

Supplementary Table S1. Baseline characteristics

Characteristics	Total (n=93)	High-AFP (n=77)	High-DCP (n=76)
Sex (male)	83 (89.2)	68 (88.3)	73 (96.1)
Median age (years)	56 (22–88)	55 (22–88)	55 (22–88)
HBV positive	86 (92.5)	71 (92.2)	72 (94.7)
PS (0/1)	71 (76.3)/22 (23.7)	59 (76.6)/18 (23.4)	62 (81.6)/14 (18.4)
ALBI grade (I/II)	49 (52.7)/44 (47.3)	38 (49.4)/39 (50.6)	43 (56.6)/33 (43.4)
BCLC stage (B/C)	33 (35.5)/60 (64.5)	25 (32.5)/52 (67.5)	24 (31.6)/52 (68.4)
Tumor size (cm)	9.4 (2.0–22.0)	9.7 (2.2–22.0)	9.1 (2.0–22.0)
Tumor number (solitary/multiple)	8 (8.6)/85 (91.4)	5 (6.5)/72 (93.5)	5 (6.6)/71 (93.4)
Macrovascular invasion	55 (59.1)	48 (62.3)	47 (61.8)
WBC count ($\times 10^9/L$)	6.3 (2.4–13.7)	6.3 (2.4–13.7)	6.4 (2.7–13.7)
Hemoglobin (g/L)	143 (77–192)	140 (77–192)	145 (81–192)
Platelet count ($\times 10^9/L$)	196 (29–598)	196 (29–598)	197 (46–598)
ALT (U/L)	41.0 (9.8–178.0)	40.0 (9.8–178.0)	41.0 (15.0–178.0)
AST (U/L)	54.0 (21.0–356.6)	54.0 (21.0–356.6)	49.0 (22.0–269.0)
Albumin (g/L)	40.0 (29.8–57.0)	40.0 (29.8–57.0)	41.0 (30.0–57.0)
Total bilirubin ($\mu\text{mol/L}$)	14.6 (3.3–45.0)	15.2 (4.3–44.7)	14.6 (3.3–45.0)
AFP (ng/mL)	696.1 (1.8–778724.8)	1985.2 (10.5–778724.8)	999.5 (1.8–778724.8)
DCP (mAU/mL)	6874 (26–75000)	15774 (26–7500)	7337 (44–75000)
AFP reduction>50%		56 (72.7)	
DCP reduction>50%			58 (76.3)
ORR	72 (77.4)	58 (75.3)	60 (78.9)
Sintilimab	28/37 (75.7)	23/32 (71.9)	24/32 (75.0)
Tislelizumab	14/19 (73.7)	10/14 (71.4)	13/17 (76.5)
Camrelizumab	19/24 (79.2)	16/20 (80.0)	12/16 (75.0)
Pembrolizumab	2/2 (100.0)	2/2 (100.0)	2/2 (100.0)
Toripalimab	9/11 (81.8)	7/9 (77.8)	9/9 (100.0)
Main reason for conversion therapy			
Bilobar tumor locations	33(35.5)	27 (35.1)	25 (32.9)
Lesions could not be radically resected	24 (25.8)	21 (27.3)	23 (30.3)
Extrahepatic metastasis	18 (19.4)	14 (18.2)	16 (21.1)

Anticipated insufficient future liver remnant volume	18 (19.4)	15 (19.5)	12 (15.8)
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Data are expressed as median (range) or n (%).

Abbreviations: HBV, hepatitis B virus; PS, performance status; ALBI, albumin–bilirubin; BCLC, Barcelona Clinic Liver Cancer staging; WBC, white blood cell; ALT, alanine aminotransferase; AST, aspartate aminotransferase; AFP, alpha-fetoprotein; DCP, des-gamma-carboxyprothrombin; ORR, objective response rate

Supplementary Table S2. Relationship between treatment response and response of tumor markers

Response	Total (n=93)	High-AFP group (AFP \geq 10 ng/mL)			High-DCP group (DCP \geq 40 mAU/mL)		
		Total (n=77)	AFP responder (n=56)	AFP non-responder (n=21)	Total (n=76)	DCP responder (n=58)	DCP non-responder (n=18)
CR	18	16	16	0	14	14	0
PR	54	42	34	8	46	39	7
SD	9	7	3	4	7	3	4
PD	12	12	3	9	9	2	7
ORR (%)	77.4	75.3	89.3	38.1	78.9	91.4	38.9
<i>p</i> -Value			0.000			0.000	

Abbreviations: CR, complete response; PR, partial response; SD, stable disease; PD, progressive disease; ORR, objective response rate; AFP, alpha-fetoprotein; DCP, des-gamma-carboxyprothrombin
Bold values are statistically significant ($p < 0.05$).

Supplementary Table S3. Univariate and multivariate analysis for progression-free survival in the high-AFP group (n=77)

Variables	Univariate		Multivariate	
	HR (95% CI)	<i>p</i> -Value	HR (95% CI)	<i>p</i> -value
Sex (male)	1.801 (0.553–5.873)	0.329		
Age (≥65 years)	0.401 (0.157–1.029)	0.057	0.446 (0.172–1.155)	0.096
PS (I)	1.604(0.776–3.314)	0.202		
ALBI grade (II)	2.119 (1.107–4.055)	0.023	1.902 (0.981–3.688)	0.057
BCLC (C)	1.644 (0.800–3.377)	0.176		
Tumor size (mm) (≥50)	1.890 (0.671–5.323)	0.228		
Tumor number(multiple)	1.796 (0.432–7.466)	0.420		
Macrovascular invasion (yes)	1.500 (0.770–2.921)	0.233		
AFP (ng/mL) (≥400)	1.217 (0.625–2.372)	0.563		
AFP reduction>50% (yes)	0.305 (0.160–0.583)	0.000	0.377 (0.195–0.731)	0.004

Abbreviations: HR, hazard ratio; CI, confidence interval; PS, performance status; ALBI, albumin–bilirubin; BCLC, Barcelona Clinic Liver Cancer staging; AFP, alpha-fetoprotein

Bold values are statistically significant (p<0.05).

Supplementary Table S4. Univariate and multivariate analysis for progression-free survival in the high-DCP group (n=76)

Variables	Univariate		Multivariate	
	HR (95% CI)	<i>p</i> -Value	HR (95% CI)	<i>p</i> -value
Sex (male)	2.684 (0.639–11.272)	0.177		
Age (≥65 years)	0.386 (0.151–0.988)	0.047	0.447 (0.167–1.194)	0.108
PS (1)	1.884 (0.920–3.856)	0.083	2.133 (1.017–4.476)	0.045
ALBI grade (II)	2.105 (1.135–3.902)	0.018	1.849 (0.983–3.479)	0.057
BCLC (C)	1.625 (0.796–3.320)	0.183		
Tumor size (mm) (≥50)	0.982 (0.432–2.228)	0.965		
Tumor number(multiple)	1.714 (0.522–5.622)	0.374		
Macrovascular invasion (yes)	1.374 (0.727–2.595)	0.328		
DCP (mAU/mL) (≥400)	1.435 (0.632–3.261)	0.388		
DCP reduction>50% (yes)	0.243 (0.126–0.471)	0.000	0.307 (0.154–0.609)	0.001

Abbreviations: HR, hazard ratio; CI, confidence interval; PS, performance status; ALBI, albumin–bilirubin; BCLC, Barcelona Clinic Liver Cancer staging; DCP, des-gamma-carboxyprothrombin
 Bold values are statistically significant ($p < 0.05$).