## Supplementary

## Table S1 DCE-MRI scan parameters

Scanner	Scanner I (1.5-T)	Scanner II (3.0-T)	Scanner III (3.0-T)
Sequence	3D FLASH	3D FLASH	3D FLASH
Orientation	Axial	Axial	Axial
Fat suppression	Spectral attenuated inversion recovery	Quick fat sat	Quick fat sat
Repetition time (msec)	4.43	4.51	4.51
Echo time (msec)	1.5	1.61	1.61
Flip angle (°)	10	10	10
Field of view (mm <sup>2</sup> )	340×340	340×340	340×340
Matrix	448×336	448×448	448×300
Number of slices	144	144	160
Slice thickness (mm)	1.20	1.00	1.20
Slice gap (mm)	0	0	0
Number of averages	1	1	1
Voxel size (mm)	1.0×0.8×1.2	1.1×0.8×1.0	1.1×0.8×1.2
Pixel bandwidth (Hz)	1,086	1,262	400
Acquisition time (min:sec)	6:39	5:55	5:50

DCE-MRI, dynamic contrast-enhanced magnetic resonance imaging; FLASH, fast low-angle shot.



**Figure S1** Key radiomics features selected from intratumoral radiomic features and peritumoral radiomic features. (A,C,E) The tuning parameter ( $\lambda$ ) in the LASSO was screened using 10-fold cross-validation based upon minimum criteria. Log( $\lambda$ ) was plotted on the X-axis, and binomial deviance was plotted on the Y-axis. The dotted vertical lines demonstrate optimal values determined by the minimum criterion and 1 – SE. Optimal log( $\lambda$ ) =–3.336 for intratumoral radiomic features (A); –3.094 for peritumoral radiomic features (C); –3.373 for combined intratumoral and peritumoral radiomic features (E). (B,D,F) Coefficient distribution of whole radiomic features extracted from intratumoral radiomic features (B), peritumoral radiomic features (D) and combined intratumoral and peritumoral radiomic features (F). The dotted vertical lines indicate the optimal values based on the minimum criterion and 1 – SE of the minimum criterion. 1 – SE, one standard error of the minimum criterion; AUC, area under the curve; LASSO, least absolute shrinkage, and selection operator.

Cohort	Models	AUC (95% CI)	Accuracy	Sensitivity	Specificity	PPV	NPV	F1-score
Training group	Radiomics model	0.850 (0.804–0.890)	0.777	0.776	0.778	0.724	0.823	0.749
	Clinical model	0.781 (0.723–0.830)	0.740	0.736	0.743	0.681	0.790	0.708
	Combined model	0.897 (0.862–0.931)	0.832	0.840	0.826	0.784	0.873	0.811
Internal validation group	Radiomics model	0.807 (0.718–0.888)	0.792	0.741	0.831	0.769	0.808	0.755
	Clinical model	0.739 (0.649–0.824)	0.672	0.648	0.690	0.614	0.721	0.631
	Combined model	0.871 (0.803–0.934)	0.808	0.815	0.803	0.759	0.851	0.786
External validation group	Radiomics model	0.778 (0.699–0.844)	0.699	0.790	0.610	0.667	0.746	0.723
	Clinical model	0.808 (0.736–0.871)	0.675	0.506	0.841	0.759	0.633	0.607
	Combined model	0.869 (0.807–0.920)	0.761	0.815	0.707	0.733	0.795	0.772

Table S2 Diagnostic performance of each model in the training, internal validation, and external validation groups

AUC, area under the curve; CI, confidence interval; NPV, negative predictive value; PPV, positive predictive value.

Table S3 Univariate and multivariate logistic regression analyses of clinico-radiological factors

Factors —	Univariate logistic a	nalysis	Multivariate logistic analysis		
	OR (95% CI)	P value	OR (95% CI)	P value	
Age	1.053 (1.031–1.078)	<0.001*	1.059 (1.034–1.086)	<0.001*	
Position (right)	0.770 (0.482–1.226)	0.271	NA	NA	
Size	1.048 (0.991–1.109)	0.105	NA	NA	
TIC (outflow type)	8.840 (4.677–17.605)	<0.001*	9.726 (4.975–20.129)	<0.001*	
TIC (platform type)	3.224 (1.576–6.818)	0.002*	3.277 (1.550–7.165)	0.002*	
Tumor (no mass)	0.938 (0.474–1.823)	0.851	NA	NA	

\*, P<0.05. CI, confidence interval; OR, odds ratio; TIC, time-intensity curve.

Table S4 Comparison of the prediction performance of the combined model and other models

Group	Model 1	Model 2	DeLong's test
Training group	Combined model	Radiomics model	0.001
	Combined model	Clinical model	<0.001
Internal validation group	Combined model	Radiomics model	0.009
	Combined model	Clinical model	0.001
External validation group	Combined model	Radiomics model	<0.001
	Combined model	Clinical model	0.051

Table S5 Prediction performance of the combined model in different subgroups

Subgroup	AUC (95% CI)	Accuracy	Sensitivity	Specificity
Size ≤10 mm	0.819 (0.755–0.875)	0.767	0.712	0.802
Size >10 mm	0.907 (0.878–0.936)	0.826	0.872	0.784

AUC, area under the curve; CI, confidence interval.



**Figure S2** Analysis of batch effects under different MR field strengths in the internal validation cohort. (A) Principal component analysis scatter plot. The first two principal components of the radiomics features were visualized in a two-dimensional scatter plot for 1.5- and 3.0-T field strengths. The X- and Y-axis represent the two principal component dimensions. (B) The ROC curves for the 1.5- and 3.0-T field strengths in the validation cohort. AUC, area under the curve; CI, confidence interval; MR, magnetic resonance; ROC, receiver operating characteristic.



**Figure S3** SHAP bees-warm plot. The SHAP bees-warm plot shows the positive or negative effects of each feature on the prediction probability through yellow and purple colors. SHAP, SHapley Additive exPlanations; TIC, time-intensity curve.