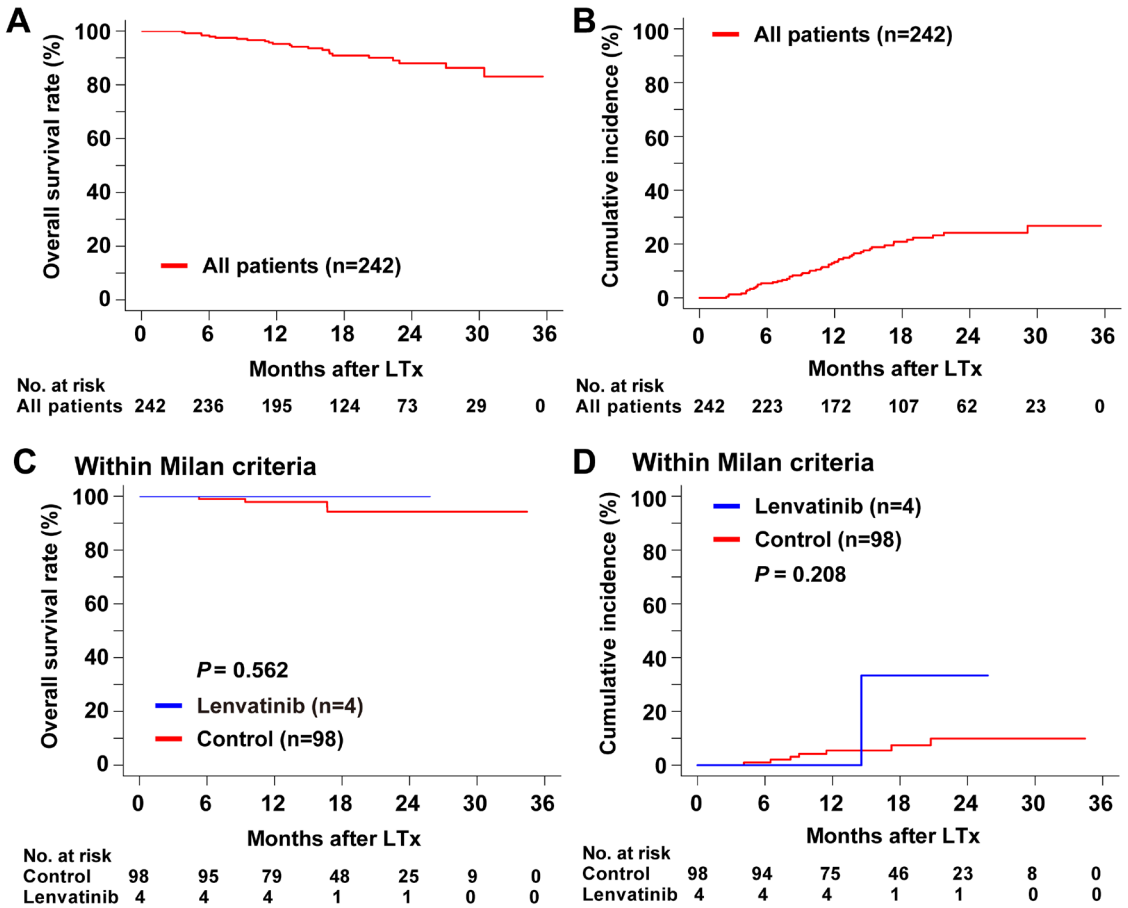

Figure S1 Efficacy of postoperative lenvatinib treatment in patients with HCC within Milan criteria who underwent LTx. (A) Kaplan-Meier analysis of OS for all patients. (B) Competing risk analysis of cumulative incidences of recurrence for all patients. (C) Kaplan-Meier analysis of OS for patients with HCC within the Milan criteria in the lenvatinib and control groups. (D) Competing risk analysis of cumulative incidences of recurrence for patients with HCC within the Milan criteria in the lenvatinib and control groups. LTx, liver transplantation; OS, overall survival; HCC, hepatocellular carcinoma. HCC, hepatocellular carcinoma; LTx, liver transplantation; OS, overall survival.

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Table S1 Univariate analysis to identify independent risk factors of OS and TTR in all patients

Variable	OS		TTR	
	HR (95% CI)	P value	sHR (95% CI)	P value
Gender (female)	0.72 (0.17–3.08)	0.661	0.80 (0.34–1.89)	0.610
Age (>50 years)	0.99 (0.44–2.25)	0.987	0.83 (0.47–1.45)	0.510
HBsAg (positive)	0.62 (0.24–1.58)	0.316	1.87 (0.80–4.34)	0.150
AFP (>400 ng/mL)	0.62 (0.24–1.58)	0.320	3.30 (1.85–5.89)	<0.001
PIVKA-II (>100 ng/mL)	6.32 (1.88–21.28)	0.003	3.11 (1.62–5.94)	<0.001
Child-Pugh class (B–C)	1.29 (0.55–3.05)	0.560	1.01 (0.55–1.87)	0.970
Cirrhosis (yes)	2.37 (1.00–5.59)	0.049	0.58 (0.31–1.11)	0.100
Tumor size (>5 cm)	3.53 (1.56–8.01)	0.003	2.75 (1.56–4.85)	<0.001
Tumor number (multiple)	1.80 (0.67–4.84)	0.248	3.40 (1.52–7.63)	0.003
Edmondson stage (III–IV)	2.35 (0.96–5.72)	0.060	2.84 (1.53–5.27)	0.001
mVI (yes)	1.65 (0.67–4.02)	0.273	2.54 (1.33–4.85)	0.005
Preoperative TACE	1.07 (0.45–2.53)	0.873	1.38 (0.78–2.43)	0.270
Duration of surgery (minutes)	1.00 (0.99–1.01)	0.792	1.00 (0.99–1.00)	0.840
Blood loss (mL)	1.00 (1.00–1.00)	0.016	1.00 (1.00–1.00)	0.270
Warm ischemic time (minutes)	0.96 (0.90–1.02)	0.223	0.97 (0.94–1.01)	0.110
Lenvatinib (yes)	0.70 (0.21–2.36)	0.564	0.72 (0.33–1.57)	0.410

OS, overall survival; TTR, time to recurrence; AFP, alpha-fetoprotein; CI, confidence interval; HbsAg, hepatitis B surface antigen; HCC, hepatocellular carcinoma; HR, hazard ratio; mVI, microvascular invasion; PIVKA-II, protein induced by vitamin K absence or antagonist-II; sHR, sub-hazard ratio; TACE, transarterial chemoembolization.

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Table S2 Baseline characteristics in patients with HCC undergoing LTx beyond Milan criteria after PSM

Variable	Group	Patients after PSM beyond Milan criteria (n=99)		
		Control (n=66)	Lenvatinib (n=33)	P value
Gender	Male	63 (95.5)	31 (93.9)	0.746 [a]
	Female	3 (4.5)	2 (6.1)	
Age (years)	≤50	33 (50.0)	17 (51.5)	0.887
	>50	33 (50.0)	16 (48.5)	
HBsAg	Negative	11 (16.7)	7 (21.2)	0.580
	Positive	55 (83.3)	26 (78.8)	
AFP (ng/mL)	≤400	52 (78.8)	26 (78.8)	1.000
	>400	14 (21.2)	7 (21.2)	
PIVKA-II (mAU/mL)	<100	20 (30.3)	9 (27.3)	0.755
	>100	46 (69.7)	24 (72.7)	
Child–Pugh class	A	52 (78.8)	26 (78.8)	1.000
	B-C	14 (21.2)	7 (21.2)	
Cirrhosis	No	13 (19.7)	7 (21.2)	0.860
	Yes	53 (80.3)	26 (78.8)	
Tumor size (cm)	≤5	35 (53.0)	18 (54.5)	0.887
	>5	31 (47.0)	15 (45.5)	
Tumor number	Single	9 (13.6)	5 (15.2)	0.838 [a]
	Multiple	57 (86.4)	28 (84.8)	
Edmondson stage	I-II	29 (43.9)	16 (48.5)	0.669
	III-IV	37 (56.1)	17 (51.5)	
mVI	No	22 (33.3)	11 (33.3)	1.000
	Yes	44 (66.7)	22 (66.7)	
CNLC stage	I	9 (13.6)	5 (15.2)	0.838 [a]
	II	57 (86.4)	28 (84.8)	
Milan criteria	Within	0	0	/
	Beyond	102 (100.0)	38 (100.0)	
Fudan criteria	Within	13 (19.7)	6 (18.2)	0.857
	Beyond	53 (80.3)	27 (81.8)	
Preoperative TACE	No	35 (53.0)	19 (57.6)	0.669
	Yes	31 (47.0)	14 (42.4)	
Duration of surgery (minutes)		305.00 [284.00, 332.00]	302.00 [272.00, 330.00]	0.385 [b]
Blood loss (mL)		800.00 [500.00, 1200.00]	800.00 [600.00, 1200.00]	0.855 [b]
Warm ischemic time (minutes)		40.00 [36.25, 43.00]	39.00 [36.00, 42.00]	0.330 [b]

Categorical variables were summarized as n (%); continuous variables were summarized as median (interquartile range). [a] Continuous correction. [b] Wilcoxon rank-sum test. LTx, liver transplantation; PSM, propensity score matching; AFP, alpha-fetoprotein; CNLC, China Liver Cancer Stage; HBsAg, hepatitis B surface antigen; HCC, hepatocellular carcinoma; mVI, microvascular invasion; PIVKA-II, protein induced by vitamin K absence or antagonist-II; TACE, transarterial chemoembolization.

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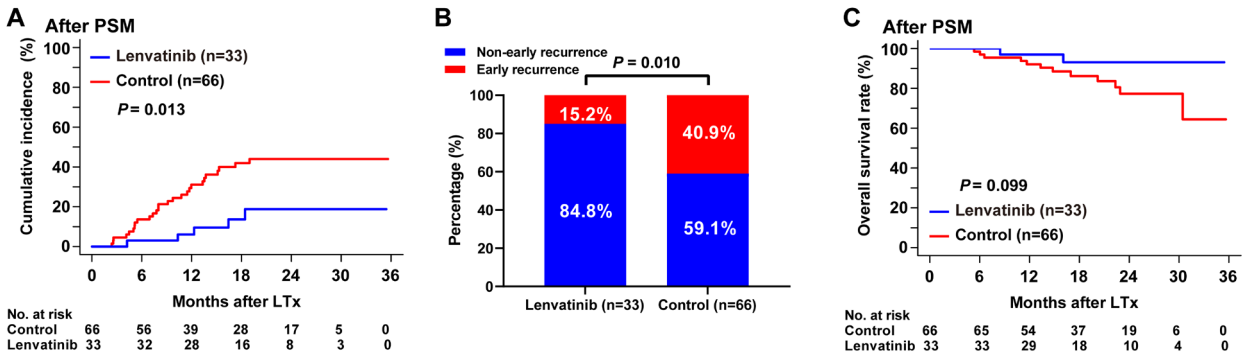

Figure S2 Efficacy of postoperative lenvatinib treatment in patients with HCC beyond Milan criteria after PSM who underwent LTx. (A) Competing risk analysis of cumulative incidences of recurrence for patients with HCC beyond the Milan criteria in the lenvatinib and control groups after PSM. (B) The correlation between adjuvant lenvatinib and early recurrence (≤2 years) in patients with HCC beyond the Milan criteria after PSM. (C) Kaplan-Meier analysis of OS for patients with HCC beyond the Milan criteria in the lenvatinib and control groups after PSM. HCC, hepatocellular carcinoma; LTx, liver transplantation; OS, overall survival; PSM, propensity score matching.

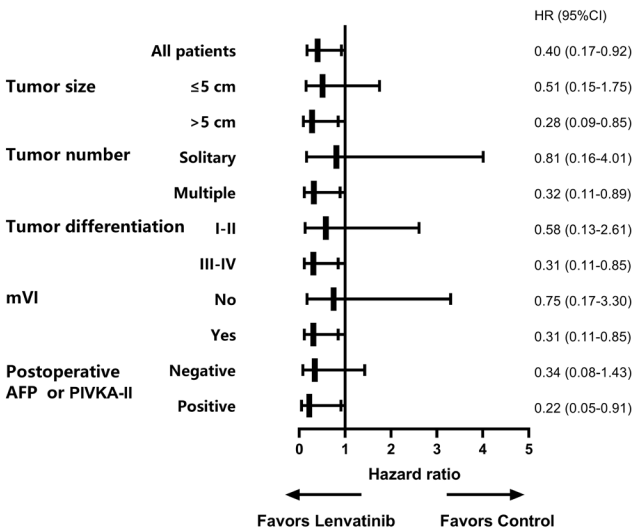

Figure S3 Forest plot of subgroup analyses for time to recurrence using a competing risk model in patients with HCC beyond Milan criteria who underwent LTx. The characteristics in subgroup analyses included tumor size, tumor number, tumor differentiation, mVI, and postoperative AFP or PIVKA-II. Postoperative AFP or PIVKA-II positive means AFP >20 ng/mL or PIVKA-II >40 mAU/mL 1 month after LTx. AFP, alpha-fetoprotein; HCC, hepatocellular carcinoma; LTx, liver transplantation; mVI, microvascular invasion; PIVKA-II, protein induced by vitamin K absence or antagonist-II.

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