

## Breast Biopsy with Mammotome® MR System

### Clinical Situation

The patient is 65-years old and presents with a vaguely palpable mass in her left breast. The breast exam is extremely difficult due to marked fibrocystic changes.

### Findings

Mammography demonstrated only marked breast density without focal abnormality. The patient was referred directly for breast MRI. The breast MRI was reviewed with the assistance of the DynaCAD™ (Invivo Corporation). MRI demonstrated a suspicious enhancing mass in the left breast laterally (*Figure 1*). The mass was lobulated in its morphologic appearance, and it demonstrated heterogeneous rim enhancement. The kinetics pattern was suspicious, as it demonstrated areas of marked early wash-in and wash-out [BIRADS 5] (*Figure 2*). Due to the difficult physical exam, the referring surgeon requested MRI biopsy to assure sampling of the appropriate imaged abnormality.

### Procedure

The Mammotome® MR device was used to biopsy the lesion with the Invivo (Invivo Corporation) BBC 7-channel breast coil. The patient was positioned prone with lateral access. The pedestal and fiducial were positioned so they would be close to the expected position of the lesion. The original X and Y of the pedestal are noted on the supplied worksheet.

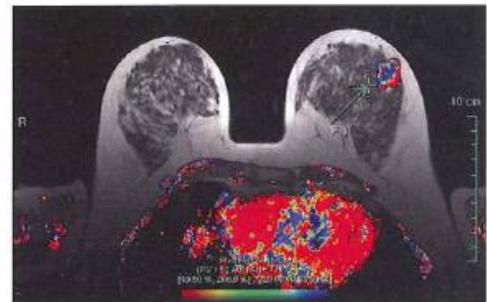
Localization of the lesion was performed by obtaining T1W images pre- and post-gadolinium enhancement in the sagittal and axial planes. Image subtraction was performed for improved lesion identification. The fiducial was localized on the skin in the axial plane pre-contrast, and its X, Y and Z coordinates were determined (*Figure 3*). The lesion was then identified and targeted, and its X, Y and Z were determined. The difference (or delta) between the two values was determined manually with the use of a calculator. Then, the X, Y and Z were aligned on the pedestal and Z stop of the targeting set. It was noted that the probe would strike the vertical bar on the compression plate, so the X was adjusted several millimeters to avoid it.

By pressing the fiducial on the skin, an impression was made on the skin surface. Local anesthesia was given. A small skin incision was made with an MR-safe blade. The targeting set was advanced through the skin incision to the Z depth.

Imaging was repeated in the sagittal and axial planes, confirming good positioning of the bowl within the enhancing mass (*Figure 4*). Multiple specimens were obtained after the Mammotome® MR probe was positioned on the cradle. They were easily retrieved at the collection chamber of the probe. Ten specimens were obtained at various locations.



*Figure 1* Enhancing Left Breast Mass.



*Figure 2* Wash-In and Wash-Out Color Encoding.



*Figure 3* Fiducial Image at Skin.



*Figure 4* Probe Documented in Lesion.

Repeat T1W images were again obtained in the sagittal and axial planes to confirm adequate biopsy viewed as a biopsy cavity (*Figure 5*). A tissue marker was then deployed through the targeting set.

### Pathology

Infiltrating carcinoma with mucinous features, grade 1.

### Discussion

The first Mammotome® MR biopsy was performed successfully. This was assured, as a large lesion was chosen purposely for the first case. With any new procedure, you should expect the unexpected and limit the challenges you face. As targeting manually is a new process, a larger lesion will allow for unexpected error in calculation or probe placement. As confidence in performing the procedure is gained, more challenging lesions can be attempted.

On our post-procedure mammogram, we found the tissue marker had not deployed. This could have been disastrous had the lesion not been large and palpable.

During this case, we found the act of adjusting the X to avoid hitting the vertical rail of the compression plate did not interfere with successful biopsy. The strength of the Mammotome® MR vacuum should be able to draw the appropriate tissue into the biopsy aperture for adequate sampling.

Finally, becoming accustomed to performing manual calculation to determine the X, Y and Z values of the lesion is invaluable in an MR biopsy program. Even if a CAD system is utilized, sometimes it may not be available for use, and by knowing the thought process for targeting successfully, one may provide each patient a successful and accurate procedure.

### Courtesy

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*Figure 5* Biopsy Cavity Documented