Y-90 Segmentectomy in Hepatocellular Carcinoma: Evaluating Safety, Tolerability, and Risk Mitigation

Lauren Weil,[1] Delmarie M. Rivera Rodriguez, BS[1], Samdeep Mouli, MS, MD[1]
[1]Northwestern Memorial Hospital, Interventional Radiology Department

Introduction

- **Hepatocellular carcinoma (HCC)** often occurs in patients with underlying liver dysfunction, limiting curative surgical or transplant options.
- **Yttrium-90 (Y-90) segmentectomy** provides targeted, high-dose radiation while preserving healthy liver parenchyma.
- This approach can serve as a **curative therapy** or as a **bridge to transplant**.
- Despite its promise, Y-90 carries a **distinct risk profile**.

Purpose

To systematically evaluate the spectrum and incidence of adverse effects associated with Y-90 therapy for hepatocellular carcinoma (HCC) as documented in the existing literature.

Methods

A broad topic search was conducted, and it was found that Y-90 is currently a promising technique in the field with potential withdrawals.

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A targeted literature review from 2016-2024 consisting of peer-reviewed retrospective, prospective, and institutional studies regarding Y-90 was performed.

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The findings focusing on tumor control, treatment-related toxicity, and AEs was synthesized and summarized.

Results

Table 1. Summary of side effects and AEs across studies. Severe AEs occurred in <10% of patients, with ~6% attributable to treatment. Notably, ~40% of patients were >65 years and ~20% were >75 years, suggesting age-related comorbidities may have contributed.

Category	Incidence
Fatigue	50-60%
Nausea	~20%
Abdominal Pain	~20%
Vomiting, chest pain, back pain	Reported in some trials
Biliary complications	<10%
Cholangitis/Biloma	1-3.9%
Radiation-induced liver disease	0-rare
Grade 3 AEs	19.1%
Serious AEs	<10%

Severe AEs	
Leukopenia	Anemia
Thrombocytopenia	Pyrexia
Cerebrovascular accident	Hepatobiliary disorders
Infection	Radiation pneumonitis

Table 2. Severe Adverse Events Reported in the Literature for Y-90 HCC therapy.

Table 3. Risk Mitigation for Biliary Complications and Nontarget GI Radioembolization.

Risk Region	Mitigation
Biliary	Prophylactic antibiotics ↓ biloma/hepatic abscess risk
Nontarget GI	High-dose PPI, sucralfate, avoid NSAIDs
Overall	Severe adverse events ↓ with technique, patient selection, protocols

Conclusion

Y-90 segmentectomy is generally well-tolerated, but careful characterization of its side effect profile remains essential for guiding safe and effective use.

References