Breast Lesion Localization: Savi Scout

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Introduction on Mammography

- Imaging of the breast
  - Screening and diagnostic exams
- The breast consists of glandular and connective tissue which is shown on the radiographic image
  - Radiographic detail is determined by the amount of fatty tissue within the breast.
  - Post-pubertal adolescent breast (move over)contains more dense tissue.
  - Development of glandular tissue decreases radiographic contrast and creates an opaque image.
- Between puberty and menopause, hormones influence changes in breast tissue
- Breast tissue density is categorized by different types
  - Fatty, heterogeneously dense, and extremely dense

(Long, Rollins, & Smith, 2016)

Non-Palpable Breast Lesions

- Requires preoperative image-guided localization
- First breast lesion localization, 1966, using a bent-wire implanted through a needle under fluoroscopic guidance
  - Needle-wire localization
- Multiple methods to localize non-palpable breast lesions,
  - Wire guided (WL)
  - Radioactive seed (RSL)
  - Savi Scout (SSL)
  - Magnetic seed (MSL)
  - Radiofrequency identification (RFID)
  - Hematoma ultrasound guided (HUG)

(Cheang, Thornton, & Mango, 2018)

What is the Savi Scout ?

- Cleared by the FDA in 2014 from Cianna Medical Inc. and is non-radioactive
- Places a reflector under ultrasound or mammographic guidance at the localized lesion
- Placement can be completed up to 30 days before surgery, maximizing flexibility of the surgeon, radiologist, and patient's schedule
- The signal emits a loud sound and numerical signal
- When the reflector is detected and proximity changes, the sound changes

(Jeffries, Dossett, & Jorns, 2017)

Savi Scout Procedure

- Scout images obtained to localize area of interest
- Once lesion found, measurements taken to correctly place reflector
- Radiologist numbs area, makes incision
- Delivery system is inserted into breast, and reflector released when button pushed, creating a snapping sound.
- Delivery system removed from the breast, and radiologist tests reflector using hand piece.
- After placement confirmation, two post-procedure images are taken to verify reflector location

(Jeffries, Dossett, & Jorns, 2017)

Equipment Used

- Uses a radar reflector activated with an infrared light
  - Reflector is the length of a dime
  - Reflects the radar signal and is detected by a hand piece and console
  - Uses a preloaded 16-gauge needle through a delivery system to insert the reflector
  - Reflector is 12mm in length with a 4mm body and two 4mm antennas, one at each end, that can be inserted under ultrasound or mammographic guidance
  - Placement is chosen based on scout images, and once lesion is located measurements are taken with grid coordinates

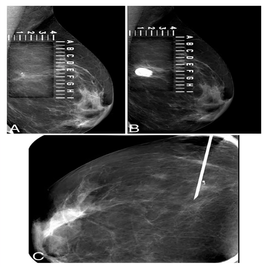
(Jeffries, Dossett, & Jorns, 2017)

Images

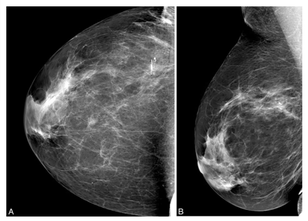
Savi Scout guidance system with console and hand piece

Size and Scale: Savi Scout reflector to a dime

(Kasem, & Mokbel, 2020, p. 3635)



Mammographic guided placement Savi Scout



Savi Scout reflector adjacent to biopsy clip marker

(Jeffries, Dossett, & Jorns, 2017)

Savi Scout vs. Wire Localization

- A study recently conducted compared 42 patients who underwent Savi Scout localization and another 42 patients who underwent wire guided localization
- All had malignant diagnoses
- All were comparable and matched
  - Age
  - Tumor size
  - Invasive cancer rate
  - Receptor status
- No statistical difference
  - Mean tumor volume (15.2 cm^3 in SSL *vs* 16.3 cm^3 in WL)
  - Negative margin rate (92.9% in SSL *vs* 88.1% in WL)
  - Re-excision rate (7.1% in SSL *vs* 9.5% in WL)
- Savi Scout localization is very safe
  - Does not require radiation safety precautions.

(Cheang, Thornton, & Mango, 2018)

Savi Scout: Advantages and Disadvantages

- **Advantages**
  - Non-radioactive, FDA approved
  - Scheduling flexibility
  - Real time distance measurement
  - Determines the ideal incision site and improves cosmesis
  - Skips preoperative localization procedure
  - No radioactive decay over time
- **Disadvantages**
  - Limits repositioning once deployed
  - Repositioning could damage the reflector and cause migration
  - Placement deeper than 6cm can interfere with detection of the reflector
  - Only placed under ultrasound or mammographic guidance
  - Contains nickel which can cause a reaction in patients with an allergy
  - Substantially more expensive than other localization methods including an initial capital purchase and disposable purchase per procedure

(Cheang, Thornton, & Mango, 2018)

Expansion of Localizing Non-Palpable Breast Lesions

- A growing number in different types of techniques, offering an alternative to wire-guided localization over the last five years
- Previously, radioisotope dependent localization techniques never got full acceptance
  - due to issues of handling disposal and accessibility associated with radiation and inoperative ultrasound.
- Three radioisotope free licensed localization devices for use in both Europe and the U.S.
  - Magseed
    - Endomag, Cambridge, UK
  - Radiofrequency detection using a localizer
    - Hologic, Massachusetts, USA
  - Infrared detection using Savi Scout
    - Cianna Medical, Aliso Viejo, CA
- The change and shift in switching technologies is difficult for healthcare providers,
- Three main companies producing these new techniques
  - Have all demonstrated the feasibility of their products to perform safe localization lesion excisions.
- New methods are a replication of the radioactive methods without the radioactivity
  - Creates an increase in cost of equipment
  - Decrease in time patients spend at a facility

(Ahmed, 2020)

Conclusion

- The Savi Scout localization procedure is a new and safe method used to localize non-palpable breast lesions
- It is more efficient, and has become a more common procedure that many radiologists are performing more often
- Minimally invasive
- FDA approved
- Determines the correct site of incision
- Although it more expensive than other localization methods, it is very beneficial to the patient as it is more of a convenience
- Savi Scout is is becoming more common to diagnose breast lesions

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