

between established risk factors and breast cancer risk. These findings are important given the size, prospective design, and comprehensive approach of our study.

Friday, 23 March 2012

10:30–11:30

PROFFERED PAPER

Imaging

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Proffered paper oral

3-Tesla MRI is More Efficient for the Evaluation of Tumor Extent of Breast Cancer: a Comparative Study with Conventional 1.5-Tesla MRI

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Background: High quality of space and temporal resolution is demanded from the diagnosis for intraductal spreading area of breast cancer. In our hospital, from April 2007, 3-Tesla (T) MRI was transduced and high resolution dynamic studies for bilateral mammary have been performed. However, superiority of 3-T MRI to 1.5-T MRI remains almost unproven in the evaluation of intraductal spreading area of breast cancer.

Objective: Our goal is to determine the accuracy of 3-T MRI in the evaluation of breast cancer tumor extent, compared with conventional 1.5-T MRI, by reviewing pre-operative MRI report and pathological diagnosis of resected specimen.

Methods: We assessed 342 patients with primary breast cancer who underwent the 3-T or 1.5-T breast MRI as pre-operative examination between April, 2007 and March, 2011. Concerning the diagnosis of intraductal spreading area of breast cancer, we weighed 3-T MRI against conventional 1.5-T MRI. Using 1.5-T or 3-T MRI (Achieva, Philips), we injected contrast medium and photographed five aspects before injection and after injection for every 90 seconds. We obtained fat-sat T1-weighted magnetic resonance image (T1WI), multi-planar reconstruction (MPR) image and standard maximum intensity projection (MIP) image based on T1WI by coronal section, and furthermore slab MIP image with Aquarius net, and we evaluated the enhanced area.

Results: 138 cases were examined with 1.5-T MRI, and 204 cases with 3-T MRI. In 1.5-T group, 40 cases (30%) were underestimated, additional resection were required intra-operatively with cancer-cells positive surgical margin in 18 cases (13%), and surgical margin was positive with carcinoma cells by final pathological findings in 12 cases (9%). In two patients we were forced to changes from breast-conserving surgery to mastectomy, and two cases underwent reoperation (mastectomy) with the diagnosis of widely positive surgical margin. In comparison with 1.5-T MRI group, 28 cases (14%) were underestimated in 3-T MRI group, intraoperative addition resection in 12 cases (6%), and surgical margin positive by the final pathological findings in 18 cases (9%), respectively.

Conclusion: The concern to enhance an artifact is known on 3-T MRI because it has high resolution. However, it may be more efficient rather than 1.5-T MRI to evaluate the intraductal spreading area of breast cancer and to determine the appropriate extent of surgical resection.

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Proffered paper oral

Analysis of the Impact of Intraoperative Margin Assessment with Adjunctive Use of MARGINPROBE® Vs. Standard of Care on Margin Status with Different Definitions of Positive Margin Depth, Results From a Randomized Prospective Multi Center Study

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Background: The current practice of breast conserving surgery (BCS) involves intraoperative margin assessment according to the surgeon's gross assessment and judgment. This intraoperative assessment has been associated with a 20% to 40% reoperation rate to assure negative margins. MarginProbe (Dune Medical Devices, Framingham, MA) was developed to provide real-time assessment of lumpectomy specimens to evaluate for the presence of disease at the surgical margins. A 21-center international pivotal study was conducted to determine if adjunctive use of MarginProbe can enable surgeons to identify positive margins intraoperatively, resulting in fewer patients who are candidates for re-excision procedures. Results for a 1 mm definition of positive margins have been reported previously. We sought to understand the benefit of device use at alternative thresholds.

Methods: 664 women with non-palpable lesions undergoing lumpectomy for DCIS and invasive cancer were enrolled and 596 randomized (1:1) in the

operating room following standard of care (SOC) lumpectomy. In the device arm, MarginProbe was used to assess all surfaces of the lumpectomy specimen and positive readings required additional resections. The device was not used on additional resections. All specimens were examined to verify excision of the target lesion intraoperatively. Pathologists were blinded to study arm. Additional surgeries to re-excite involved margins were performed per each individual site criteria. Patients were followed for 2 months following surgery; additional procedures were documented. Distance from tumor to each margin face was recorded for each patient.

Results: Following lumpectomy, the number of patients having positive margins due to failed intraoperative assessment was significantly reduced in the device arm at each potential definition of positive margins (see Table 1).

Conclusions: It has been shown previously that adjunctive use of MarginProbe significantly reduced the number of candidates for re-excision at a 1 mm definition of positive margins. Based on this analysis, surgeons can expect a substantial reduction in the number of patients with positive margins at definitions from tumor on ink to 5 mm.

Table 1. Patients with positive margins after 1st surgery

Depth	Device (%), N = 298	Control (%), N = 298	p-value
0 mm	6.4	13.4	0.0057
1 mm	15.4	38.3	<0.0001
2 mm	22.5	49.7	<0.0001
3 mm	30.9	57.0	<0.0001
4 mm	36.6	61.7	<0.0001
5 mm	39.9	66.4	<0.0001

*Excludes positive margins on shavings, as device was only used on the main specimen.

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Proffered paper oral

The Impact of Preoperative Real-Time Virtual Sonography (RVS) on Surgical Treatment of Breast Cancer

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Background: We recently have developed a real-time virtual sonography (RVS) system which can synchronize a sonography image and the MRI image with multi-planar reconstruction of the same section in real time. The aim of this study was to evaluate the utility of RVS as a diagnostic tool to determine the surgical management of breast cancer.

Material and Methods: In a retrospective study, we reviewed 210 consecutive women who underwent radical surgery for breast cancer at Aichi Medical University Hospital between 2009 and 2010. On the basis of mammographic findings and sonographic findings, 102 women with 103 breasts were identified as candidates for breast-conserving therapy (BCT) and underwent contrast-enhanced MRI if not contraindicated. MRI images were obtained with the patient lying supine by the use of flexible body surface coil. Of the breast in which the additional lesion was detected by MRI, we determined the extent of resection after we re-assessed the lesion with RVS system and confirmed the histological diagnosis of them by RVS-guided needle biopsy if necessary. Comparing pathological findings on the excised specimens with preoperative imaging findings, we examined the accuracy of the extent of resection which was determined by using RVS.

Results: Of 99 women with 100 breasts who underwent MRI, in 30 breasts, additional lesions were detected by both MRI and RVS. In 2 breasts of them, additional lesions were diagnosed as benign by RVS-guided needle biopsy. In the remaining of 28 breasts, we broadened the extent of resection based on the RVS finding. In 9 breasts of them which were treated by mastectomy, the wide extent of ductal carcinoma in situ (DCIS) was confirmed pathologically. From specimens of 19 breasts treated by BCT with wider margins than anticipated, the additional lesions were diagnosed as the wide extent of DCIS, multicentric breast cancer and sclerosing adenosis in 16, 2 and 1 respectively. In 20 of the 28 breasts, complete resection was achieved. In a total of 94 breasts treated by BCT, the rates of incomplete resection of non-invasive disease and invasive disease were 19% and 3%.

Conclusions: The use of RVS made it possible for us to project MRI information onto a body surface and to determine the extent of resection more precisely and easily. Our results suggest that using preoperative RVS in combination with conventional imaging modality can reduce the rate of incomplete resection of invasive diseases after BCT for breast cancers.