AbstractID: 107 Title: Clinical applications of a dose calculation algorithm with analytic pencil beam kernel to IMRT patient specific QA

Manual verification of the monitor units for a treatment plan is recommended to find mistakes in the treatment planning process. A point-dose calculation program DYNA with an analytic pencil-beam kernel was used for patient specific QA of six-field prostate IMRT treatment. IMRT treatment plans were generated with the HELIOS Inverse Planning software. Isocenter dose was measured with a 0.6-cc ionization chamber in a 25x25x20.8 cm^3 polystyrene phantom. Mean percentage differences of calculated total doses from measured total doses were 1.89 0.94% and 1.71 0.25% for DYNA and HELIOS, respectively. The correlation coefficient of the percentage differences between DYNA vs. measurements and HELIOS vs. measurements was 0.9903. The mean percentage difference of DYNA from HELIOS was 0.15 0.16%. When doses from individual fields were analyzed, mean percentage differences of DYNA and HELIOS from measurements were 1.72 0.63% and 1.72 0.53%, respectively. The correlation coefficient between DYNA and HELIOS was 0.8914. The mean difference between DYNA and HELIOS was -0.06 0.25%. DYNA calculated doses were more than 5% different from measured doses for 30% of the fields (63 out of 210). This number for HELIOS vs. measurements was 27% (56 out of 204). Mean percentage difference of total doses calculated by DYNA and HELIOS for actual treatment plans was 0.47 0.37%. The corresponding value for individual fields was 0.48 0.25%. DYNA shows excellent agreement with HELIOS for both phantom and in-vivo cases. Therefore, we can replace the ionization chamber measurements by the in-vivo DYNA calculations for the 6-field prostate IMRT cases.