Early Experience in MagSeed:

An Emerging Tool for Breast Lesion Localization

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BACKGROUND

MagSeed, a tool for breast lesion localization using magnetic field, has recently been invented. MagSeed is induced to become a magnet when under the influence of the detector, hence becomes localizable.

The advantages of MagSeed over radioisotope and hookwire is the absence of radioactivity or wire that require special care and limit localization-operation interval.

However, there are limited literatures concerning its performance in breast lesion localization.[1, 2]

AIM

To review the performance of breast lesion localization using MagSeed in Kwong Wah Hospital.

METHODS

Retrospective review in single center.

All patients with breast lesion localized using MagSeed from September 2018 to July 2019 were included.
Localization procedures, complications and localization-operation interval were reviewed via electronic patient records.

Images during localization procedure and specimen images were reviewed in PACS. Measurements were performed in consensus by 2 breast radiologists with 1 and 5 years' experience:

- Minimal distance between MagSeed and target in post-placement image. Technical success was defined as distance <1cm.

- Displacement of MagSeed relative to target during localization-operation interval = the difference between distances from midpoint of MagSeed to target center, in post-placement and specimen images.

RESULTS

9 patients with 10 lesions were included.

USG Guidance

5 masses in 4 patients with mean lesion size of 1.02 ± 0.29cm and mean lesion depth of 1.12 ± 0.18cm.
Technical success was achieved in all cases (100%). (Fig. 1)
All lesions were resected on the day of localization. MagSeed was dislodged from the specimen during handling in operating room for 1 lesion that was then excluded from displacement analysis.
Mean MagSeed displacement during localization-operation interval was 2.2mm(1.1 - 4.2mm).
In 1 patient, 2 lesions (2.1cm apart) were each localized with 1 MagSeed, and were successfully resected in a single specimen.

Stereotactic Guidance

5 groups of microcalcifications in 5 patients with mean target span of 1.04 ± 0.63cm and mean lesion depth of 1.60 ± 1.23cm.
Technical success was achieved in 4 cases (80.0%). MagSeed was placed 1.6cm from the target in 1 case, due to accordion effect during release of compression, requiring additional hookwire localization. (Fig. 2 and 3)

3 lesions were resected on the day of localization. 2 were resected 4 and 7 days later, with MagSeed displacement during localization-operation interval of 0.1mm and 2.7mm respectively. Overall mean MagSeed displacement was 1.6mm (0.1 - 4.4mm).

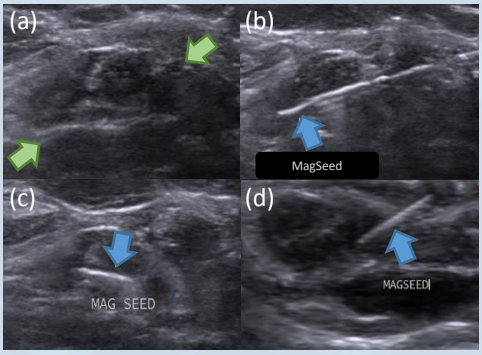

Fig. 1 USG guided MagSeed localization of a breast mass. (a) Target lesion (green arrows). (b) Needle tip within lesion with MagSeed (blue arrows) being deployed. (c) Post-procedural USG confirmed MagSeed within lesion. (d) Specimen USG showing minimal displacement of MagSeed relative to the target.

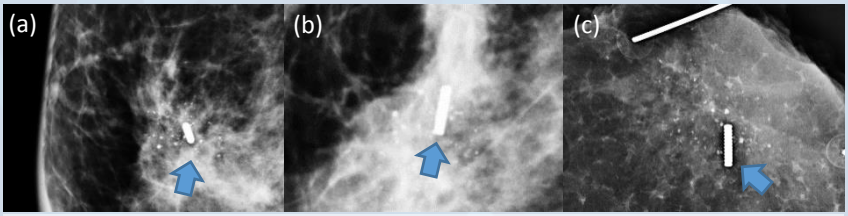

Fig. 2 Stereotactic guided MagSeed localization of microcalcifications. (a) and (b): Post-procedural MLO and CC views (cropped) showing MagSeed (blue arrows) within the target. (c) Specimen MMG showing removal of both MagSeed and the target without significant displacement.

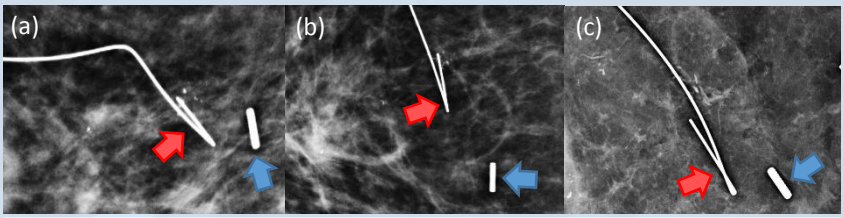

Fig. 3 Stereotactic guided MagSeed localization of microcalcifications. (a) and (b): Post-procedural MLO and CC views (cropped) showing MagSeed (blue arrows) located 1.6cm from the target due to accordion effect. Additional hookwire localization was deployed (red arrows). (c) Specimen MMG showing removal of both MagSeed, hookwire and the target.

There was no documented complication in all cases.

CONCLUSION

MagSeed is a non-radioactive, wireless alternative for breast lesion localization, which allows decoupling of radiological and surgical schedules. However, accordion effect is a drawback for stereotactic guided placement.

REFERENCES

1. ER Price, AL Khoury, LJ Esserman, et al. Initial Clinical Experience With an Inducible Magnetic Seed System for Preoperative Breast Lesion Localization. *AJR* 2018;210:W1-5
2. LR Lamb, M Bahl, MC Specht, et al. Evaluation of a Nonradioactive Magnetic Marker Wireless Localization Program. *AJR* 2018;211:1-6