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Palliative Management of Metastatic Spinal Tumors With Spine Radiosurgery

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Abstract

Objectives: To assess pain and local outcomes in the successful palliative management of metastatic spine tumors treated with spine radiosurgery.

Methods: Spine stereotactic body radiotherapy (SBRT) is a new and emerging technology thought to be advantageous in achieving adequate and durable tumor control in the treatment of metastatic spinal neoplasms. Data are needed to support its routine use in the palliation of spinal disease to ensure this treatment, as it is currently being practiced, remains safe and cost-effective. It has been suggested by preliminary studies that higher focal radiation doses than those typically used in palliative radiation oncology regimens, offer excellent and more durable tumor control with less treatment time. From our institutional database we analyzed 136 patients (317 spine segments) who were treated for spinal metastasis or recurrence of primary spinal tumors with spine stereotactic body radiation therapy (SBRT) from March 2010 to May 2015. Separation surgery to decompress high grade epidural spinal cord compression was done first in 25 patients, spanning 57 vertebral bodies before adjuvant SBRT. The remaining 111 patients (260 spinal levels) were treated with SBRT alone. The primary clinical outcome measured was pain control after treatment averaged from all follow up visits. Pain was quantified using an 11 point visual analog scale (VAS) at pre-treatment and again at each follow up appointment at least two weeks after completion of SBRT followed by every 3-6 months thereafter. The primary radiographic outcome was local control based on revised RECIST guidelines (version 1.1) which was determined for each patient utilizing serial MRI, CT and PETCT imaging.

Results: The mean follow-up for this cohort was 7.7 months (0.32-56.2 months). Out of 317 treated vertebral bodies there were 50 eventual failures defined as tumor increasing in either size or avidity by radiological surveillance by either MR, CT, PETCT or bone scan. Out of 134 patients with whole body imaging available for review, 81 (60%) patients had extraspinal metastatic disease at the time of treatment. Radiological local control of the treated spinal segments at 12 months was 73.4% for the entire cohort. Mean pain scores for patients with an initial pain score of at least 4 were 5.9 (95% CI, 5.3-6.4) vs. 3.1 (95% CI, 2.4-3.9) and max pain scores were 7.9 (95% CI, 7.5-8.4) vs. 5.0 (95% CI, 4.7-5.4) at pre-treatment and at post-treatment follow-up, respectively. Tumor types stratified by primary tumor histology and thus inherent

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radioresistance failed to demonstrate a difference in local control (Log rank, p=0.754). There was no difference in the rates of radiologic local control in patients with ESCC scores of 1c-3 stratified by need for surgical decompression followed by SBRT (Log rank, p=0.19). Patients treated with a single fraction had better local control than those treated with 3-5 fractions, (Log rank, p=0.0026) regardless of whether they required up-front separation surgery or not.

Conclusions: Spine SBRT can achieve durable radiologic local control and pain control of metastatic spinal disease in the majority of patients treated. Local control after spine SBRT was independent of tumor radiosensitivity. Single fraction treatment is superior to multi-fraction regimens in controlling spinal metastasis.