

## AbstractID: 3370 Title: Development of Specific Treatment Plan based on Physical Lattice Structure for Stereotactic Radiosurgery

### **Purpose:**

The stereotactic radiosurgery (SRS) describes a method of delivering a high dose of radiation to a small target volume in the brain, generally in a single fraction, while the dose delivered to the surrounding normal tissue should be minimized. To perform automatic plan of the SRS, a new method of multi-isocenter/shot linear accelerator (linac) and gamma knife (GK) radiosurgery treatment plan was developed, based on a physical lattice structure in target.

### **Method and Materials:**

The optimal radiosurgical plan had constructed by many beam parameters in a linear accelerator or gamma knife-based radiation therapy. In this work, one isocenter/shot was modeled as a sphere, which is equal to the circular collimator/helmet hole size because the dimension of the 50% isodose level in the dose profile is similar to its size. In computer-aided system, it accomplished first an automatic arrangement of multi-isocenter/shot considering two parameters such as positions and collimator/helmet sizes for each isocenter/shot. Simultaneously, an irregularly shaped target was approximated by cubic structures through computation of voxel units. The treatment planning method by the technique was evaluated as a dose distribution by dose volume histograms (DVHs), dose conformity, and dose homogeneity to targets.

### **Results:**

For irregularly shaped targets, the new method performed the optimal multi-isocenter packing, and it only took a few seconds in computer-aided system. The targets were included in a more than 50% isodose curve. The dose conformity was ordinarily acceptable levels and the dose homogeneity was always less than 2.0, satisfying for various targets referred to Radiation Therapy Oncology Group (RTOG) SRS criteria.

### **Conclusion:**

This approach using new method could be an efficient radiosurgical plan used two beam parameters both the irregularly shaped targets and different modality techniques such as linac and GK for SRS.

### **Conflict of Interest (only if applicable):**