Appendix 1

Magnetic resonance imaging (MRI) examinations were conducted using a Discovery MR750w 3.0T MR scanner and a Discovery 1.5T MR scanner equipped with a phased-array coil, following a standardized protocol that captured oblique axial, sagittal, and coronal views. High-resolution oblique axial T2-weighted images and diffusion-weighted (DW) images were analyzed in the study. Before the MRI scan, an enema was administered using water to minimize artifacts caused by intestinal contents in the images. For the Discovery MR750w 3.0T MR scanner, the oblique axial T2-weighted imaging (T2WI) was performed with the following protocol: repetition time (TR)/echo time (TE), 5,990 ms/125.7 ms; field of view (FOV), 20 cm; and 3.6-mm thickness with 0.3 mm slice spacing; the oblique axial diffusion-weighted imaging (DWI) was performed with the following protocol: TR/TE, 4,881 ms/70.2 ms; FOV, 28 cm; and 3.6-mm thickness with 0.3 mm slice spacing. The Ethics Committee of the Second Affiliated Hospital of Harbin Medical University approved this study (No. YJSKY2024-062). All personal information was de-identified, and patient informed consent requirements were waived. For the Discovery 1.5T MR scanner, the oblique axial T2WI was performed with the following protocol: TR/TE, 6,200 ms/130 ms; FOV, 20 cm; and 3.6-mm thickness with 0.3 mm slice spacing; the oblique axial DWI was performed with the following protocol: TR/TE, 5,000 ms/80 ms; FOV, 24 cm; and 3.6-mm thickness with 0.3 mm slice spacing. The Ethics Committee of the Xinjiang Production and Construction Corps Tenth Division Beitun Hospital (No. BTKY2021-005) approved this study. All personal information was de-identified, and patient informed consent requirements were waived.

Table S1 The univariate logistic regression analysis of risk factor for LVI of all patients

Feature name	Log (OR)	Lower 95%CI	Upper 95% CI	OR	OR lower 95% CI	OR upper 95% CI	P value
Age	–0.002	–0.006	0.002	0.998	0.994	1.002	0.372
Gender	0.034	–0.046	0.114	1.035	0.955	1.121	0.479
mrT stage	0.124	0.060	0.188	1.132	1.062	1.207	0.002
mrN stage	0.068	0.020	0.116	1.070	1.020	1.123	0.021
Tumor location	0.043	–0.011	0.096	1.044	0.989	1.101	0.190
Tumor length	0.018	–0.008	0.044	1.018	0.992	1.045	0.253
CEA	0.190	0.108	0.272	1.210	1.114	1.313	0.000
CA19-9	0.302	0.192	0.412	1.352	1.212	1.510	0.000

OR, odds ratio; CI, confidence interval; mrT stage, MR-predicted tumor stage; mrN stage, MR-predicted lymph node stage; CEA, carcinoembryonic antigen; CA19-9, carbohydrate antigen 19-9; MR, magnetic resonance; LVI, lymphovascular invasion.

Table S2 The multivariate logistic regression analysis of risk factor for LVI of all patients

Feature name	Log (OR)	Lower 95%CI	Upper 95%CI	OR	OR lower 95% CI	OR upper 95% CI	P value
mrN stage	0.034	-0.016	0.085	1.035	0.984	1.089	0.265
mrT stage	0.085	0.017	0.152	1.088	1.017	1.164	0.040
CEA	0.126	0.041	0.210	1.134	1.042	1.234	0.014
CA19-9	0.235	0.122	0.348	1.265	1.130	1.416	0.001

OR, odds ratio; CI, confidence interval; mrT stage, MR-predicted tumor stage; mrN stage, MR-predicted lymph node stage; CEA, carcinoembryonic antigen; CA19-9, carbohydrate antigen 19-9; MR, magnetic resonance; LVI, lymphovascular invasion.

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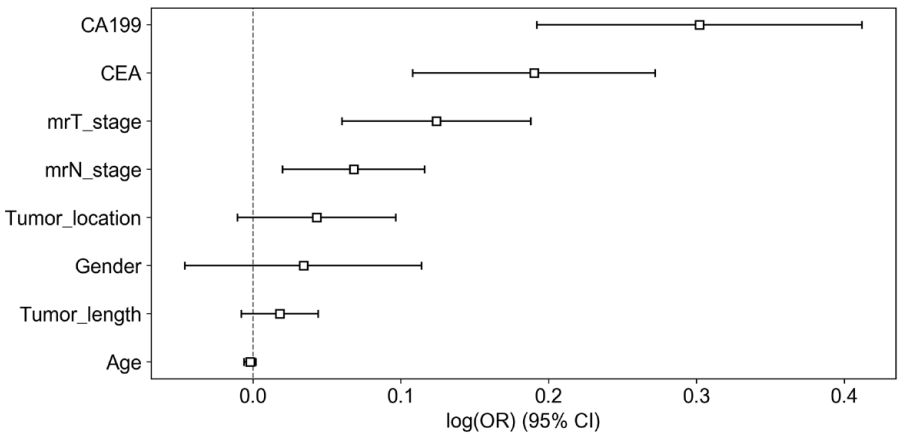

Figure S1 The OR forest plot of LVI in univariate analysis. The higher the OR value, the closer the relationship with LVI in RC patients. OR, odds ratio; CI, confidence interval; mrT stage, MR-predicted tumor stage; mrN stage, MR-predicted lymph node stage; CEA, carcinoembryonic antigen; CA19-9, carbohydrate antigen 19-9; LVI, lymphovascular invasion; MR, magnetic resonance.

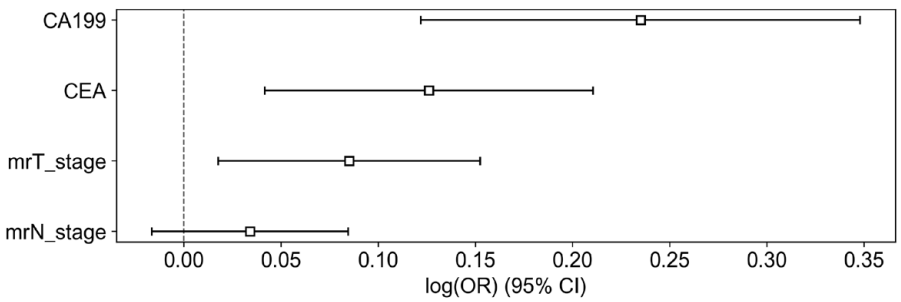

Figure S2 The OR forest plot of LVI in multivariable analysis. The higher the OR value, the closer the relationship with LVI in RC patients. OR, odds ratio; CI, confidence interval; mrT stage, MR-predicted tumor stage; mrN stage MR-predicted lymph node stage; CEA, carcinoembryonic antigen; CA19-9, carbohydrate antigen 19-9; LVI, lymphovascular invasion; MR, magnetic resonance.

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