

Table S1 Baseline characteristics of the ruptured group and non-ruptured group after IPTW

Characteristic	Overall (N=2,486)	Rupture		SMD	P value [†]
		No (N=2,368)	Yes (N=118)		
Age (≤ 60 / >60 years)	2,029 (82%)/457 (18%)	1,932 (82%)/436 (18%)	97 (82%)/21 (18%)	0.022	0.90
Gender (female/male)	338 (14%)/2,148 (86%)	323 (14%)/2045 (86%)	15 (13%)/103 (87%)	0.021	0.90
Symptom (no/yes)	1,290 (52%)/1,196 (48%)	1,232 (52%)/1,136 (48%)	58 (49%)/60 (51%)	0.061	0.70
TACE (no/yes)	1,616 (65%)/870 (35%)	1,539 (65%)/829 (35%)	76 (65%)/42 (35%)	0.005	>0.99
Cancer embolus (no/yes)	2,146 (86%)/340 (14%)	2,044 (86%)/324 (14%)	102 (86%)/16 (14%)	0.004	>0.99
Operation (anatomy/non-anatomy)	498 (20%)/1,988 (80%)	475 (20%)/1,893 (80%)	23 (20%)/95 (80%)	0.006	>0.99
BCLC (A/B/C)	1,737 (70%)/400 (16%)/350 (14%)	1,655 (70%)/380 (16%)/333 (14%)	81 (69%)/20 (17%)/17 (14%)	0.026	>0.99
Child-pugh (A/B-C)	2,404 (97%)/82 (3.3%)	2,290 (97%)/78 (3.3%)	114 (96%)/4 (3.8%)	0.026	0.80
Tumor number (multiple/single)	561 (23%)/1,925 (77%)	536 (23%)/1832 (77%)	25 (21%)/93 (79%)	0.034	0.80
Tumor size (≤ 3 / >3 cm)	465 (19%)/2,021 (81%)	449 (19%)/1,919 (81%)	15 (13%)/103 (87%)	0.163	0.70
Cirrhosis (no/yes)	1,149 (46%)/1,337 (54%)	1,094 (46%)/1,274 (54%)	55 (46%)/63 (54%)	0.005	>0.99
Location (central/left/right)	194 (7.8%)/494 (20%)/1,798 (72%)	185 (7.8%)/470 (20%)/1713 (72%)	9 (7.7%)/24 (20%)/85 (72%)	0.010	>0.99
HBsAg (negative/positive)	296 (12%)/2,190 (88%)	282 (12%)/2,086 (88%)	14 (12%)/104 (88%)	0.011	>0.99
Tumor capsule (no/yes)	546 (22%)/1,940 (78%)	519 (22%)/1,849 (78%)	27 (23%)/91 (77%)	0.019	0.90

[†], Pearson's Chi-squared test; Fisher's exact test. TACE, transcatheter arterial chemoembolization; BCLC, Barcelona Clinic Liver Cancer stage; SMD, standardized mean difference.

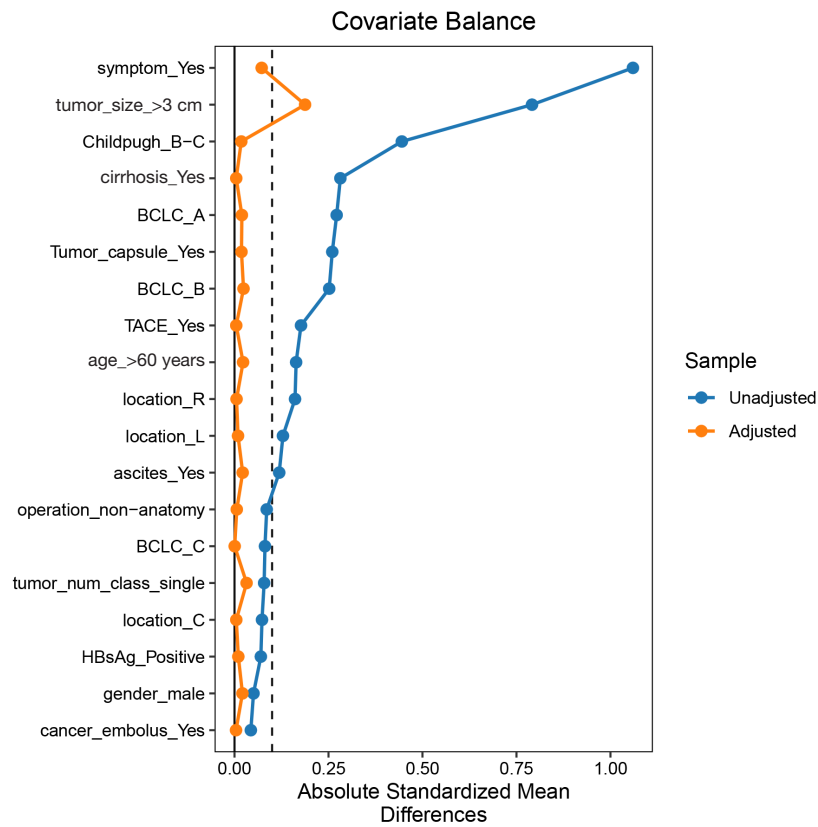


Figure S1 Comparison of differences before (blue curve) and after adjustment (orange curve) using inverse probability of treatment weighting (IPTW) analysis of clinical factors in patients with hepatocellular carcinoma (HCC).

Table S2 Risk factors associated with OS and RFS of patients before IPTW

Characteristic	N	OS			RFS		
		HR	95% CI	P value	HR	95% CI	P value
Rupture (no/yes)	2,368/118	1.86	1.49–2.32	<0.001	1.63	1.32–2.00	<0.001
Age (≤ 60 / > 60 years)	2,005/481	1.06	0.93–1.21	0.37	0.85	0.75–0.96	0.006
Gender (female/male)	357/2,129	1.17	1.00–1.37	0.052	1.36	1.18–1.57	<0.001
Symptom (no/yes)	1,374/1,112	1.97	1.77–2.20	<0.001	1.64	1.49–1.80	<0.001
TACE (no/yes)	1,615/871	0.70	0.63–0.79	<0.001	0.74	0.67–0.82	<0.001
Ascites (no/yes)	2,316/170	1.70	1.40–2.06	<0.001	1.62	1.36–1.92	<0.001
Cancer embolus (no/yes)	2,143/343	3.79	3.31–4.33	<0.001	3.46	3.05–3.93	<0.001
Operation (anatomy/non-anatomy)	506/1,980	0.90	0.79–1.03	0.14	0.94	0.84–1.05	0.27
BCLC (A)	1,758	1.00		<0.001	1.00		<0.001
B	376	2.54	2.21–2.92		2.42	2.13–2.74	
C	352	4.85	4.22–5.57		4.14	3.65–4.71	
Child-Pugh (A/B–C)	2,413/73	1.46	1.10–1.95	0.014	1.47	1.14–1.90	0.005
Tumor number (multiple/single)	593/1,893	0.45	0.40–0.51	<0.001	0.44	0.40–0.49	<0.001
Tumor size (≤ 3 / > 3 cm)	614/1,872	2.73	2.33–3.19	<0.001	1.79	1.59–2.00	<0.001
Cirrhosis (no/yes)	1,145/1,341	1.16	1.04–1.29	0.009	1.17	1.06–1.28	0.001
Location (central)	203	1.00		0.001	1.00		0.39
Left	485	1.12	0.90–1.39		0.93	0.76–1.12	
Right	1798	0.87	0.72–1.06		0.89	0.75–1.06	
HBsAg (negative/positive)	302/2,184	1.03	0.87–1.21	0.77	1.24	1.07–1.44	0.003
Tumor capsule (no/yes)	531/1,955	0.51	0.45–0.57	<0.001	0.54	0.49–0.61	<0.001

HR, hazard ratio; CI, confidence interval; OS, overall survival; RFS, recurrence-free survival; TACE, transcatheter arterial chemoembolization; BCLC, Barcelona Clinic Liver Cancer stage.

Table S3 Risk factors associated with recurrence-free survival of patients after IPTW

Characteristic	N	Univariable			Multivariable		
		HR	95% CI	P value	HR	95% CI	P value
Rupture (No/Yes)	2,367/118	1.68	1.28–2.22	<0.001	1.60	1.16–2.20	0.004
Age (≤ 60 / > 60 years)	2,029/456	0.70	0.54–0.92	0.009	0.69	0.55–0.87	0.002
Gender (female/male)	338/2,147	1.33	1.05–1.68	0.02	1.33	1.02–1.73	0.04
Symptom (no/yes)	1,290/1,195	1.60	1.35–1.91	<0.001	1.13	0.95–1.33	0.20
TACE (no/yes)	1,615/870	0.68	0.57–0.82	<0.001	0.59	0.50–0.69	<0.001
Ascites (no/yes)	2,326/159	2.09	1.61–2.72	<0.001	1.84	1.42–2.38	<0.001
Cancer embolus (no/yes)	2,145/340	3.93	3.20–4.82	<0.001	1.57	1.07–2.30	0.02
Operation (anatomy/non-anatomy)	498/1,987	0.88	0.72–1.09	0.24			
BCLC (A)	1,736	1.00		<0.001	1.00		0.002
B	399	2.18	1.76–2.71		1.28	0.87–1.88	
C	349	4.05	3.23–5.08		1.87	1.31–2.68	
Child-Pugh (A/B–C)	2,403/82	1.26	0.87–1.82	0.21			
Tumor number (multiple/single)	561/1,924	0.46	0.38–0.55	<0.001	0.72	0.53–0.97	0.03
Tumor size (≤ 3 / > 3 cm)	464/2,021	1.75	1.47–2.09	<0.001	1.58	1.30–1.92	<0.001
Cirrhosis (no/yes)	1,148/1,337	1.05	0.88–1.25	0.57			
Location (central)	194	1.00		0.79			
Left	494	0.90	0.60–1.33				
Right	1,797	1.00	0.75–1.32				
HBsAg (negative/positive)	295/2,190	1.14	0.90–1.44	0.28			
Tumor capsule (no/yes)	545/1,940	0.46	0.39–0.55	<0.001	0.65	0.53–0.79	<0.001
OS	2,486	5.24	4.25–6.46	<0.001			
OS time	2,486	0.96	0.96–0.97	<0.001			

HR, hazard ratio; CI, confidence interval; TACE, transcatheter arterial chemoembolization; BCLC, Barcelona Clinic Liver Cancer stage.

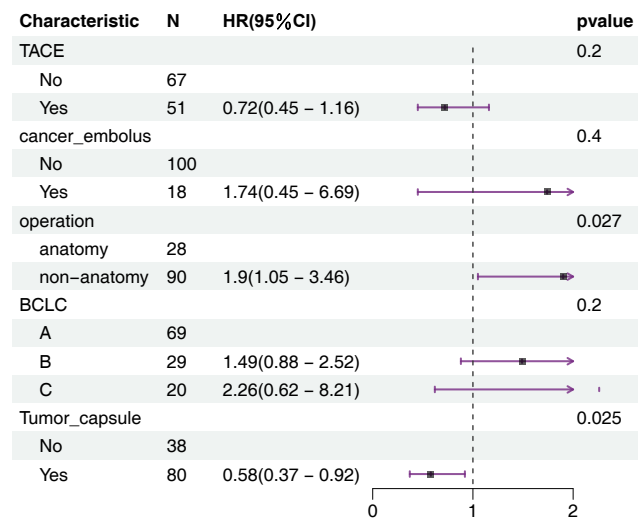


Figure S2 Forest plot of risk factors associated with overall survival rate of patients in the rupture group.

Table S4 Risk factors associated with recurrence-free survival of the ruptured group

Characteristic	N	Univariable			Multivariable		
		HR	95% CI	P value	HR	95% CI	P value
Age (≤60/>60 years)	102/16	1.23	0.69–2.17	0.49			
Gender (female/male)	15/103	1.11	0.59–2.08	0.74			
Symptom (no/yes)	15/103	0.71	0.40–1.26	0.26			
TACE (no/yes)	67/51	0.50	0.33–0.75	<0.001	0.61	0.39–0.95	0.03
Ascites (no/yes)	113/5	1.73	0.70–4.26	0.27			
Cancer embolus (no/yes)	100/18	3.44	2.01–5.89	<0.001	3.14	0.71–13.9	0.09
Operation (anatomy/non-anatomy)	28/90	2.06	1.23–3.45	0.003	2.24	1.27–3.92	0.003
BCLC (A)	69	1.00		<0.001			0.041
B	29	1.89	1.16–3.06		5.00	1.26–19.8	
C	20	3.40	1.97–5.86		1.29	0.31–5.29	
Child-Pugh (A/B–C)	101/17	0.82	0.46–1.48	0.51			
Tumor number (multiple/single)	32/86	0.63	0.40–0.98	0.048	2.15	0.60–7.67	0.20
Tumor size (≤3/>3 cm)	1/117	1.43	0.20–10.3	0.71			
Cirrhosis (no/yes)	70/48	1.19	0.79–1.79	0.40			
Location (central)	12	1.00		0.27			
Left	29	1.60	0.77–3.35				
Right	77	1.11	0.57–2.17				
HBsAg (negative/positive)	17/101	2.10	1.12–3.96	0.01	2.41	1.27–4.59	0.003
Tumor capsule (no/yes)	38/80	0.63	0.41–0.96	0.04	0.70	0.45–1.10	0.13

HR, hazard ratio; CI, confidence interval; TACE, transcatheter arterial chemoembolization; BCLC, Barcelona Clinic Liver Cancer stage.

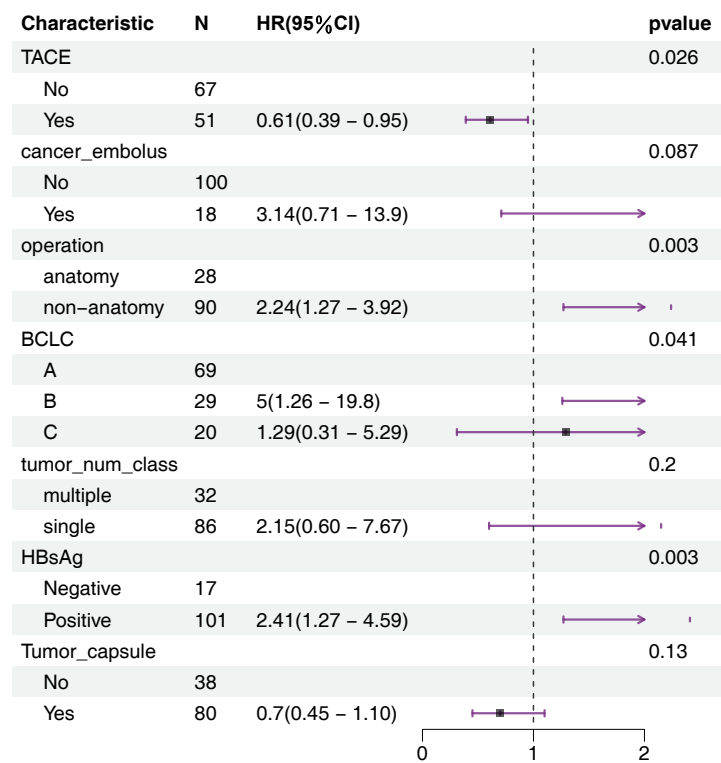


Figure S3 Forest plot of risk factors associated with recurrence free survival rate of patients in the rupture group.