Purpose: To determine if MRI is suitable for planning of intratumoral radionuclide therapy of prostatic cancer by correlation of MRI imaging parameters to histologic parameters

Methods: All statistical analysis was performed using GraphPad Prism version 5.00 for Windows, GraphPad Software, San Diego California USA, www.graphpad.com. A total of 22 tumors from 10 patients who underwent 3T endorectal MRI and subsequent prostatectomy were investigated retrospectively. Differences in raw T2 signal, T2 signal ratios, apparent diffusion coefficient (ADC), and ADC ratios were tested for significance using one-way ANOVA for normal tissue, index lesions and secondary lesions as a function of specific pathology parameters (percent stroma, percent glandular area, percent cellularity, glandular area, glandular perimeter, stromal width). Bonferroni multiple comparisons test was performed to test differences in index and secondary tumors as a part of ANOVA analysis. Pearsons correlation was performed for each MRI parameter and pathology parameter based on tissue type as well.

Results: Normal tissue MRI parameters were found to be significantly different ($p < .05$) from index and secondary tumors for all pathologic parameters. Index and secondary lesions showed no significant differences from one another ($p < .05$). Significant correlations were seen for normal tissue, index and secondary lesions for T2 signal intensity ratios and raw T2 when looking at glandular area and percent luminal space ($p < .05$, $r > .66$). Other moderate to strong correlations were seen for ADC and secondary lesions ($r < -.58$).

Conclusions: These results show that MRI has he ability to distinguish between index lesions and secondary lesions as well as informing on the tissue microenvironment. A larger, randomized prospective trial should be performed to further test this hypothesis. MRI will play a central role in successfully planning intratumoral radionuclide therapy of prostatic index lesions in the future.