

Low-Dose Stereotactic Body Radiotherapy for Spinal Metastases Has Reduced Vertebral Body Fracture Rates While Maintaining Local and Pain Control

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Introduction

A staple of current treatment paradigm of spinal metastasis is radiosurgery as the primary modality, reserving surgery for high-grade epidural spinal cord compression or spinal instability. Multiple studies report vertebral body compression fracture rates from 11-39% after SBRT. Reports of patients’ pain control ranged from 52-85% at 12 months and local control rates of 87-95% at 6 months to 73-92% at 12 months. Studies have shown that with high treatment doses the fracture rates are higher. We describe our experience of low-dose SBRT for spinal metastasis with fracture rates, local and pain control.

Methods

This is a retrospective, single institution analysis of 134 patients (316 spinal segments) undergoing SBRT for spinal metastases from 2010- 2015. Fracture rates were assessed on follow-up CT. Local control analysis conducted with Kaplan-Meier statistics.

Results

127 patients (287 spinal segments) were included in the analysis. Median age 67 years. Location of tumors were 13% cervical, 49% thoracic, 34% lumbar, 4% sacral. Tumor histology was 57.8% radiosensitive and 42.2% radioresistant. Treatment doses were: 13--20Gy single--fraction (52%); 16--27Gy 3--fraction (37%); and 25--40Gy 5--fraction (11%). 19% spinal levels required separation surgery for high--grade epidural-spinal-cord-compression. Patient-reported pain scores showed 36% improved, 43% stable, and 20% worsened. Fracture rates were 9.06%. Local control rates were 83% at 6-months and 76% at 12-months. Local failure rates better in single-fraction versus hypofractionated (HR=2.63; p=0.01). There was no difference between radiosensitive and radioresistant tumors in local control (HR=1.59; p=0.26). Better local control with SINS 0-6 vs >7 (HR=4.25; p=0.004).

Conclusions

Low-dose SBRT can achieve durable radiologic local and pain control in spinal metastatic disease. Fracture rates can be lowered with this approach, while still balancing appropriate local and pain control. Single- fraction treatment is superior to multi-fraction regimens. Multidisciplinary treatment teams can entertain low-dose regimens for patients at higher risk for vertebral body fractures.

Learning Objectives

- (1) Describe the effect of SBRT dose on vertebral body fracture rates. (2) Identify effective treatment options to reduce vertebral body fracture rates.
- (3) Identify the ability to of low-dose SBRT to obtain similar local control and pain control as higher dose-SBRT.

References

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