

Background

- Selective internal radiation therapy (SIRT) with Yttrium-90 (Y-90), using either resin microspheres (SIR-Spheres® (SS)) or glass microspheres (TheraSpheres® (TS)), is an intra-arterial, catheter-based locoregional therapy
- Unresectable hepatocellular carcinoma (HCC) can be treated with SIRT with Y-90
- Limited data are available on many potential confounding factors and their impact on overall survival (e.g., patient demographics, disease etiology, disease severity, etc.)

Research Objectives

- Primary Objective:**
- Assess patient demographics and disease characteristics in patients with unresectable HCC undergoing SIRT with Y-90, using either SS or TS
- Secondary Objectives:**
- Investigate the effects of a wide range of factors on survival after SIRT with Y-90 (SS or TS)
 - Assess tolerability of SIRT with Y-90 (SS or TS) in a heterogeneous population of patients

Methods and Materials

We retrospectively analyzed charts of 137 patients who underwent SIRT with SS or TS at our center from April 2017 to January 2021, comprising 210 total procedures. Statistical analysis was performed using SAS.

- Key points:**
- 137 patients
 - 210 total procedures
 - April 2017 – January 2021

Results

- Results were stratified by therapy type and displayed in Tables 1 and 2
- 70% (146) of total Y-90 therapy procedures were with SS and 30% (63) with TS
- Median injected dose of Y-90 SS (24.9 mCi, range 5.7-81.8 mCi) was significantly lower than that of Y-90 TS (39.6 mCi, range 4.6-90.1 mCi). This is likely due to different dosimetry models for each type of bead.

Table 1. Patient Demographics and Disease Characteristics by Treatment Type

	SIR-Spheres® (SS)	TheraSpheres® (TS)
Procedures	147	63
Gender		
Male	73%	62%
Female	27%	38%
Race		
Caucasian	56%	52%
African American	20%	21%
Hispanic or Latino	21%	22%
Asian	3%	5%
Etiology of Liver Disease		
Hepatitis C	55%	46%
Non-alcoholic Steatohepatitis (NASH)	24%	25%
Other	21%	29%
Model for End-Stage Liver Disease (MELD) Score		
Median Score	9	8
Barcelona Clinic Liver Cancer (BCLC) Stage		
Stage 0	1%	3%
Stage A	11%	13%
Stage B	45%	43%
Stage C	38%	35%
Stage D	5%	6%

Results (cont.)

- Decrease in size, enhancement, or both size and enhancement:
 - 85% of SS patients
 - 88% of TS patients
- Median overall survival:
 - 18 months for SS
 - 20 months for TS

Table 2. Modified Response Evaluation Criteria in Solid Tumors (mRECIST) and Associated Symptoms by Treatment Type

	SIR-Spheres® (SS)	TheraSpheres® (TS)
Procedures	147	63
mRECIST		
Complete Response	37%	49%
Partial Response	21%	25%
Stable Disease	21%	10%
Progressive Disease	20%	16%
Associated Symptoms Pre-Treatment		
Ascites	16%	16%
GI Bleed	16%	22%
Hepatic Encephalopathy	17%	17%
Associated Symptoms Post-Treatment		
Ascites	29%	16%
GI Bleed	3%	2%
Hepatic Encephalopathy	8%	0%

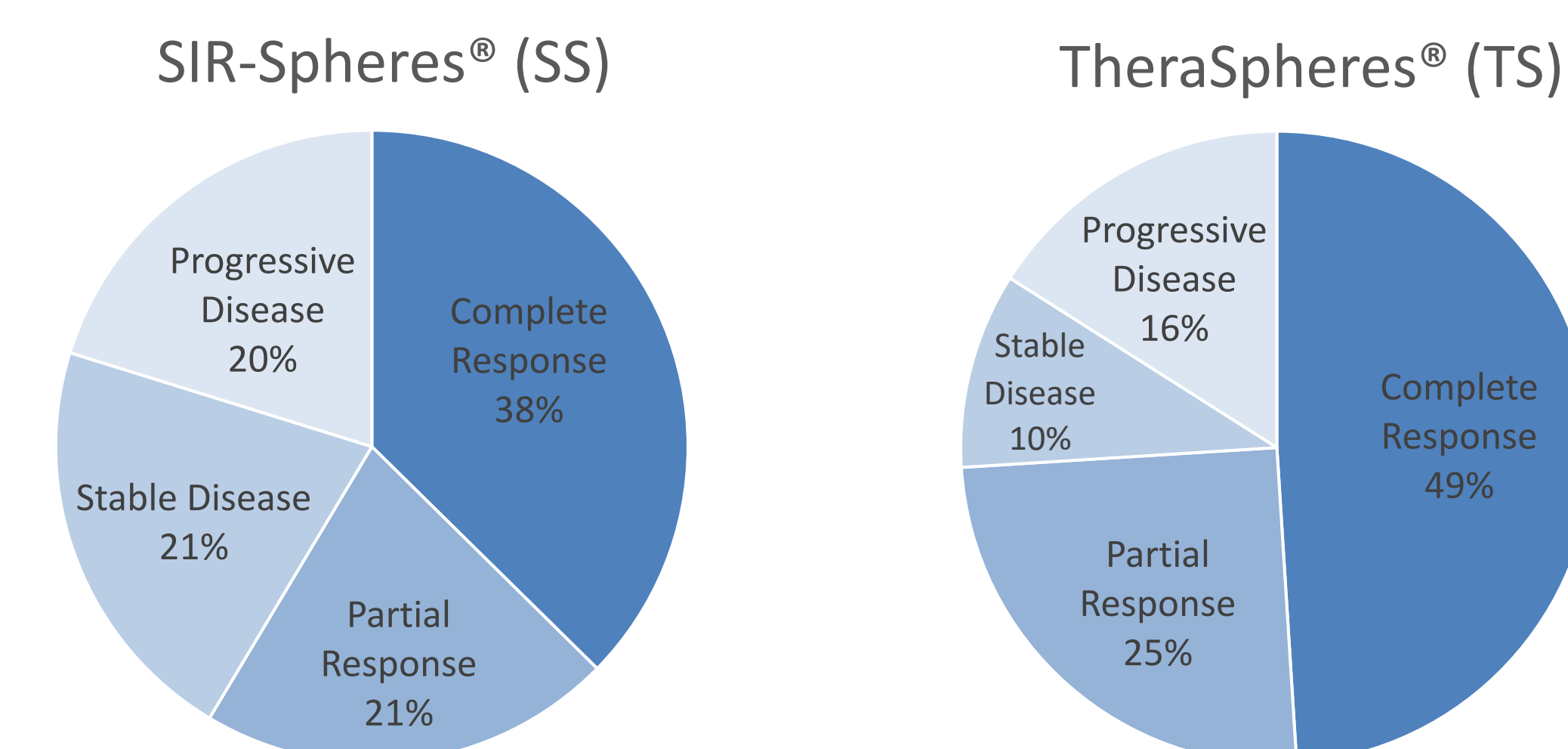


Figure 1. Modified Response Evaluation Criteria in Solid Tumors (mRECIST) by Treatment Type

Conclusions

Our findings indicate that intermediate and advanced HCC patients have excellent response to Y-90 therapy with both SS and TS, as depicted by:

- decrease in size, enhancement, or both in 85% (SS) and 88% (TS) of patients
- complete response in 37% (SS) and 49% (TS) of patients
- overall survival that ranges from 18 (SS) to 20 (TS) months, which is very favorable in this group of patients

Therapy is very well tolerated. Differences between SS and TS may possibly be explained by dosimetry; however, further comparative studies may be needed.

Implications

While the results of our study are promising, there remains an overall lack of evidence to formally support the use of SIRT in unresectable HCC¹. Furthermore, although our results support the effectiveness and tolerability of SIRT in a heterogeneous patient population, the subgroup of patients benefitting from SIRT needs further definition^{1,2}. Further randomized controlled trials should be conducted to compare SIRT among patient subgroups and with current standards of care.

References

1. Moctezuma-Velazquez C, Montano-Loza AJ, Meza-Junco J, et al. Selective Internal Radiation Therapy for Hepatocellular Carcinoma Across the Barcelona Clinic Liver Cancer Stages. *Dig Dis Sci.* 2021;66(3):899-911. doi:10.1007/s10620-020-06245-y
2. Galle PR, Forner A, Llovet JM, et al. EASL Clinical Practice Guidelines: Management of hepatocellular carcinoma. *J Hepatol.* 2018;69(1):182-236. doi:10.1016/j.jhep.2018.03.019

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