AbstractID: 13095 Title: Intensity-Modulated Arc Therapy for Stereotactic Radiotherapy of Spinal & Paraspinal Tumors

Purpose: Stereotactic radiosurgery of metastatic spinal tumor with intensity-modulated radiotherapy（IMRT）technique requires a long treatment time due to an extensive monitor units (MU) resulting from multiple highly intensity-modulated beams in order to sparing adjacent spinal cord and other critical structures. This study investigates the feasibility of using intensity-modulated arc therapy (IMAT) as an alternative modality with a shorter treatment time while maintaining a compatible dosimetric performance as IMRT technique.

Methods/Materials: 8 patients with spinal or paraspinal tumor were recruited in this study. All those patients were previously treated with IMRT technique, in which 18Gy or 24Gy doses were delivered in a single fraction with 11 to 13 coplanar radiation beams. Single arc and 2-arc IMAT plans were retrospectively generated for each patients using RapidArc^{TM} treatment planning system (Varian Medical System, Sunnyvale, CA). The previous delivered IMRT plans were chosen as a reference. The differences of following parameters between IMAT and IMRT plans were used to evaluate the plan performance: the volumes of PTV receiving 95% and 100% of prescribed dose(V_{95}, V_{100}), the maximum spinal cord dose (MSPDOSE) and the total monitor units (TMU).

Results: For all 8 patients, the differences of V_{95} and V_{100} between single arc IMAT and IMRT plans are -5.3%±4.8% and -9.3%±7.8% , while the difference of MSPDOSE is 0.23Gy±0.87Gy. In contrary, the differences of V_{95} and V_{100} between 2-arc IMAT and IMRT plans are -0.67%±2.01%, -1.1%±2.23% , while the difference of MSPDOSE is 0.38Gy±0.47GY. The ratios of TMU of single arc and 2-arc IMAT plans over IMRT plan are 55%±19% and 65%±17%.

Conclusion: For stereotactic radiosurgery of spinal tumor, IMRT plan provide better dose coverage than single arc IMAT plan, but 2-arc IMAT plan is capable of providing a compatible dosimetric performance as IMRT plan while significantly reducing the treatment time.