



CONFERENCES

OARs

Should organs at risk (OARs) be prioritized over target volume coverage in stereotactic ablative radiotherapy (SABR) for oligometastases? a secondary analysis of the population-based phase II SABR-5 trial

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Abstract

BACKGROUND AND PURPOSE

Stereotactic ablative radiotherapy (SABR) for oligometastases may improve survival, however concerns about safety remain. To mitigate risk of toxicity, target coverage was sacrificed to prioritize organs-at-risk (OARs) during SABR planning in the population-based SABR-5 trial. This study evaluated the effect of this practice on dosimetry, local recurrence (LR), and progression-free survival (PFS).

METHODS

This single-arm phase II trial included patients with up to 5 oligometastases between November 2016 and July 2020. The protocol-specified planning objective was to cover 95 % of the planning target volume (PTV) with 100 % of the prescribed dose, however PTV coverage was reduced as needed to meet OAR constraints. This trade-off was measured using the coverage compromise index (CCI), computed as minimum dose received by the hottest 99 % of the PTV (D99) divided by the prescription dose. Under-coverage was defined as CCI < 0.90. The potential association between CCI and outcomes was evaluated.

RESULTS

549 lesions from 381 patients were assessed. Mean CCI was 0.88 (95 % confidence interval [CI], 0.86-0.89), and 196 (36 %) lesions were under-covered. The highest mean CCI (0.95; 95 % CI, 0.93-0.97) was in non-spine bone lesions (n = 116), while the lowest mean CCI (0.71; 95 % CI, 0.69-0.73) was in spine lesions (n = 104). On multivariable analysis, under-coverage did not predict for worse LR (HR 0.48, p = 0.37) or PFS (HR 1.24, p = 0.38). Largest lesion diameter, colorectal and 'other' (non-prostate, breast, or lung) primary predicted for worse LR. Largest lesion diameter, synchronous tumor treatment, short disease free interval, state of oligoprogression, initiation or change in systemic treatment, and a high PTV Dmax were significantly associated with PFS.

CONCLUSION

PTV under-coverage was not associated with worse LR or PFS in this large, population-based phase II trial. Combined with low toxicity rates, this study supports the practice of prioritizing OAR constraints during oligometastatic SABR planning.

KEYWORDS

Coverage compromise index; Oligometastases; Oligometastasis; SABR; SABR-5; SBRT; Stereotactic ablative radiotherapy; Stereotactic body radiation therapy.

