

Stereotactic Body Radiation Therapy (SBRT) to Sites of Extracranial Metastatic Cancer and Factors Associated with Short Interval to Death After Treatment

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INTRODUCTION

Radiation therapy is commonly used in both curative and palliative treatments for many forms of cancer. A modern technique, stereotactic body radiation therapy (SBRT), allows for the delivery of high doses of radiation to target sites of disease (tumor + at-risk tissues), while simultaneously minimizing toxicity to healthy tissues. Among patients with metastatic cancers, SBRT has been shown to improve disease control in patients with limited sites of disease (1-3), but it also more effectively treat pain for tumors in the spine than conventional techniques in many cases (2).

AIM

Evaluate factors associated with a short duration of survival following SBRT to sites of extracranial metastases.

METHOD

Data and Participants

- IRB approval was obtained.
- Patients who received SBRT at extracranial sites of metastatic cancer at UNC between 2014 and 2022 were identified, and their medical records were reviewed to build a database of demographic, disease, and treatment details.

Statistical Analysis

- Descriptive statistics were performed.
- SBRT events were separated into two groups: those who did versus did not die within 180 days of SBRT.
- Comparisons were made between these groups using chi-square test, Fisher's exact test, and t-test.
- Kaplan-Meier survival analysis was performed for the entire cohort, and a multivariable Cox regression model was created to examine the effect of significant variables on univariable analysis
- All analyses were performed using SPSS Statistics 28 (IBM Corporation, Armonk, NY)

RESULTS

267 patients with 366 SBRT treatments were identified. Overall, 366 SBRT treatments were received by this cohort, 11.7% are reported to have died within 180 days of SBRT.

Among the 267 patients, 25.7% were diagnosed with breast or prostate cancer but accounted for 11.6% of deaths within 180 days of SBRT. Patients treated to the spine made up 30% of the cohort yet accounted for 48.8% of deaths before 180 days. Before SBRT, 55.7% of the cohort received radiation therapy at their primary site of disease, and 21.0% received radiation therapy at a site of metastatic disease.

21.0% of patients had a Karnofsky Performance Status (KPS) \leq 70; however, this group disproportionately made up 34.9% of those who died within 180 days of SBRT. At the time of treatment, 34 SBRT episodes were associated with \leq 3 progressing lesions and made up 79.1% of those who died within 180 days of SBRT.

Variable	Group	Dead Within 180 Days n = 43 (%)	Died after 180 Days n = 323 (%)	Total N = 366	Sig (p)
Progressing Lesions	3 or fewer	34 (79.1%)	293 (90.7%)	327 (89.3%)	0.09
	4 or more	9 (20.9%)	30 (9.3%)	39 (10.7%)	
Karnofsky Performance Status (KPS)	70 or less	15 (34.9%)	62 (19.2%)	77 (21.0%)	0.032
	80 or better	28 (65.1%)	261 (80.8%)	289 (79.0%)	
Site	Spine	21 (48.8%)	89 (27.6%)	110 (30.1%)	<0.001
	Non-spine bone	8 (18.6%)	65 (20.1%)	73 (19.9%)	
	Liver	2 (4.7%)	37 (11.5%)	39 (10.7%)	
	Lung	8 (18.6%)	85 (26.3%)	93 (25.4%)	
Histology	Other	4 (9.3%)	47 (14.6%)	51 (14.9%)	0.091
	Breast or Prostate	38 (84.4%)	234 (72.4%)	272 (74.3%)	

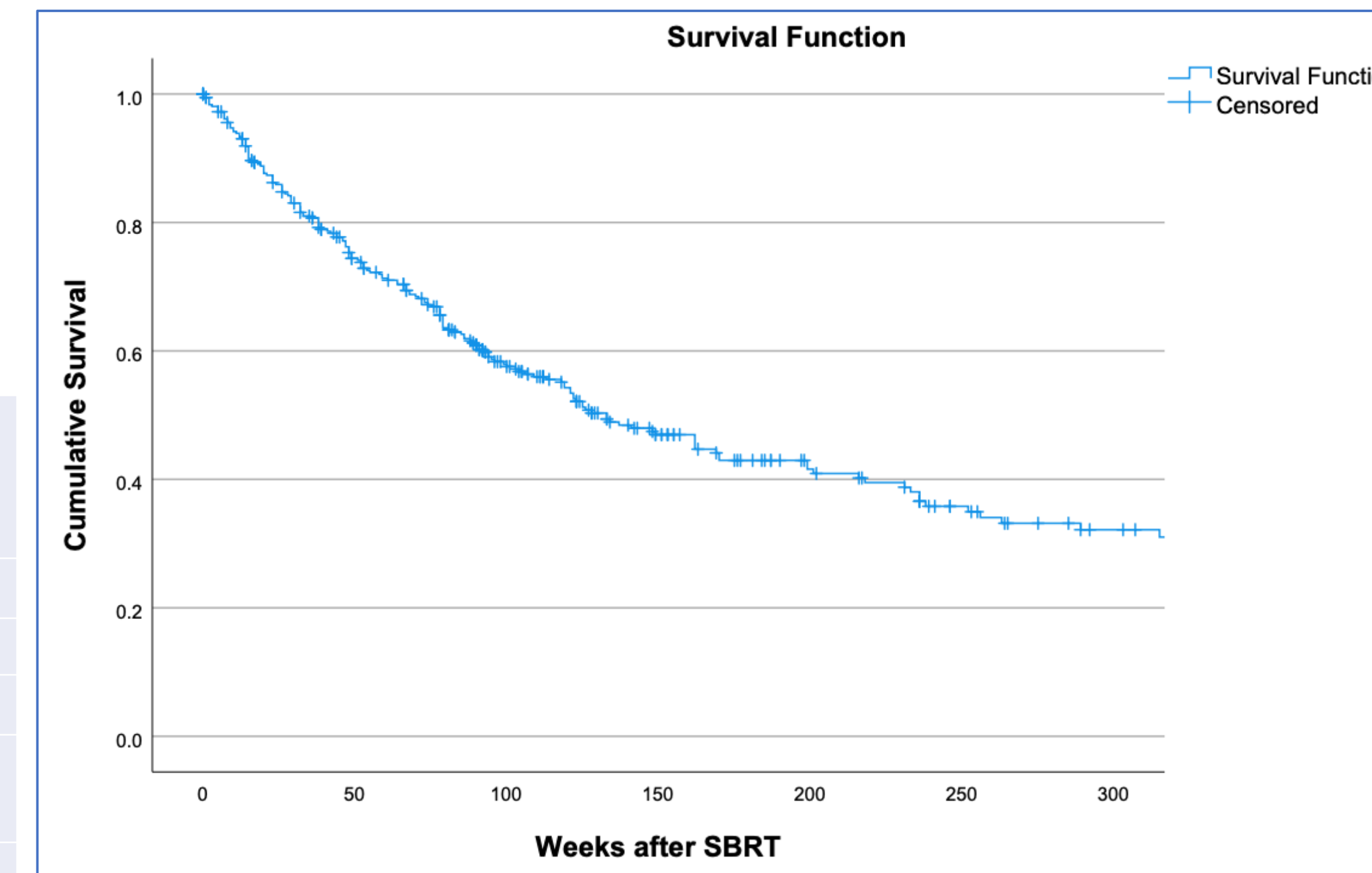


Figure 1: Survival curve for entire cohort of patients. Displays patient survival and censors points belonging to patients who were lost to follow up.

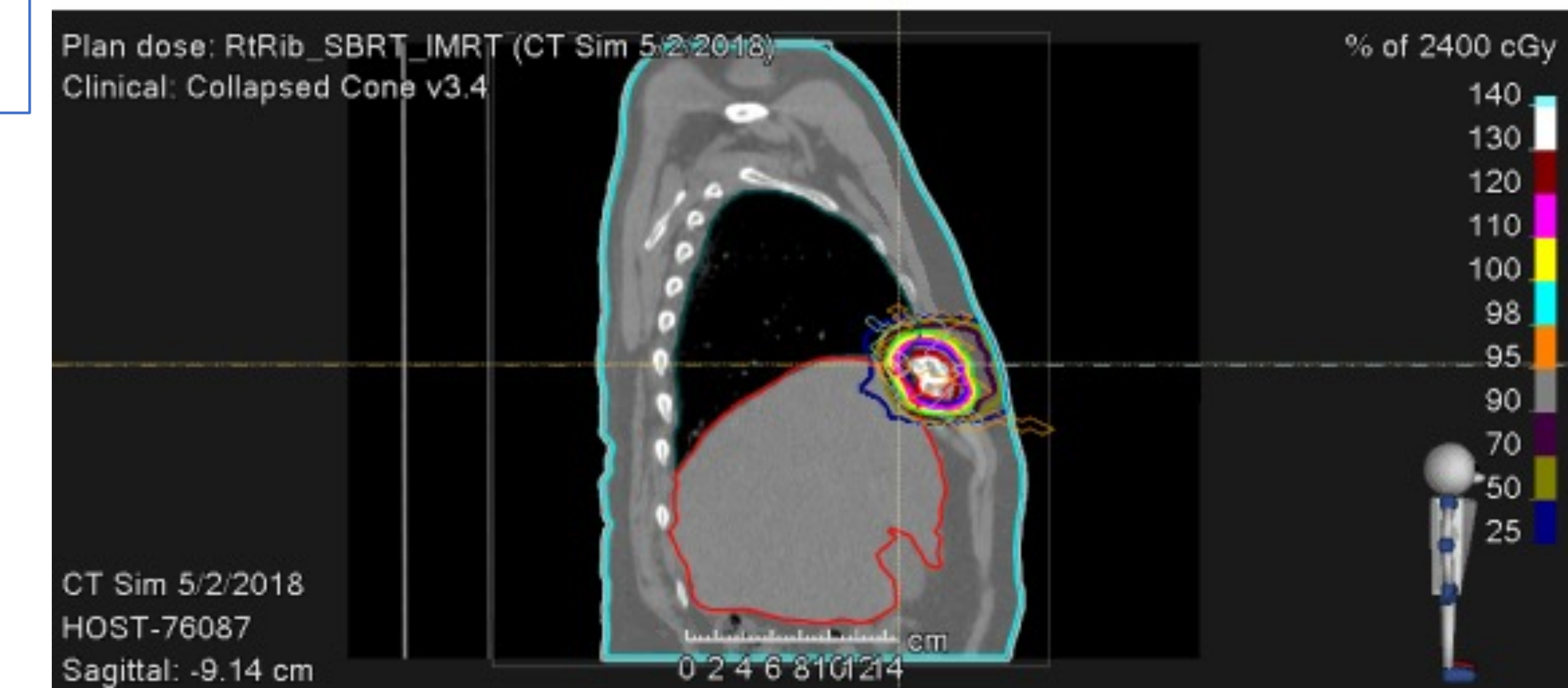
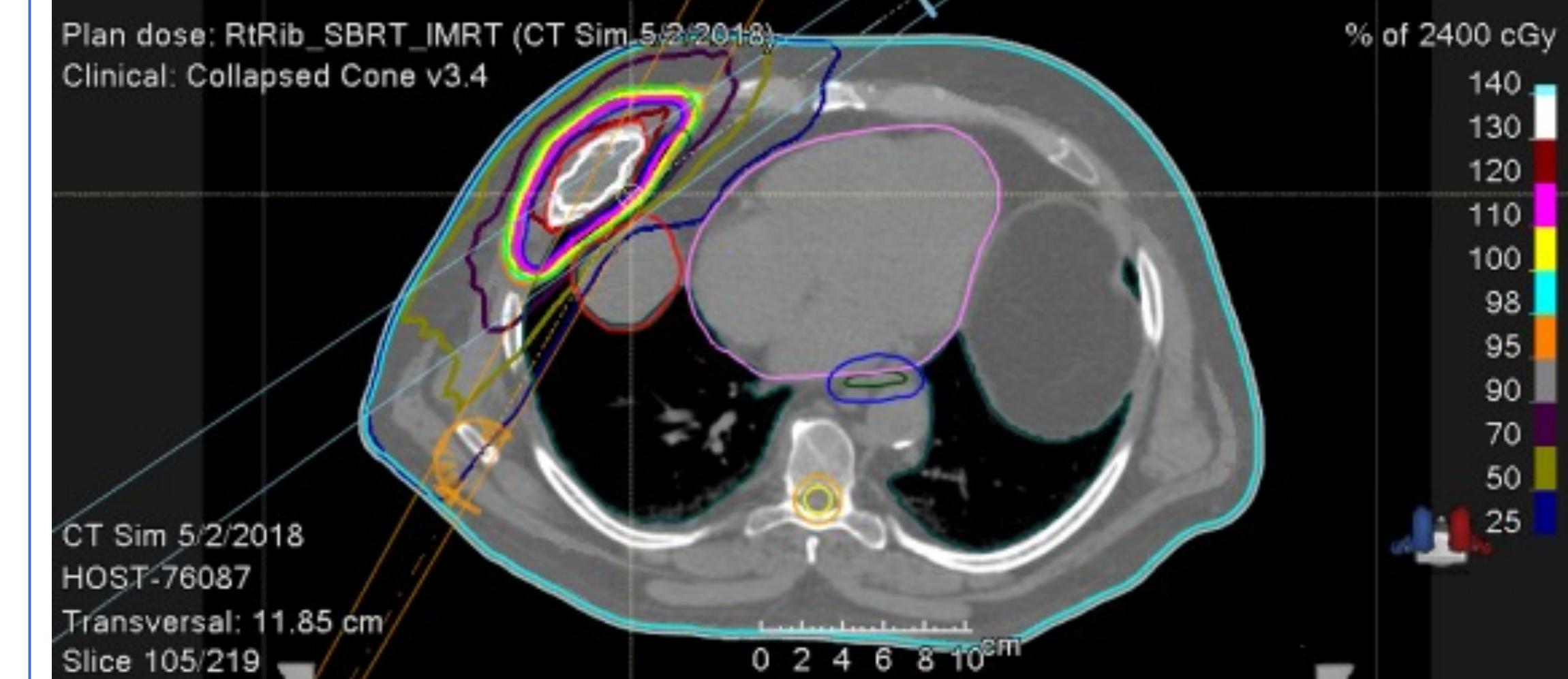


Figure 2: SBRT for rib metastasis

CONCLUSIONS AND NEXT STEPS

- Analysis of these records suggests multiple factors associated with the duration of survival after treatment.
- This study suggests patients with low-performance status, progressing cancer, and previous radiation treatment are associated with shorter survival.
- These results provide context for the current utilization of SBRT in the palliative setting and could help guide the selection of appropriate patients for future treatment.
- The next steps include the development of a prospective database of patients treated with SBRT at sites of metastatic disease and obtaining patient-reported outcomes to better guide management.

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