

AbstractID: 10687 Title: Surface doses comparison for spot scanned and passively scattered proton therapy beams

Purpose: To evaluate the differences in surface doses deposited from spot scanned and passively scattered proton therapy beams used for treatment of prostate cancer patients.

Method and Material: The Proton Therapy Center of UT MD Anderson Cancer Center in Houston is equipped with a Hitachi synchrotron accelerator that delivers proton beams to four treatment rooms. Three of the rooms are equipped with passively scattered proton beams and one is equipped with spot scanning delivery system. The surface doses were measured using a PTW Markus chamber with a 1 mm thick cap in a plastic phantom slab. The calculated skin doses were obtained from the Eclipse treatment planning system (TPS). Markus chamber measurements were compared with the TPS calculated skin doses for fields of 10 patients treated with spot scanning and 10 patients treated with passively scattered proton beams.

Results: Comparison of isodose distributions shows a lower dose to skin in case of spot scanned proton treatment fields as compared to the passively scattered proton treatment fields. The average measured surface dose was 11.8% lower for spot scanning than for passive scattering proton beams, with a standard deviation of 0.3%. The average difference in calculated surface doses from the treatment planning system for spot scanning was found to be 6.7% less than that for the passive scattering proton beams with a standard deviation of 0.2%.

Conclusions: The results of our study show that the skin dose to patients is considerably lower (11-12% of the prescribed dose) with spot scanning proton beams than with passive scattering proton beams. For a prescribed dose of 76 CGE from two parallel opposed lateral fields, this amounts to a reduction of 4-5 CGE per field with the spot scanning proton beam.