

# Review of localization methods for non-palpable breast lesion

YY Man<sup>1</sup>, HL Chan<sup>1</sup>, LC Chan<sup>1</sup>, KF Tam<sup>1</sup>, HL Chau<sup>2</sup>

<sup>1</sup> Department of Radiology, North District Hospital

<sup>2</sup> Department of Imaging and Interventional Radiology, Prince of Wales Hospital



## Objectives

With the advancement of screening and imaging techniques, more and more non-palpable breast lesions including carcinoma, are being diagnosed. It is thus crucial to localize the non-palpable breast lesion for surgical excision. There are different localizing techniques including conventional ones: wire-guided localization (WGL) and radio-occult lesion localization (ROLL); and emerging tissue markers of different principles like magnetic localization, radiofrequency identification (RFID), radar reflector localization and intraoperative ultrasound (USG) markers. Tissue markers could also be used to localize the lesion for pre-operative chemotherapy.

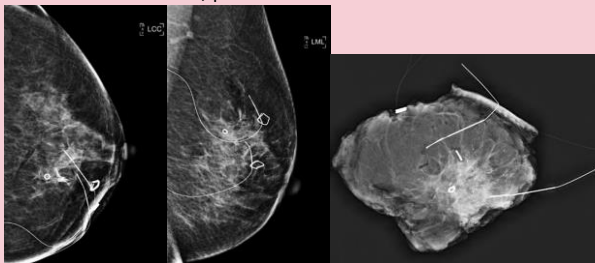
## Materials and Methods

Retrospective review of imaging of localization of non-palpable breast lesions from 1/1/2019 to 31/12/2023 in local centre and literatures.

## Wire-guided localization (WGL)

Gold standard in many countries with longest history

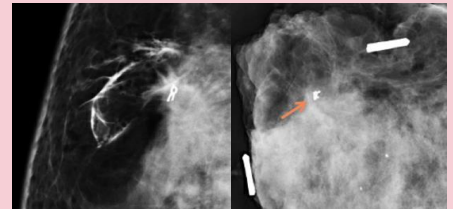
- ✓ Low-cost
- ✗ Wire dislocation, patient discomfort and distress



## Radio-occult lesion localization (ROLL)

Radioactive tracer Technetium-labelled sulphur colloid with subsequent contrast injection and identified intra-operatively by handheld gamma probe

- ✓ MRI compatible, higher surgeon satisfaction
- ✗ Availability of radioactive tracer, radiation exposure and logistic issue

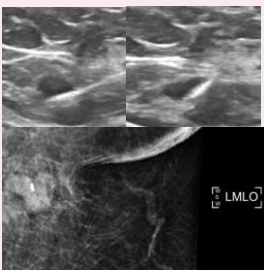


## Tissue markers

### Magnetic marker (e.g. magseed)

Permanent magnet detected intra-operatively by the corresponding magnetic probe

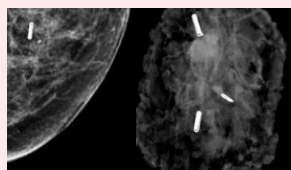
- ✓ No radiation exposure, less marker dislocation and capability to decouple the localization and operation to allow more logistic flexibility
- ✗ Expensive, MRI artifacts, interference if two markers are located less than 2cm



### RFID marker (e.g. LOCALIZER)

Radiofrequency tag identified with corresponding hand-held probe

- ✓ Similar benefits as magnetic markers, real-time distance to the tag in millimeters, unique tag identification number based on each individual tag
- ✗ Expensive, MRI artifacts (if post-chemotherapy MRI assessment is required)

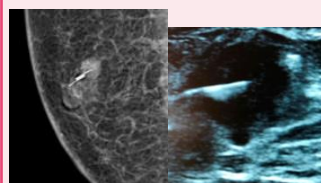


(images from reference 1)

### Radar reflector marker (e.g. SAVI SCOUT)

Micro-impulse radar technology: activated by infrared light impulses generated by the console probe and uses two antennas to reflect an electromagnetic wave signal back to the handpiece.

- ✓ Similar benefits as magnetic markers
- ✗ Expensive, MRI artifacts (if post-chemotherapy MRI assessment is required)

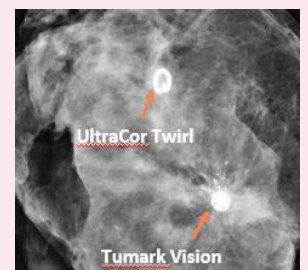
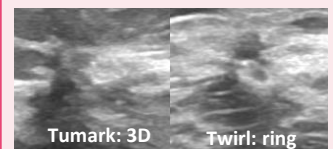


(images from reference 1)

### Intraoperative USG marker (e.g. Tumark Vision, UltraCor Twirl)

Designed to be better visualized on ultrasound intra-operatively

- ✓ Similar benefits as magnetic markers, cheaper
- ✗ Only for lesions which are visible on USG, operator-dependent



## Conclusion

There are different techniques for localization of non-palpable breast lesions with their pros and cons.

## Reference

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