

Introduction

Selective Internal Radiation Therapy (SIRT) is an intra-arterial treatment used for patients with unresectable hepatocellular carcinoma (HCC) using either Yttrium-90 labelled glass or resin microspheres. This study aims to compare the overall and progression-free survival of HCC patients treated with SIRT using standard (glass) and personalised (resin) dosimetry

Materials / Methods

Data of consecutive uncomplicated treatments in our tertiary referral center were retrospectively analysed: from November 2016 to October 2018 (glass) and June 2021 to November 2023 (resin). Patients were selected based on Child-Pugh A score, and treatment to only one lobe. Patients with other diseases than HCC and missing follow-up were excluded. Response to the treatment was determined on follow-up imaging (MRI or CT), at 3, 6, 9 and 12 months. Overall and progression-free survival were determined using the Kaplan-Meier estimate

Results

Both glass and resin groups consisted of 15 patients. Glass patients were younger: median age 63 (range 52-78) vs 70 (58-82) $p=0.029$. No significant differences were found in other baseline characteristics, especially no difference in treated liver volume (median glass 900 mL (100-3000 mL) vs resin 750 mL (256-1610 mL)) or tumour burden (glass 51 mL (5-1620) mL vs resin 30 mL (7-755 mL)). Median administered activity was not different between glass and resin patient: 2300 (270-7331) MBq vs 1500 (800-3280) MBq, $p=0.081$, respectively, whereas the median dose to the tumour was 300 (45-850) Gy (glass) vs 190 (105-420) Gy (resin), $p=0.32$. Median time to progression was 193 days in the glass group, and not reached in the resin group, $p=0.009$. At 12 months follow-up, 9 glass patients (60%) and 3 resin patients (20%) were deceased, resulting in a significant difference in overall survival (median overall survival 360 days vs not-reached. $p=0.03$)

Conclusions

HCC patients treated with glass microspheres using standard dosimetry show shorter progression-free and overall survival compared to those treated with resin microspheres using personalised dosimetry

Patient Characteristics Table

Variable	Resin Patients (n=15)	Glass Patients (n=15)	p-values
Median age in years (range)	71 (58-82)	63 (52-78)	0.020
Sex			1
Male	13 (86.66%)	12 (80%)	
Female	2 (13.33%)	3 (20%)	
WHO performance status			0.427
0	3 (20%)	6 (40%)	
1	12 (80%)	9 (60%)	
Primary tumor location			1
Left (s2, s3, s4)	3 (20%)	3 (20%)	
Right (s5, s6, s7, s8)	12 (80%)	12 (80%)	
Child-Pugh score			1
Stage A	15 (100%)	15 (100%)	
Causes of HCC			0.210
Alcohol abuse	3 (20%)	8 (50%)*	
Hepatitis B	0	1 (6.25%)	
Hepatitis C	3 (20%)	3 (18.75%)*	
Unknown	9 (60%)	4 (25%)	
Injected activity (GBq)	1.5 (0.76-3.28)	2.3 (0.27-8.05)	0.098
Dose to the tumour (Gy)	190 (105-420) (n=14)**	300 (45-850)	0.320
BCLC stage			0.682
Stage A	5 (33.33%)	3 (20%)	
Stage B	10 (66.66%)	12 (80%)	
Treated Liver Volume (mL)	750 mL (256-1610)	900 mL (100-3000)	0.62
Tumour Burden (mL)	30 mL (7-755)	51 mL (5-1620)	0.42
Laboratory findings:			
Bilirubin (µmol/L)	11 (4-34)	11 (3-32)	0.482
Albumin (g/L)	40 (32-47)	39 (29-44)	0.655
INR	1.1 (1-1.3)	1.1 (1-1.2)	0.374

*one patient had both alcohol and hepatitis C as underlying cause

**Dose to tumor could not be determined for one patient

Survival Curves

