

AbstractID: 1524 Title: MRSI Guided Intraoperative Computer Optimized Dose Escalation for Transperineal Permanent Interstitial Prostate Implantation

To report the dosimetric outcome and acute toxicity profile in patients who underwent permanent interstitial I-125 prostate implantation using intraoperative computer-based treatment-planning with magnetic resonance spectroscopic image (MRSI)-directed dose escalation to intraprostatic tumor deposits. MRSI was obtained preoperatively for 44 patients with clinically localized prostate cancer. The coordinates of abnormal voxels identified on MRSI were transferred and overlaid on the intraoperative ultrasound images. Treatment planning system was used to determine a seed distribution to deliver a dose of 144 Gy to the prostate, 200%-300% of the dose to the MRSI suspect regions, while keeping urethral dose below 120% and rectum dose below 80% of prescription. The median pre-treatment PSA in these patients was 5ng/mL and the median Gleason score was 6.0 (6-7). 82% of patients were categorized as having favorable risk 18% of patients were categorized as having intermediate risk disease. The median follow-up in these patients was 28 months. Based on the post-implantation CT-based dosimetric evaluation, the median V100, V150, D90 were 99.8%, 70% and 180 Gy respectively. The MRSI-identified abnormal voxels received a mean dose of 343 Gy (182-680 Gy). Despite dose escalation achieved for the MRSI positive voxels, the urethral and rectal doses were maintained within tolerance ranges. The median average rectal and urethral doses were 49% and 130% of the prescription dose. MRSI-directed dose escalation for I-125 permanent prostate implants is feasible. Longer follow-up will be necessary to ascertain whether this form of dose escalation will further enhance the disease-free survival outcome in these patients.