Descriptive Analysis of Oligometastatic Lesions Treated With Curative-Intent Stereotactic Body Radiation Therapy

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Purpose

To characterize oligometastases in patients enrolled on two prospective pilot studies, treating oligometastases with hypofractionated stereotactic body radiation therapy and stereotactic radiosurgery to cranial lesions.

Methods and Materials

We describe the characteristics and local control (LC) of 293 lesions in 121 patients with five or fewer metastases treated with stereotactic body radiation and/or cranial stereotactic radiosurgery. For each lesion, the primary cancer site, tumor histology, site of metastasis, gross tumor volume, and prescribed dose were ascertained. The prescribed dose is expressed by the biologically effective dose in 2-Gy fractions (BED2), calculated using the linear quadratic model, assuming an $\alpha/\beta$ ratio of 10.

Results

Lung lesions were significantly smaller than other lesions in our cohort, whereas liver lesions were significantly larger, possibly reflecting a detection and/or referral bias. The 2-year and 4-year tumor LC rates were 77% and 73% respectively. A larger gross tumor volume was significantly ($p < 0.0001$) correlated with worse lesion LC. Lesions originating from primary pancreatic, biliary or liver cancer exhibited significantly poorer LC, as did lesions from colorectal cancer. Lesions from breast cancer were better controlled. A higher BED2 did not correlate with improved tumor control.

Conclusions

Stereotactic body radiation to aggressively treat oligometastatic lesions results in good local tumor control. Bulkier lesions are more difficult to control and may benefit from dose escalation.

Stereotactic body radiotherapy, Oligometastases

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