Spinal Metastases Radiotherapy

In patients with significant epidural spinal cord compression, initial surgical decompression and stabilization of spinal metastases, as opposed to radical oncological resection, provides a margin around the spinal cord that facilitates subsequent treatment with high-dose adjuvant stereotactic radiosurgery (SRS). If a safe margin exists between the tumor and the spinal cord on initial imaging, then high-dose SRS may be used as the primary therapy, eliminating the need for surgery. Selecting the appropriate approach has shown greater efficacy in tumor control, neurological outcome, and duration of response when compared with external beam radiotherapy, regardless of tumor histology.

In the absence of prospectively randomized trials comparing radiation therapy with current surgical techniques, treatment decisions continue to be based predominantly on retrospective case series and institutional experience, but the indications and timing for each are becoming more clear [1].

Moore-Palhares et al. designed a 30 Gy in 4 fractions stereotactic body radiotherapy protocol, as an alternative option to our standard 2-fraction approach, for primarily large volume, multilevel, or previously radiated spinal metastases.

Objective: To report imaging-based outcomes of this novel fractionation scheme.

The institutional database was reviewed to identify all patients who underwent 30 Gy/4 fractions from 2010 to 2021. Primary outcomes were magnetic resonance-based vertebral compression fracture (VCF) and local failure per treated vertebral segment.

They reviewed 245 treated segments in 116 patients. The median age was 64 years (range, 24-90). The median number of consecutive segments within the treatment volume was 2 (range, 1-6), and the clinical target volume (CTV) was 126.2 cc (range, 10.4-863.5). Fifty-four percent had received at least 1 previous course of radiotherapy, and 31% had previous spine surgery at the treated segment. The baseline Spinal Instability Neoplastic Score was stable, potentially unstable, and unstable for 41.6%, 51.8%, and 6.5% of segments, respectively. The cumulative incidence of local failure was 10.7% (95% CI 7.1-15.2) at 1 year and 16% (95% CI 11.5-21.2) at 2 years. The cumulative incidence of VCF was 7.3% (95% CI 4.4-11.2) at 1 year and 11.2% (95% CI 7.5-15.8) at 2 years. On multivariate analysis, age ≥68 years (P = .038), CTV volume ≥72 cc (P = .021), and no previous surgery (P = .021) predicted an increased risk of VCF. The risk of VCF for CTV volumes <72 cc/≥72 cc was 1.8%/14.6% at 2 years. No case of radiation-induced myelopathy was observed. Five percent of patients developed plexopathy.

30 Gy in 4 fractions was safe and efficacious despite the population being at increased risk of toxicity. The lower risk of VCF in previously stabilized segments highlights the potential for a multimodal treatment approach for complex metastases, especially for those with a CTV volume of ≥72 cc [2].

Stereotactic radiosurgery

Spinal stereotactic radiosurgery.

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https://theoncologist.alphamedpress.org/content/4/6/459.full
[2)]

Moore-Palhares D, Sahgal A, Zeng KL, Myrehaug S, Tseng CL, Detsky J, Chen H, Ruschin M, Atenafu EG, Wilson J, Larouche J, da Costa L, Maralani PJ, Soliman H. 30 Gy in 4 Stereotactic Body Radiotherapy Fractions for Complex Spinal Metastases: Mature Outcomes Supporting This Novel Regimen. Neurosurgery. 2023 Apr 19. doi: 10.1227/neu.0000000000002498. Epub ahead of print. PMID: 37074052.