

# Clinical Outcomes and Treatment-Related Factors in Patients with Hepatocellular Carcinoma Treated with Ablative Radiation Therapy

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## Introduction

- Hepatocellular Carcinoma (HCC) is the most common form of liver cancer, making up 75%-85% of cases.<sup>1</sup>
- Hawai'i has one of the highest incidence rates of HCC (9.5 per 100,000) in the United States.<sup>2</sup>
- Stereotactic body radiation therapy (SBRT) is a local therapy for patients not candidates for surgery or other liver directed therapies.<sup>3</sup>
- SBRT is reported to have an exceptional local control rate with 90% in small tumors.<sup>4</sup>

## Aim

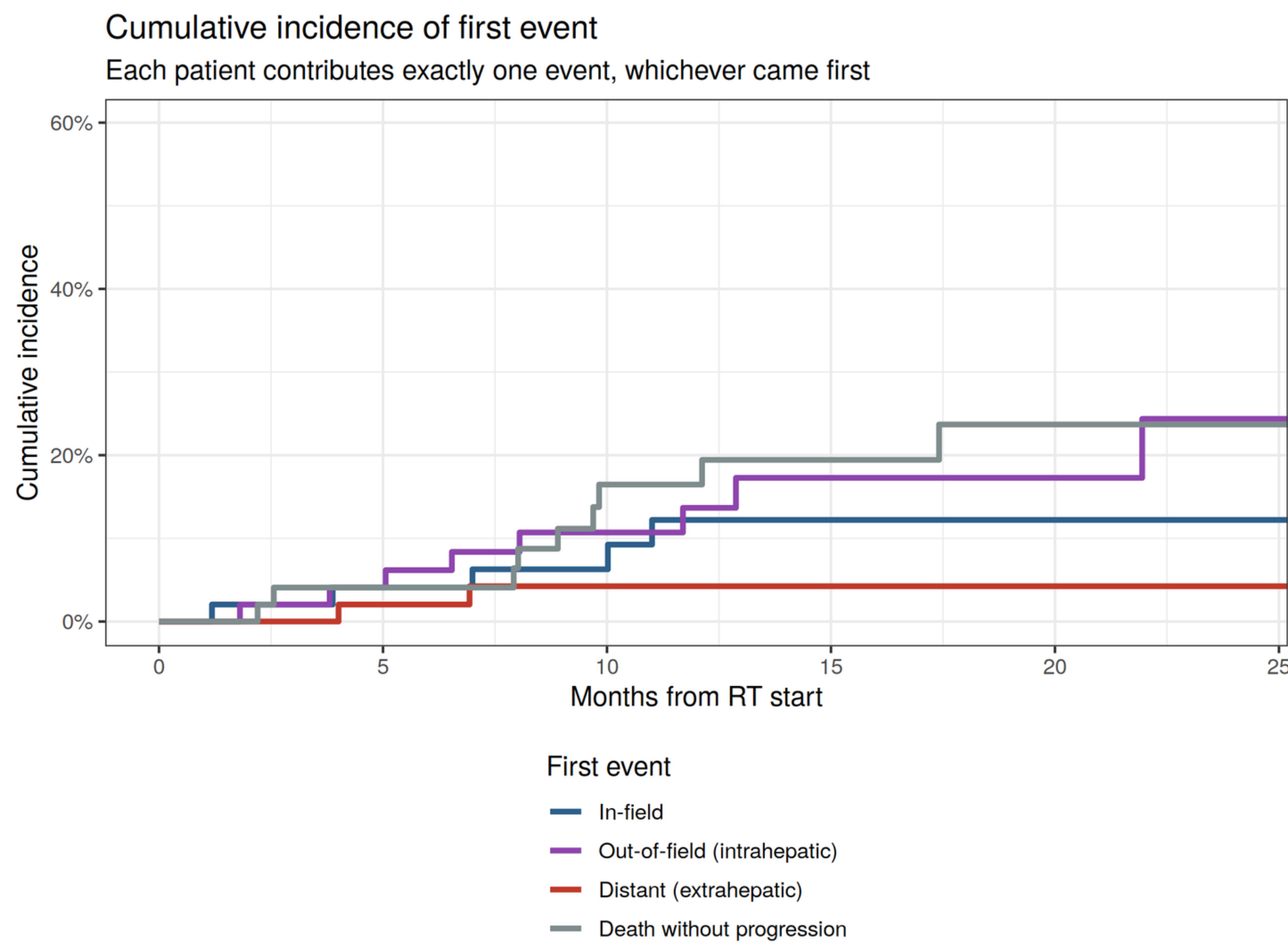
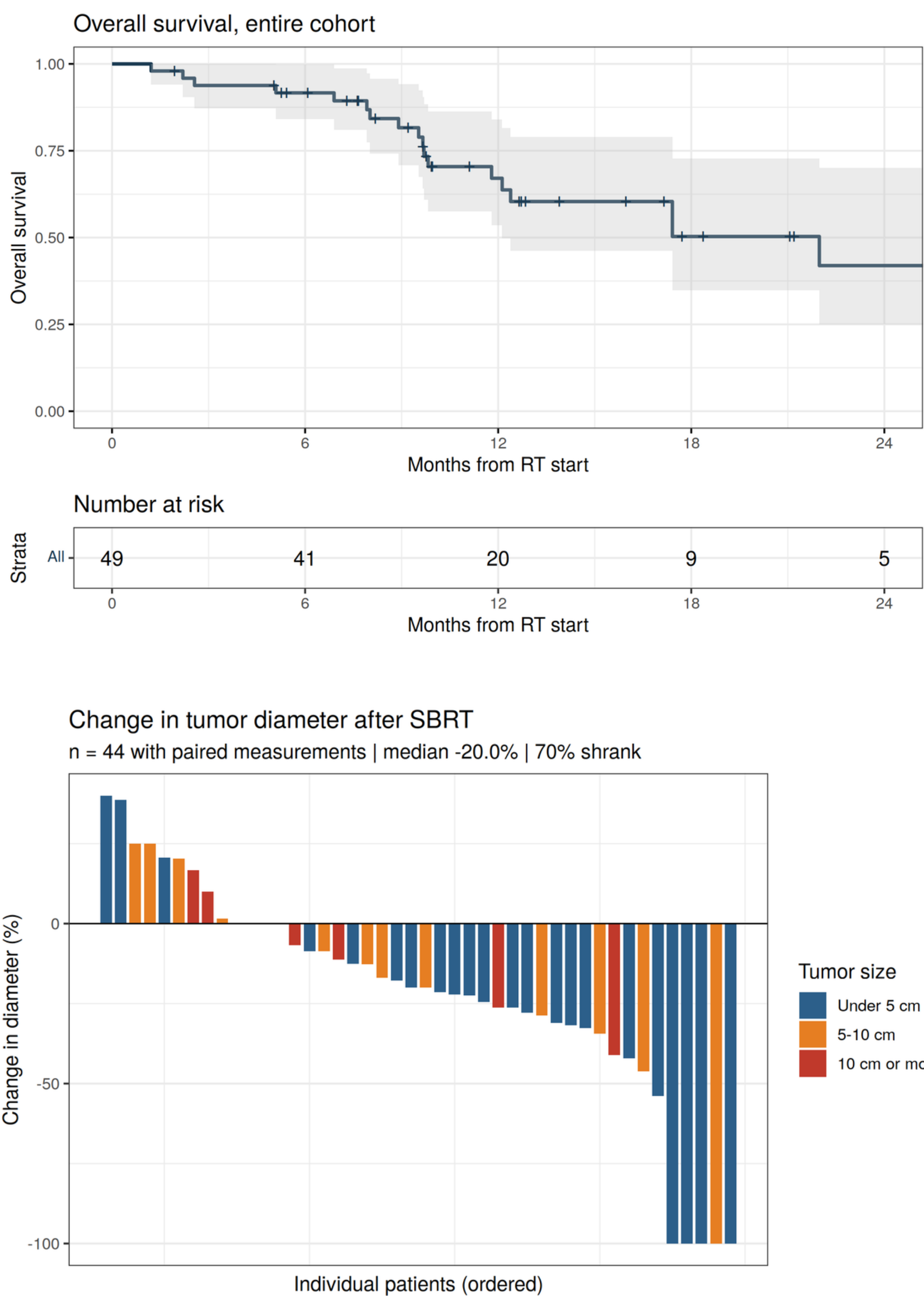
- The focus of this study was to characterize patient outcomes when treated with ablative radiation therapy

## Methodology

- This single institution retrospective study looked at patients who underwent SBRT to the liver between 2015 to 2025.
- Participants had HCC and their clinicodemographic characteristics were described
- The Kaplan Meier method was used to estimate progression free and overall survival. Cumulative incidence of local progression was estimated to account for competing risks of death.
- Cox regression model was used to calculate adjusted HR (aHR) of tumor progression and survival

## Results

| Patients (n = 49)                                                               |                      |                                          |                    |
|---------------------------------------------------------------------------------|----------------------|------------------------------------------|--------------------|
| Characteristic                                                                  | Value                | Characteristic                           | Value              |
| Age, years, median (IQR)                                                        | 70.0 (65.0-78.0)     | Child-Pugh score, median (IQR)           | 6.0 (5.0-7.0)      |
| Male                                                                            | 36 (77%)             | Child-Pugh >=7                           | 17 (35%)           |
| Non-White                                                                       | 39 (80%)             | Tumor size, cm, median (IQR)             | 4.2 (2.9-6.5)      |
| Native Hawaiian / Pacific Islander (Chuukese, Marshallese, Samoan, Micronesian) | 14 (29%)             | Range                                    | 0.8 - 19.1         |
| East Asian (Chinese, Japanese, Korean)                                          | 19 (39%)             | >=5 cm / >=10 cm                         | 20 (41%) / 7 (14%) |
| South East Asian (Filipino, Laotian)                                            | (4 Filipino) 5 (10%) | Dose, Gy, median (IQR)                   | 45.0 (40.0-50.0)   |
| Hepatitis B / Hepatitis C                                                       | 20 (42%) / 12 (25%)  | Prior liver-directed or systemic therapy | 16 (33%)           |



## Conclusion

- SBRT yields high local control for HCC, though intrahepatic out-of-field progression remains the predominant failure mode.
- Tumor size is associated with shorter PFS, highlighting the need for multimodal therapy combining SBRT with systemic agents.
- For patients with advanced Child-Pugh disease, optimal management requires balancing local control against hepatic function preservation.

- 40.8% had tumors > 5 cm, 34.7% had CP B7 or higher disease, 33% had at least one prior cancer-directed therapy
  - Prior therapies included 9 (18%) y90, 3 (6%) TACE, 2 (4%) RFA, 1 (2%) resection, 1(2%) transplant, 4 (8%) immunotherapy, 4 (8%) TKI.
- Cumulative incidence of local progression was 12.2% at 2 yrs, and intrahepatic out-of-field failure was 24.4% at 2 yrs
- PFS worsened as tumor size increased (aHR per cm (HR 1.18, 95% CI 1.07-1.30, p=0.001) stratifying by CP B7 or higher
- Overall survival worsened with size (aHR 1.19, 95% CI 1.04-1.37, p=0.013) and Child-Pugh (per point) aHR 1.60, 95% CI 1.19-2.16, p=0.002)
- In-field control was durable across the cohort. Of 19 deaths, 9 occurred without documented progression, more often in patients with worse baseline liver function (median CP 7 vs 5.5). Chart review attributed most of these to non-treatment causes (Gastrointestinal bleeding and tumor rupture)

## Acknowledgements

I would like a moment to extend my gratitude to Dr. Jared Hara, Dr. Jared Acoba, and Dr. Linda Wong for their support and for sharing their wealth of knowledge. I am also extremely grateful to Lori Tsue, Dr. Seto, Sherry Chan, and the Office of Research and Development for making the 2026 Queen's Summer Research Internship possible and for giving me this incredible opportunity.

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