Reirradiation of Patients with Hepatocellular Carcinoma Is Associated with Decreased Liver Toxicity and Increased Survival

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INTRODUCTION

Laboratory biomarkers play a key role in assessing SBRT outcomes in HCC patients, predicting survival and toxicity, and guiding further personalized treatment. Although several retrospective and prospective studies have been conducted, many are limited by small sample sizes, a narrow focus on specific biomarkers. For a new course of liver stereotactic body radiation (reirradiation), we apply a normal tissue complication probability(NTCP) model to guide planning and estimate toxicity risk.

AIM

We assessed the effectiveness of this approach in achieving longer survival and delaying liver toxicity in patients undergoing reirradiation for hepatocellular carcinoma(HCC), using retrospective matched patient data.

METHOD

Patient Cohort

Retrospective analysis of 290 patients without prior liver SBRT and 41 patients who received one previous SBRT course

Matching Protocol

Patients without prior irradiation were matched on Albumin-Bilirubin (ALBI) values within the interquartile range (Q25–Q75) of the reirradiation group.

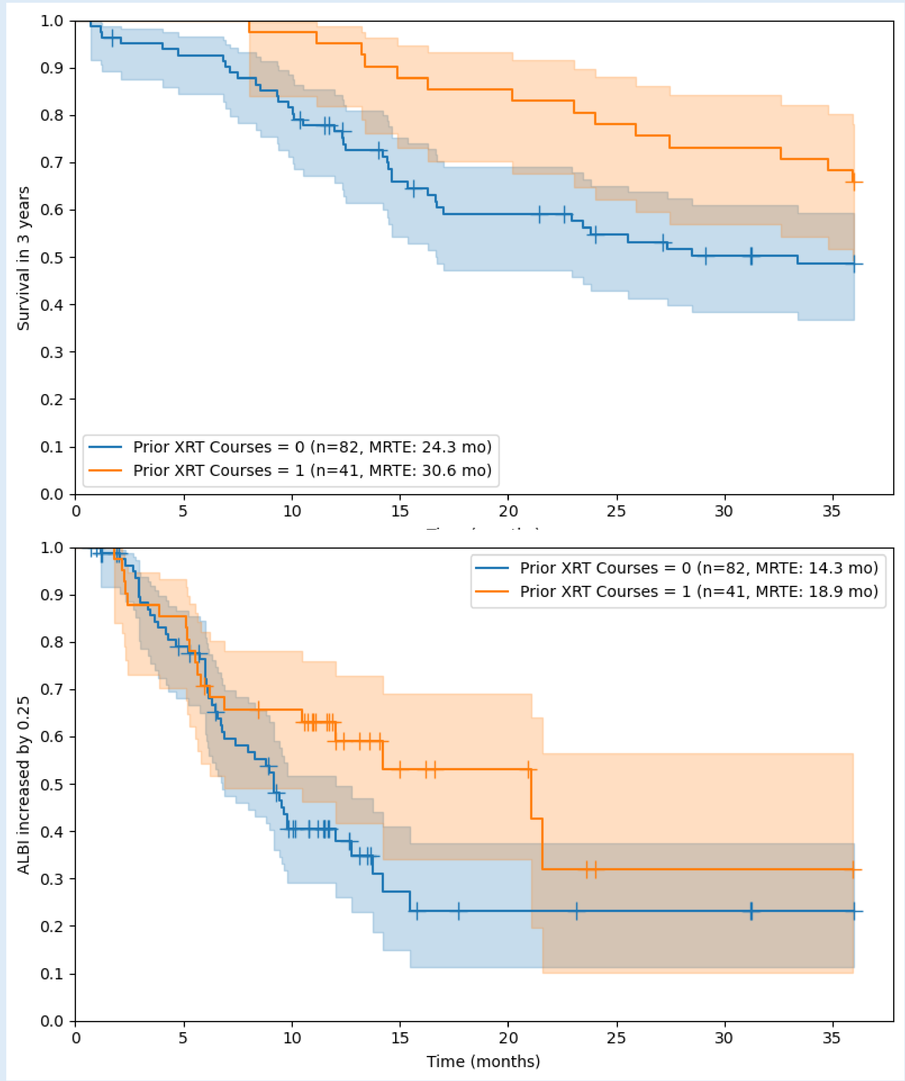
Final Study Population

82 patients without prior irradiation vs. 41 patients with reirradiation.

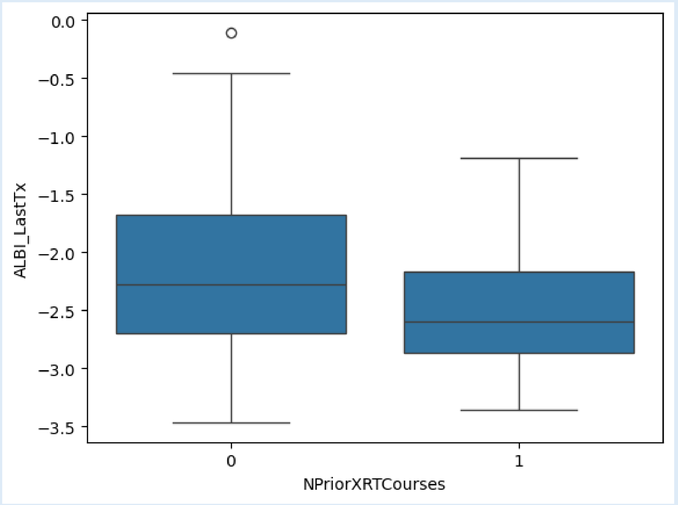
Primary Outcomes

Three-year survival (3yrS) and onset of liver toxicity (ALBI score increase ≥ 0.25).

RESULTS



RESULTS



- Three-year survival estimated via median restricted time estimators (MRTE): 24.3 mo (no prior irradiation) vs. 30.6 mo (reirradiation)
- Time to liver toxicity (ALBI increase ≥ 0.25): 14.3 mo vs. 18.9 mo — delayed onset with reirradiation
- Cox hazard analysis: lower risk of adverse outcomes in the reirradiation cohort for both survival and toxicity
- Both hazard ratios (0.61 survival, 0.67 toxicity) were statistically significant ($p < 0.01$)

CONCLUSIONS

Reirradiation of the liver for new lesions, guided by an NTCP model, is linked to longer time to toxicity and improved three-year survival versus matched patients without prior hepatic irradiation. Favorable outcomes in the reirradiation group may reflect selection of patients with less aggressive disease or better liver function. Prospective studies are needed for confirmation and clarification.

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