Stereotactic body radiation therapy versus conventional external beam radiotherapy for spinal metastases: A systematic review and meta-analysis of randomized controlled trials

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Introduction: This study aimed to compare SBRT and cEBRT for treating spinal metastases through a systematic review and meta-analysis of randomized controlled trials (RCTs).

Methods: PubMed, EMBASE and Cochrane Library were searched up to 6 May 2023 for RCTs comparing SBRT and cEBRT for spinal metastases. Overall and complete pain response, local progression, overall survival, quality of life and adverse events were extracted. Data were pooled using random-effects models. Results were reported as risk ratios (RRs) for dichotomous outcomes, and hazard ratios (HRs) for time-to-event outcomes, along with their 95% confidence intervals (CIs). Heterogeneity was evaluated using the I^2 statistic.

Results: Three RCTs were identified involving 642 patients. No differences were seen in overall pain response comparing SBRT and cEBRT (RR at 3 months: 1.12, 95% CI, 0.74-1.70, p = 0.59; RR at 6 months: 1.29, 95% CI, 0.97-1.72, p = 0.08). Only two of three studies presented complete pain response data. SBRT demonstrated a statistically significant improvement in complete pain response compared to cEBRT (RR at 3 months: 2.52; 95% CI, 1.58-4.01; P < 0.0001; RR at 6 months: 2.48; 95% CI, 1.23-4.99; P = 0.01). There were no significant differences in local progression and overall survival. Adverse events were similar, except for any grade radiation dermatitis, which was significantly lower in SBRT arm (RR 0.17, 95% CI 0.03-0.96, P = 0.04).

Conclusion: SBRT is a safe treatment option for spine metastases. It may provide better complete pain response compared to cEBRT. Additional trials are needed to determine the potential benefits of SBRT in specific patient subsets.

Keywords: Bone Neoplasms/secondary; Conformal; Meta-Analysis; Pain Management; Radiotherapy; Stereotactic Body Radiation Therapy.