

Locoregional Therapy of Hepatocellular Carcinoma



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KEYWORDS

- Hepatocellular carcinoma • Interventional oncology • Transplantation
- Locoregional therapies • Radioembolization • Transarterial chemoembolization
- Radiofrequency ablation • Percutaneous ethanol injection

KEY POINTS

- Most hepatocellular carcinomas are not amenable to standard surgical intervention or systemic oncologic therapies.
- Interventional oncology, practiced by a subset of interventional radiologists, offers minimally invasive, locoregional therapies for the treatment of hepatic malignancies.
- Some of these locoregional therapies can be combined, or used in sequence.
- In the setting of transplantation, locoregional therapies offer promise in “bridging” patients to transplantation.
- Large-scale studies in a randomized setting will help better elucidate the appropriate application of locoregional therapies for personalized care of a patient’s hepatocellular carcinoma.

INTRODUCTION

Locoregional therapy has become increasingly important for patients with hepatocellular carcinoma (HCC) because of advances of techniques, survival benefit, and a favorable safety profile. Although curative measures, such as liver transplantation and surgical resection, continue to be the gold standard, approximately 70% to 80% of patients are poor candidates for such invasive procedures.¹ Underlying liver dysfunction, stage of disease at presentation, and comorbidities limit patients from curative intervention. These patients often have extrahepatic spread of disease, cancer-related symptoms, and portal vein invasion, warranting alternative approaches

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that can help decrease rates of disease progression and recurrence. Patients with advanced-stage HCC according to Barcelona Clinic Liver Cancer (BCLC) specifications, could potentially receive sorafenib, a first-line therapy that has improved overall survival (OS) in both the Asia-Pacific and Sorafenib HCC Assessment Randomized Protocol (SHARP) trials.^{2,3} However, sorafenib warrants future quality-of-life (QoL) studies to better understand its tolerability. Systemic chemotherapy has not shown survival benefit in patients with advanced HCC. External beam radiation therapy has been used in a similar clinical setting; however, radiation-induced liver disease (RILD) (ie, elevation of liver enzymes, hepatomegaly, and/or ascites) has proven to complicate its use.^{4,5} For patients who may not be candidates for therapies due to comorbidities or disease stage, interventional radiology (IR) has allowed for treatment of these patients via locoregional techniques, image-guided therapies that allow for minimally invasive delivery of oncologic and necrotizing agents. The therapies can be divided into catheter-based embolotherapies, such as radioembolization (RE, with Yttrium-90 [⁹⁰Y]) or transarterial chemoembolization (TACE), and thermal ablative therapies, such as radiofrequency ablation (RFA), microwave ablation (MWA), irreversible electroporation (IRE), cryoablation, and chemical ablation, such as percutaneous ethanol injection (PEI). Potential risks and benefits of these treatments, appropriate patient selection, and determining response to therapy is discussed at length (summarized in [Tables 1–4](#)), helping elucidate the application of locoregional therapy in the setting of HCC.

Table 1					
Candidacy for surgical resection, liver transplantation, or ablative therapies according to Barcelona Clinic Liver Cancer stage					
Patient Type					
Stage	Performance Status	Nodules	Metastases	Associated Disease	Treatment
A (Early)	0	3 nodules <3 cm	None	Yes	Ablative
B (Intermediate)	0	Multinodular	None	X	Chemoembolization
C (advanced)	1–2	N1	M1	Portal invasion	Sorafenib
Patient Type					
Surgical Resection Candidate	CTP Class	Transplant Candidate	Extrahepatic Disease	Nodules	Treatment
Yes	A/B	No	No	Solitary	On operative evaluation if inoperable—>ethanol injection, RFA, cryoablation
No	C	No	No	If single <5 cm, or up to 4 lesions, each <4 cm	RFA, PEI/ cryoablation, TACE, RE, radiotherapy
No	C	Yes	No	X	Bridge to transplant (RFA, TACE, RE)

Abbreviations: CTP, Child-Turcotte-Pugh; M1, distant metastasis; N1, regional lymph node metastasis; PEI, percutaneous ethanol injection; RE, radioembolization; RFA, radiofrequency frequency ablation; TACE, transarterial chemoembolization; X, not included for guidelines.

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