ACR Appropriateness Criteria Radiologic Management of Hepatic Malignancy

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Abstract

Management of primary and secondary hepatic malignancy is a complex problem. Achieving optimal care for this challenging population often requires the involvement of multiple medical and surgical disciplines. Because of the wide variety of potential therapies, treatment protocols for various malignancies continue to evolve. Consequently, development of appropriate therapeutic algorithms necessitates consideration of medical options, such as systemic chemotherapy; surgical options, such as resection or transplantation; and loco-regional therapies, such as thermal ablation and transarterial embolization techniques. This article provides a review of treatment strategies for the three most common subtypes of hepatic malignancy treated with loco-regional therapies: hepatocellular carcinoma, neuroendocrine metastases, and colorectal metastases. The ACR Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed every three years by a multidisciplinary expert panel. The guideline development and review include an extensive analysis of current medical literature from peer reviewed journals and the application of a well-established consensus methodology (modified Delphi) to rate the appropriateness of imaging and treatment procedures by the panel. In those instances where evidence is lacking or not definitive, expert opinion may be used to recommend imaging or treatment.

Key Words: Appropriateness criteria, Liver malignancy, chemoembolization, radioembolization, embolization, ablation

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SUMMARY OF LITERATURE REVIEW

Introduction/Background

Management of hepatic malignancy remains a challenging problem. Depending on the clinical scenario, traditional therapies, such as resection, systemic chemotherapy, and external beam radiation are either unavailable or ineffective. To help address this issue, several treatment techniques have been developed by interventional radiologists to treat hepatic malignancies. These treatments include direct tumor ablation via chemical or thermal means, and endovascular

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The American College of Radiology seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document.

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techniques, such as embolization, chemoembolization, and radioembolization with yttrium-90 (Y90). The role of these treatments in the management of primary and secondary hepatic malignancy is reviewed below.

Discussion by Variant

Variants 1-3: Primary hepatic malignancy; hepatocellular carcinoma. Despite marked advances in interventional oncology over the past decade, the preferred first-line treatment for hepatocellular carcinoma (HCC) remains liver transplantation when proper indications are met [1,2]. Unfortunately, the number of patients waiting for a transplant far outstrips the number of available organs. Patients younger than age 65 years who have a limited tumor burden (conventionally defined by the Milan criteria as 1 tumor measuring ≤5 cm or up to three tumors all measuring <3 cm) should undergo evaluation for transplantation [3]. In addition, resection offers acceptable long-term survival in suitable patients, often defined as those who have low-volume tumor burden, well-preserved liver function, and no significant portal hypertension [4].

Systemic therapy [5] and radiation therapy [6] have traditionally been ineffective in treating HCC. Marginal therapeutic improvement has been accomplished in recent years with the development of sorafenib, a multikinase inhibitor. A double-blinded randomized study of sorafenib versus placebo, in patients who have HCC, demonstrated a statistically significant difference in median overall survival: 10.7 months for those taking sorafenib, compared with 7.9 months for those taking placebo [7]. Nevertheless, given that many patients are not candidates for surgery, and in light of the relative ineffectiveness of other treatments, percutaneous therapies often play a central role in the management of HCC. These therapies can be categorized as either ablative or transarterial techniques.

Variant 1. Hepatocellular carcinoma: Solitary tumor <3 cm

Treatment/Procedure	Rating	Comments
Systemic chemotherapy	3	
Resection	8	
Transplantation	9	
Chemical ablation	5	
Thermal ablation	8	
Stereotactic body radiotherapy (SBRT)	5	
Transarterial embolization (TAE)	5	
Transarterial chemoembolization (TACE)	5	
Selective internal radiation therapy (SIRT)	5	

Rating Scale: 1,2,3 usually not appropriate; 4,5,6 may be appropriate; 7,8,9 usually appropriate.

Variant 2. Hepatocellular carcinoma: Solitary tumor 5 cm

Treatment/Procedure	Rating	Comments
Systemic chemotherapy	3	
Resection	8	
Transplantation	9	
Chemical ablation	3	The tumor is too large for chemical ablation. This procedure can be used instead of or in addition to thermal ablation, depending on the tumor location.
Thermal ablation	5	
Stereotactic body radiotherapy (SBRT)	4	
Transarterial embolization (TAE)	6	
Transarterial chemoembolization (TACE)	7	This procedure refers to either conventional TACE or DEB-TACE.
Selective internal radiation therapy (SIRT)	7	This procedure is especially applicable in portal vein thrombosis or extensive bilobar disease.
Transarterial chemoembolization (TACE) combined with thermal ablation	7	

Rating Scale: 1,2,3 usually not appropriate; 4,5,6 may be appropriate; 7,8,9 usually appropriate.

Ablative therapies are typically divided into two groups: chemical and thermal. Chemical ablation is accomplished by injection of a tumoricidal agent, typically absolute alcohol, directly into the tumor, under imaging guidance. Thermal ablation commonly refers to radiofrequency ablation (RFA), but other techniques include cryoablation and microwave ablation. Ablative therapies can be performed either percutaneously or surgically, using open or laparoscopic methods. RFA has been shown to be a more effective ablative therapy than percutaneous ethanol injection for treating HCC [8]. However, percutaneous ethanol injection may still have a legitimate role for treating tumors that are adjacent to critical structures that would be at higher risk of injury with RFA [9,10]. Microwave ablation has shown promise for this indication as well [11]. Theoretical justification for microwave ablation is that it may carry certain advantages, compared with RFA. These potential advantages include a decreased susceptibility to heat sink from adjacent large vessels, increased ability to supply thermal energy through