AbstractID: 10759 Title: Dose fault by enhanced image in planning system

Purpose: The aim of this study is to evaluate the default of dose calculation using enhanced images in radiation treatment planning.

Method and materials: Dose calculation is based on relative electron density which is converted from HU of CT image in treatment planning. Various concentrations of conray were proceeding in CT scanning to establish the relationship between relative electron density and HU in different concentration of conray. A container can be filled with conray or water in different depth stacking on a solid phantom. A Farmer-type ionization chamber was embedded in solid phantom was used to measure the dose of photon beams. CT images of this set of combination phantom were transferred to conventional planning system. To simplify, a single beam irradiated the phantom in experiment and planning then to compare these data.

Results: When concentration of conray was over 46%, HU of image was saturated. Relative electron density of 43.5% conray in planning system was 2.5 times the real value. And it was 1.5 times for 9.6% conray. To analyze conray data range from 0% to 20%, the relation of HU and conray was linear, and their correlation coefficient was 0.999. For a single beam passed through 9.6% conray in 6.5cm thickness, there were 8% and 6% dose differences between planning and measurement for 6 and 10MV. Even 3.5% conray was used in this study, there still had 4% and 2.4% differenced in dose for 6 and 10MV.

Conclusion: Conray can cause overestimated relative electron in planning system. Enhanced image by conray was not suitable for dose calculation in one beam in treatment planning.