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Preoperative MRI Imaging Not Helpful in Reducing Positive Margins and Re-Operations in Lumpectomy Patients

New Study Finds MRI Not a Tool for Evaluating the Extent of Disease

Abstract: Does Preoperative MRI Reduce Positive Margins After Breast Conserving Surgery?

Columbia, MD, April 27, 2023—Preoperative MRI imaging of lumpectomy patients was not associated with a reduction in positive margins at the tumor site or in the need to re-operate to help ensure complete tumor excision, according to a study presented this week at the American Society of Breast Surgeons Annual Meeting in Boston. Authors note that this research is important because many surgeons routinely order these exams prior to surgery presumably believing that the images will help more precisely visualize the extent of a patient’s tumor than intraoperative imaging or the surgeon’s assessment.

“MRI exams are costly and potentially stressful for patients,” comments senior study author Marissa Howard-McNatt, MD, FACS, FSSO, Professor of Surgery, Director Breast Care Center, Wake Forest Baptist Health. “The thought is that they will help physicians achieve negative margins during the initial surgery. However, our study shows this is simply not the case.”

Dr. Howard-McNatt explains that a successful lumpectomy procedure calls for excision of a cancerous tumor surrounded by a rim of healthy tissue to minimize residual disease. If post-surgical pathology reports find cancerous cells in the tumor margins, women return to the operating room for another procedure to remove additional tissue to clear the margin.

“Reoperation can be traumatic, and researchers continue to look for better ways to assess margin status while the patient is still on the operating table,” she says. “However, our study found that pre-surgical planning based on MRI images is not useful to achieve this goal and not a productive use of healthcare resources,” she says.

To determine whether MRI was associated with a lower rate of positive margins, the study analyzed data from two prior randomized trials that evaluated tumor cavity-shaved margins. Researchers looked at data collected at the time of surgery prior to any additional cavity shaving and after surgery to evaluate the final pathologic results.

The study involved 631 patients with a median tumor measurement of 1.3 cm. Of these, 165 had palpable tumors, 7% had invasive lobular histology, 32.8% had an extensive intraductal component and 6.5% had been treated with neoadjuvant chemotherapy. An MRI had been performed in 193 women, with 31.1% later found to have positive margins. Of patients who did not receive an MRI, 38.8% had positive margins. However, the difference did not achieve statistical significance. “In our study, MRI imaging was in no way associated with clear tumor margins,” says Dr. Howard-McNatt.

“Perhaps surprisingly, we did find that tumor size was predictive of margin status,” she adds. “However, this may be attributable to an inaccurate initial assessment of the extent of the actual tumor size for a variety of reasons,” she explains. “For example, tumors may be discontinuous or have satellite lesions which may touch the edge of a specimen.”

Dr. McNatt points out that MRI is a valuable tool in many other preoperative breast cancer applications, including evaluation of patients with lobular breast cancer, known genetic mutations and extremely dense breasts. Tumor cavity shaving – removing additional tissue around the initial tumor cavity during a first operation – often has been shown to be extremely effective in eliminating a second surgery.

“No one wants to take a patient back to the operating room,” Dr. McNatt comments. “Advances in surgical techniques and technology, including new imaging modalities such as contrast-enhanced mammography, may prove successful in adding precision to breast cancer surgery.”

Does Preoperative MRI Reduce Positive Margins After Breast Conserving Surgery?

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Background/Objective

Breast conserving surgery (BCS) is important in the management of breast cancer. Obtaining negative margins is critical. Some clinicians utilize MRI to reduce positive margins and evaluate extent of disease. We sought to determine whether patients who had an MRI were less likely to have positive margins than those who did not.

Methods

Data from two randomized controlled trials from 10 centers evaluating cavity-shaved margins were combined. We evaluated whether a preoperative MRI was associated with a reduced rate of positive margins at the time of surgery before the randomization for cavity shave margins.

Results

631 patients participated in the trials. Median age was 64 with a median tumor size of 1.3 cm. 165 patients had palpable tumors, 7% had invasive lobular histology, 32.8% had an extensive intraductal component (EIC), and 6.5% had neoadjuvant chemotherapy. An MRI was performed in 193. Those who had an MRI were less likely to have a positive margin (31.1% vs. 38.8%), although this did not reach statistical significance ($p=0.073$). On multivariate analysis, controlling for patient age, race, neoadjuvant chemotherapy, EIC, histologic subtype, and tumor size, MRI was not associated with a higher rate of negative margins ($p=0.110$). Rather, patient age ($p=0.032$) and tumor size ($p=0.040$) were predictive of margin status. MRI use was associated with younger patients (median 63 vs. 66 years) and smaller tumors (median 2.0 vs. 2.1 cm).

Conclusions

Preoperative use of MRI does not affect margin status; rather, patient age and tumor size are key in predicting margin status.