

AbstractID: 6796 Title: Impact of volume effect of detectors in multiple points absolute dose and the choice of plane of measurement in 2D planar dose verification in patient specific IMRT QA

**Purpose**

To evaluate the volume effect of detector's in multiple points dose in small and large field IMRT verification and to compare the planar dose distribution between fixed-fields coronal-plane and multifield axial-plane verification methods.

**Method and Materials**

Patient-specific dosimetric verification was conducted for 20 patients of nasopharynx's small-field, SIB-IMRT large-field and prostate tumors. Eclipse-Helios system, Clinac-2300C/D linear accelerator, Med-Tec IMRT phantom and ionchambers of 0.6, 0.13 and 0.015cm<sup>3</sup> and MOSFET detectors were used. For each patient, 15 IMRT plans were generated. The multiple points doses were measured at multifield and fixed-fields on-axis, 4-offsets and inhomogeneous points. The agreements between calculated and measured doses were found for small and large field IMRT verification. For relative dosimetry, EDR2 films, Virtual Water phantom for fixed-fields coronal-plane and IMRT Body phantom for multifield axial-plane verifications RITsystem and Vidar scanner were used. The agreements between calculated and measured dose distributions between two methods were compared using various gamma criteria.

**Results**

The agreements between measured and calculated doses using 0.6 and 0.13cm<sup>3</sup> chambers at multifield and fixed-fields on-axis points were within 4.7% ±2.3. The dose differences of 6% ±1.7, 19.7% ±5.5, and 12.1% ±3.2 at offset 1 to 3 points were found. The 0.015cm<sup>3</sup> chamber and MOSFET detectors were showed the dose differences of upto 8.4% in large field verification. The mean differences in percentage of pixels passing the gamma criteria of 3mm/5% were 98.2% ±0.9 and 90% ±5.4 for fixed-fields coronal-plane and multifield axial-plane verifications.

**Conclusions**

This study is useful in evaluating the detector's response at high and low dose, outside the fields and inhomogeneous points dose verification. In offset points, 0.6cm<sup>3</sup> is more accurate than 0.13cm<sup>3</sup> chamber in both small and large field verification. The fixed-fields coronal-plane verification is more accurate, however, the multifield axial-plane is clinically realistic method of verification and to be adopted.