

Commissioning of ADAC Pinnacle 3 Treatment Planning System: Inhomogeneity Correction

As part of our commissioning of ADAC Pinnacle 3 treatment planning system, we validated the dose convolution calculation algorithm for heterogeneous phantom using film dosimetry. KODAK XV-2 films (one at a time) were irradiated in polystyrene phantom with and without heterogeneity, such as RMI bone slab, or cylindrical air cavity, by 6 MV photon and 9 MeV electron beams of Clinac2100C/D (at SSD=100 cm and 10x10cm collimator setting). For photon beam, the film was situated at d=10 cm in the polystyrene phantom sandwiching a bone slab of either 1cm or 5 cm thick, or with an air cavity of either 1 cm or 2 cm thick, 5 cm diameter. For electron beam, the film was exposed both at d=3 cm with 1 cm air cavity, 0.5 cm or 1cm bone slab and at d=4 cm with 2 cm air cavity. RIT113/Lumisys150 densitometer system was used for film scanning and data analysis. Compared with Pinnacle calculated doses in heterogeneous phantoms, the film dosimetry revealed an agreement of less than $\pm 3\%$ for 6 MV photon, within $\pm 8\%$ of difference for 9 MeV electron. The Pinnacle generated isodose curves reflected proper inhomogeneity correction. We conclude that the inhomogeneity corrections for both 6 MV photon and 9 MeV electron are handled properly in the Pinnacle 3 algorithm.