

Table S1 Radiomic parameters

Classification	Features
Conventional Indices	SUV _{maximum} MTV TLG
Morphologic characteristics	Volume Approximate Volume Surface Area Surface To Volume Ratio Compactness1 Compactness2 Spherical Disproportion Sphericity Asphericity Centre Of Mass Shift Maximum 3D Diameter Integrated Intensity
Intensity-based	Mean Variance Skewness Kurtosis Median Minimum Grey Level 10 th Percentile 50 th Percentile 90 th Percentile Maximum Grey Level Interquartile Range Range Mean Absolute Deviation Robust Mean Absolute Deviation Median Absolute Deviation Coefficient Of Variation Quartile Coefficient Of Dispersion Energy Root Mean Square
Local intensity features	Global Intensity Peak Local Intensity Peak
Intensity histogram features	Intensity Histogram Mean Intensity Histogram Variance Intensity Histogram Skewness Intensity Histogram Kurtosis Intensity Histogram Median Intensity Histogram Minimum Grey Level Intensity Histogram 10 th Percentile Intensity Histogram 90 th Percentile Intensity Histogram Maximum Grey Level Intensity Histogram Mode Intensity Histogram Interquartile Range Intensity Histogram Range Intensity Histogram Mean Absolute Deviation Intensity Histogram Robust Mean Absolute Deviation Intensity Histogram Median Absolute Deviation Intensity Histogram Coefficient Of Variation Intensity Histogram Quartile Coefficient Of Dispersion Intensity Histogram EntropyLog2 Uniformity Maximum Histogram Gradient Maximum Histogram Gradient Grey Level Minimum Histogram Gradient Minimum Histogram Gradient Grey Level

Table S1 (continued)

Table S1 (continued)

Classification	Features
Grey Level Co-occurrence Matrix (GLCM)	GLCM_Joint Average
	GLCM_Joint Variance
	GLCM_Joint EntropyLog2
	GLCM_Difference Average
	GLCM_Difference Variance
	GLCM_Difference Entropy
	GLCM_Sum Average
	GLCM_Dissimilarity
	GLCM_Inverse Difference
	GLCM_Normalised Inverse Difference
	GLCM_Inverse Difference Moment
	GLCM_Normalised Inverse Difference Moment
	GLCM_Inverse Variance
	GLCM_Correlation
	GLCM_Autocorrelation
	GLCM_Cluster Tendency
GLCM_Cluster Shade	
GLCM_Cluster Prominence	
Grey-Level Run Length Matrix (GLRLM)	GLRLM_SRE (Short-Run Emphasis)
	GLRLM_LRE (Long-Run Emphasis)
	GLRLM_LGRE (Low Grey-level Run Emphasis)
	GLRLM_HGRE (High Grey-level Run Emphasis)
	GLRLM_SRLGE (Short-Run Low Grey-level Emphasis)
	GLRLM_SRHGE (Short-Run High Grey-level Emphasis)
	GLRLM_LRLGE (Long-Run Low Grey-level Emphasis)
	GLRLM_LRHGE (Long-Run High Grey-level Emphasis)
	GLRLM_GLNUR (Grey-Level Non-Uniformity for run)
	GLRLM_RLNU (Run Length Non-Uniformity)
	GLRLM_RP (Run Percentage)
Neighbourhood Grey-Level Difference Matrix (NGLDM)	NGLDM_Coarseness
	NGLDM_Contrast
	NGLDM_Busyness
	NGLDM_Complexity
	NGLDM_Strength
Grey-Level Size Zone Matrix (GLSZM)	GLSZM_SZE (Short-Zone Emphasis)
	GLSZM_LZE (Long-Zone Emphasis)
	GLSZM_LGZE (Low Grey-level Zone Emphasis)
	GLSZM_HGZE (High Grey-level Zone Emphasis)
	GLSZM_SZLGE (Short-Zone Low Grey-level Emphasis)
	GLSZM_SZHGE (Short-Zone High Grey-level Emphasis)
	GLSZM_LZLGE (Long-Zone Low Grey-level Emphasis)
	GLSZM_LZHGE (Long-Zone High Grey-level Emphasis)
	GLSZM_GLNUZ (Grey-Level Non-Uniformity for zone)
	GLSZM_NGLNU (Normalised Grey-Level Non-Uniformity)
	GLSZM_ZSNU (Zone Size Non-Uniformity)
	GLSZM_NZSNU (Normalised Zone Size Non-Uniformity)
	GLSZM_ZP (Zone Percentage)
	GLSZM_GLV (Grey-Level Variance)
	GLSZM_ZSV (Zone Size Variance)
GLSZM_ZSE (Zone Size Entropy)	

Table S2 Comparison of AUC between simple models and complex models

Method	SUV2.5	SUV4.0	25%SUV _{max}	41%SUV _{max}	Manual
Treatment Response (Hottest lesion)					
LASSO+Logistic	0.536	0.603	0.538	0.605	0.583
RF+Xgboost	0.642	0.618	0.638	0.704	0.695
Treatment Response (Largest lesion)					
LASSO+Logistic	0.617	0.609	0.604	0.614	0.622
RF+Xgboost	0.616	0.626	0.665	0.657	0.666
Treatment Response (Patient level)					
LASSO+Logistic	0.622	0.638	0.606	0.633	0.620
RF+Xgboost	0.656	0.768	0.652	0.744	0.606
Prognosis (Hottest lesion)					
LASSO+Logistic	0.562	0.562	0.564	0.480	0.531
RF+Xgboost	0.584	0.612	0.626	0.594	0.636
Prognosis (Largest lesion)					
LASSO+Logistic	0.512	0.501	0.531	0.470	0.512
RF+Xgboost	0.633	0.667	0.705	0.700	0.652
Prognosis (Patient level)					
LASSO+Logistic	0.597	0.561	0.566	0.538	0.630
RF+Xgboost	0.617	0.652	0.583	0.699	0.645

Table S3 Description of prediction models included in this study

Models	Included features
Model 1: Clinical model	gender, age, Ann Arbor stage, LDH, B symptoms, ECOG PS, EN, bulky disease , histological subtypes
Model 2: TMTV	TMTV
Model 3: radiomic features at patient level	112 radiomic features for all lesions
Model 4: radiomic features for the hottest lesion	112 radiomic features for the hottest lesion
Model 5: radiomic features for the largest lesion	112 radiomic features for the largest lesion
Model 6: combined model	Features model 1 and the best of model 3-5
Model 7: IPI	IPI

Table S4 Clinical predictors of treatment response

Variable	Univariate regression		Multivariate regression	
	OR (95% CI)	P value	OR (95% CI)	P value
Age	1.742 (1.141–2.659)	<0.009*	1.662 (1.080–2.559)	<0.001*
Gender	1.280 (0.844–1.940)	0.224	–	–
Ann Arbor stage	1.691 (1.350–2.119)	<0.001*	1.671 (1.332–2.096)	<0.001*
LDH	1.689 (1.113–2.563)	0.013*	1.125 (0.711–1.779)	0.338
B symptoms	1.109 (0.561–2.191)	0.766	–	–
ECOG PS	1.173 (0.740–1.859)	0.496	–	–
Extranodal involvement	1.525 (0.951–2.446)	0.080	–	–
Bulky disease	2.339 (1.274–4.294)	0.008*	1.854 (0.989–3.478)	0.056
Pathological type	0.897 (0.542–1.486)	0.674	–	–

*, P<0.05.

Table S5 Clinical predictors of prognosis

Variable	Univariate regression		Multivariate regression	
	OR (95% CI)	P value	OR (95% CI)	P value
Age	1.317 (0.853–2.035)	0.214	–	–
Gender	1.500 (0.971–2.317)	0.068	–	–
Ann Arbor stage	1.937 (1.522–2.467)	<0.001*	1.845 (1.427–2.386)	<0.001*
LDH	1.838 (1.185–2.852)	0.007*	1.171 (0.721–1.901)	0.437
B symptoms	1.100 (0.674–1.796)	0.704	–	–
ECOG PS	1.046 (0.495–2.214)	0.906	–	–
Extranodal involvement	1.442 (0.882–2.357)	0.144	–	–
Bulky disease	2.053 (1.071–3.935)	0.030*	1.500 (0.759–2.962)	0.210
Pathological type	0.834 (0.483–1.440)	0.514	–	–
IPI	0.277 (0.144–0.536)	<0.001*	–	–

*, P<0.05.

Table S6 TMTV models with different segmentation methods

Segmentation	Treatment Response		Prognosis	
	TMTV (Median)	AUC*	TMTV (Median)	AUC*
SUV2.5	181	0.657	200	0.542
SUV4.0	128.5	0.755	147	0.576
25%SUV _{max}	117	0.683	136	0.579
41%SUV _{max}	58	0.662	65	0.565
Manual	233	0.730	253	0.610

*, AUC in the validation cohort.

Table S7 Feature importance of radiomic models for treatment response prediction (hottest lesion)

Segmentation	Feature type	Feature	Importance
SUV2.5	LOCAL_INTENSITY_BASED	LOCAL_INTENSITY_BASED_GlobalIntensityPeak	7.5%
	INTENSITY-BASED	INTENSITY-BASED_QuartileCoefficientOfDispersion	5.8%
	Metabolism	TLG	5.5%
	INTENSITY-BASED	INTENSITY-BASED_Range	5.2%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramVariance	4.9%
	INTENSITY-BASED	INTENSITY-BASED_MedianAbsoluteDeviation	4.8%
	Texture	GLRLM_LRLGE	4.3%
	INTENSITY-BASED	INTENSITY-BASED_Mean	3.1%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram Robust Mean Absolute Deviation	3%
SUV4	MORPHOLOGICAL	MORPHOLOGICAL_Surface Area	2.9%
	Texture	GLCM_Inverse Difference Moment	6.8%
	Texture	GLSZM_ZP	6.3%
	Texture	GLRLM_SRHGE	5.6%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MaximumHistogramGradient	4.8%
	Texture	GLSZM_LZLGE	4.3%
	Texture	GLSZM_SZLGE	3.9%
	MORPHOLOGICAL	MORPHOLOGICAL_Approximate Volume	2.9%
	INTENSITY-BASED	INTENSITY-BASED_InterquartileRange	2.3%
	Texture	GLCM_Normalised Inverse Difference	2.2%
INTENSITY-BASED	INTENSITY-BASED_10 th Percentile	2%	
25%SUV _{max}	Texture	NGTDM_Coarseness	11.4%
	Texture	GLSZM_LGZE	6.3%
	Texture	GLCM_Inverse Difference Moment	4.6%
	Texture	NGTDM_Complexity	4%
	Texture	GLSZM_ZSNU	3.6%
	Texture	GLCM_Correlation	3.1%
	Texture	NGTDM_Busyness	2.8%
	Texture	GLSZM_SZLGE	2.6%
	Texture	GLCM_Difference Average	2.5%
	Texture	GLSZM_LZLGE	2.3%
41%SUV _{max}	Texture	GLSZM_LZHGE	13.5%
	Texture	GLSZM_SZHGE	8.9%
	Texture	GLSZM_SZLGE	4.4%
	Texture	GLCM_InverseVariance	3%
	INTENSITY-BASED	INTENSITY-BASED_MeanAbsoluteDeviation	2.9%
	Texture	NGTDM_Strength	2.7%
	MORPHOLOGICAL	MORPHOLOGICAL_SurfaceToVolumeRatio	2.4%
	Texture	GLCM_NormalisedInverseDifferenceMoment	2.4%
	Texture	GLSZM_GLV	2.3%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramEntropyLog2	2.2%
Manual	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram Median Absolute Deviation	9.3%
	Texture	NGTDM_Coarseness	7.7%
	Texture	NGTDM_Strength	4.9%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MaximumHistogramGradient	4.3%
	Texture	GLSZM_ZSNU	3.3%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMode	3.2%
	Texture	GLRLM_LGRE	3%
	Texture	GLRLM_SRLGE	2.8%
	Metabolism	TLG	2.7%
INTENSITY-BASED	INTENSITY-BASED_Energy	2.6%	

Table S8 Feature importance of radiomic models for prognosis prediction (hottest lesion)

Segmentation	Feature type	Feature	Importance
SUV2.5	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMeanAbsoluteDeviation	5.6%
	Texture	GLRLM_SRHGE	3.5%
	Texture	GLRLM_GLNU	3.5%
	Texture	GLCM_NormalisedInverseDifferenceMoment	3.3%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Uniformity	2.7%
	INTENSITY-BASED	INTENSITY-BASED_InterquartileRange	2.6%
	INTENSITY-BASED	INTENSITY-BASED_QuartileCoefficientOfDispersion	2.5%
	Texture	NGTDM_Strength	2.2%
	INTENSITY-BASED	INTENSITY-BASED_Energy	2.1%
	Texture	GLSZM_ZP	2.1%
SUV4	Texture	GLSZM_ZSE	4.5%
	Texture	GLSZM_ZSNU	3.3%
	Texture	GLRLM_HGRE	3.2%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMean	2.5%
	Texture	GLRLM_LRLGE	2.5%
	INTENSITY-BASED	INTENSITY-BASED_Energy	2.4%
	Texture	GLCM_InverseVariance	2.3%
	Texture	GLSZM_ZP	2.3%
	Texture	GLRLM_GLNU	2.1%
	25%SUV _{max}	Texture	GLSZM_NZSNU
INTENSITY-BASED		INTENSITY-BASED_10thPercentile	5.4%
Texture		GLCM_DifferenceAverage	4.1%
Texture		GLSZM_SZLGE	3.7%
INTENSITY-HISTOGRAM		INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation	3.4%
Texture		GLRLM_LRHGE	3.4%
Texture		GLSZM_GreyLevelVariance	3.1%
MORPHOLOGICAL		MORPHOLOGICAL_SurfaceArea	3.0%
Texture		GLSZM_LZLGE	3.0%
INTENSITY-HISTOGRAM		INTENSITY-HISTOGRAM_IntensityHistogramRobustMeanAbsoluteDeviation	2.9%
41%SUV _{max}	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation	3.8%
	Texture	GLCM_NormalisedInverseDifferenceMoment	3.5%
	Texture	GLSZM_GLNU	2.8%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMode	2.5%
	Texture	GLCM_Correlation	2.5%
	Texture	NGTDM_Coarseness	2.4%
	Texture	GLCM_CP	2.2%
	INTENSITY-BASED	INTENSITY-BASED_MeanAbsoluteDeviation	2.1%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMeanAbsoluteDeviation	2.1%
	Texture	GLRLM_RLNU	2.1%
Manual	Texture	GLSZM_ZSE	3.8%
	MORPHOLOGICAL	MORPHOLOGICAL_IntegratedIntensity	2.7%
	MORPHOLOGICAL	MORPHOLOGICAL_Maximum3DDiameter	2.6%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MaximumHistogramGradient	2.5%
	Texture	GLSZM_HGZE	2.3%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MaximumHistogramGradient	2.3%
	Texture	GLCM_InverseDifference	2.1%
	Texture	GLCM_NormalisedInverseDifference	2.1%
	MORPHOLOGICAL	MORPHOLOGICAL_SurfaceArea	2%
INTENSITY-BASED	INTENSITY-BASED_MinimumGreyLevel	2%	

Table S9 Selected features of LASSO-logistic radiomic models

Method	Features
Treatment Response (Hottest lesion)	
SUV2.5	INTENSITY-HISTOGRAM_IntensityHistogramMaximumGreyLevel, INTENSITY-HISTOGRAM_MinimumHistogramGradientGreyLevel, GLSZM_LZHGE, GLSZM_GLNU
SUV4.0	MORPHOLOGICAL_IntegratedIntensity, GLRLM_RLNU
25%SUV _{max}	MORPHOLOGICAL_Compactness2, MORPHOLOGICAL_Maximum3DDiameter, INTENSITY-BASED_Kurtosis, INTENSITY-BASED_CoefficientOfVariation, INTENSITY-HISTOGRAM_IntensityHistogramKurtosis, INTENSITY-HISTOGRAM_IntensityHistogramMinimumGreyLevel, INTENSITY-HISTOGRAM_IntensityHistogramRobustMeanAbsoluteDeviation, INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation, INTENSITY-HISTOGRAM_IntensityHistogramQuartileCoefficientOfDispersion, INTENSITY-HISTOGRAM_MaximumHistogramGradientGreyLevel, INTENSITY-HISTOGRAM_MinimumHistogramGradientGreyLevel, GLCM_DifferenceVariance, GLCM_SumVariance, GLCM_SumEntropy, GLCM_NormalisedInverseDifference, GLCM_InverseVariance, GLCM_ClusterTendency, GLCM_ClusterShade, GLRLM_LRE, NGTDM_Complexity, NGTDM_Strength, GLSZM_LZLGE, GLSZM_LZHGE, GLSZM_GLNU
41%SUV _{max}	TLG, MORPHOLOGICAL_SurfaceArea
Manual	MORPHOLOGICAL_IntegratedIntensity, GLSZM_GLNU, GLSZM_ZSNU
Treatment Response (Largest lesion)	
SUV2.5	MORPHOLOGICAL_IntegratedIntensity, GLSZM_GLNU
SUV4.0	MORPHOLOGICAL_IntegratedIntensity
25%SUV _{max}	MORPHOLOGICAL_IntegratedIntensity, GLSZM_GLNU, GLSZM_ZSNU
41%SUV _{max}	GLSZM_GLNU
Manual	GLSZM_GLNU
Treatment Response (Patient level)	
SUV2.5	MORPHOLOGICAL_IntegratedIntensity
SUV4.0	MORPHOLOGICAL_IntegratedIntensity
25%SUV _{max}	INTENSITY-BASED_Energy, GLSZM_ZSNU
41%SUV _{max}	GLSZM_GLNU
Manual	GLSZM_GLNU, GLSZM_ZSNU
Prognosis (Hottest lesion)	
SUV2.5	MORPHOLOGICAL_Compactness2, MORPHOLOGICAL_Maximum3DDiameter, INTENSITY-HISTOGRAM_MaximumHistogramGradientGreyLevel, INTENSITY-HISTOGRAM_MinimumHistogramGradientGreyLevel, GLCM_SumEntropy, GLCM_NormalisedInverseDifference, GLCM_InverseVariance, GLCM_ClusterShade, GLRLM_SRLGE, GLSZM_LZLGE, GLSZM_ZP
SUV4.0	GLRLM_SRE
25%SUV _{max}	MORPHOLOGICAL_ApproximateVolume, MORPHOLOGICAL_CentreOfMassShift, MORPHOLOGICAL_Maximum3DDiameter, INTENSITY-BASED_MinimumGreyLevel, INTENSITY-BASED_CoefficientOfVariation, INTENSITY-BASED_QuartileCoefficientOfDispersion, LOCAL_INTENSITY_BASED_LocalIntensityPeak, INTENSITY-HISTOGRAM_MaximumHistogramGradientGreyLevel, GLCM_DifferenceAverage, GLCM_InverseVariance, GLCM_Correlation, GLRLM_LRE, GLRLM_LGRE, GLRLM_LRLGE, NGTDM_Contrast, GLSZM_LZLGE, GLSZM_ZP
41%SUV _{max}	GLSZM_ZP
Manual	MORPHOLOGICAL_Compactness2, MORPHOLOGICAL_Maximum3DDiameter, INTENSITY-BASED_Skewness, INTENSITY-HISTOGRAM_MaximumHistogramGradientGreyLevel, GLCM_SumEntropy, GLCM_NormalisedInverseDifference, GLSZM_LZE, GLSZM_LGZE, GLSZM_LZLGE
Prognosis (Largest lesion)	
SUV2.5	INTENSITY-BASED_Energy, INTENSITY-HISTOGRAM_MinimumHistogramGradientGreyLevel, GLCM_NormalisedInverseDifference, NGTDM_Strength, GLSZM_ZP
SUV4.0	GLSZM_ZP
25%SUV _{max}	INTENSITY-BASED_MinimumGreyLevel, INTENSITY-BASED_CoefficientOfVariation, INTENSITY-BASED_QuartileCoefficientOfDispersion, INTENSITY-BASED_Energy, INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation, GLCM_Correlation, NGTDM_Coarseness, GLSZM_LZLGE, GLSZM_ZP
41%SUV _{max}	GLSZM_ZP
Manual	NGTDM_Strength
Prognosis (Patient level)	
SUV2.5	MORPHOLOGICAL_SurfaceToVolumeRatio, MORPHOLOGICAL_CentreOfMassShift, INTENSITY-BASED_Energy, NGTDM_Coarseness, NGTDM_Strength, GLSZM_LZLGE, GLSZM_GLNU, GLSZM_ZSNU, GLSZM_ZP
SUV4.0	MORPHOLOGICAL_IntegratedIntensity, NGTDM_Strength, GLSZM_GLNU, GLSZM_ZP
25%SUV _{max}	INTENSITY-BASED_MinimumGreyLevel, INTENSITY-BASED_QuartileCoefficientOfDispersion, INTENSITY-BASED_Energy, INTENSITY-HISTOGRAM_IntensityHistogramMinimumGreyLevel, INTENSITY-HISTOGRAM_MaximumHistogramGradientGreyLevel, GLCM_SumVariance, GLCM_Correlation, GLCM_ClusterTendency, GLRLM_LRLGE, GLSZM_LZLGE, GLSZM_GLNU, GLSZM_ZP, GLSZM_ZSE
41%SUV _{max}	GLSZM_ZP
Manual	GLSZM_GLNU

Table S10 Feature importance of radiomic models for treatment response prediction (largest lesion)

Segmentation	Feature type	Feature	Importance
SUV2.5	Texture	NGTDM_Complexity	10.2%
	Texture	GLSZM_LZHGE	6.3%
	MORPHOLOGICAL	MORPHOLOGICAL_IntegratedIntensity	6.1%
	INTENSITY-BASED	INTENSITY-BASED_InterquartileRange	5.8%
	MORPHOLOGICAL	MORPHOLOGICAL_SphericalDisproportion	4.5%
	Texture	GLCM_Correlation	4.4%
	Texture	GLRLM_LRLGE	3.7%
	Texture	NGTDM_Contrast	3.3%
	Texture	GLRLM_LRE	2.8%
	Texture	GLSZM_GLNU	2.6%
SUV4	Texture	GLSZM_SZHGE	9.5%
	MORPHOLOGICAL	MORPHOLOGICAL_SurfaceArea	7.7%
	Texture	GLRLM_GLNU	6.5%
	INTENSITY-BASED	INTENSITY-BASED_QuartileCoefficientOfDispersion	4.6%
	INTENSITY-BASED	INTENSITY-BASED_Energy	4.2%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramMeanAbsoluteDeviation	4.1%
	Texture	GLCM_Joint Variance	3.2%
	Texture	GLCM_Sum Variance	2.9%
	Texture	GLSZM_GLV	2.3%
	MORPHOLOGICAL	MORPHOLOGICAL_Maximum3DDiameter	2.1%
25%SUV _{max}	Texture	NGTDM_Complexity	10.2%
	Texture	GLSZM_LZHGE	6.3%
	MORPHOLOGICAL	MORPHOLOGICAL_IntegratedIntensity	6.1%
	INTENSITY-BASED	INTENSITY-BASED_InterquartileRange	5.8%
	MORPHOLOGICAL	MORPHOLOGICAL_SphericalDisproportion	4.5%
	Texture	GLCM_Correlation	4.4%
	Texture	GLRLM_LRLGE	3.7%
	Texture	NGTDM_Contrast	3.3%
	Texture	GLRLM_LRE	2.8%
	Texture	GLSZM_GLNU	2.6%
41%SUV _{max}	Texture	GLRLM_LRE	18.3%
	MORPHOLOGICAL	MORPHOLOGICAL_SurfaceArea	6.6%
	MORPHOLOGICAL	MORPHOLOGICAL_Volume	6.4%
	Texture	GLCM_AngularSecondMoment	3.9%
	Texture	GLSZM_SZLGE	3.6%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramQuartileCoefficientOfDispersion	2.9%
	Texture	NGTDM_Complexity	2.8%
	MORPHOLOGICAL	MORPHOLOGICAL_Compactness1	2.4%
	Texture	GLCM_NormalisedInverseDifferenceMoment	2.3%
	Texture	GLSZM_ZSNU	2.2%
Manual	Texture	GLCM_DifferenceVariance	6.7%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogram10 th Percentile	6.4%
	Texture	NGTDM_Coarseness	4.6%
	Texture	NGTDM_Complexity	4.3%
	Texture	GLSZM_NGLNU	3.7%
	Texture	GLSZM_ZSNU	3.7%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramRobustMeanAbsoluteDeviation	2.8%
	Texture	GLSZM_LGZE	2.8%
	Texture	GLCM_DifferenceAverage	2.7%
	Texture	GLSZM_SZLGE	2.6%

Table S11 Feature importance of radiomic models for prognosis prediction (largest lesion)

Segmentation	Feature type	Feature	Importance	
SUV2.5	Texture	GLCM_InverseDifferenceMoment	5.0%	
	Texture	GLRLM_SRHGE	3.5%	
	Texture	GLSZM_SZHGE	3.0%	
	Texture	GLRLM_GLNU	2.8%	
	Texture	GLSZM_ZSNU	2.8%	
	Texture	GLRLM_LGRE	2.6%	
	Texture	GLCM_NormalisedInverseDifferenceMoment	2.4%	
	INTENSITY-BASED	INTENSITY-BASED_MedianAbsoluteDeviation	2.1%	
	Texture	GLSZM_HGZE	2.1%	
	MORPHOLOGICAL	MORPHOLOGICAL_Maximum3DDiameter	1.9%	
SUV4	Texture	GLRLM_HGRE	6.6%	
	Texture	GLCM_JointVariance	3.8%	
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MinimumHistogramGradient	2.9%	
	INTENSITY-BASED	INTENSITY-BASED_Range	2.7%	
	Texture	GLSZM_NGLNU	2.7%	
	Texture	GLSZM_HGZE	2.4%	
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramRobustMeanAbsoluteDeviation	2.3%	
	Texture	GLCM_SumEntropy	2.2%	
	Texture	GLRLM_SRHGE	2.1%	
	Texture	GLSZM_GLNU	2.1%	
25%SUV _{max}	Texture	GLSZM_LZE	5.1%	
	Texture	GLCM_JointEntropyLog2	4.6%	
	Texture	GLCM_JointEntropyLog2	3.5%	
	Texture	GLRLM_SRLGE	3.2%	
	Texture	GLCM_InverseDifferenceMoment	2.9%	
	Texture	GLRLM_GLNU	2.8%	
	Texture	GLCM_AngularSecondMoment	2.7%	
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramEntropyLog2	2.2%	
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation	2.0%	
	Texture	GLSZM_LGZE	1.9%	
	MORPHOLOGICAL	MORPHOLOGICAL_Maximum3DDiameter	1.9%	
	41%SUV _{max}	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogram90thPercentile	4.2%
		Texture	GLRLM_SRLGE	3.8%
		Texture	GLCM_Correlation	3.3%
Texture		GLSZM_GLNU	3.1%	
Texture		GLRLM_RLNU	2.6%	
INTENSITY-HISTOGRAM		INTENSITY-HISTOGRAM_Uniformity	2.5%	
Texture		NGTDM_Contrast	2.5%	
Texture		GLCM_AngularSecondMoment	2.4%	
Texture		GLCM_InverseDifference	2.3%	
MORPHOLOGICAL		MORPHOLOGICAL_ApproximateVolume	2.2%	
Manual	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_MinimumHistogramGradient	3.6%	
	Texture	GLCM_NormalisedInverseDifferenceMoment	3.4%	
	Texture	GLSZM_SZE	3.3%	
	Texture	GLCM_Contrast	3.1%	
	Texture	GLRLM_RP	3.1%	
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_IntensityHistogramCoefficientOfVariation	2.5%	
	INTENSITY-BASED	INTENSITY-BASED_Range	2.2%	
	Texture	NGTDM_Complexity	2.1%	
	INTENSITY-BASED	INTENSITY-BASED_RootMeanSquare	1.9%	
	Texture	GLRLM_LRLGE	1.9%	

Table S12 Feature importance of radiomic models for treatment response prediction (patient level)

Segmentation	Feature type	Feature	Importance
SUV2.5	INTENSITY-BASED	INTENSITY-BASED_Range	4%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram Variance	3%
	Texture	GLRLM_SRHGE	2.9%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Minimum Histogram GradientGreyLevel	2.5%
	Texture	GLCM_DifferenceVariance	2.5%
	Texture	GLSZM_GLNU	2.5%
	Texture	GLRLM_LRLGE	2.4%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Uniformity	2.4%
	Texture	NGTDM_Coarseness	2.3%
	Texture	GLSZM_HGZE	2.3%
SUV4	LOCAL_INTENSITY_BASED	LOCAL_INTENSITY_BASED_GlobalIntensity Peak	7.4%
	Texture	GLRLM_SRLGE	6.2%
	Texture	GLRLM_LRE	6.1%
	Texture	GLRLM_RLNU	5.5%
	Texture	GLCM_NormalisedInverseDifference	4%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Maximum Histogram GradientGreyLevel	3.8%
	INTENSITY-BASED	INTENSITY-BASED_Energy	3.4%
	Texture	GLRLM_LRLGE	2.9%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity HistogramRange	2.7%
	Metabolism	TLG	2.5%
25%SUV _{max}	Texture	GLSZM_LZHGE	10.3%
	Texture	GLRLM_LRE	6.4%
	Texture	GLSZM_GLV	5.1%
	Texture	GLSZM_HGZE	3%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity HistogramKurtosis	2.9%
	Texture	GLCM_InverseDifference	2.7%
	Texture	GLCM_SumVariance	2.6%
	Texture	GLCM_Correlation	2.5%
	Texture	GLRLM_LRLGE	2.5%
	Texture	GLRLM_RP	2.4%
41%SUV _{max}	Texture	GLCM_DifferenceVariance	9%
	INTENSITY-BASED	INTENSITY-BASED_10 th Percentile	6.8%
	Texture	GLRLM_RP	6%
	Texture	GLSZM_LZHGE	5.5%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity HistogramMean	4.3%
	INTENSITY-BASED	INTENSITY-BASED_Energy	4.1%
	Texture	GLCM_SumEntropy	3.6%
	Texture	GLCM_NormalisedInverseDifferenceMoment	3.3%
	Texture	GLRLM_GLNU	3.1%
	Texture	GLSZM_NZSNU	3.1%
Manual	INTENSITY-BASED	INTENSITY-BASED_MeanAbsoluteDeviation	8.1%
	Texture	GLCM_Autocorrelation	6.5%
	Texture	GLSZM_LZHGE	5.7%
	Texture	GLCM_AngularSecondMoment	5%
	Texture	GLRLM_RLNU	3.8%
	Texture	GLCM_Correlation	3.4%
	MORPHOLOGICAL	MORPHOLOGICAL_Maximum3DDiameter	3.3%
	Texture	GLSZM_LZLGE	3%
	Texture	GLSZM_ZSNU	3%
	Texture	GLCM_DifferenceVariance	2.6%

Table S13 Feature importance of radiomic models for prognosis prediction (patient level)

Segmentation	Feature type	Feature	Importance
SUV2.5	Texture	GLSZM_GLNU	6.1%
	Texture	GLRLM_LRLGE	4.6%
	Texture	GLRLM_LGRE	3.6%
	Texture	GLRLM_GLNU	3.3%
	Texture	GLSZM_ZSE	2.9%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity HistogramRange	2.8%
	Texture	GLCM_Autocorrelation	2.5%
	INTENSITY-BASED	INTENSITY-BASED_MeanAbsoluteDeviation	2.2%
	Texture	GLCM_AngularSecondMoment	2.2%
	MORPHOLOGICAL	MORPHOLOGICAL_ApproximateVolume	2.1%
SUV4	Texture	GLSZM_GLNU	7.5%
	Texture	GLCM_AngularSecondMoment	3.8%
	Texture	GLRLM_SRHGE	3.7%
	Texture	GLCM_JointAverage	3.6%
	Texture	GLRLM_LRLGE	3.6%
	Texture	GLCM_JointEntropyLog2	2.8%
	Texture	GLRLM_RP	2.8%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity HistogramVariance	2.7%
	INTENSITY-HISTOGRAM	INTENSITY-BASED_MeanAbsoluteDeviation	2.6%
	Texture	GLCM_InverseVariance	2.5%
25%SUV _{max}	Texture	GLRLM_SRLGE	6.7%
	Texture	GLRLM_LRE	4.7%
	Texture	GLRLM_RP	4.4%
	Texture	GLRLM_SRHGE	3.9%
	Texture	GLSZM_SZE	3.9%
	Texture	GLCM_JointVariance	3.5%
	Texture	GLRLM_RLNU	3.5%
	Texture	GLSZM_LZE	3.1%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram CoefficientOfVariation	2.5%
	MORPHOLOGICAL	MORPHOLOGICAL_ApproximateVolume	2.2%
41%SUV _{max}	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram MeanAbsoluteDeviation	4.8%
	Texture	GLCM_Correlation	4.4%
	Texture	GLSZM_LZLGE	3.8%
	INTENSITY-BASED	INTENSITY-BASED_MinimumGreyLevel	2.5%
	Texture	GLSZM_ZoneSizeVariance	2.4%
	Texture	GLCM_InverseVariance	2.2%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram Kurtosis	2.1%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram CoefficientOfVariation	2.1%
	Texture	GLRLM_GLNU	2.1%
	Texture	GLSZM_SZLGE	2.1%
Manual	Texture	GLRLM_RLNU	10.5%
	INTENSITY-BASED	INTENSITY-BASED_RootMeanSquare	4.4%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram 10thPercentile	4.3%
	Texture	GLSZM_GLNU	3.4%
	INTENSITY-HISTOGRAM	INTENSITY-HISTOGRAM_Intensity Histogram MinimumGreyLevel	2.8%
	Texture	GLRLM_LRLGE	2.7%
	MORPHOLOGICAL	MORPHOLOGICAL_IntegratedIntensity	2.2%
	MORPHOLOGICAL	MORPHOLOGICAL_Approximate Volume	2.0%
	Texture	GLRLM_GLNU	2.0%
	Texture	GLSZM_ZoneSizeVariance	2.0%