

# AbstractID: 13352 Title: Evaluation of RapidArc vs. Static Intensity-Modulated Radiosurgery in the Single-isocenter Approach for Multiple Brain Metastases

## **Purpose:**

RapidArc has the advantage of reducing the MUs in dose delivery. This study reports the comparison of the beam arrangement and MU reductions of RapidArc (RA) and IMRT based radiosurgery (IMRS) for the treatment of multiple intracranial metastases.

## **Method and Materials:**

Twelve patients with multiple brain metastases treated with IMRS were re-planned with RapidArc. All the IMRS were delivered in a single fraction, single-isocenter approach using 8-11 static beams. The prescribed dose was 18-20 Gy and the normalization as 100% of prescription dose covering 98% of PTV. Across patients, all the RA-plans used 2-coplanar arcs and followed systematic strategies in optimization objectives and MU limits. For each patient, two or more RapidArc plans were generated, and the plan with lower MU and higher conformity was chosen for comparison.

## **Results:**

It is found that the MU reduction by RapidArc is more predominant for larger number of brain lesions, as the MU-ratio of RA and IMRS was reduced from 92% to 39% as lesion number increased from 2 to 12. Also, the strategy of using only two coplanar arcs was based on the realization that it has a better dose conformity with comparable amount of total MUs as compared with a single-arc approach. The 2-coplanar-arcs is also favorable as compared to more arcs as adding vertical or oblique arcs actually increases the dose to the normal brain and brainstem with little benefit to the PTV dose conformity.

## **Conclusion:**

The MU reduction of RapidArc is more significant in intracranial radiosurgery. RapidArc uses much fewer MUs in radiosurgery as compared to those in the static 9-beam IMRS treatment. The total treatment time is reduced even more, as two co-planar arcs with zero couch position further reduced the beam setup time as compared to 6-9 couch positions normally used in the IMRS treatment.