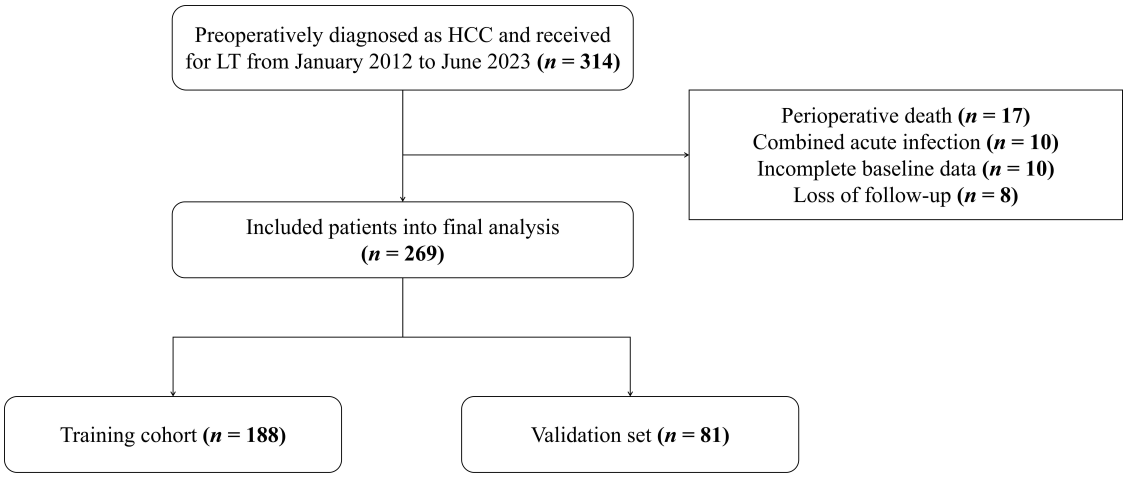
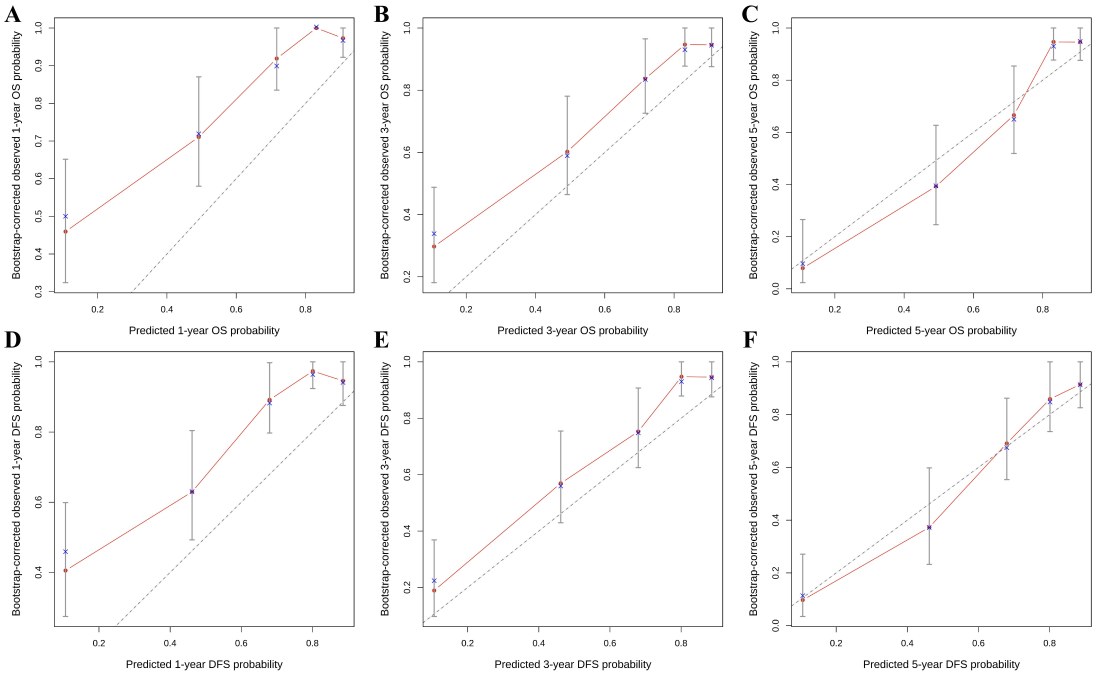


Supplementary Figure 1 The diagram of patient selection.



Supplementary Figure 2 Bootstrap-corrected calibration curves of the nomograms. Calibration plots after bootstrap correction showing the agreement between predicted and observed 1-, 3-, and 5-year probabilities of OS (A–C) and DFS (D–F) in the training cohort.

Supplementary Table 1 Multivariable Cox regression results for overall survival after exclusion of Child-Pugh C patients

Variables	Training cohort		Validation cohort	
	HR(95% CI)	***P* value**	**HR(95% CI)**	***P* value**
PIIN score	2.805 (1.729-4.550)	<0.001[a]	4.971 (2.210-11.181)	<0.001[a]
Hypertension (Yes vs. No)	1.871 (0.987-3.550)	0.055	1.034 (0.324-3.297)	0.955
Tumor number	1.376 (1.173-1.614)	<0.001[a]	1.583 (1.230-2.036)	<0.001[a]
Tumor size	1.235 (1.151-1.325)	<0.001[a]	1.165 (0.941-1.442)	0.162
Differentiation (III vs. I-II)	1.833 (0.938-3.584)	0.076	4.370 (1.693-11.279)	0.002[a]

(PIIN score, Prognostic immune-inflammatory-nutritiona score; HR, hazard ratio; CI, confidence interval; [a] $P < 0.05$)

Supplementary Table 2 Multivariable Cox regression results for disease-free survival after exclusion of Child-Pugh C patients

Variables	Training cohort		Validation cohort	
	HR(95% CI)	***P* value**	**HR(95% CI)**	***P* value**
PIIN score	2.539 (1.576-4.090)	<0.001[a]	4.305 (1.932-9.593)	<0.001[a]
Hypertension (Yes vs. No)	1.942 (1.024-3.681)	0.042[a]	0.726 (0.258-2.039)	0.543
Tumor number	1.352 (1.156-1.581)	<0.001[a]	1.488 (1.165-1.900)	0.001[a]

Tumor size	1.249 (1.165-1.339)	<0.001[a]	1.209 (1.019-1.435)	0.030[a]

(PIIN score, Prognostic immune-inflammatory-nutritiona score; HR, hazard ratio; CI, confidence interval; [a] $P < 0.05$)

Supplementary Table 3 Result of Schoenfeld residual tests of variables in different models

Model	Variables	Statistic	*P* value
OS Training	AFP	0.656	0.417
OS Training	Differentiation	5.146	0.023[a]
OS Training	PIIN score	3.203	0.073
OS Training	Tumor number	0.149	0.700
OS Training	Tumor size	0.741	0.389
OS Training	Global	10.393	0.065
OS Validation	AFP	1.662	0.197
OS Validation	Differentiation	2.109	0.164
OS Validation	PIIN score	1.138	0.286
OS Validation	Tumor number	1.319	0.251
OS Validation	Tumor size	1.022	0.312
OS Validation	Global	7.341	0.196
DFS Training	AFP	1.124	0.289
DFS Training	Differentiation	4.125	0.042[a]
DFS Training	Hypertension	0.061	0.806
DFS Training	PIIN score	2.742	0.098
DFS Training	Tumor number	1.290	0.256
DFS Training	Tumor size	0.576	0.448
DFS Training	Global	11.04	0.087
DFS Validation	AFP	2.314	0.128
DFS Validation	Differentiation	1.868	0.172

DFS Validation	Hypertension	1.182	0.277
DFS Validation	PIIN score	0.373	0.541
DFS Validation	Tumor number	0.028	0.868
DFS Validation	Tumor size	2.055	0.152
DFS Validation	Global	9.717	0.137

(OS, Overall survival; AFP, Alpha fetoprotein; PIIN score, Prognostic immune-inflammatory-nutritiona score; [a] $P < 0.05$)

Supplementary Table 4 Pairwise comparisons of 1-, 3-, and 5-year time-dependent AUCs between the PIIN-based nomogram and the Milan, UCSF, and RETREAT models

Endpoint	**Cohort**	**Time point**	**Comparator model**	**Nomogram AUC**	**Comparator AUC**	***P* value**
OS	Training	1-year	Milan	0.866	0.714	<0.001[a]
OS	Training	3-year	Milan	0.815	0.659	<0.001[a]
OS	Training	5-year	Milan	0.855	0.648	<0.001[a]
OS	Validation	1-year	Milan	0.851	0.627	<0.001[a]
OS	Validation	3-year	Milan	0.865	0.611	<0.001[a]
OS	Validation	5-year	Milan	0.889	0.620	<0.001[a]
OS	Training	1-year	UCSF	0.866	0.730	<0.001[a]
OS	Training	3-year	UCSF	0.815	0.674	<0.001[a]

OS	Training	5-year	UCSF	0.855	0.665	<0.001[a]
OS	Validation	1-year	UCSF	0.851	0.541	<0.001[a]
OS	Validation	3-year	UCSF	0.865	0.556	<0.001[a]
OS	Validation	5-year	UCSF	0.889	0.612	<0.001[a]
DFS	Training	1-year	Milan	0.808	0.645	<0.001[a]
DFS	Training	3-year	Milan	0.835	0.671	<0.001[a]
DFS	Training	5-year	Milan	0.851	0.635	<0.001[a]
DFS	Validation	1-year	Milan	0.816	0.636	<0.001[a]
DFS	Validation	3-year	Milan	0.841	0.625	<0.001[a]
DFS	Validation	5-year	Milan	0.819	0.628	0.005[a]
DFS	Training	1-year	RETREAT	0.808	0.758	0.089
DFS	Training	3-year	RETREAT	0.835	0.788	0.121
DFS	Training	5-year	RETREAT	0.851	0.752	0.005[a]
DFS	Validation	1-year	RETREAT	0.816	0.690	0.019[a]
DFS	Validation	3-year	RETREAT	0.841	0.727	0.031[a]

	n	r				
DFS	Validatio	5-yea	RETREAT	0.819	0.779	0.553
	n	r				

(AUC, area under the receiver operating characteristic curve; OS, overall survival; DFS, disease-free survival; UCSF, University of California, San Francisco; RETREAT, Risk Estimation of Tumor Recurrence After Transplant; [a] $P < 0.05$)