the medical records of all early-stage breast cancer patients who had a breast MRI, MG/US, and surgical pathology data at our institution between 6/2005 and 12/2006. Any suspicious lesions identified on MRI were further evaluated by a targeted US ± biopsy.

Results: We identified 260 patients who met eligibility criteria for NSABP B-39 by MG/US, physical exam, and surgical pathology. The median age was 56 years (range 28 to 86 years). DCIS was present in 64 patients, and invasive breast cancer was found in 196 patients, of which 165 were pT1, 31 were pT2, and 39 were pN1. By pathologic stage, 64 were stage 0, 139 were stage I, 44 were stage IIA, and 13 were stage IIB. By invasive histology, 156 were ductal, 17 were lobular, and 22 were mixed/other. MRI identified suspicious lesions in the ipsilateral breast in 28 patients (11%), and in the contralateral breast in 15 patients (6%). Biopsy-proven multifocal (MF) disease was found in 3 (1.2%), multicentric (MC) in 9 (3.5%), and contralateral (CL) in 4 (1.5%). MRI findings altered the surgical management plan in 15 patients (6%). The sensitivity of MRI in finding MF/MC disease was 85%, the specificity was 87%, the positive predictive value was 26%, and the negative predictive value was 99%. The overall accuracy of MRI was 87% (95% CI 83–91%).

Conclusions: Breast MRI can identify mammographically occult MF/MC disease and contralateral breast cancers in early breast cancer patients who would otherwise be candidates for PBI. A pending multivariate analysis of patient and tumor-related factors will be performed to further identify patients in whom MRI should be routinely conducted before consideration of PBI.

Author Disclosure: R.D. Tendulkar, None; L. Rybicki, None; A. Rim, None; M. Chellman-Jeffers, None; R. Macklis, None; B.B. Obi, None.

42 Accelerated Partial Breast Irradiation With Multi-Catheter Brachytherapy: Local Control, Side Effects and Cosmetic Outcome for 274 Patients. Results of the German-Austrian Multi-centre Trial

O. J. Ott[1], G. Hildebrandt[2], R. Pötter[3], J. Hammer[4], M. Lotter[1], A. Resch[3], R. Sauer[1], V. Strnad[1]

[1]University Hospital Erlangen, Erlangen, Germany, [2]University Hospital Leipzig, Leipzig, Germany, [3]University Hospital AKH Vienna, Vienna, Austria, [4]Hospital Barmherzige Schwestern, Linz, Austria

Purpose/Objective(s): To evaluate the safety and effectiveness of accelerated partial breast irradiation (APBI) with multi-catheter brachytherapy.

Materials/Methods: Between 11/2000 and 04/2005, 274 patients participated. Patients were eligible for APBI if they had histologically confirmed breast cancer, a tumour diameter ≤3 cm, complete resection with clear margins ≥2 mm, negative axillary lymph nodes or singular nodal micrometastasis, no distant metastases, hormone receptor-positive tumours, and were ≥35 years. Patients were excluded if mammographically they showed a multicentric invasive growth pattern, poorly differentiated tumours, residual diffuse microcalcifications, extensive intraductal component, or vessel invasion. Median follow-up was 38 months (range; 9–76).

Results: The local control rate was 98.5% (270/274), the 3 year-local-recurrence-free survival probability, 99.6%. Peri-operative complications occurred in 5.5% (15/274): 9 (3.3%) experienced implant infection and 6 (2.2%) hematoma. Acute toxicity (Grade 1/2-radiodermatitis) was seen in 6.6% (18/274). Late side effects ≥ Grade 3 (fibrosis, teleangiectasia) occurred in 1.8% (4/274). Cosmetic results were good/excellent in 94% (253/274).

Conclusions: This analysis underlined the safety and effectiveness of APBI in a carefully selected subgroup with favourable disease characteristics. Of course, longer follow-up and randomised trials are necessary to conclusively assess the potential of APBI.

Author Disclosure: O.J. Ott, None; G. Hildebrandt, None; R. Pötter, None; J. Hammer, None; M. Lotter, None; A. Resch, None; R. Sauer, None; V. Strnad, None.

43 Image Guidance for External Beam Partial Breast Irradiation

S. H. Wahab, H. Zhao, E. Klein, M. Taylor, I. Zoberi, F. Rey, S. Powell

Washington University School of Medicine, St. Louis, MO

Purpose/Objective(s): Patient positioning using laser alignment may provide insufficient accuracy for highly conformal treatments such as partial breast irradiation (PBI). We tested three image guidance methods in patients receiving external beam PBI: 3D video surface mapping, kilovoltage on-board imaging and internal fiducial markers (IFM).

Materials/Methods: The study cohort included patients treated with external beam PBI on an intramural, IRB-approved clinical protocol. Each patient was treated with 9 fractions of 4 Gy over the course of one week. For each treatment, the patients were initially positioned by alignment lasers. The on-board imaging system (OBI, Varian Medical Systems, Palo Alto, CA, USA) was then used to acquire orthogonal images. Projected couch offsets using 2D/2D image matching software were recorded but the couch was not moved. Next, the 3D surface mapping system (AlignRT, Vision RT Ltd, London, UK) was used and the couch was shifted to the final treatment position as specified by automated topographical matching. Verification surface and OBI images were acquired and the recommended couch offsets were recorded but the couch was not further manipulated. Fourteen patients had internal fiducial markers (IFM) placed at the time of surgery. The IFM were identified on orthogonal images of the patient in the final treatment position, and residual setup error against a reference (simulation) image was measured.

Results: Twenty-six patients have been studied, and data from 226 treatment fractions were available for analysis. The average absolute shifts for all fractions, analyzed independently, are listed in Table 1. The average three dimensional isocenter shift from the initial setup position using laser alignment was 8.5 mm with AlignRT and 8.4 mm with OBI. There was a striking discrepancy in the recommended treatment isocenters between the two image guidance systems, with an average isocenter difference of 8.4 mm. Using the IFM as a gold standard for accuracy, the residual setup error was less with the AlignRT system compared to the OBI system. The average isocenter shift needed for IFM alignment was 2.9 mm after setup by AlignRT and 7.5 mm after setup by OBI (p = 1.1E-13).

Conclusions: Laser alignment alone is sub-optimal in positioning patients for external beam PBI. There is significant discordance in setup recommendations between systems using surface topography and systems using skeletal anatomy. Internal fiducial markers are recommended to provide validation of setup accuracy. As confirmed by internal fiducial markers, 3D surface mapping provides patient positioning accuracy within 2 mm in any one dimension.

Author Disclosure: S.H. Wahab, None; H. Zhao, None; E. Klein, None; M. Taylor, None; I. Zoberi, None; F. Rey, None; S. Powell, None.