

Table S1 Patient demographics and baseline characteristics

Characteristics	Training set (n=278)		P value	Validation set (n=119)		P value
	No postoperative complication (n=180)	Postoperative complication (n=98)		No postoperative complication (n=81)	Postoperative complication (n=38)	
Age (years)	56 [48, 61]	55 [48, 62]	0.952	55 [51, 60]	59 [50, 64]	0.179
Gender			0.236			0.864
Male	135 (75.0)	67 (68.4)		65 (80.2)	31 (81.6)	
Female	45 (25.0)	31 (31.6)		16 (19.8)	7 (18.4)	
Diabetes mellitus			0.719			0.556
No	164 (91.1)	88 (89.8)		72 (88.9)	32 (84.2)	
Yes	16 (8.9)	10 (10.2)		9 (11.1)	6 (15.8)	
Cirrhosis			0.400			0.648
No	94 (52.2)	46 (46.9)		39 (48.1)	20 (52.6)	
Yes	86 (47.8)	52 (53.1)		42 (51.9)	18 (47.4)	
Child-Pugh grade			<0.001			0.018
A	173 (96.1)	81 (82.7)		75 (92.6)	29 (76.3)	
B	7 (3.9)	17 (17.3)		6 (7.4)	9 (23.7)	
BMI (kg/m <sup>2</sup> )	22.9 [21.2, 24.8]	22.5 [20.2, 24.2]	0.065	23.4 [21.2, 25.6]	23.1 [21.4, 24.3]	0.614
ASA			0.532			0.277
1	31 (17.2)	11 (11.2)		18 (22.2)	8 (21.1)	
2	120 (66.7)	70 (71.4)		50 (61.7)	19 (50.0)	
3	28 (15.6)	17 (17.3)		12 (14.8)	11 (28.9)	
4	1 (0.6)	0 (0.0)		1 (1.2)	0 (0.0)	
Surgical approach			0.134			0.218
Open	141 (78.3)	84 (85.7)		60 (74.1)	32 (84.2)	
Laparoscopic	39 (21.7)	14 (14.3)		21 (25.9)	6 (15.8)	
Operative time (min)	150 [105, 205]	233 [170, 340]	<0.001	145 [100, 180]	220 [160, 300]	<0.001
Blood loss (mL)	250 [100, 500]	500 [250, 1,000]	<0.001	200 [100, 400]	600 [300, 1,150]	<0.001
Blood transfusion (mL)	0 [0, 400]	710 [0, 1,200]	<0.001	0 [0, 390]	785 [0, 1,160]	<0.001
Lowest MAP (mmHg)	72 [69, 77]	67 [60, 72]	<0.001	73 [69, 78]	67 [63, 71]	<0.001
Lowest HR (beats/min)	58 [54, 61]	65 [58, 70]	<0.001	58 [52, 62]	63 [59, 69]	<0.001
Lymph node metastasis			0.002			>0.999
No	172 (95.6)	83 (84.7)		77 (95.1)	37 (97.4)	
Yes	8 (4.4)	15 (15.3)		4 (4.9)	1 (2.6)	
MVI			0.015			0.060
No	137 (76.1)	61 (62.2)		66 (81.5)	25 (65.8)	
Yes	43 (23.9)	37 (37.8)		15 (18.5)	13 (34.2)	
TNM stage			<0.001			0.424
I	126 (70.0)	48 (49.0)		58 (71.6)	23 (60.5)	
II	35 (19.4)	21 (21.4)		14 (17.3)	9 (23.7)	
III	11 (6.1)	14 (14.3)		5 (6.2)	5 (13.2)	
IV	8 (4.4)	15 (15.3)		4 (4.9)	1 (2.6)	
CNLC stage			0.015			0.547
I	161 (89.4)	75 (76.5)		71 (87.7)	33 (86.8)	
II	11 (6.1)	12 (12.2)		5 (6.2)	1 (2.6)	
III	8 (4.4)	11 (11.2)		5 (6.2)	4 (10.5)	
BCLC stage			0.031			0.354
0	20 (11.1)	7 (7.1)		12 (14.8)	2 (5.3)	
A	141 (78.3)	68 (69.4)		59 (72.8)	31 (81.6)	
B	11 (6.1)	12 (12.2)		5 (6.2)	1 (2.6)	
C	8 (4.4)	11 (11.2)		5 (6.2)	4 (10.5)	
Pathologic type			0.095			0.273
HCC	145 (80.6)	69 (70.4)		75 (92.6)	32 (84.2)	
ICC	24 (13.3)	23 (23.5)		5 (6.2)	4 (10.5)	
cHCC-ICC	11 (6.1)	6 (6.1)		1 (1.2)	2 (5.3)	
Tumor grade			0.009			0.679
G1	20 (11.1)	6 (6.1)		10 (12.3)	6 (15.8)	
G2	120 (66.7)	55 (56.1)		53 (65.4)	21 (55.3)	
G3	28 (15.6)	32 (32.7)		17 (21.0)	11 (28.9)	
G4	12 (6.7)	5 (5.1)		1 (1.2)	0 (0.0)	
NLR	1.89 [1.52, 2.57]	2.49 [1.89, 3.61]	<0.001	1.83 [1.39, 2.56]	2.11 [1.66, 3.31]	0.077
Hb (g/L)	147 [136, 156]	140 [126, 150]	0.002	146 [132, 156]	135 [128, 146]	0.025
PLR	91.25 [68.40, 121.39]	111.83 [76.74, 151.55]	0.004	93.18 [70.14, 119.89]	105.74 [65.67, 145.03]	0.331
ALT (U/L)	26 [19, 39]	32 [22, 51]	0.012	28 [20, 43]	33 [24, 51]	0.116
AST (U/L)	28 [20, 39]	38 [26, 56]	<0.001	31 [22, 41]	39 [28, 54]	0.017
GGT (U/L)	54 [26, 99]	98 [51, 209]	<0.001	44 [24, 93]	59 [39, 132]	0.033
ALBI	-2.86 [-3.09, -2.67]	-2.63 [-3.00, -2.27]	<0.001	-2.86 [-3.05, -2.61]	-2.45 [-2.85, -2.00]	<0.001
PNI	52.08 [48.55, 55.03]	48.70 [44.35, 54.30]	<0.001	50.85 [47.65, 54.25]	45.93 [40.25, 53.20]	<0.001
AFP (ng/mL)	12.3 [3.3, 131.8]	65.7 [5.2, 191.6]	0.011	10.5 [3.3, 111.3]	16.7 [4.0, 68.4]	0.826
PTA (%)	88 [81, 96]	84 [75, 93]	0.012	87 [80, 93]	81 [76, 91]	0.125
INR	1.04 [0.99, 1.10]	1.08 [1.01, 1.14]	0.014	1.06 [0.99, 1.12]	1.09 [0.99, 1.16]	0.211
PT (s)	11.2 [10.7, 11.9]	11.7 [10.9, 12.4]	0.009	11.4 [10.7, 12.1]	11.8 [10.7, 12.6]	0.271
APTT (s)	36.4 [34.3, 38.9]	35.5 [32.9, 40.4]	0.411	36.0 [34.0, 38.5]	37.0 [34.0, 38.7]	0.694

Data are presented as median [first quartile, third quartile] or n (%). AFP, alpha-fetoprotein; ALBI, albumin-bilirubin; ALT, alanine aminotransferase; APTT, activated partial thromboplastin time; ASA, American Society of Anesthesiologists; AST, aspartate aminotransferase; BCLC, Barcelona Clinic Liver Cancer; BMI, body mass index; CHCC-ICC, combined hepatocellular-cholangiocarcinoma; CNLC, China Liver Cancer; G, grade; GGT, gamma-glutamyl transferase; Hb, hemoglobin; HCC, hepatocellular carcinoma; HR, heart rate; ICC, intrahepatic cholangiocarcinoma; INR, international normalized ratio; MAP, mean arterial pressure; MVI, microvascular invasion; NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio; PNI, prognostic nutritional index; PT, prothrombin time; PTA, prothrombin activity; TNM, tumor-node-metastasis.