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Outcomes of TARE as salvage liver-directed therapy in patients with poor response to first-line TAE/TACE for neuroendocrine liver metastases

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BACKGROUND

To assess the safety and efficacy of salvage transarterial radioembolization (TARE) in patients with neuroendocrine liver metastases (NELM) who fail liver-directed therapy (LDT) with bland (TAE) or chemoembolization (TACE).

METHODS

This single-center retrospective study identified 18 patients (10 male; median age 61 years [range, 36–82]) who failed TAE/TACE, with failure defined as hepatic progression within <12 months, and underwent subsequent TARE from 2011-2023. Demographic, clinical, treatment, and adverse event data were collected. Adverse events were graded per Common Terminology Criteria for Adverse Events (CTCAE) v5.0 and Society for Interventional Radiology (SIR) classification criteria. Hepatic progression-free survival (hPFS) and overall survival (OS) were estimated using Kaplan–Meier analysis and compared using log-rank test.

RESULTS

Primary tumors were pancreatic (61%), small bowel (11%), and other/unknown (29%). Tumors were grade 1 (6%), grade 2 (78%), grade 3 (6%), and unknown (10%). Liver-only disease was present in 44%, and liver-dominant disease in 56%. First-line LDT was TAE in 16% and TACE in 84%, with a median of two sessions. Median hPFS after TAE/TACE was 5.6 months (95% CI, 3.9–7.9). Patients underwent 31 TARE sessions (87% lobar), with a median delivered activity of 52.7 mCi. The median follow-up after salvage TARE was 22.6 months (range, 1.4–146.2 months). Median hPFS after TARE, assessed by RECIST criteria, was 13.8 months (95% CI, 5.8–59.1), significantly longer than after TAE/TACE (log-rank p=0.001; HR 0.20, 95% CI 0.07–0.52, p<0.001). Median OS after TARE was 17 months (95% CI, 5.8–31.7). Common acute adverse events (AEs) following salvage TARE were fatigue (78%), nausea or vomiting (61%), abdominal pain (50%), and constipation (39%), all of which were CTCAE grade 1/2. Mild hepatic encephalopathy occurred in one patient (6%). No patients met full criteria for radioembolization induced liver disease, however, one patient with

hyperbilirubinemia was treated as such. Chronic AEs were observed in 2 patients (11%). One patient developed grade 1 radioembolization-induced chronic hepatotoxicity (RECHT) with evidence of pseudocirrhosis and portal hypertension, without ascites, and mild liver function test abnormalities. Another patient developed probable grade 4 RECHT, with development of ascites 13 months after TARE. No procedure-related mortality was observed.

CONCLUSIONS

TARE is a safe and effective salvage therapy for patients with NELMs who progress after TAE/TACE, providing significantly longer hepatic progression-free survival with acceptable toxicity. These findings support early consideration and incorporation of TARE into a sequential embolization algorithm for NELMs, offering a viable salvage option for TAE/TACE non-responders.

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