

Stereotactic Body Radiotherapy for Hepatocellular Carcinoma: the RSSearch® Patient Registry's Experience

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Abstract

Objectives: To report overall survival and local control for patients identified in the RSSearch® Patient Registry with hepatocellular carcinoma (HCC) treated with liver stereotactic body radiotherapy (SBRT).

Methods: All patients in the RSSearch® Registry with hepatocellular carcinoma treated with SBRT were identified. Available treatment plan parameters and outcome data for overall survival and local control were extracted. SBRT dose and fractionation schedules for all patients were normalized using the linear-quadratic equation with $\alpha/\beta = 10$ to generate biologically equivalent doses (BED) for dose-response analysis. Actuarial local control and overall survival curves were generated using the Kaplan-Meier method. Comparisons between groups were made using log-rank testing. Multivariate Cox models were generated to evaluate predictors of local control and overall survival.

Results: Seventy-one patients with hepatocellular carcinoma were identified in the RSSearch® Registry treated with SBRT from 2007-2016. Patients with incomplete data were excluded from further analysis. 44 patients with available SBRT treatment parameters were evaluable for overall survival and 19 deaths were recorded. Median OS for the entire cohort was 463 days. Median OS was 281 days for patients with lesions treated to doses < 100 Gy10 compared to median OS of 474 days for patients with lesions treated to doses ≥ 100 Gy10 (logrank $p=0.032$). 25 patients with available SBRT treatment parameters were evaluable for local control and 6 local failure events were recorded. Median time to local failure was not reached for the overall cohort. Median time to local failure was 144 days for patients with lesions treated to doses < 100 Gy10 whereas median time to local failure was not reached for patients with lesions treated to doses ≥ 100 Gy10 (logrank $p=0.013$). The relationship between BED ≥ 100 Gy10 and local control persisted in a multi-variable Cox regression model adjusting for patient age ($p=0.015$). This relationship between BED ≥ 100 Gy10 and OS also persisted in a multi-variable Cox regression model adjusting for patient age ($p=0.012$). 14 patients had reported CTCAE graded toxicities: 8 patients had Grade 1 toxicity, 5 patients had Grade 2 toxicity, 1 patient had Grade 3 toxicity. Reported toxicity was most commonly gastrointestinal and constitutional.

Conclusions: Rates of OS and local control demonstrated in a multi-institutional prospective database (RSSearch® Patient Registry) of liver SBRT for HCC are comparable to published

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single institution experiences. Our analysis demonstrates improved OS duration and improved local control with liver SBRT for HCC when dose-fractionation schedules with BED ≥ 100 Gy10 are utilized. Further studies with a larger number of patients are needed to validate this finding.