Supplementary

Table S1 Univariate and multivariate analyses for predicting the efficacy of concurrent radiotherapy in the training cohort

Variables	Univariate analysis		Multivariate analysis	
	P	OR (95% CI)	P	OR (95% CI)
Clinical M stage				
M0		1.00 (reference)		1.00 (reference)
M1	0.012	2.33 (1.20–4.53)	0.161	1.66 (0.82–3.38)
The number of chemotherapy cycles administered during CCRT				
<3		1.00 (reference)		1.00 (reference)
≥3	0.015	0.45 (0.24–0.86)	0.035	0.48 (0.24–0.95)
CYFRA21-1				
Normal		1.00 (reference)		1.00 (reference)
Increase	0.005	2.55 (1.32–4.93)	0.010	2.46 (1.24–4.90)

OR, odds ratio; CI, confidence interval; CCRT, concurrent chemoradiotherapy; M, distant metastasis; CYFRA 21-1, cytokeratin 19 fragment.

Table S2 Clinical models of eight different machine learning algorithms

Model	Training cohort				Validation cohort			
	AUC (95% CI)	Accuracy	Sensitivity	Specificity	AUC (95% CI)	Accuracy	Sensitivity	Specificity
LR	0.679 (0.5904–0.7685)	0.672	0.776	0.562	0.619 (0.4240–0.8149)	0.667	0.882	0.437
SVM	0.407 (0.3211–0.4921)	0.511	1.000	0	0.664(0.4773–0.8499)	0.667	0.765	0.562
KNN	0.683 (0.5961–0.7696)	0.672	0.776	0.562	0.638 (0.4626–0.8132)	0.667	0.882	0.437
RF	0.686(0.5984–0.7740)	0.672	0.776	0.562	0.634 (0.4430–0.8254)	0.667	0.882	0.437
Extra Trees	0.686 (0.5984–0.7740)	0.672	0.776	0.562	0.634 (0.4430–0.8254)	0.667	0.882	0.437
XGBoost	0.683 (0.5961–0.7696)	0.672	0.776	0.562	0.627 (0.4387–0.8150)	0.667	0.882	0.437
LightGBM	0.622 (0.5418–0.7014)	0.618	0.478	0.766	0.548 (0.3747–0.7209)	0.545	0.471	0.625
MLP	0.686 (0.5984–0.7740)	0.672	0.776	0.562	0.627 (0.4327–0.8210)	0.667	0.882	0.437

LR, Logistic Regression; SVM, Support Vector Machine; RF, Random Forest; XGBoost, Extreme Gradient Boosting, KNN, k-Nearest Neighbors; Extra Trees, Extremely Randomized Trees; LightGBM, Light Gradient Boosting Machine; MLP, multilayer perceptron; AUC, area under the receiver operating characteristic curve; CI, confidence interval.

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Table S3 2D-Rad models of eight different machine learning algorithms

Model	Training cohort				Validation cohort			
	AUC (95% CI)	Accuracy	Sensitivity	Specificity	AUC (95% CI)	Accuracy	Sensitivity	Specificity
LR	0.760 (0.6777–0.8419)	0.725	0.851	0.594	0.599 (0.3939–0.8046)	0.697	0.882	0.500
SVM	0.547 (0.4473–0.6471)	0.565	0.642	0.484	0.684 (0.4933–0.8743)	0.727	0.824	0.625
KNN	0.828 (0.7606–0.8954)	0.763	0.821	0.703	0.656 (0.4732–0.8393)	0.636	0.529	0.750
RF	0.881 (0.8244–0.9384)	0.832	0.821	0.844	0.607 (0.4058–0.8074)	0.667	0.882	0.437
Extra Trees	0.938 (0.8997–0.9763)	0.878	0.940	0.812	0.614 (0.4152–0.8127)	0.636	0.706	0.562
XGBoost	0.936 (0.8987–0.9726)	0.847	0.806	0.891	0.678 (0.4918–0.8649)	0.667	0.882	0.437
LightGBM	0.627 (0.5577–0.6972)	0.634	0.896	0.359	0.568 (0.4181–0.7179)	0.576	0.824	0.312
MLP	0.719 (0.6320–0.8064)	0.718	0.687	0.750	0.518 (0.3132–0.7236)	0.576	0.235	0.937

LR, Logistic Regression; SVM, Support Vector Machine; RF, Random Forest; XGBoost, Extreme Gradient Boosting, KNN, k-Nearest Neighbors; Extra Trees, Extremely Randomized Trees; LightGBM, Light Gradient Boosting Machine; MLP, multilayer perceptron; AUC, area under the receiver operating characteristic curve; CI, confidence interval.

Table S4 3D-Rad models of eight different machine learning algorithms

Model	Training cohort				Validation cohort			
	AUC (95% CI)	Accuracy	Sensitivity	Specificity	AUC (95% CI)	Accuracy	Sensitivity	Specificity
LR	0.653 (0.5591–0.7478)	0.641	0.597	0.687	0.732 (0.5477–0.9156)	0.788	1.000	0.562
SVM	0.673 (0.5775–0.7681)	0.672	0.776	0.562	0.643 (0.4390–0.8477)	0.697	0.824	0.562
KNN	0.706 (0.6226–0.7895)	0.649	0.701	0.594	0.561 (0.3598–0.7615)	0.636	0.941	0.312
RF	0.822 (0.7522–0.8914)	0.740	0.657	0.828	0.697 (0.5089–0.8844)	0.727	0.824	0.625
Extra Trees	0.734 (0.6495–0.8186)	0.679	0.806	0.547	0.583 (0.3706–0.7948)	0.667	0.824	0.500
XGBoost	0.908 (0.8544–0.9609)	0.885	0.896	0.875	0.686 (0.4911–0.8802)	0.727	0.824	0.625
LightGBM	0.766 (0.6863–0.8452)	0.695	0.866	0.516	0.662 (0.4701–0.8534)	0.667	0.882	0.437
MLP	0.652 (0.5574–0.7463)	0.641	0.612	0.672	0.724 (0.5344–0.9142)	0.758	0.941	0.562

LR, Logistic Regression; SVM, Support Vector Machine; RF, Random Forest; XGBoost, Extreme Gradient Boosting, KNN, k-Nearest Neighbors; Extra Trees, Extremely Randomized Trees; LightGBM, Light Gradient Boosting Machine; MLP, multilayer perceptron; AUC, area under the receiver operating characteristic curve; CI, confidence interval.

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Table S5 Lung-Rad models of eight different machine learning algorithms

Model	Training cohort				Validation cohort			
	AUC (95% CI)	Accuracy	Sensitivity	Specificity	AUC (95% CI)	Accuracy	Sensitivity	Specificity
LR	0.625 (0.5282–0.7218)	0.634	0.642	0.625	0.765 (0.6000–0.9367)	0.758	0.824	0.687
SVM	0.498 (0.3975–0.5983)	0.565	0.896	0.219	0.353 (0.1560–0.5499)	0.515	0.412	0.625
KNN	0.765 (0.6887–0.8421)	0.702	0.776	0.625	0.616 (0.4262–0.8055)	0.606	0.588	0.625
RF	0.841 (0.7753–0.9073)	0.779	0.687	0.875	0.638 (0.4385–0.8373)	0.697	0.471	0.937
Extra Trees	0.872 (0.8150–0.9299)	0.794	0.716	0.875	0.649 (0.4538–0.8440)	0.667	0.647	0.687
XGBoost	0.782 (0.7053–0.8595)	0.710	0.821	0.594	0.710 (0.5308–0.8884)	0.667	0.588	0.750
LightGBM	0.627 (0.5514–0.7030)	0.626	0.836	0.406	0.533 (0.3583–0.7079)	0.576	0.882	0.250
MLP	0.569 (0.4689–0.6683)	0.588	0.657	0.516	0.555 (0.3495–0.7608)	0.636	0.588	0.687

LR, Logistic Regression; SVM, Support Vector Machine; RF, Random Forest; XGBoost, Extreme Gradient Boosting, KNN, k-Nearest Neighbors; Extra Trees, Extremely Randomized Trees; LightGBM, Light Gradient Boosting Machine; MLP, multilayer perceptron; AUC, area under the receiver operating characteristic curve; CI, confidence interval.

Table S6 3D-CRL models of eight different machine learning algorithms

Model	Training cohort				Validation cohort			
	AUC (95% CI)	Accuracy	Sensitivity	Specificity	AUC (95% CI)	Accuracy	Sensitivity	Specificity
LR	0.740 (0.6549–0.8250)	0.695	0.672	0.719	0.735 (0.5566–0.9140)	0.727	0.706	0.750
SVM	0.850 (0.7814–0.9182)	0.802	0.896	0.703	0.713 (0.5281–0.8983)	0.758	0.941	0.562
KNN	0.782 (0.7082–0.8566)	0.695	0.716	0.672	0.688 (0.5049–0.8701)	0.667	0.529	0.812
RF	0.895 (0.8438–0.9463)	0.817	0.940	0.687	0.790 (0.6266–0.9543)	0.758	0.706	0.812
Extra Trees	0.810 (0.7370–0.8836)	0.740	0.776	0.703	0.761 (0.5823–0.9397)	0.788	0.824	0.750
XGBoost	0.966 (0.9412–0.9917)	0.908	0.881	0.937	0.816 (0.6605–0.9718)	0.818	0.706	0.937
LightGBM	0.820 (0.7482–0.8913)	0.763	0.910	0.609	0.678 (0.4864–0.8702)	0.667	0.706	0.625
MLP	0.796 (0.7194–0.8725)	0.748	0.761	0.734	0.787 (0.6162–0.9573)	0.818	0.882	0.750

LR, Logistic Regression; SVM, Support Vector Machine; RF, Random Forest; XGBoost, Extreme Gradient Boosting, KNN, k-Nearest Neighbors; Extra Trees, Extremely Randomized Trees; LightGBM, Light Gradient Boosting Machine; MLP, multilayer perceptron; AUC, area under the receiver operating characteristic curve; CI, confidence interval.

Table S7 AUC comparisons using DeLong's test

Model A	Model B	Difference in AUC	SE	95% CI	z	P
C	2D-Rad	0.2528	0.0472	0.160–0.345	5.3534	<0.0001
C	3D-Rad	0.2248	0.0528	0.121–0.328	4.2566	<0.0001
C	Lung-Rad	0.0996	0.0583	–0.015 to 0.214	1.7085	0.0875
C	3D-CRL	0.2836	0.0424	0.200–0.367	6.6866	<0.0001
2D-Rad	3D-Rad	0.0280	0.0335	–0.038 to 0.094	0.8365	0.4029
2D-Rad	Lung-Rad	0.1532	0.0437	0.068–0.239	3.5057	0.0005
2D-Rad	3D-CRL	0.0308	0.0222	–0.013 to 0.074	1.3873	0.1654
3D-Rad	Lung-Rad	0.1252	0.0405	0.046–0.205	3.0918	0.0020
3D-Rad	3D-CRL	0.0588	0.0265	0.007–0.111	2.2215	0.0263
Lung-Rad	3D-CRL	0.1840	0.0364	0.113–0.255	5.0509	<0.0001

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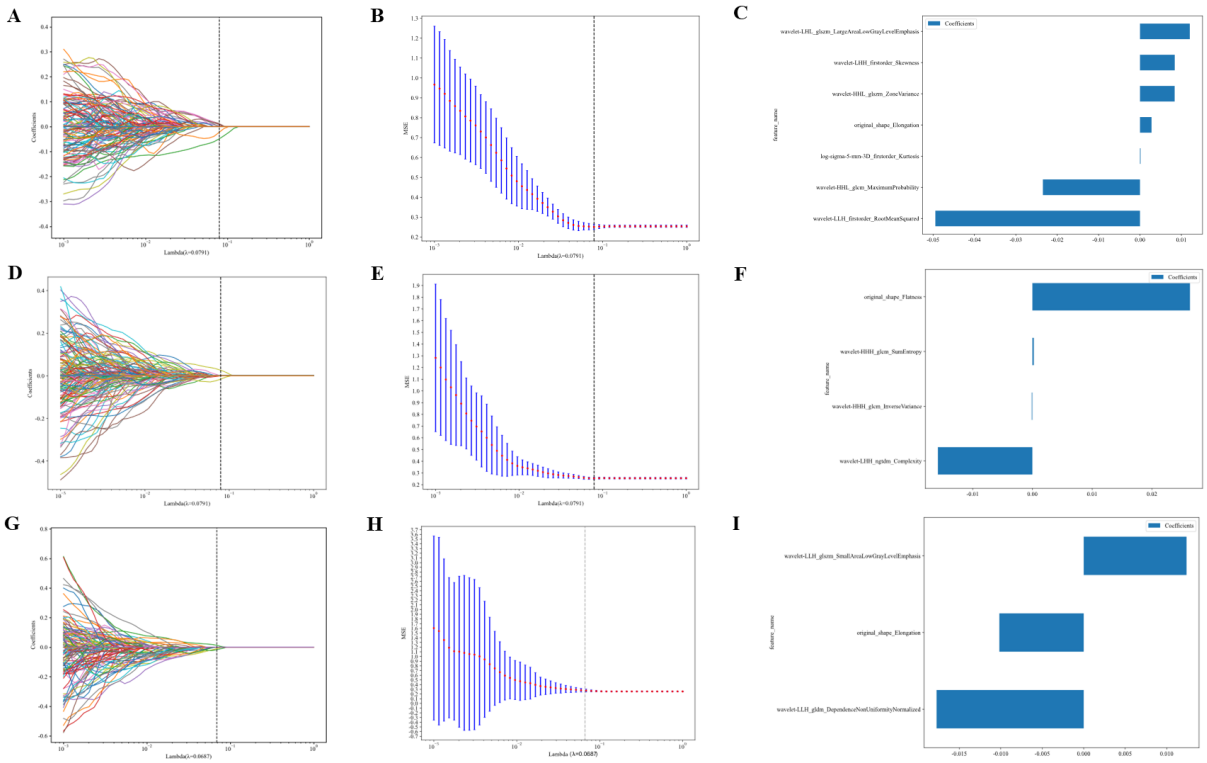

Figure S1 Radiomics feature selection and construction of radiomics models based on the LASSO algorithm. (A,D,G) Cross-validation coefficients of LASSO regression. (B,E,H) LASSO regression mean square error. (C,F,I) Weighting coefficients of selected features. (A-C) is 2D Tumor-based radiomic features; (D-F) is 3D tumor-based radiomic features; (G-I) is ipsilateral whole lung-based radiomic features. LASSO, least absolute shrinkage and selection operator; MSE, mean standard error.

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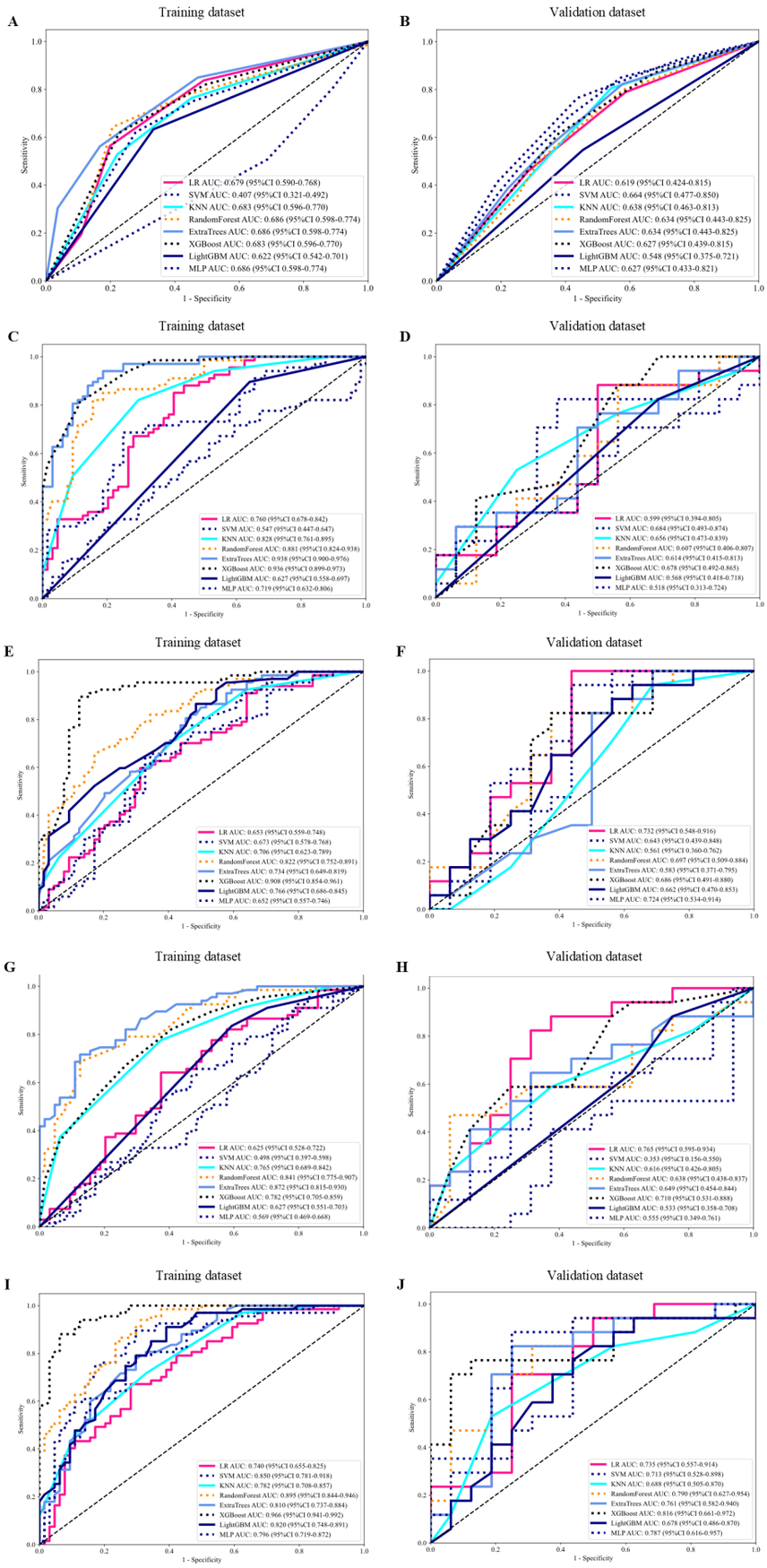

Figure S2 Comparative ROC curves of five prognostic models implemented with eight machine learning algorithms. (A) and (B) display the ROC curves for the training and validation sets, respectively, of clinical models based on eight different machine learning algorithms; (C) and (D) display the ROC curves for the training and validation sets, respectively, of 2D-Rad models based on eight different machine learning algorithms; (E) and (F) display the ROC curves for the training and validation sets, respectively, of 3D-Rad models based on eight different machine learning algorithms; (G) and (H) display the ROC curves for the training and validation sets, respectively, of Lung-Rad models based on eight different machine learning algorithms; (I) and (J) display the ROC curves for the training and validation sets, respectively, of 3D-CRL models based on eight different machine learning algorithms.

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