2023 APPLE
The 13th Asia-Pacific Primary Liver Cancer Expert Meeting
Novel Insights into the Evolution of Liver Cancer Management
July 6-8, 2023 | Grand InterContinental Seoul Parnas, Seoul, Korea

Long-term Surgical Outcomes for NAFLD Associated HCC

Jai Young Cho; Mizelle D'Silva; Ho-Seong Han; Yoo-Seok Yoon; Hae Won Lee; Jun Suh Lee; Boram Lee

Department of Surgery, Seoul National University Bundang Hospital,
Seoul National University College of Medicine, Korea

Introduction

- The global burden of NAFLD and NAFLD-associated HCC is steadily rising.
- NAFLD spans across a wide spectrum of diseases, from
  simple steatosis → non-alcoholic steatohepatitis (NASH; hepatocyte triglyceride accumulation with inflammation and hepatocyte injury) →fibrosis and cirrhosis or HCC.
- There are few reports on the surgical outcomes of HCC patients with NAFLD, and on the outcomes of NAFLD-associated HCC compared with HBV-associated HCC.
- Therefore, we compared the surgical outcomes between patients with NAFLD-associated HCC and patients with HBV-associated HCC.

Methods

- All patients who underwent liver resection for HCC between January 2004 and December 2018.
- All specimen slides were reviewed by the pathologist and those conforming to Kleiner's pathological criteria were categorized as NAFLD.
- The criteria included lobular inflammation, presence of steatosis, and ballooning degeneration.
- Patients with both NAFLD and HBV whose pathological features suggested dominance of NAFLD were included in the NAFLD group

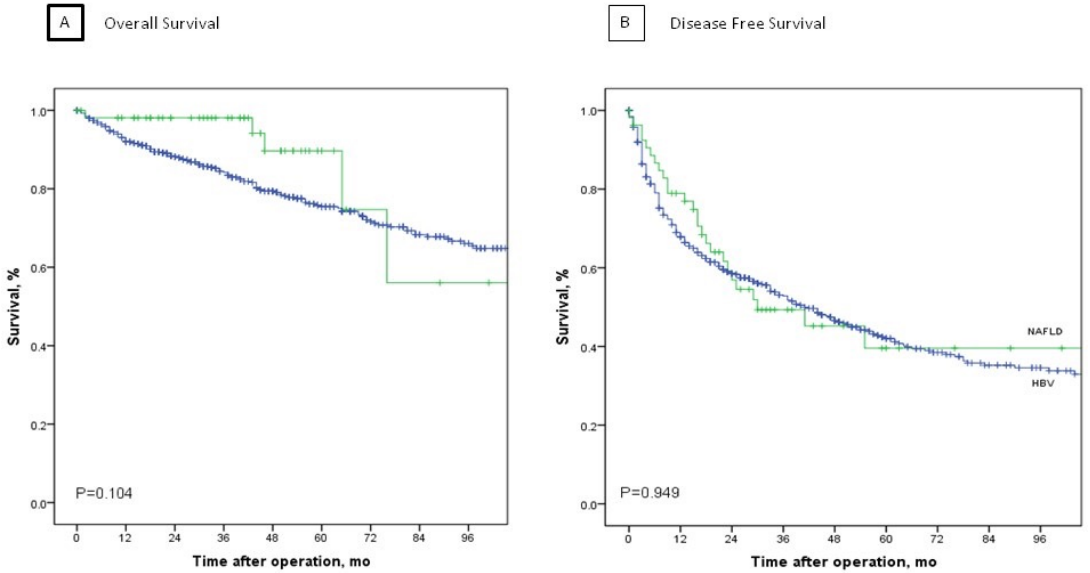
Pre-operative, peri-operative, and postoperative factors (1)

	LLR (n = 59)	OLR (n = 51)	p-Value
Age, (years), median (range)	57 (26–74)	57 (30–85)	0.926
Gender			0.036
Male	41 (69.5)	44 (86.3)	
Female	18 (30.5)	7 (13.7)	
BMI (kg/m^2), median (range)	24.4 (16.36–31.61)	24.2 (16.73–32.06)	0.242
Tumor size (cm), median (range)	3.0 (0.9–10.3)	5.0 (1.5–13.0)	0.000
Location of tumor			
Segment 1	7 (11.9)	2 (3.9)	
Segment 4	15 (25.4)	11 (21.6)	
Segment 5	10 (16.9)	14 (27.5)	
Segment 8	15 (25.4)	11 (21.6)	
Segment 1 and 8	0	1 (2.0)	
Segment 4 and 5	1 (1.7)	2 (4.0)	
Segment 4 and 8	2 (3.4)	6 (11.8)	
Segment 5 and 8	6 (10.2)	3 (5.9)	
Segment 4, 5, 8	3 (5.1)	1 (2.0)	
Albumin (g/dL), median (range)	4.3 (1.3–4.9)	4.1 (2.5–5.1)	0.011
Bilirubin (mg/dL), median (range)	0.7 (0.2–2.4)	0.8 (0.3–2.8)	0.149
PT-INR, median (range)	1.05 (0.9–1.24)	1.1 (0.9–1.45)	0.005
PLT (1000/μL), median (range)	179 (73–334)	176 (38–424)	0.590
SGOT (IU/L), median (range)	37.0 (14–176)	36 (20–118)	0.563
SGPT (IU/L), median (range)	33.0 (11–256)	36 (7–260)	0.500

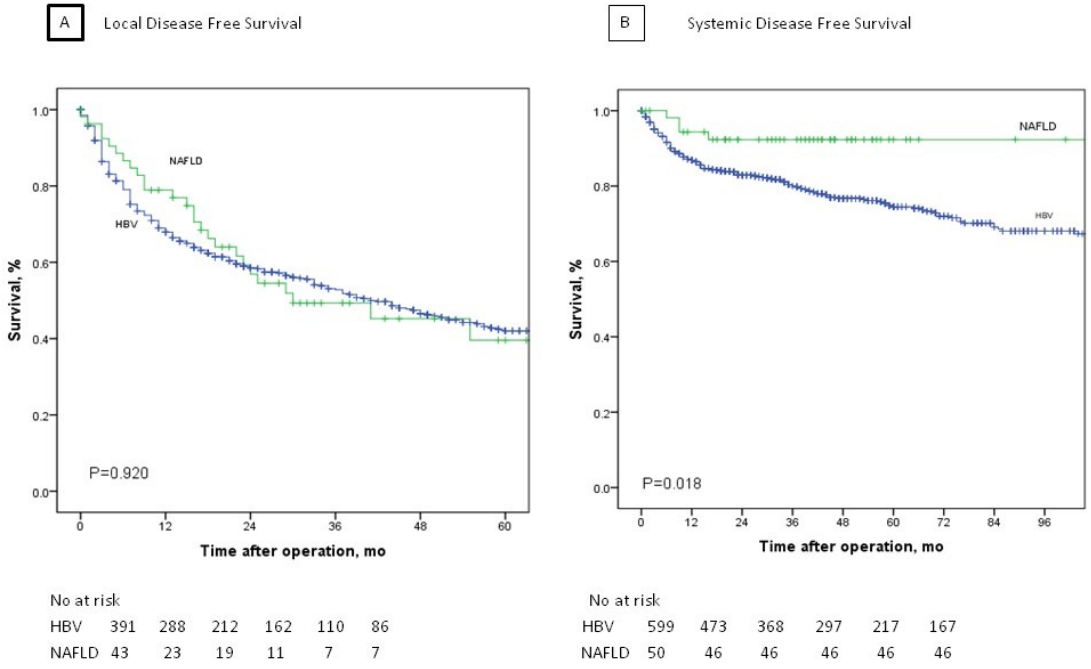
Pre-operative, peri-operative, and postoperative factors (2)

	NAFLD[a] (n = 54)	HBV[b] (n = 589)	P value
Ascites	1 (1·9)	14 (2·4)	0·792
Major resection	10 (18·5)	146 (24·8)	0·290
Minor resection	44 (81·5)	443 (75·2)	
Anatomical resection	28 (51·9)	348 (59·1)	0·149
Non anatomical resection	26 (48·1)	241 (40·9)	
Margin Status (R1)	2 (3·7)	34 (5·8)	0·519
Operative Time (minutes)	239·07 ± 142·7	260·89 ± 141·1	0·278
Blood Loss (ml)	586·8 ± 1017·2	800·79± 1472·3	0·301
Hospital Stay (days)	6·8 ± 3·8	9·38±11·9	0·115
Largest Tumour Size (cm)	3·32 ± 2·08	3·94 ± 3·14	0·161
Presence of Satellite Lesions	3 (5·6)	56 (9·5)	0·314
Microvascular Invasion	17 (31·5)	253 (43·0)	0·087
Cirrhosis	33 (61·1)	364 (61·8)	0·909
Edmonson Steiner I+II	18/52 (34·6)	217/555 (39·1)	0·523
III+IV	34/52 (65·4)	338/555 (60·9)	
Solitary tumours	48 (88·9)	511 (86·8)	0·650
Multiple tumours	6 (11·1)	78 (13·2)	
Recurrence	27 (50·0)	313 (53·1)	0·658
Type of recurrence			0.008
Intrahepatic recurrence	23 (85·2)	178 (56·9)	
Extrahepatic recurrence	4 (14·8)	135 (43·1)	

Results


A
Overall Survival
Survival, %
1.0
0.8
0.6
0.4
0.2
0.0
P=0.104
0
12
24
36
48
60
72
84
96
Time after operation, mo
No at risk
HBV 513 418 336 275 206 165
NAFLD 51 51 51 20 20 5
B
Disease Free Survival
Survival, %
NAFLD
HBV
P=0.949
Time after operation, mo
No at risk
HBV 380 275 206 155 106 79
NAFLD 41 24 19 11 7 7

Results


A
Local Disease Free Survival
Survival, %
1.0
0.8
0.6
0.4
0.2
0.0
NAFLD
HBV
P=0.920
0
12
24
36
48
60
Time after operation, mo
No at risk
HBV 391 288 212 162 110 86
NAFLD 43 23 19 11 7 7
B
Systemic Disease Free Survival
Survival, %
1.0
0.8
0.6
0.4
0.2
0.0
NAFLD
HBV
P=0.018
0
12
24
36
48
60
72
84
96
Time after operation, mo
No at risk
HBV 599 473 368 297 217 167
NAFLD 50 46 46 46 46 46

Univariate and multivariate analysis for DFS in NAFLD patients

Variable	DFS[a]	P value	Hazard Ratio (95% CI)
Age > 65years	0·869	-	-
Child Pugh	0·796	-	-
MELD[b] > 10	0·840	-	-
Albumin<3.5 g/dL	0·475	-	-
Platelets <100000/μL	0·331	-	-
AFP[c] > 20ng/mL	0·734	-	-
Minor vs major resection	0·909	-	-
Anatomical vs non anatomical resection	0·030	0·033	0·337 (0·124-0·917)
Operation time >200 minutes	0.033	0·345	0·661 (0·280-1·560)
Blood Loss (ml)	0·196	-	-
Satellite nodule	0·003	0·048	6.908 (1.018-46.853)
Microvascular invasion	0·991	-	-
Cirrhosis	0·150	-	-
T[d] stage	0·017	0·067	4.515 (0·900-22)

Conclusion

- Overall survival is similar between NAFLD-associated HCC and HBV-associated HCC.
- NAFLD-associated HCC shows lower systemic recurrence compared to HBV-associated HCC.
- Anatomical liver resection in NAFLD patients could provide better outcomes in terms of lower recurrence rates.