AbstractID: 8858 Title: Statistical Validation of A New Helical Tomotherapy Patient Transfer Station

Purpose: To evaluate statistically the accuracy of a patient transfer station (PTS, TomoTherapy Inc., Madison, WI) that automatically converts one planning-station-generated treatment plan to another one with a different beam model.

Method and Materials: In our department we have installed 2 HI·ART tomotherapy systems, and patients often need to be transferred from one tomotherapy unit to the other. 30 patients who underwent patient transfer between the two systems were evaluated. For each patient, dose differences between his/her original plan and PTS-transferred plan were evaluated by comparing doses at 10 randomly selected positions in his/her CT images. The Pearson indexes were calculated to analyze the relationship of the deviations to other parameters, which include absolute dose levels, sites (targets or normal tissues), dose accuracy of original plans and that of transferred plans. The dose accuracy of a treatment plan was determined by comparing delivered doses at the center of a 30cm x 30cm x 12cm solid water phantom to planned doses at the same position.

Results: The maximum calculated dose difference between original and transferred plans for target was 1.9%; the average deviation (of non-directional values) was 0.8% ± 0.005. The errors generated during PTS-based transferring process were random and did not show correlation with other parameters. More importantly, the PTS took less than 10 minutes to generate a backup plan and reduced the transfer time by ~90% compared to creating a duplicate plan manually.

Conclusion: The results show that a PTS-transferred plan is an excellent match to the original plan. With a physician's approval, a transferred plan is acceptable for treatment without the necessity of being revalidated in phantom. Thus far, all of our PTS plans have been approved by the treating physician without further optimization.