

Effect of Image Guidance Modality on Accuracy of Breast Biopsy Marker Placement after 11 Gauge (G) Directional Vacuum Assisted Biopsy (DVAB): Multi-Site Study

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Purpose: To evaluate the placement accuracy of two breast biopsy markers following stereotactic and US-guided 11 gauge DVAB procedures.

Methods and Materials: Three sites retrospectively identified a cohort of patients who met the following criteria: marker placement after 11 G DVAB; accurate reporting of procedural details; and comparable pre and post biopsy mammographic views documenting the lesion and marker position. Of 267 patients meeting these criteria, 133 received the Gel Mark marker (SenoRx, Aliso Viejo, CA) between June 2001 and February 2002 and 132 received the MicroMark marker (Ethicon Endo-Surgery, Cincinnati, OH) between October 2000 and March 2002. The Gel Mark delivers 11 US visible bioresorbable pellets, with a stainless steel wireform embedded in the center pellet. The MicroMark is a stainless steel marker, which mechanically clips to the cavity wall. One radiologist at each site used a film mask technique to mark the lesion center and the metal marker onto one set of CC and lateral (or MLO) masks. The distance of the marker from the lesion center was measured in the long axis of the biopsy cavity along the sample notch (z-axis).

Results: For all cases, the average z-axis distance from the marker to the lesion center was 6.5 mm for the Gel Mark and 7.8 mm for the MicroMark markers. When cases were analyzed separately by imaging guidance method, larger differences in placement accuracy of the markers were noted between the two modalities. Using US guidance, the distances in the long axis were 3.8 vs. 9.7 mm for the Gel Mark and the MicroMark, respectively. Using stereotactic guidance, the distances in the long axis were 7.1 and 7.3 mm for the Gel Mark and MicroMark, respectively.

Conclusions: The position of the breast during US and stereotactic biopsy is quite different. These positioning differences and the mechanism of deployment both contribute to the placement accuracy of biopsy markers. For stereotactic biopsies, sampling under compression results in elongation of the biopsy cavity ("accordion effect") which contributes to marker displacement. By using US for guidance, the operator can perform the biopsy in a more anatomic position and eliminate the exaggeration of the long axis of the biopsy cavity caused by compression. Further, more accurate placement can be achieved by using a marker which distributes the wireform within the cavity rather than attaching to the cavity wall.