

AbstractID: 5724 Title: Dosimetry Validation for Spinal Cord Irradiation In Extracranial Stereotactic Radiosurgery

Purpose: A single large dose in the range of 16 to 20 Gray at 90% isodose line can be safely delivered to solitary or multiple metastases in the vertebral column via extracranial stereotactic radiosurgery. However, the spinal cord dose is usually limited to 10 Gy within the treatment segment. Thus, the dosimetry validation for the spinal cord is critical for this procedure and for further dose escalation. **Methods and Materials:** Bearing the challenges of the great dose gradient and irregular shape of the target around the cord, we have designed an experiment to measure the absolute dose to the cord using a farm chamber placed at the location of the spine cord inside the solid water phantom. The air-cavity of the chamber is precisely delineated in the iPlan system (BrainLAB) and dose volume histogram for the air cavity was used for calculating the effective dose in the treatment plan. This can then be compared with measured doses by the chamber. Isodose distributions in two coronal planes through the center of tumor and through the cord are also measured with EDR2 films and compared with the planned dose distributions. **Results:** Our tests demonstrated that this dosimetry measurement is reliable with high accuracy and precision of < 3% deviation in such difficult dosimetry verification. Results from five spinal SRS cases show that the cord doses with IMRS plans are within 5 % from those of the treatment planned doses. Importantly, the isodose distributions at the cord and near the target volume are consistent with the planned dose distributions. **Conclusions:** The small discrepancies (up to 5%) for the absolute dose measurement show no gross errors in the dose delivery and dose calculation using a pencil beam algorithm in the planning system.