 with an additional \$80 per minute charge throughout the operation. It is estimated that this 29-minute reduction of unproductive OR waiting time seen with SCOUT could result in savings of nearly \$2,000 per procedure. There were no same day cancellations attributed to SCOUT localization in our study, which could also provide significant cost benefits by eliminating unnecessary OR set-up fees.

Reducing delays in OR start times may also have benefits beyond per-procedure cost savings. These include decreasing the stress and anxiety that patients and their families experience in conjunction with surgery and enabling more efficient use of existing personnel and infrastructure resources and amortization of overhead fixed costs.

In response to the growing national debate about the need for outcomes-based healthcare, we strive to improve patient comfort, safety and outcomes while reducing cost through improved efficiencies and evidence-based treatment decisions. The availability of multiple options for breast lesion localization, including SCOUT, helps us to achieve this goal.

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