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Association between Radiation and Immunotherapy Sequencing and Survival in Spine Stereotactic Body Radiation Therapy

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Abstract
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Abstract

Objective: The purpose of the study is to retrospectively investigate if immunotherapy sequencing was associated with local control, fracture risk, or survival in SBRT for spine metastases.

Methods: All patients at our institution who received SBRT and systemic therapy for spine metastases from 2010-2019 were retrospectively reviewed. Primary endpoint was local control (LC). Secondary endpoints were vertebral fracture and overall survival (OS). Kaplan-Meier analysis was used to determine if the use of and timing of immunotherapy in relation to SBRT were associated with LC, OS or fracture.

Results: A total of 191 lesions in 127 patients were treated with SBRT and had systemic therapy data available for analysis. The median age was 62 years (range: 16-91). Median follow up was 16.5 months (range: 1.0-118.0). Median Karnofsky Performance Status was 80 (range: 40-90). 107 (56%) lesions were treated in a single fraction using either 16Gy (n=77, 44.8%) or 18Gy (n=13, 7.6%). The remainder were treated in 3 fractions to a median dose of 24 Gy (range: 18-27). The most common primary histologies were NSCLC (n=35, 18.3%), breast (n=35, 18.3%), and renal cell carcinoma (n=26, 13.6%). Forty-two (33.0%) patients with 62 (32.5%) lesions received immunotherapy, and 17 patients with 26 (13.6%) lesions received the first dose prior to the first fraction of SBRT while 25 (19.6%) patients with 36 (18.8%) lesions received the first dose after SBRT. Non-immunotherapy systemic therapies were administered in 172 (90.1%) lesions.

LC did not significantly differ between lesions treated with immunotherapy before SBRT vs after (1 year LC 75.3% vs 82.9%, p=.195). Fracture risk was also not associated with immunotherapy timing (p=.653). OS was higher in patients who received immunotherapy after vs before SBRT (median OS 34.1 months vs 6.6 months, p<0.001). Immunotherapy treatment at any time versus no immunotherapy was not associated with any difference in LC (p=.489) or OS (p=.289).

Conclusion: While there was no difference in outcomes between different systemic therapy regiments, patients in our cohort who received immunotherapy after SBRT had higher rates of survival than those who received immunotherapy before SBRT.