



### Introduction

Cone beam computed tomography (CBCT) image guidance technology has been adopted for spine radiosurgery. This study prospectively evaluated a series of intradural spine tumors treated with radiosurgery using CBCT. The feasibility of using CBCT guidance for radiosurgery for intradural spine tumors was evaluated.

### Methods

Eighty-two patients with intradural tumors were evaluated. The positioning deviations of the spine radiosurgery treatments in patients were recorded. Radiosurgery was delivered using a linear accelerator with a beam modulator and CBCT combined with a robotic couch that allows positioning correction in three translational and three rotational directions. To measure patient movement, three quality assurance CBCTs were performed and recorded in 30 patients: before, halfway, and after the radiosurgery treatment. The positioning data and fused images of planning CT and CBCT from the treatments were analyzed to determine intra-fraction patient movements. From each of three CBCTs, three translational and three rotational coordinates were obtained.

### Results

Lesion locations include cervical (22), thoracic (17), lumbar (38) and sacral (5). Tumor histologies included schwannoma (27), neurofibroma (18) meningioma (16), hemangioblastoma (8) and ependymoma (5). The mean prescription dose was 17 Gy delivered in one to three fractions. At the treatment halfway point, the translational variations and standard deviations were  $0.4 \pm 0.5$ ,  $0.5 \pm 0.8$ , and  $0.4 \pm 0.5$  mm in the lateral (X), longitudinal (Y) and AP (Z) directions, respectively. Similarly, the variations immediately after treatment were  $0.5 \pm 0.4$ ,  $0.5 \pm 0.6$ , and  $0.6 \pm 0.5$  mm along X, Y and Z directions, respectively. The mean rotational angles were  $0.3 \pm 0.4$ ,  $0.3 \pm 0.4$ , and  $0.3 \pm 0.4$  degrees along yaw, roll, and pitch, respectively, at the halfway point and  $0.5 \pm 0.5$ ,  $0.4 \pm 0.5$ , and  $0.2 \pm 0.3$  degrees after treatment.

### Conclusions

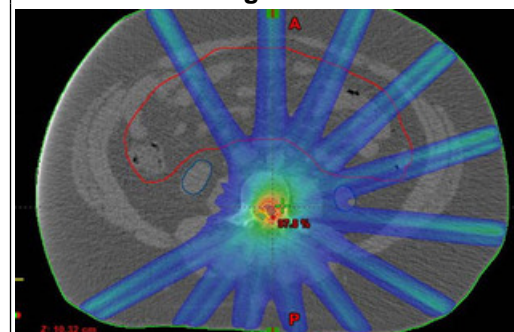
Radiosurgery offers an alternative treatment option for intradural spine tumors in patients who may not be optimal candidates for open surgery. CBCT image guidance for patient setup for spine radiosurgery is accurate and successful in patients with intradural tumors.

### Learning Objectives

By the conclusion of this session, participants should be able to:  
1) understand the role of radiosurgery for intradural spinal tumors, 2) understand the technical principals behind CBCT image guidance, 3) Discuss the shortcomings of radiosurgery for intradural spinal tumor.

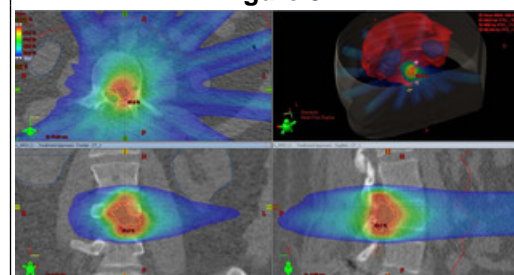
### References

Figure 2



The prescribed dose to the GTV was 16 Gy delivered using 12 coplanar IMRT beams in a single fraction. The GTV was 7.3 cm<sup>3</sup>. The patient reported complete pain resolution at 1-month follow up.

Figure 3



Radiosurgery was offered to avoid the morbidity of resection of this tumor. Images of the treatment plan