AbstractID: 7344 Title: A new software tool for inter Treatment Planning System IMRT comparison study

Purpose: To develop a software tool to enable the direct comparison of the dose accuracy of different treatment planning systems (TPS) and the efficacy of different optimization methods while separating the effects of the dose engine and optimizer.

Method and Materials: Based on TPS used at our institution, we have developed a software tool using the C programming language to convert RTP files exported from the Corvus system to the Pinnacle system. The planning CT along with the contoured structures can be transferred between these two TPS's. The developed software tool was used to convert the Corvus treatment delivery files to the Pinnacle system. The first application of this tool is to compare the dose calculations performed by these systems. The second application is to compare the efficacy of the optimization methods in these systems. We plan to test ten patients with head and neck tumors.

Results: The new software tool successfully converts RTP files exported from any commercial TPS to the Pinnacle TPS, allowing us to separately study the optimization algorithm and dose calculation engine in the two systems. Preliminary results from one patient plan showed that Pinnacle and Corvus systems give different results, where Pinnacle system gave a 3.6% higher D95% value in the pGTV and 3.7% higher in the pCTV. The maximum dose to the brainstem and spinal cord in Pinnacle plan were 7.3% and 3.7%, higher respectively. Both TPS's have been commissioned for clinical use in our institution, and a patient specific phantom measurement is performed for each patient.

Conclusion: A new software tool for inter-TPS IMRT comparison study has been developed and tested. This tool allows us to directly compare TPS's using clinical data, revealing detailed dose differences in the coverage of the tumor volume as well as the doses to the sensitive structures.