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Breast MRI is increasingly being used to aid in the diagnosis and staging of breast lesions, due to its ability to help detect additional lesions that are not visualized on the mammogram. For MR-guided breast biopsy the Panorama High Field Open system offers advantages over closed-bore MR systems.

Maurice van den Bosch, MD, PhD, is an interventional radiologist at University Medical Center Utrecht (UMC Utrecht, Utrecht, The Netherlands). He is performing breast biopsies with very good results using the Panorama HFO, along with the 4-channel ST SENSE Breast coil, the matching biopsy kit and DynaCAD software for lesion targeting.

Openness facilitates time efficient biopsy process

With the patient prone on the ST SENSE Breast coil, this solution for breast biopsy stabilizes the breast with both medial and lateral compression plates, and allows confident placement of the biopsy needle via a localization grid. Using the DynaCAD digital workstation after an initial MR scan to calculate the entry point and distance to the target lesion, as well as real-time MR imaging, Dr. van den Bosch says MR-guided biopsy is quick and efficient.

“The openness of the Panorama offers us direct access to the patient,” says Dr. van den Bosch. “While in the room, next to the patient, the guiding needle is advanced. We then take a quick scan to verify that the guiding needle is, indeed, in front of the target. If the correct needle position is verified in two directions, we immediately take the large-core needle biopsy. We don’t have to take the patient in and out of the magnet, and we don’t have to walk in and out of the room.”

Dr. van den Bosch appreciates the time savings enabled by the Panorama system. Most biopsy procedures take about 30 minutes in entirety using the Panorama, he says. “We don’t have to move the patient in and out of the scanner at any time. That’s the major difference between the Panorama and closed-bore systems.”

Dr. van den Bosch can switch to a freehand technique for the initial needle guidance, if he so desires. “By using the grid localizer, I can anesthetize the breast skin entry point and make a small incision,
and then advance the biopsy needle directly, without a guiding needle. In a conventional closed MR system, the patient has to be moved in and out of the scanner to accomplish this. But using the Panorama, I can advance the biopsy needle, see it approach the target lesion, and then perform the biopsy very efficiently and accurately. We can also do a control scan after taking the biopsy, which confirms in two dimensions that the needle has targeted the tumor. That was not possible previously.”

**Pre-clinical imaging further speeds the biopsy process**

Dr. van den Bosch optimizes the image sequences for good fat suppression, especially for lesions that are imaged with a T1-weighted fat-suppressed dynamic sequence.

“We instead of planning the patient directly for breast biopsy on the Panorama, we see the patient first for a pre-clinical visit, to perform diagnostic imaging on the Panorama, to confirm that the breast lesion can be visualized. We do this diagnostic imaging with the breast hanging free in the breast coil, and then we do it with the compression plate to make sure that the lesion is also identified with the breast compressed (since compression results in changed anatomic landmarks, and may influence the appearance of smaller lesions). When we have an optimal image of the breast, with the tumor localized, we schedule the biopsy for three days later. With our team ready to go on that day, we position the patient, scan and use DynaCAD for calculation of the needle trajectory, do image sequences of six to nine seconds while advancing the needle, then perform the actual biopsy and that’s it.”

With pre-clinical imaging, Dr. van den Bosch knows exactly which sequence to use, saving time and improving workflow during the actual biopsy. It also reserves the time on the Panorama for patients who might be claustrophobic, or too large to fit inside a closed-bore system.
Biopsy of invasive ductal carcinoma

Patient with an irregular mass in the left breast classified as a BIRADS IV lesion. The 5 mm lesion is not visible with mammography or ultrasound. The left breast is compressed with the localization grid. The guiding needle is advanced towards the small lesion, and when needle position is confirmed just in front of the lesion the biopsy is taken. The image on the right shows the 14G biopsy needle advanced through the target lesion. Left is the DynaCAD screen of this biopsy.

Panorama is a multi-functional interventional MR system

About 25 biopsies, most of them large-core needle biopsies, have already been performed at UMC Utrecht. Because of Panorama’s open, patient-friendly aperture and ease of use for MR-guided biopsies, a large percentage of Dr. van den Bosch’s patients are very good candidates for this type of procedure.

Dr. van den Bosch adds, “Other interventions can easily be performed in the Panorama HFO, and we do have a dedicated interventional staff for the Panorama. We want to get the breast program running first, so we’ve decided to focus our interventional Panorama HFO work on breast biopsy for the time being. But other interventions are clearly possible using the Panorama.”

Biopsy of invasive ductal carcinoma

Patient with a spiculated mass in the right breast classified as a BIRADS V lesion. The 8 mm lesion is not visible with mammography or ultrasound. Since the lesion is located very posterior in the breast, not the grid, but the freehand biopsy technique is used to target the lesion. The breast is not compressed, and imaged with the patient prone in the ST SENSE Breast coil. The biopsy needle is advanced in an angle directly towards the mass, and biopsy is taken.

“Using the Panorama, I can advance the biopsy needle, see it approach the target lesion, and then perform the biopsy.”