

Title: Multiparameter MRI-Based Model Integrating Radiomics and Deep Learning for Preoperative Staging of Laryngeal Squamous Cell Carcinoma

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Supplementary TABLE S1. The Detailed MRI protocols of the two centers

MRI Scanner Center 1	GE Signa HDxt 3.0T			Siemens Skyra 3.0T			Siemens Essenza 1.5T		
Sequence	T1WI	T2WI	CE-T1W	T1WI	T2WI	CE-T1W	T1WI	T2WI	CE-T1W
TR (ms)	410	3780	770	650	3000	510	780	4380	510
TE (ms)	12	85	12	8	85	10	12	90	12
FOV (cm2)	22×22	22×22	22×22	24×24	24×24	24×24	22×22	22×22	24×24
NEX	2	2	2	2	2	2	2	2	2
Acquisition matrix	288×224	288×224	288×224	320×224	320×224	320×224	256×204	256×204	320×224
Slice thickness (mm)	5	5	5	4	4	4	5	5	4

MRI Scanner Center 2	GE Discovery MR750w			Phlips Ingenia Elition X			UIH uMR 588		
Sequence	T1WI	T2WI	CE-T1W	T1WI	T2WI	CE-T1W	T1WI	T2WI	CE-T1W
TR (ms)	520	5380	500	550	3000	574	550	5800	650
TE (ms)	12	80	8	18	80	10	10	57	27
FOV (cm2)	24x24	24x24	24x24	25x25	23x23	28x28	24x24	26x26	24x24
NEX	1	1	1	1	1	1	1	1.5	1
Acquisition matrix	320x192	320x224	320x224	320x247	328x228	280x278	320x272	256x205	288x288
Slice thickness (mm)	5	5	5	5	5	3	5	5	3

Center 1, The First Affiliated Hospital of Chongqing Medical University; Center 2, West China Hospital of Sichuan University. TR, repetition time; TE, echo time; FOV, field of view; NEX, number of excitations; T1WI, T1-weighted imaging; T2WI, T2-weighted imaging; CE-T1W, contrast-enhanced T1-weighted imaging.

Supplementary TABLE S2. The performance comparison of different models in the training set

Model	AUC (95%CI)	Accuracy	Specificity	Sensitivity	PPV	NPV
Training set						
Radiomics-CE-T1WI	0.906 (95%CI:0.890-0.921)	0.991	0.901	0.991	0.991	0.990
Radiomics-T1WI	0.879 (95%CI:0.823-0.935)	0.962	0.962	0.962	0.962	0.962
Radiomics-T2WI	0.911 (95%CI:0.873-0.949)	0.976	0.990	0.962	0.990	0.962
Radiomics-CE-T1WI + T1WI	0.903 (95%CI:0.841-0.964)	0.981	0.992	0.968	0.989	0.976
Radiomics-CE-T1WI + T2WI	0.930 (95%CI:0.904-0.955)	0.986	0.991	0.980	0.990	0.982
Radiomics-T1WI + T2WI	0.918 (95%CI:0.873-0.962)	0.972	0.965	0.980	0.961	0.982
Radiomics-ALL	0.937 (95%CI:0.910-0.965)	0.991	0.982	1.000	0.980	1.000
DL model	0.919 (95%CI:0.872-0.965)	0.972	0.980	0.962	0.980	0.962
Combined model	0.943 (95%CI:0.863-1.000)	0.991	1.000	0.980	1.000	0.893

DL, deep learning; AUC, area under the curve; CI, confidence interval; PPV, positive predictive value; NPV, negative predictive value, T1WI, T1-weighted imaging; T2WI, T2-weighted imaging; CE-T1WI, contrast-enhanced T1-weighted imaging.

Supplementary TABLE S3. The Delong test results for pairwise comparisons of AUC values among different models

	Radiomics- CE-T1WI	Radiomics- T1WI	Radiomics- T2WI	Radiomics- CE-T1WI+ T1WI	Radiomics- CE-T1WI + T2WI	Radiomics- T1WI + T2WI	Radiomics- ALL	DL model	Combined model	Doctor1
Radiomics-T1WI	0.643									
Radiomics-T2WI	0.939	0.767								
Radiomics-CE-T1WI + T1WI	0.912	0.539	0.877							
Radiomics-CE-T1WI + T2WI	0.705	0.398	0.703	0.809						
Radiomics-T1WI + T2WI	0.648	0.358	0.548	0.664	0.835					
Radiomics-ALL	0.005	0.000	0.039	0.002	0.001	0.007				
DL model	0.686	0.408	0.040	0.736	0.894	0.829	0.040			
Combined model	0.044	0.005	0.013	0.002	0.001	0.005	0.039	0.017		
Doctor1	0.214	0.302	0.180	0.161	0.107	0.703	0.000	0.078	0.016	
Doctor2	0.208	0.346	0.216	0.168	0.115	0.692	0.000	0.075	0.017	0.970

DL, deep learning; T1WI, T1-weighted imaging; T2WI, T2-weighted imaging; CE-T1WI, contrast-enhanced T1-weighted imaging.