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Abstract

Stereotactic Body Radiotherapy (SBRT) for Colorectal Liver Metastasis - Updated Clinical Outcomes from the International Multi-Institutional RSSearch® Patient Registry

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Abstract

Objectives: We investigated factors associated with clinical outcome for liver metastases from colorectal primary tumors treated with Stereotactic Body Radiotherapy (SBRT) from a multi-center, international, prospective patient registry.

Methods: A subgroup of patients with colorectal liver metastases treated with SBRT was identified from the RSSearch® Patient Registry. Patient, tumor and treatment characteristics associated with outcome were evaluated. Dose fractionations were normalized to BED10. Overall survival (OS), local control (LC) and progression-free survival (PFS) were evaluated using Kaplan Meier analysis and log-rank test.

Results: 254 patients with 354 liver metastases from primary colorectal cancer treated with SBRT between 2005-2019 in 25 institutions and enrolled in the RSSearch Patient Registry were included. Median age was 67 years (30-90 years) with a median KPS of 90% (40-100%); 60% of patients were male and 40% female, with a median body mass index (BMI) of 27.6 (4.8 - 52.14). The median follow-up was 13 months (1-81 months). 77% of patients received prior or concurrent chemotherapy. Median tumor volume was 25.1 cm3 (0.5 - 638 cc) with a median SBRT dose was 45 Gy (16 - 60 Gy) delivered in 1 to 12 fractions (median of 3). Median number of liver metastases was 1 (1-8). Median overall survival (OS) was 25 months and median local control (LC) was 41 months. Median progression-free survival (PFS) was 8 months. One and two-year OS was 75% and 55%, respectively. One and two-year LC was 79% and 68%, respectively; one and two-year PFS was 32% and 19%, respectively. Higher BED10 was associated with improved LC (median not met for BED10 = 100 Gy compared to 39 months for BED10 < 100 Gy, p=0.0001), PFS (median of 9 months for BED10 = 100 Gy and 6 months for BED < 100, p=0.0296) and OS (median of 29 months for BED10 = 100 Gy vs 16 months for BED10 < 100 Gy, p=0.0002). One-year LC rates for BED10 = 100 Gy and BED < 100 were 89% and 62%, respectively. One-year PFS was 35% for BED10 = 100 Gy compared to 26% for BED < 100, and one-year OS for BED10 = 100 Gy was 83% vs 62% for BED < 100. No previous or concurrent

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chemotherapy during SBRT was associated with higher OS and PFS. Median OS was 39 months for patients without chemotherapy vs 25 months for patients receiving chemotherapy (p= 0.0293). Median PFS was 12 months for patients without chemotherapy vs 8 months for patients receiving chemotherapy (p = 0.0098). Chemotherapy was not associated with LC. Tumor volume, age, KPS, BMI were not associated with OS, LC or PFS.

Conclusions: In this multi-institutional prospective cohort, BED10 was the only variable positively correlated with OS, LC and PFS. Chemotherapy was negatively associated with both OS and PFS and did not have any impact on LC, probably due to more advanced systemic disease and/or end-stage disease at the time of SBRT.