

Figure S1 Interaction analysis of RFS and OS for low and high DIRER groups. AFP, alpha-fetoprotein; ALB, albumin; ALBI, albumin-bilirubin; BCLC, Barcelona Clinic Liver Cancer; BMI, body mass index; CI, confidence interval; DIRER, daily increment of residual liver regeneration; HBsAg, hepatitis B surface antigen; HR, hazard ratio; ISGLS, International Study Group of Liver Surgery; OS, overall survival; PLT, platelets; RFS, recurrence-free survival; RLVw, residual liver volume to body weight ratio.

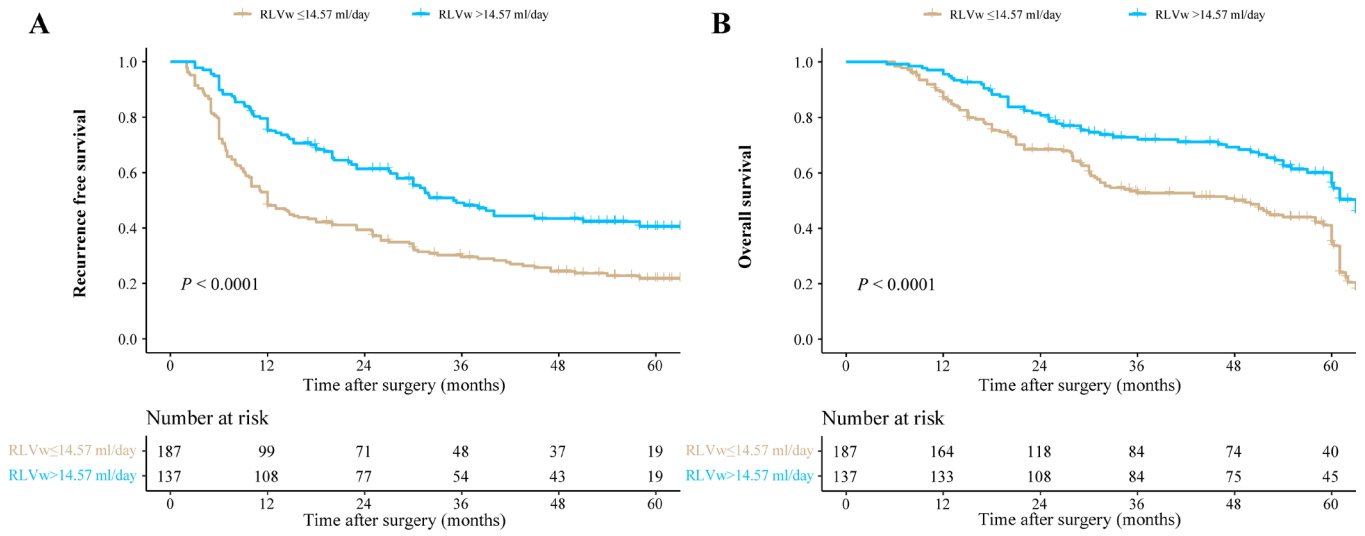


Figure S2 Comparison of RFS (A) and OS (B) for low and high RLVw groups. OS, overall survival; RFS, recurrence-free survival; RLVw, residual liver volume to body weight ratio.

Table S1 Univariable and multivariable Cox proportional hazards regression model of early or late tumor recurrence of the entire cohort

Characteristics	Early tumor recurrence				Late tumor recurrence			
	Univariable analysis		Multivariable analysis		Univariable analysis		Multivariable analysis	
	HR (95% CI)	P value	HR (95% CI)	P value	HR (95% CI)	P value	HR (95% CI)	P value
Demographics								
Sex, male vs. female	0.640 (0.426–0.962)	0.032	0.650 (0.421–1.005)	0.053	5.170 (0.714–37.440)	0.104		
Age	1.000 (0.986–1.013)	0.949			1.022 (0.997–1.047)	0.082		
BMI	1.004 (0.955–1.055)	0.888			1.126 (1.034–1.227)	0.007	1.104 (0.963–1.266)	0.156
Comorbidities								
Hypertension, yes vs. no	0.996 (0.646–1.535)	0.986			1.682 (0.816–3.464)	0.159		
Diabetes mellitus, yes vs. no	0.974 (0.582–1.632)	0.921			2.348 (1.054–5.232)	0.037	1.857 (0.706–4.887)	0.210
Gastroesophageal varices, yes vs. no	1.223 (0.601–2.490)	0.579			0.547 (0.075–3.962)	0.550		
Treatment history								
Previous treatment, yes vs. no	0.937 (0.598–1.468)	0.776			0.912 (0.388–2.143)	0.833		
Antiviral treatment, yes vs. no	1.077 (0.793–1.463)	0.635			0.465 (0.259–0.834)	0.010	0.502 (0.264–0.952)	0.035*
Positive for HBsAg	1.265 (0.874–1.830)	0.213			0.700 (0.395–1.240)	0.222		
Preoperative liver function								
PLT	1.000 (0.998–1.002)	0.839			0.998 (0.994–1.002)	0.335		
Total bilirubin	0.994 (0.981–1.007)	0.359			0.990 (0.957–1.025)	0.578		
ALB	1.008 (0.983–1.034)	0.542			1.017 (0.976–1.059)	0.421		
ALBI score, >–2.6 vs. ≤–2.6	0.804 (0.580–1.115)	0.191			0.958 (0.544–1.688)	0.883		
Liver cirrhosis, yes vs. no	1.082 (0.793–1.475)	0.619			0.736 (0.397–1.366)	0.332		
Tumor characteristics								
AFP, >400 vs. ≤400 ng/mL	1.134 (0.829–1.553)	0.432			0.752 (0.405–1.395)	0.365		
PIVKA	1.000 (1.000–1.000)	0.106			1.000 (1.000–1.000)	0.747		
BCLC stage, B vs. 0–A	0.908 (0.426–1.935)	0.802			0.830 (0.201–3.422)	0.797		
Tumor number, multiple vs. single	0.805 (0.505–1.286)	0.364			1.292 (0.646–2.585)	0.468		
Tumor diameter	1.009 (0.978–1.042)	0.566			0.988 (0.937–1.041)	0.643		
Satellites, present vs. absent	1.521 (0.624–3.705)	0.356			0.970 (0.134–7.034)	0.976		
Tumor differentiation, III–IV vs. I–II	1.463 (0.648–3.307)	0.360			0.936 (0.291–3.011)	0.912		
MVI, present vs. absent	1.499 (1.104–2.035)	0.009	1.843 (1.300–2.614)	0.001*	1.034 (0.579–1.845)	0.911		
Tumor capsule, absent vs. present	1.659 (1.150–2.393)	0.007	1.612 (1.072–2.424)	0.022*	1.357 (0.610–3.017)	0.454		
Surgical characteristics								
Type of hepatectomy, major vs. minor	1.545 (1.133–2.107)	0.006	1.285 (0.919–1.796)	0.143	1.197 (0.667–2.149)	0.547		
Intraoperative blood loss	1.000 (0.999–1.000)	0.393			1.000 (0.999–1.001)	0.652		
Hilar clamping time	0.997 (0.986–1.008)	0.544			1.008 (0.987–1.029)	0.456		
Perioperative blood transfusion, yes vs. no	1.280 (0.870–1.884)	0.209			0.548 (0.233–1.288)	0.168		
Operative time	1.001 (0.998–1.004)	0.538			0.996 (0.991–1.002)	0.211		
Postoperative complications								
ISGLS grade, 0–A vs. B	0.504 (0.248–1.026)	0.059			1.657 (0.744–3.691)	0.216		
Clavien-Dindo grade, III–IV vs. I–II	0.508 (0.282–0.915)	0.024	0.663 (0.357–1.232)	0.194	2.234 (1.164–4.285)	0.016	2.408 (1.166–4.974)	0.018*
Liver regeneration								
RLV	0.999 (0.998–0.999)	<0.001	0.999 (0.997–1.001)	0.396	1.001 (1.000–1.002)	0.042	1.001 (1.000–1.002)	0.155
RLVw	0.892 (0.844–0.943)	<0.001	0.946 (0.817–1.096)	0.457	0.998 (0.912–1.093)	0.973		
ΔRLV	1.008 (1.006–1.009)	<0.001	1.005 (0.992–1.018)	0.463	1.004 (1.001–1.007)	0.013	0.983 (0.953–1.015)	0.304
ΔRLVw	1.514 (1.407–1.630)	<0.001	0.782 (0.437–1.398)	0.406	1.236 (1.005–1.520)	0.045	1.475 (0.347–6.262)	0.598
DIRER	1.052 (1.043–1.061)	<0.001	1.049 (1.007–1.093)	0.023*	1.028 (1.008–1.049)	0.007	1.101 (0.957–1.267)	0.177

*, P<0.05 was considered statistically significant. AFP, alpha-fetoprotein; ALB, albumin; ALBI, albumin-bilirubin; BCLC, Barcelona Clinic Liver Cancer; BMI, body mass index; CI, confidence interval; DIRER, daily increment of residual liver regeneration; HBsAg, hepatitis B surface antigen; HR, hazard ratio; ISGLS, International Study Group of Liver Surgery; MVI, microvascular invasion; PIVKA, protein induced by vitamin K antagonist; PLT, platelets; RLV, residual liver volume; RLVw, residual liver volume to body weight ratio; ΔRLV, change in residual liver volume; ΔRLVw, change in residual liver volume to body weight ratio.

Table S2 Univariable and multivariable logistic regression model of DIRER

Characteristics	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P value	OR (95% CI)	P value
Demographics				
Sex, male vs. female	0.877 (0.457–1.659)	0.688		
Age	1.003 (0.983–1.024)	0.746		
BMI	1.037 (0.966–1.115)	0.320		
Comorbidities				
Hypertension, yes vs. no	1.248 (0.667–2.378)	0.492		
Diabetes mellitus, yes vs. no	1.390 (0.659–3.044)	0.394		
Gastroesophageal varices, yes vs. no	1.380 (0.450–4.653)	0.580		
Treatment history				
Previous treatment, yes vs. no	0.747 (0.393–1.414)	0.369		
Antiviral treatment, yes vs. no	0.768 (0.495–1.190)	0.239		
Positive for HBsAg	0.989 (0.598–1.631)	0.965		
Preoperative liver function				
PLT	0.998 (0.996–1.001)	0.304		
Total bilirubin	1.002 (0.989–1.018)	0.754		
ALB	1.009 (0.972–1.048)	0.621		
ALBI score, >−2.6 vs. ≤−2.6	0.737 (0.466–1.162)	0.189		
Liver cirrhosis, yes vs. no	1.046 (0.669–1.638)	0.844		
Tumor characteristics				
AFP, > 400 vs. ≤400 ng/mL	1.019 (0.646–1.610)	0.936		
PIVKA	1.000 (1.000–1.000)	0.905		
BCLC stage, B vs. 0–A	1.292 (0.455–3.937)	0.635		
Tumor number, multiple vs. single	1.606 (0.856–3.102)	0.147		
Tumor diameter	0.989 (0.942–1.038)	0.656		
Satellites, present vs. absent	0.848 (0.197–3.643)	0.818		
Tumor differentiation, III–IV vs. I–II	0.909 (0.318–2.501)	0.854		
MVI, present vs. absent	0.958 (0.617–1.487)	0.848		
Tumor capsule, absent vs. present	1.342 (0.748–2.447)	0.329		
Surgical characteristics				
Extent of hepatectomy, major vs. minor	1.170 (0.741–1.854)	0.502		
Intraoperative blood loss	1.000 (0.999–1.001)	0.954		
Hilar clamping time	1.005 (0.990–1.021)	0.502		
Perioperative blood transfusion, yes vs. no	2.227 (1.218–4.221)	0.011	2.464 (1.294–4.891)	0.008*
Operative time	1.000 (0.996–1.004)	0.938		
Postoperative complications				
ISGLS grade, 0–A vs. B	0.349 (0.139–0.802)	0.017	0.458 (0.167–1.173)	0.111
Clavien-Dindo grade, III–IV vs. I–II	0.274 (0.122–0.570)	0.001	0.282 (0.120–0.622)	0.002*
Liver regeneration				
RLV	0.999 (0.998–1.000)	0.056		
RLVw	0.869 (0.802–0.939)	<0.001	0.859 (0.789–0.930)	<0.001*

*, $P < 0.05$ was considered statistically significant. AFP, alpha-fetoprotein; ALB, albumin; ALBI, albumin-bilirubin; BCLC, Barcelona Clinic Liver Cancer; BMI, body mass index; CI, confidence interval; DIRER, daily increment of residual liver regeneration; HBsAg, hepatitis B surface antigen; ISGLS, International Study Group of Liver Surgery; MVI, microvascular invasion; OR, odds ratio; PIVKA, protein induced by vitamin K antagonist; PLT, platelets; RLV, residual liver volume; RLVw, residual liver volume to body weight ratio.