

AbstractID: 6895 Title: Preliminary results of in-vivo dosimetry in prostate IMRT patients using DVS implantable dosimeters

Purpose: Report the initial clinical experience using an in-vivo, implantable MOSFET dosimeters for measuring dose in prostate IMRT patients.

Method and Materials: Six patients were implanted with 2 DVS[®] (Dose Verification System) dosimeters. CT scans for treatment planning were performed 4-5 days after implantation. The predicted dose for each dosimeter was calculated and compared to the measured dose. Patients were positioned daily with a MV digital images and ultrasound. The daily dose delivered was recorded and compared to the expected dose. Weekly analysis was performed to confirm the accuracy of the dose delivered and identify dose variation trends (random or systematic). For cases when the dose reading deviated more than 10% from the expected, an immediate analysis of the patient setup and treatment plan was performed.

Results: The majority of the patient cases had an average variance $\leq 5\%$. However, there were significant daily dose variations identified by the DVS that could easily have gone unnoticed without the DVS. One patient had deviations of 12-20% on the first fraction due to misreadings in the patient positioning images and the ultrasound localization. In addition to helping identify dose variations, the DVS confirmed that the prostate boost margins were appropriate and that target coverage was adequate on a daily basis.

Conclusions: Significant variations between the measured and predicted doses were found in 2 out of 6 (33%) patients and required immediate action. The cause for the variation was easily identified and corrected. The DVS acts as an adjunct to IMRT and IGRT since it provides a final confirmation of the dose received in the target measuring the net effect of all the variables that can affect accurate dose delivery. The DVS can be a valuable tool in the continuing radiation therapy goal for improving accuracy of treatment delivery.