

**Supplementary Table 1 Sequence parameters for MRI**

<b>MRI</b>	<b>HR-T2WI</b>	<b>DCE-T1</b>	<b>DWI (ADC) <math>b = 1000</math></b>
Repetition time (ms)	7100	4.22	5500
Echo time (ms)	88	1.91	61
Flip angle (degree)	150	9	180
Band Width (Hz/pixel)	205	445	1220
Acquisition matrix (pixel)	$256 \times 256$	$256 \times 256$	$128 \times 128$
Field of View (mm <sup>2</sup> )	$180 \times 180$	$300 \times 300$	$216 \times 216$
Slice thickness (mm)	3.0	2.0	4.5
Gap (mm)	0.9	0.4	0.45

MRI: Magnetic resonance imaging; HR-T2WI: high resolution T2-weighted imaging; DCE-T1: dynamic contrast enhanced T1 images; DWI: Diffusion-weighted imaging.

**Supplementary Table 2 The most significant radiomics features of different models**

Total features		mRMR+LASSO
CT	396	[1] "sumAverage"
		[2] "VolumeCC"
		[3] "GLCMEntropy_AllDirection_offset1_SD"
		[4] "Percentile5"
		[5] "ShortRunEmphasis_AllDirection_offset4_SD"
		[6] "GLCMEntropy_AllDirection_offset4_SD"
		[7] "Correlation_angle45_offset7"
		[8] "Percentile95"
		[9] "MeanDeviation"
		[10] "LongRunEmphasis_angle90_offset1"
		[11] "GLCMEntropy_AllDirection_offset7_SD"
		[12] "Inertia_AllDirection_offset1_SD"
		[13] "GreyLevelNonuniformity_AllDirection_offset7_SD"
		[14] "MaxIntensity"
		[15] "Compactness2"
		[16] "LongRunLowGreyLevelEmphasis_AllDirection_offset7_SD"
		[17] "LowGreyLevelRunEmphasis_AllDirection_offset1_SD"
		[18] "ShortRunLowGreyLevelEmphasis_AllDirection_offset7_SD"
DCE-T1		[1] "ShortRunEmphasis_angle90_offset1"
		[2] "SurfaceArea"
		[3] "Quantile0.025"
		[4] "HaralickCorrelation_angle135_offset4"
		[5] "LongRunHighGreyLevelEmphasis_angle135_offset1"
		[6] "ShortRunEmphasis_angle90_offset7"
		[7] "GLCMEntropy_angle135_offset7"
		[8] "GLCMEntropy_AllDirection_offset7_SD"
		[9] "ShortRunEmphasis_AllDirection_offset1_SD"
		[10] "LongRunEmphasis_angle45_offset1"

---

	[11] "GLCMEntropy_AllDirection_offset1_SD"
	[12] "MeanDeviation"
	[13] "HaralickCorrelation_AllDirection_offset1_SD"
	[14] "LongRunHighGreyLevelEmphasis_angle135_offset7"
	[15] "Inertia_AllDirection_offset7_SD"
	[16] "LongRunLowGreyLevelEmphasis_angle90_offset1"
HR-T2WI	[1] "Maximum3DDiameter"
	[2] "Correlation_angle135_offset1"
	[3] "stdDeviation"
	[4] "LowGreyLevelRunEmphasis_AllDirection_offset4_SD"
	[5] "uniformity"
	[6] "GLCMEntropy_AllDirection_offset7_SD"
	[7] "GLCMEntropy_AllDirection_offset4_SD"
	[8] "RunLengthNonuniformity_AllDirection_offset4_SD"
	[9] "Correlation_angle135_offset4"
	[10] "LongRunEmphasis_AllDirection_offset4_SD"
	[11] "RelativeDeviation"
	[12] "LongRunEmphasis_angle0_offset1"
	[13] "ClusterShade_angle45_offset4"
	[14] "ShortRunEmphasis_angle90_offset1"

---

---

ADC	[1] "GLCMEntropy_AllDirection_offset1_SD"
	[2] "Inertia_angle90_offset4"
	[3] "uniformity"
	[4] "ClusterShade_angle0_offset4"
	[5] "IntensityVariability"
	[6] "MeanValue"
	[7] "Correlation_AllDirection_offset4_SD"
	[8] "RunLengthNonuniformity_AllDirection_offset1_SD"
	[9] "Correlation_angle45_offset4"
	[10] "InverseDifferenceMoment_angle90_offset7"
	[11] "LongRunLowGreyLevelEmphasis_angle135_offset1"
	[12] "LongRunHighGreyLevelEmphasis_angle0_offset4"
	[13] "Maximum3DDiameter"
	[14] "LongRunHighGreyLevelEmphasis_AllDirection_offset7_SD"
	[15] "HighGreyLevelRunEmphasis_AllDirection_offset7_SD"
	[16] "MeanDeviation"
	[17] "ClusterShade_AllDirection_offset4_SD"
Combined	[1] "ADC_LargeAreaEmphasis"
	[2] "T1_LongRunHighGreyLevelEmphasis_angle135_offset7"
	[3] "T1_ShortRunEmphasis_angle90_offset7"
	[4] "ADC_Inertia_angle45_offset4"
	[5] "T1_ShortRunEmphasis_angle90_offset4"
	[6] "T1_RunLengthNonuniformity_AllDirection_offset7_SD"
	[7] "ADC_LongRunHighGreyLevelEmphasis_angle90_offset1"
	[8] "CT_sumAverage"
	[9] "T1_GLCMEntropy_angle0_offset1"
	[10] "ADC_Percentile15"
	[11] "T2_uniformity"
	[12] "ADC_InverseDifferenceMoment_angle90_offset7"
	[13] "CT_SmallAreaEmphasis"

---

CT: Computed tomography; ADC: apparent diffusion coefficient; DCE-T1:

dynamic contrast enhanced T1 images; HR-T2WI: high resolution T2-weighted imaging; EMVI: extramural venous invasion; mRMR: Minimum redundancy maximum relevance; LASSO: least absolute shrinkage and selection operator.

**Supplementary Table 3 The comparisons of different radiomics features models**

	CT	ADC	DCE-T1	HR-T2WI	Combined	Nomogram	EMVI
CT	\	0.50	0.60	0.30	0.08	0.04	0.01
ADC	0.40	\	0.90	0.70	0.30	0.20	0.00
DCE-T1	0.30	1.00	\	0.60	0.20	0.10	0.00
HR-T2WI	0.40	1.00	0.90	\	0.50	0.30	0.00
Combined	0.03	0.10	0.20	0.10	\	0.30	0.00
Nomogram	0.03	0.10	0.10	0.10	0.80	\	0.00
EMVI	0.20	0.07	0.07	0.08	0.00	0.00	\

Training

Validation

CT: Computed tomography; ADC: apparent diffusion coefficient; DCE-T1: dynamic contrast enhanced T1 images; HR-T2WI: high resolution T2-weighted imaging; EMVI: extramural venous invasion.