

AbstractID: 7117 Title: Intracranial Applications of IMRT Based Stereotactic Radiosurgery to Treat Multiple or Large Irregular Lesions

Purpose: For multiple brain metastases, or large irregular lesions, the linac-based multi-arc stereotactic radiosurgery approach with circular collimators may not be feasible to provide conformal dose coverage, or to deliver treatment in a realistic time period tolerated by patient. We are reporting our experience using Intensity Modulated Radiosurgery (IMRS) to treat such intracranial lesions.

Method and Materials: The frameless localization system was used for patient setup and target localization during treatment. The image fusion of MR and CT scans was used for better tumor definition. PTV margin was normally 1- 3 mm. Critical structures, as well as the normal brain were delineated for optimization and plan evaluation. Fine tuned inverse optimization procedure gave satisfactory conformal PTV dose coverage and critical organ sparing. QA procedure included independent point dose calculation and planar dose verification, plus daily calibration of infrared camera vs. linac isocenter. The patient setup was guided by the infrared camera through the fine adjustment in three-translational and three-rotational degrees for isocenter localization. Orthogonal KV images were taken by on board imager (OBI) before treatment and the overlay of KV images with DRRs ensured the accuracy of IMRS treatment.

Results: Ten patients were treated using IMRS. It was found that properly selected 8 to 12 fixed beams with a single isocenter were sufficient to achieve good dose coverage and organ sparing. Utilizing portal dosimetry and KV images provided excellent quality assurance for the IMRS plan and patient setup. The treatment time was less than 60 minutes to deliver dose of 16 -18 Gy.

Conclusion: IMRS treatment of multiple brain metastases or large irregular lesion enables saving of treatment time and gives the benefits of dose-conformity and organ-sparing, easy plan QA, and patient setup verification.