

AbstractID: 5033 Title: The effect of target volume depth on surface dose for inverse planned IMRT treatments of head and neck cancers

Introduction: This work evaluates the surface dose as a function of PTV proximity to the surface for inverse planned head-and-neck IMRT patients and compares the results to measurements performed for a conventional treatment technique.

Methods and Materials: An anthropomorphic phantom was CT scanned in the supine treatment position with thermoplastic mask immobilization covering the entire head-and-neck excluding the supra-clavicular region. A CTV including the cervical, low neck, and supra-clavicular lymph nodes, as well a 5 mm margin was outlined. Inverse IMRT plans were generated using a 7 field coplanar technique with 6 MV photons. Plans were created for PTVs defined at 0, 5, and, 10 mm depth from the phantom surface (PTV_{skin} , PTV_5 , PTV_{10}). The treatments were delivered using a dynamic multileaf collimator sliding window technique. Measurements at up to 8 locations on the surface of the phantom and at 2 locations near the center of the PTVs were performed using TLD and MOSFET dosimeters. Results were compared to measurements performed for a conventional 3-field geometry (opposed laterals and anterior supra-clavicular field planned to cover the PTV_{skin}).

Results and Discussion: The average surface dose for the IMRT plans in the neck region was measured to be 59%, 78%, and 92% of the prescription dose for the PTV_{10} , PTV_5 , and PTV_{skin} plans respectively, and likewise, 53%, 55%, and 73%, respectively in the supra-clavicular region. Average surface doses from the conventional field arrangement were measured to be 100% and 36% of the prescription dose for the neck and supra-clavicular region respectively.

Conclusion: For the IMRT plans the surface dose increased as a function of the PTV proximity to the surface. For an equivalent prescription dose, the conventional 3-field technique yielded a higher average skin dose in the neck region and lower dose in the supra-clavicular region in comparison with the IMRT plans.