

AbstractID: 4543 Title: IMRT Composite Plan - A Must Tool for Final Dose Distribution with IMRT Boost Plan

Purpose: To observe the IMRT composite planning results from two different dose object functions and to suggest the adequate methodology for plan evaluation.

Method and Materials: IMRT treatment planning often presents a two-steps process; initial plan to cover the gross tumor disease and potential nodal areas; then the Cone Down (CD) plan for gross tumor boost. IMRT CD plan usually is a great challenge to generate the composite dose distribution due to its dose non-uniformity nature for IMRT planning. Quality of the composite IMRT plan can be greatly influenced by the initial treatment planning due to its non-uniform dose distribution nature to add on the CD IMRT plan. Since there are still a few planning systems not even provide the composite dose options for summarizing the initial IMRT plan with IMRT CD plan. We are currently using the Pinnacle system to analyze composite dose effects by using the total dose constraints as well as the separate dose constraints.

Results: Clinical findings are summarized as 1) Initial IMRT and CD IMRT plans are highly correlated and the dose constraints have to be considered in a composite way (see fig. 1 (composite dose constraints) and fig. 2 (CD dose constraints)); 2) A sub-optimal initial IMRT plan can disturb the IMRT CD plan for composite dosimetry, creating a unacceptable MUS due to the non-uniform intensity map summarization (figs. 3 and 4 shows high MUS to compensate the PTV coverage compared to figs. 5 and 6) ; 3) Scaled CD IMRT dose constraints may not generate an acceptable composite dose distribution since summation of the two acceptable individual intensity maps may not create an optimum composite intensity to meet the final dose criteria.

Conclusion: From planning comparison, composite IMRT plan has to be analyzed in order to create the true dose distribution in IMRT.