Outcomes of transarterial radioembolization as salvage liver-directed therapy in patients with poor response to first-line bland or chemoembolization for neuroendocrine liver metastases

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Background

- Transarterial embolization (TAE), chemoembolization (TACE), and radioembolization (TARE) are established liver-directed therapies (LDT) for neuroendocrine liver metastases (NELM). TAE and TACE are often employed as first line LDTs as they can be repeated (if effective) with less risk than TARE, which is associated with potential long-term radiation-based hepatic toxicities
- Not all patients have a good treatment response to TAE/TACE, with a subset of patients progressing rapidly after treatment (<12 months). Such patients require additional treatment options.
- **Transarterial radioembolization (TARE) has demonstrated efficacy in NELM, yet its role specifically as salvage liver-directed therapy after failed TAE/TACE is not well defined.**

Objectives

- **Assess the safety and efficacy of salvage TARE in patients with NELM who fail first-line LDT with TAE or TACE**

Methods

Study Design

Single-center, IRB-approved retrospective study (2011–2023)

Eligibility Criteria

Prior TAE/TACE for NELM

Treatment failure = hepatic progression <12 months

Intervention

Salvage TARE

Final Cohort:

18 patients(10 male,8 female)

Median age: 61 (range 36-82)

Data Collected

Demographics, Clinical & treatment variables, Adverse events

Outcomes & Analysis

hPFS & OS comparison via Kaplan-Meir

Log-rank test for comparison

Results

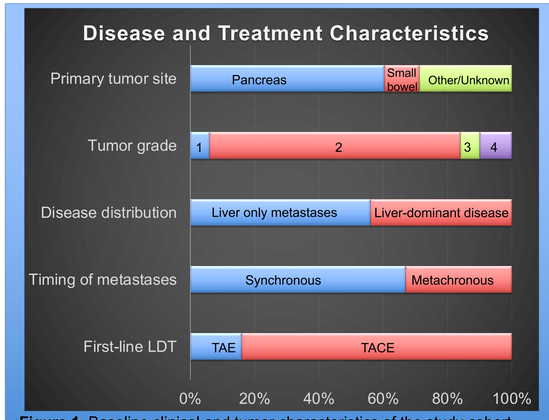


Figure 1. Baseline clinical and tumor characteristics of the study cohort, including primary tumor site, tumor grade, timing of metastases and liver disease distribution at the time of initial embolization.

Frequency of Acute and Chronic Adverse Events(AEs)**

	Grade 1	Grade 2	Grade 3	Grade 4
Acute AEs:				
Fatigue	14	-	-	-
Weight loss	4	-	-	-
Nausea/Vomiting	7	4	-	-
Fever	1	-	-	-
Abdominal pain	5	4	-	-
Bowel changes	10		-	-
LFT abnormalities	3	1		
Hepatic Encephalopathy	-	1	-	-
Chronic AEs:				
RECHT	1	-	-	1*

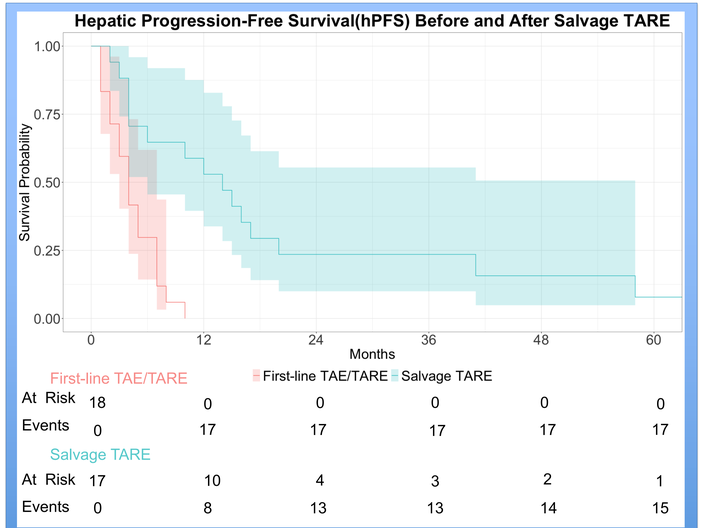


Figure 2. Hepatic progression-free survival before and after salvage TARE. Kaplan–Meier curves comparing hepatic progression-free survival (hPFS) following initial embolization (TAE/TACE) versus salvage transarterial radioembolization (TARE) in patients with neuroendocrine liver metastases. Salvage TARE demonstrated a significantly longer median hPFS compared with prior embolization (13.8 vs 4.2 months; p < 0.001). Shaded areas represent 95% confidence intervals. Tables show numbers at risk and events over time.

Figure 3. Treatment-related toxicity following salvage TARE. Incidence of acute and adverse events(AEs) after salvage TARE. Most AEs were low-grade (CTCAE Grade ≤ 2), with fatigue (78%), nausea/vomiting (61%), bowel changes (56%) and abdominal pain (50%) being most common. Less frequent acute adverse events included hepatic encephalopathy (6%), weight loss (22%) and LFT abnormalities(22%). Chronic adverse events were observed in 2 patients (11%).

* Symptoms occurred synchronously with hepatic disease progression, precluding definitive diagnosis of RECHT.

***Adverse events were re-adjudicated following abstract submission; values shown reflect the final classification.*

Discussion

- Median hPFS after TAE/TACE was 4.2 months (95% CI 2.5–7.2)
- Mean time from post TAE/TACE progression to second-line TARE: 82 days (range 27–281)
- Median hPFS after salvage TARE was 13.8 months (95% CI 5.6–58.2)
  - Significantly longer compared to TAE/TACE (log-rank p < 0.001)
- The hazard of hepatic progression following salvage TARE was 80% lower than after initial liver-directed therapy
  - HR 0.20, 95% CI 0.08–0.50, p < 0.001
- Median OS after TARE: 17 months (95% CI 5.8–31.7)

Conclusions

- TARE appears to be a safe and effective salvage LDT for patients with NELM who did not respond to TAE/TACE
  - TARE provides a **significantly longer hPFS** in these patients
  - Associated with predominantly **low-grade, manageable toxicities** and infrequent severe adverse events
- **These findings suggest that patients who fail first-line embolization should be promptly considered for TARE if liver-directed therapy remains indicated**

Future Directions

- **Larger, multicenter prospective studies**
  - To validate the improved hPFS observed with salvage TARE
- **Identification of prognostic and predictive factors**
  - Stratification tools to guide optimal patient selection
- Assessing synergy **with systemic therapies**
  - Evaluating whether timing or combination therapy improves outcomes
- Exploration of biologic and tumor microenvironment **factors influencing cross-modality treatment response**
  - Can TAE/TACE non-responders be identified pre-emptively and therefore undergo TARE or other therapy to start?

References

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