

AbstractID: 10764 Title: Independent MU calculation for pre-treatment verification of TomoTherapy StatRT

Purpose: To develop an independent calculator of MU as a check prior to delivery of a Helical TomoTherapy (HT) StatRT Treatment. **Methods:** StatRT provides rapid palliation whereby the patient gets an MVCT, and then PTVs and PRVs are defined, an inverse Tx plan is created and delivered, all in under 40 minutes without the patient leaving the Tx couch. This provides no opportunity for conventional IMRT verification (e.g. patient DQA), and no method exists for independent calculation in the short time between the plan calculation and Tx. Full dose calculation would require forward computation using the planned sinogram applied to the patient CT, something very difficult to achieve in the time clinically allotted between completion of planning and Tx delivery. Our approach is to verify the “sanity” of the total MU to be delivered prior to beam on. The approach assumes a single transverse image represents the entire contour, PTV and PRVs. It also assumes unit density and that modulation in the representative slice is constant and equal to the overall average modulation factor. An Excel application with graphic interface allows the user to quickly input an approximate patient contour (multiple XY pairs or the major-minor axes of an ellipse), PTV position, blocking structures, modulation factor, bed speed, Tx distance, field length. From these the total MU is estimated and compared to the HT TPS value. **Results:** 10 patients were treated with single fraction StatRT. Delivered dose was verified post Tx with film and ion chamber. The average absolute difference between the HT TPS MU and our calculation was 5.3%, SD = 3.6% and a maximum difference of 9.8%. Time required for data input and calculation was less than 1 minute. **Conclusion:** an independent sanity check of HT MU is possible for simple treatments with small modulation factors.