AbstractID: 10475 Title: The Viability and Use of MOSFET as Alternate Methodology for Routine Verification of IMRT Plans

Purpose: To investigate the viability and use of multiple MOSFET (Thomsan/Nelsion Canada) sensors as an alternate methodology for routine verification of IMRT plans.
Method and Material: XWU-IMRT Phantom (Thomsan/Nelsion Canada) is used for three dimensional IMRT QA. Phantom has dimension of 20cm x 20cm and predefined grooves to fix nine MOSFET dosimeters in three planes. Center planes, contains five MOSFET detection points, one at center and two each on either side separated by 2cm. One of two MOSFETs of either side is; 3.52 cm superior and other one is 2.48 cm inferior to center. Two MOSFETs are 1 cm above and two are 2 cm below center plane separated by 4cm. Total volume covered is 144 cm^3. Thus geometry of these dosimeters represents point dose measurements in three dimensions. The CT images of phantom were acquired and transferred to Brainscan planning system. IMRT plan was then transferred to phantom with pre-determined isocenter. Point doses of nine dosimeters were recorded. Some of point doses were in low dose region also. The phantom was then irradiated as per IMRT plan. The absolute doses of nine dosimeters were analyzed and compared to data generated by RTP system. All MOSFETs are calibrated to known dose.
Results: The average deviation of measured doses by MOSFET and dose calculated for 10 IMRT plans having a total of 90 measurements points was found to be 2.2% (std .53). Out of 90 measurements points, 26 points were found to be in low dose region where average variation was 2.8%.This is within acceptable level of ±3%.
Conclusion: MOSFETs are well suited for QA of IMRT. The labor-intensive procedures for verification of IMRT plans could be well managed with the three dimensional measurements using MOSFET and XWU-IMRT Phantom. This methodology can be performed effectively in a busy radiation therapy centers