

## AbstractID: 6541 Title: Dose Distribution Comparison for the Treatment of Lung and Spinal Metastases Using CyberKnife versus IMRT Stereotactic Body Radiotherapy

**Purpose:** Compare the dose-distributions from two different radiation-delivery systems in the treatment of patients with lung and spinal metastases.

**Method and Materials:** Patients with metastases underwent Cyberknife treatment at Seattle CyberKnife Center (SCC) since February 2006. Seven CT-image sets from SCC including the contours, and dose-matrix were imported through DICOM-RT into the Pinnacle treatment-planning system at MDACC for the purposes of creating an IMRT treatment-plan for the LINAC. Volumes of eight lesions ranging from 0.24- to 64.11-cc were used in this study. The treatment fractional sizes are 1-, 2-, 4- or 5-fractions and the prescription-dose per fraction is varied from 500- to 1600-cGy. The maximum dose of each plan was equal to 100%. Dose-volume histograms were generated for both CyberKnife and LINAC treatment.

**Results:** Based on the dose-volume histograms, the percentage of the tumor-volume that received the prescription-dose varied from 84.8% to 100% for CyberKnife and from 90.1% to 100% for LINAC. The dose-heterogeneity within the tumor-volume received the prescription-dose that ranged from 31.6% to 63.9% with the mean of 43.2% for CyberKnife and from 14.4% to 31.6% with the mean of 25.2% for LINAC. Dose-conformality to the tumor-volume is comparable between CyberKnife and LINAC plans, but the CyberKnife has a slight edge for treating a small lesion (0.24 cc) with the critical structure located very closely to it. In general, the IMRT plans are better at sparing the surrounding critical structures than the CyberKnife plans. This was attributed to the exclusive use of anterior oblique beam-arrangement of CyberKnife. The dose comparison for the organs at risk will be presented.

**Conclusion:** Dose-conformality is comparable between Cyberknife and LINAC plans. Dose-heterogeneity is greater for patients receiving Cyberknife treatment compared to LINAC. The use of anterior beam-arrangements in CyberKnife may increase integral-dose to anterior organs at risk compared to LINAC delivery systems.