



Figure S1 Standardized mean differences before and after matching.

Table S1 Means, standard deviations, and standardized mean differences on covariates and propensity scores post-matching

Variables	Observations	Mean difference	Standard deviation	Standardized difference	Percent reduction	Variance ratio
Logit Prop Score	All	1.0107	1.045339	0.96686	-	0.4467
	Region	0.88623	-	0.84779	12.32	0.549
	Matched	0.1691	-	0.16176	83.27	1.1638
Tumor number	All	-1.17061	1.475962	-0.79312	-	0.2926
	Region	-1.04304	-	-0.70668	10.9	0.318
	Matched	-0.14884	-	-0.10084	87.29	0.7358
Tumor size	All	-1.89826	3.761497	-0.50466	-	0.837
	Region	-1.72397	-	-0.45832	9.18	0.8807
	Matched	-0.38964	-	-0.10359	79.47	1.0476
MELD score	All	-0.711	1.904175	-0.37339	-	0.7534
	Region	-0.561	-	-0.29462	21.1	0.9
	Matched	-0.18576	-	-0.09756	73.87	1.3088

MELD, model for end-stage liver disease.

**Table S2** Baseline characteristics of 10,083 patients after the exclusion

Variables	Resection treatment (n=151)	Transarterial treatment (n=641)	Systemic treatment (n=206)	No treatment for PVI (n=228)	No PVI (n=8,857)	P value
Age <sup>†</sup>	56 (30–80)	57 (23–85)	58 (28–93)	64 (38–90)	61 (13–98)	<0.001
Sex (female)	29 (19.2)	102 (15.9)	28 (13.6)	40 (17.5)	2,010 (22.7)	<0.001
BMI (kg/m <sup>2</sup> ) <sup>†</sup>	23.2 (14.9–33.9)	23.1 (16.5–32.0)	22.9 (15.4–35.3)	23.9 (17.5–36.8)	24.1 (14.5–45.1)	<0.001
Smoking	68 (45.3)	360 (56.2)	115 (56.1)	104 (46.4)	3,742 (42.5)	<0.001
PST (grade 1)	16 (14.5)	108 (21.3)	56 (32.9)	39 (25.7)	901 (13.3)	<0.001
Hypertension	45 (30.0)	207 (32.3)	61 (29.6)	88 (38.8)	3,453 (39.2)	<0.001
Diabetes mellitus	31 (20.5)	146 (22.8)	42 (20.5)	58 (25.6)	2,428 (27.6)	0.005
Underlying liver disease (multiple)						
HBV	112 (74.2)	431 (70.0)	141 (69.5)	122 (56.2)	5,333 (62.5)	<0.001
HCV	9 (6.4)	56 (9.4)	16 (8.6)	9 (4.4)	1,070 (13.4)	<0.001
Alcoholic liver disease	41 (27.9)	234 (37.1)	78 (38.4)	82 (37.3)	2,652 (30.5)	<0.001
Ascites						
Mild	15 (9.9)	68 (10.6)	45 (21.8)	43 (18.9)	377 (4.3)	<0.001
Moderate to severe	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
Hepatic encephalopathy <sup>§</sup>	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	20 (0.2)	0.89
MELD score <sup>‡</sup>	7 (6–21)	8 (6–22)	8 (6–16)	8 (6–20)	8 (6–33)	<0.001
Laboratory finding						
Total bilirubin (mg/dL) <sup>‡</sup>	0.74 (0.14–1.90)	0.90 (0.20–2.90)	1.00 (0.30–2.30)	1.00 (0.30–2.80)	0.80 (0.10–3.00)	<0.001
PT-INR <sup>†</sup>	1.04 (0.88–1.40)	1.09 (0.83–1.61)	1.10 (0.88–1.71)	1.09 (0.87–1.45)	1.07 (0.80–2.25)	<0.001
Albumin (g/dL) <sup>‡</sup>	4.2 (3.2–5.1)	4.0 (2.8–5.1)	3.8 (2.9–5.0)	3.8 (2.9–4.9)	4.1 (2.8–5.5)	<0.001
Platelet (×10 <sup>3</sup> ) <sup>‡</sup>	180 (43–483)	157 (37–633)	166 (62–544)	185 (53–794)	149 (10–763)	<0.001
Cr (mg/dL) <sup>‡</sup>	0.86 (0.50–4.11)	0.85 (0.27–9.70)	0.87 (0.41–2.01)	0.89 (0.50–4.60)	0.87 (0.24–14.36)	0.22

Values are presented as median (range) or n (%). <sup>†</sup>, ANOVA; <sup>‡</sup>, Kruskal-Wallis test; <sup>§</sup>, Fisher's exact. PVI, portal vein invasion; BMI, body mass index; PST, performance status test; HBV, hepatitis B virus; HCV, hepatitis C virus; MELD, model for end-stage liver disease; PT-INR, prothrombin time-international normalized ratio; Cr, creatinine; ANOVA, analysis of variance.

**Table S3** Characteristics of HCC of 10,083 patients after the exclusion

Variables	Resection treatment (n=151)	Transarterial treatment (n=641)	Systemic treatment (n=206)	No treatment for PVI (n=228)	No PVI (n=8,857)	P value
Tumor number <sup>†</sup>	1 (1–5)	1 (1–10)	3 (1–5)	1 (1–5)	1 (1–20)	<0.001
Tumor size (cm) <sup>†</sup>	5.5 (1.2–20.6)	8.0 (1.0–22.6)	10.0 (1.0–20.5)	10.0 (2.0–20.0)	2.8 (2.0–21.0)	<0.001
Hepatic vein invasion	11 (7.3)	71 (11.1)	38 (18.4)	34 (14.9)	107 (1.2)	<0.001
Hepatic artery invasion <sup>‡</sup>	4 (2.6)	5 (0.8)	1 (0.5)	1 (0.4)	35 (0.4)	0.01
Bile duct invasion <sup>‡</sup>	6 (4.0)	31 (4.8)	7 (3.4)	13 (5.7)	60 (0.7)	<0.001
AFP (ng/mL) <sup>†</sup>	156.5 (1.6–101,480.7)	484.1 (1.0–882,000.0)	1,288.5 (1.3–605,000.0)	638.3 (1.8–200,000.0)	13.5 (0.1–191,791)	<0.001
PIVKA-II (mAU/mL) <sup>†</sup>	400.0 (11.0–75,000.0)	1,483.0 (6.0–100,000.0)	4,847.0 (1.4–222,157.9)	2,000.0 (10.0–110,986.0)	49.0 (2.0–463,844.0)	<0.001

Values are presented as median (range) or n (%). <sup>†</sup>, Kruskal-Wallis test; <sup>‡</sup>, Fisher's exact. HCC, hepatocellular carcinoma; PVI, portal vein invasion; AFP, alpha-fetoprotein; PIVKA-II, protein induced by vitamin K absence or antagonist-II.