Cureus

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Abstract

Toxicity and Efficacy of Stereotactic Body Radiation Therapy for Liver Tumors Larger Than 5 cm: A Case Series

Nina N. Sanford [1] , Harvey J. Mamon [1]

1. Radiation Oncology, Dana-Farber Cancer Institute / Brigham and Women's Hospital

Corresponding author: Nina N. Sanford, nsanford@partners.org

Categories: Gastroenterology, Radiation Oncology
Keywords: stereotactic body radiation therapy, sbrt, liver sbrt, toxicity

How to cite this abstract
Sanford N N, Mamon H J (November 02, 2017) Toxicity and Efficacy of Stereotactic Body Radiation Therapy for Liver Tumors Larger Than 5 cm: A Case Series. Cureus 9(11): a207

Abstract

Objectives: Liver stereotactic body radiotherapy (SBRT), which is increasingly used to treat liver metastases, hepatocellular carcinoma (HCC) and cholangiocarcinoma, has been shown to result in excellent local control, however the majority of prior research has focused on small tumors. There is concern that the efficacy and toxicity of liver SBRT with larger lesions is worse, however this has not been thoroughly investigated. Here, we report the outcomes of a series of patients with tumors larger than 5 cm.

Methods: We retrospectively reviewed the outcomes of 15 patients with liver tumors larger than 5 cm in widest dimension who were treated with SBRT between March 2012 and November 2016. The primary histology was HCC in 6, intrahepatic cholangiocarcinoma in 2, and other in 7 (1 oropharyngeal squamous cell carcinoma, 1 anal carcinoma, 1 colon adenocarcinoma, 1 adenocarcinoma of unknown primary, 1 adenoid cystic carcinoma, 1 retroperitoneal leiomyosarcoma, 1 metastatic neuroendocrine tumor). Seven patients had received prior liver-directed therapies, although none to the index lesion. The median age at diagnosis was 70 years (range 53 to 91 years) and median tumor size was 6.5 cm (range 5.1 to 8.7 cm).

Results: Patients were treated with a variety of dose-fractionation schedules including 5 Gy x 7 for 1, 6 Gy x 5 in 2, 6.6 Gy x 5 in 1, 7 Gy x 5 in 1, 7.5 Gy x 5 in 1, 8 Gy x 5 in 1, 9 Gy x 5 in 1, 10 Gy x 5 in 4, 12 Gy x 5 in 2 and 18 Gy x 3 in 1. Overall, the median BED to the GTV was 85.5 Gy (range 48 to 151.2 Gy). The median gross tumor volume (GTV) 90.35 cc (range 48.61 to 384.80 cc). 4D CT was used for simulation in 13 patients. Thirteen plans were with volumetric modulated arc therapy (VMAT) and 2 were with 3D conformal radiotherapy.The median follow-up among surviving patients from completion of SBRT was 7.9 months (range 1.7 to 14.5 months). Ten patients experienced an acute toxicity. These were predominantly Grade 1 and included 7 with fatigue, 1 with fever, 1 with pain, 3 with anorexia, 3 with nausea, 1 with dyspepsia and 1 with vomiting. One patient had Grade 2 fatigue and another had Grade 2 dehydration. Other than 1 patient with persistent Grade 1 abdominal pain, there were no incidences of late toxicity. There was one local failure at 3.5 months in a patient with metastatic anal cancer who had received 12 Gy x 5 to a 5.2 cm lesion, translating to a local control rate of 93.3%. At last follow-up, 6 had died due to cancer, 4 were alive with stable disease, 4 were alive with disease progression (1 local failure, 1 distant failure, 1 failure in non-treated liver, 1 failure distantly and in non-treated liver) and 1 was alive with no evidence of active disease. Median time to disease progression was 4.8 months.

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Published 11/02/2017

Conclusions: SBRT for liver tumors > 5 cm appears to be well-tolerated and effective although the majority of patients receiving liver SBRT had a poor prognosis from their primary disease. If our findings are validated in a large, prospective cohort, then we would recommend consideration of this non-invasive treatment for patients with large liver tumors.