Refining the Role of TACE in HCC: Patient Populations That May Benefit Beyond BCLC B

Elliott L. Fite, MS,[1] Jad A. Elharake, MPH,[1] Israel O. Ailemen, BS,[1] Mina S. Makary, MD[2]
[1]The Ohio State University College of Medicine; Columbus, OH 43210, USA
[2]Department of Radiology, The Ohio State University Medical Center, Columbus, OH 43210

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Purpose

- Transarterial chemoembolization (TACE) is the recommended first-line therapy for intermediate-stage hepatocellular carcinoma (HCC) per the Barcelona Clinic Liver Cancer (BCLC) guidelines.
- Emerging evidence suggests its utility may extend to carefully selected early- and advanced-stage patients, particularly in combination with systemic agents.
- This review evaluates recent data supporting expanded indications for TACE and its role beyond traditional BCLC B populations.

Methods

- A literature review was conducted using PubMed and recent consensus guidelines, focusing on studies evaluating TACE in early (BCLC 0–A) and advanced-stage (BCLC C) HCC. Priority was given to prospective studies, meta-analyses, and large observational series reporting survival outcomes, response rates, and safety data. Combination therapy trials integrating TACE with systemic agents (e.g., sorafenib, lenvatinib, immune checkpoint inhibitors) were also assessed.

Study / Trial	Population	Intervention	Key Findings
	Early-stage (BCLC 0-A)		
Bargellini et al. (2024)	HCC patients unfit for curative therapies	Selective TACE	67% CR, 3-yr OS 80.5%
GIDEON Registry (BCLC C subgroup)	Advanced-stage (BCLC C) HCC with TACE + sorafenib vs. sorafenib alone	TACE + sorafenib vs. sorafenib alone	15.5 mo OS vs. 8.3 mo (sorafenib only)
Zhang et al. (2014) Meta-analysis	Intermediate- and advanced-stage HCC (multiple trials pooled)	TACE + sorafenib vs. TACE alone	HR 0.65 for OS, HR 0.68 for TTP favoring combination
LEAP-012 (ongoing)	Intermediate-stage HCC (unresectable, no systemic therapy yet)	TACE + lenvatinib + pembrolizumab vs. TACE alone	Ongoing, evaluating PFS and OS
EMERALD-1 (ongoing)	Unresectable HCC, with/without systemic therapy	TACE + durvalumab ¬± bevacizumab vs. TACE alone	Ongoing, evaluating PFS and OS

Table 1: Summary of Studies Evaluating TACE in Expanded HCC Populations
This table summarizes key clinical studies supporting the expanded use of TACE in HCC beyond its traditional role in intermediate-stage disease. Included are early-stage (BCLC 0–A) cohorts ineligible for curative therapies, advanced-stage (BCLC C) patients receiving TACE in combination with systemic therapy, and ongoing randomized trials evaluating TACE with immune checkpoint inhibitors or targeted agents. Reported outcomes include complete response rates, overall survival, and time to progression, where available. TACE = transarterial chemoembolization; HCC = hepatocellular carcinoma; BCLC = Barcelona Clinic Liver Cancer staging system; CR = complete response; OS = overall survival; TTP = time to progression; PFS = progression-free survival; HR = hazard ratio.

Results

- In a prospective cohort of early-stage (BCLC 0–A) patients unfit for curative therapies, selective TACE achieved a 67% complete response rate and 3-year survival of 80.5%.[1]
- In advanced-stage patients, TACE combined with sorafenib improved median overall survival to 15.5 months versus 8.3 months with sorafenib alone in the GIDEON registry.[2]
- A meta-analysis of TACE plus sorafenib showed significant gains in overall survival (HR 0.65; 95% CI: 0.47–0.89) and time to progression (HR 0.68; 95% CI: 0.52–0.87) compared with TACE alone.[3]
- Ongoing trials are evaluating TACE with lenvatinib and immune checkpoint inhibitors, potentially redefining its role in advanced disease.[4,5]
- Safety remained acceptable, with post-embolization syndrome as the most common adverse event and grade III/IV reactions more frequent in combination therapy cohorts.[4,5]

Conclusion

- Although TACE remains the standard for BCLC B HCC, expanding its application to select early- and advanced-stage patients—especially in combination with systemic therapies—demonstrates promising improvements in survival and disease control. These findings challenge strict stage-based use and support a more nuanced, individualized application of TACE. Prospective trials integrating TACE with modern systemic regimens will be critical in defining optimal candidates and refining treatment paradigms.

References

1.Bargellini I, Sacco R, Bozzi E, et al. Transarterial chemoembolization in very early and early-stage hepatocellular carcinoma patients excluded from curative treatment: A prospective cohort study. European Journal of Radiology. 2012;81(6):1173-1178. doi:10.1016/j.ejrad.2011.03.046
2.Geschwind JF, Kudo M, Marrero JA, et al. TACE Treatment in Patients with Sorafenib-treated Unresectable Hepatocellular Carcinoma in Clinical Practice: Final Analysis of GIDEON. Radiology. 2016;279(2):630-640. doi:10.1148/radiol.2015150667
3.Zhang L, Hu P, Chen X, Bie P. Transarterial Chemoembolization (TACE) plus Sorafenib Versus TACE for Intermediate or Advanced Stage Hepatocellular Carcinoma: A Meta-Analysis. Yang LY, ed. PLoS ONE. 2014;9(6):e100305. doi:10.1371/journal.pone.0100305
4.Llovet JM, Vogel A, Madoff DC, et al. Randomized Phase 3 LEAP-012 Study: Transarterial Chemoembolization With or Without Lenvatinib Plus Pembrolizumab for Intermediate-Stage Hepatocellular Carcinoma Not Amenable to Curative Treatment. Cardiovasc Intervent Radiol. 2022;45(4):405-412. doi:10.1007/s00270-021-03031-9
5.Sangro B, Kudo M, Erinjeri JP, et al. Durvalumab with or without bevacizumab with transarterial chemoembolisation in hepatocellular carcinoma (EMERALD-1): a multiregional, randomised, double-blind, placebo-controlled, phase 3 study. The Lancet. 2025;405(10474):216-232. doi:10.1016/S0140-6736(24)02551-0