Appendix 1 Example of calculation of the ratio of lymphocyte changes before and after radiotherapy

1. WBCR1=(Pre-RT-Min during RT) / Pre-RT
2. WBCR2= (Pre-RT-Min during RT) / Min during RT
3. WBCR3= (Pre-RT-Min during RT) / Post-RT
4. WBCR4= (Post-RT-Min during RT) / Pre-RT
5. WBCR5= (Post-RT-Min during RT) / Min during RT
6. WBCR6= (Post-RT-Min during RT) / Post-RT
7. WBCR7= (Pre-RT-Post-RT) / Pre-RT
8. WBCR8= (Pre-RT-Post-RT) / During RT
9. WBCR9= (Pre-RT-Post-RT) / Post-RT

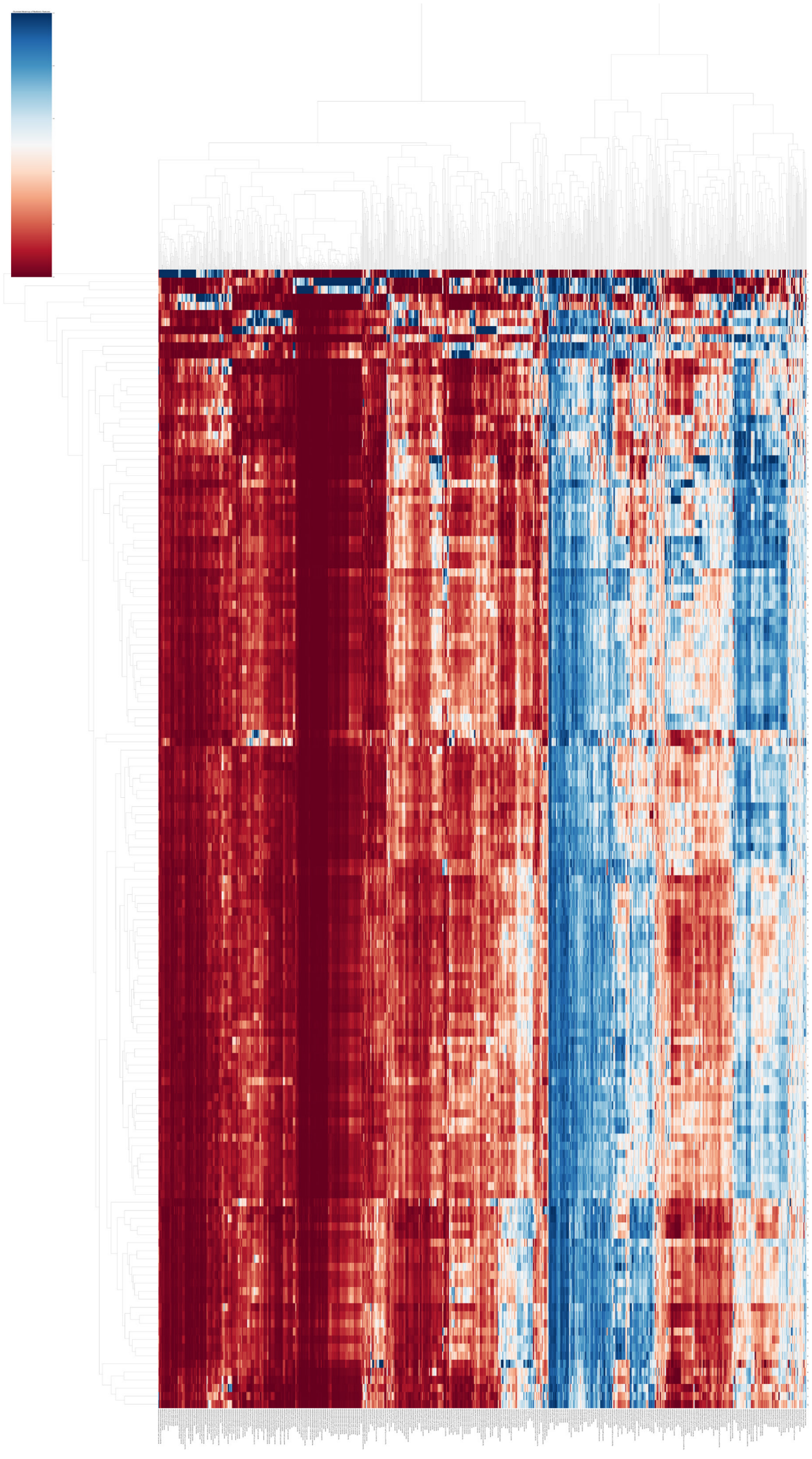

Figure S1 Heatmap of radiomics feature clustering

https://dx.doi.org/10.21037/tlcr-2025-326

Appendix 2 RadScore

RadScore=−8.7918648
+14.1063164×wavelet-LLH_glcm_Imc2
+0.0221638×wavelet-HHH_glcm_ClusterProminence
−0.0007038×log-sigma-4-0-mm-3D_glcm_ClusterShade
+0.0007850×wavelet-LLL_gldm_GrayLevelNonUniformity
−0.0002817×wavelet-HHL_glcm_ClusterProminence
−3.0419744×wavelet-LHL_glcm_Correlation
−0.3393482×wavelet-LHH_glcm_ClusterShade
−43.5299964×wavelet-LHL_glrlm_LowGrayLevelRunEmphasis
−4.7421328×wavelet-LHL_glcm_JointEnergy
−2.7550390×wavelet-HLH_glszm_GrayLevelNonUniformityNormalized

Table S1 Results of logistic regression univariate and multivariate analysis of clinical model

Variables	Univariate analysis					Multivariate analysis				
	β	SE	Z	P	OR (95% CI)	β	SE	Z	P	OR (95% CI)
HB3										
≤132g/L					1.00 (Reference)					1.00 (Reference)
>132g/L	1.39	0.46	3.03	0.002	4.00 (1.63–9.80)	1.61	0.54	3.00	0.003	5.02 (1.75–14.40)
WBC1										
≤7.48*10^9/L					1.00 (Reference)					1.00 (Reference)
>7.48*10^9/L	0.97	0.60	1.61	0.11	2.65 (0.81–8.65)	1.19	0.72	1.66	0.10	3.28 (0.81–13.37)
LMR										
≤3.90					1.00 (Reference)					1.00 (Reference)
>3.90	0.78	0.44	1.77	0.08	2.17 (0.92–5.14)	0.60	0.50	1.18	0.24	1.82 (0.68–4.88)
PLTR1										
≤0.41					1.00 (Reference)					1.00 (Reference)
≤0.41	0.68	0.44	1.55	0.12	1.97 (0.84–4.65)	1.04	0.54	1.93	0.054	2.82 (0.98–8.09)
HBR2										
≤−0.035					1.00 (Reference)					1.00 (Reference)
>−0.035	1.01	0.68	1.49	0.14	2.75 (0.73–10.34)	1.17	0.77	1.52	0.13	3.22 (0.71–14.49)
WBCR4										
≤0.68					1.00 (Reference)					1.00 (Reference)
>0.68	0.98	0.65	1.51	0.13	2.67 (0.75–9.50)	1.15	0.76	1.51	0.13	3.15 (0.71–13.92)

S.E: Standard Error; OR: Odds Ratio; CI: Confidence Interval; HB3: hemoglobin post radiotherapy;WBC1: white blood cell before radiotherapy; LMR: Lymphocyte-to-monocyte ratio; RadScore: Radiomics scores; WBCR4: ratio of change in white blood cell before and after radiotherapy; PLTR: ratio of change in platelet before and after radiotherapy; WBC: White Blood Cell; HBR2: ratio of change in hemoglobin before and after radiotherapy.

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Table S2 The AUC, accuracy, sensitivity, specificity, PPV and NPV of models

Model	Dataset	AUC	Accuracy	Sensitivity	Specificity	PPV	NPV
LR_Clinical	Train	0.781 (0.689-0.874)	0.704 (0.603-0.792)	0.708 (0.597-0.818)	0.697 (0.540-0.854)	0.821 (0.721-0.922)	0.548 (0.397-0.698)
	Internal	0.706 (0.552-0.861)	0.721 (0.563-0.847)	0.700 (0.536-0.864)	0.769 (0.540-0.998)	0.875 (0.743-1.000)	0.526 (0.302-0.751)
	External	0.647 (0.378-0.917)	0.750 (0.533-0.902)	0.842 (0.678-1.000)	0.400 (<0.001-0.829)	0.842 (0.678-1.000)	0.400 (<0.001-0.829)
LR_Radiomics	Train	0.760 (0.662-0.859)	0.745 (0.647-0.828)	0.831 (0.740-0.922)	0.576 (0.407-0.744)	0.794 (0.698-0.890)	0.633 (0.461-0.806)
	Internal	0.746 (0.580-0.912)	0.721 (0.563-0.847)	0.867 (0.745-0.988)	0.385 (0.120-0.649)	0.765 (0.622-0.907)	0.556 (0.231-0.880)
	External	0.663 (0.332-0.994)	0.583 (0.366-0.779)	0.526 (0.302-0.751)	0.800 (0.449-1.000)	0.909 (0.739-1.000)	0.308 (0.057-0.559)
LR_Combined	Train	0.831 (0.753-0.909)	0.765 (0.669-0.845)	0.738 (0.632-0.845)	0.818 (0.687-0.950)	0.889 (0.805-0.973)	0.614 (0.470-0.758)
	Internal	0.831 (0.698-0.963)	0.721 (0.563-0.847)	0.700 (0.536-0.864)	0.769 (0.540-0.998)	0.875 (0.743-1.000)	0.526 (0.302-0.751)
	External	0.863 (0.699-1.000)	0.750 (0.533-0.902)	0.737 (0.539-0.935)	0.800 (0.449-1.000)	0.933 (0.807-1.000)	0.444 (0.120-0.769)
SVM_Clinical	Train	0.863 (0.789-0.929)	0.786 (0.704-0.857)	0.545 (0.375-0.714)	0.908 (0.826-0.972)	0.750 (0.556-0.931)	0.797 (0.703-0.882)
	Internal	0.563 (0.393-0.729)	0.558 (0.419-0.721)	0.231 (0.000-0.500)	0.700 (0.533-0.853)	0.250 (0.000-0.500)	0.677 (0.500-0.844)
	External	0.721 (0.492-0.916)	0.667 (0.500-0.833)	0.200 (0.000-0.667)	0.789 (0.588-0.950)	0.200 (0.000-0.667)	0.789 (0.611-0.950)
SVM_Radiomics	Train	0.747 (0.632-0.853)	0.724 (0.633-0.806)	0.333 (0.176-0.500)	0.923 (0.859-0.984)	0.688 (0.450-0.909)	0.732 (0.623-0.829)
	Internal	0.708 (0.516-0.876)	0.744 (0.605-0.860)	0.308 (0.077-0.556)	0.933 (0.833-1.000)	0.667 (0.250-1.000)	0.757 (0.605-0.892)
	External	0.653 (0.326-0.913)	0.667 (0.458-0.833)	0.600 (0.000-1.000)	0.684 (0.473-0.895)	0.333 (0.000-0.667)	0.867 (0.688-1.000)
SVM_Combined	Train	0.902 (0.837-0.957)	0.806 (0.724-0.888)	0.606 (0.432-0.769)	0.908 (0.838-0.971)	0.769 (0.607-0.929)	0.819 (0.724-0.905)
	Internal	0.638 (0.457-0.804)	0.605 (0.465-0.744)	0.308 (0.077-0.572)	0.733 (0.556-0.875)	0.333 (0.083-0.625)	0.710 (0.555-0.862)
	External	0.737 (0.504-0.937)	0.750 (0.583-0.917)	0.400 (0.000-1.000)	0.842 (0.684-1.000)	0.400 (0.000-1.000)	0.842 (0.667-1.000)
RF_Clinical	Train	0.898 (0.832-0.950)	0.806 (0.734-0.878)	0.727 (0.556-0.867)	0.846 (0.762-0.925)	0.706 (0.543-0.848)	0.859 (0.773-0.937)
	Internal	0.642 (0.481-0.800)	0.581 (0.442-0.721)	0.308 (0.071-0.556)	0.700 (0.536-0.857)	0.308 (0.071-0.571)	0.700 (0.533-0.844)
	External	0.753 (0.523-0.963)	0.750 (0.583-0.917)	0.200 (0.000-0.667)	0.895 (0.739-1.000)	0.333 (0.000-1.000)	0.810 (0.632-0.955)
RF_Radiomics	Train	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)
	Internal	0.728 (0.577-0.861)	0.651 (0.512-0.791)	0.385 (0.125-0.667)	0.767 (0.600-0.903)	0.417 (0.143-0.714)	0.742 (0.576-0.893)
	External	0.663 (0.293-0.963)	0.667 (0.458-0.833)	0.600 (0.000-1.000)	0.684 (0.444-0.889)	0.333 (0.000-0.667)	0.867 (0.667-1.000)
RF_Combined	Train	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)
	Internal	0.705 (0.518-0.873)	0.698 (0.558-0.837)	0.615 (0.333-0.889)	0.733 (0.576-0.889)	0.500 (0.261-0.750)	0.815 (0.666-0.960)
	External	0.674 (0.413-0.905)	0.625 (0.417-0.795)	0.400 (0.000-1.000)	0.684 (0.471-0.882)	0.250 (0.000-0.600)	0.812 (0.583-1.000)
XGB_Clinical	Train	0.893 (0.824-0.950)	0.806 (0.724-0.888)	0.788 (0.647-0.920)	0.815 (0.708-0.908)	0.684 (0.531-0.829)	0.883 (0.797-0.962)
	Internal	0.647 (0.480-0.804)	0.581 (0.419-0.721)	0.615 (0.333-0.889)	0.567 (0.387-0.735)	0.381 (0.176-0.600)	0.773 (0.591-0.945)
	External	0.711 (0.493-0.922)	0.625 (0.417-0.792)	0.200 (0.000-0.667)	0.737 (0.529-0.905)	0.167 (0.000-0.500)	0.778 (0.562-0.947)
XGB_Radiomics	Train	0.985 (0.960-1.000)	0.969 (0.929-1.000)	0.970 (0.900-1.000)	0.969 (0.923-1.000)	0.941 (0.846-1.000)	0.984 (0.947-1.000)
	Internal	0.722 (0.565-0.871)	0.698 (0.558-0.837)	0.385 (0.111-0.667)	0.833 (0.690-0.966)	0.500 (0.181-0.833)	0.758 (0.592-0.900)
	External	0.589 (0.305-0.850)	0.625 (0.452-0.833)	0.400 (0.000-1.000)	0.684 (0.455-0.890)	0.250 (0.000-0.625)	0.812 (0.600-1.000)
XGB_Combined	Train	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)	1.000 (1.000-1.000)
	Internal	0.694 (0.506-0.864)	0.744 (0.605-0.860)	0.462 (0.187-0.734)	0.867 (0.724-0.969)	0.600 (0.286-0.900)	0.788 (0.636-0.914)
	External	0.647 (0.412-0.852)	0.625 (0.417-0.792)	0.200 (0.000-0.667)	0.737 (0.529-0.909)	0.167 (0.000-0.500)	0.778 (0.562-0.945)

LR: Logistic Regression; SVM: Support Vector Machine; RF: Random Forest; XGB: eXtreme Gradient Boosting; AUC: Area Under the ROC Curve; PPV: Positive Predictive Value; NPV: Negative Predictive Value.

https://dx.doi.org/10.21037/tlcr-2025-326

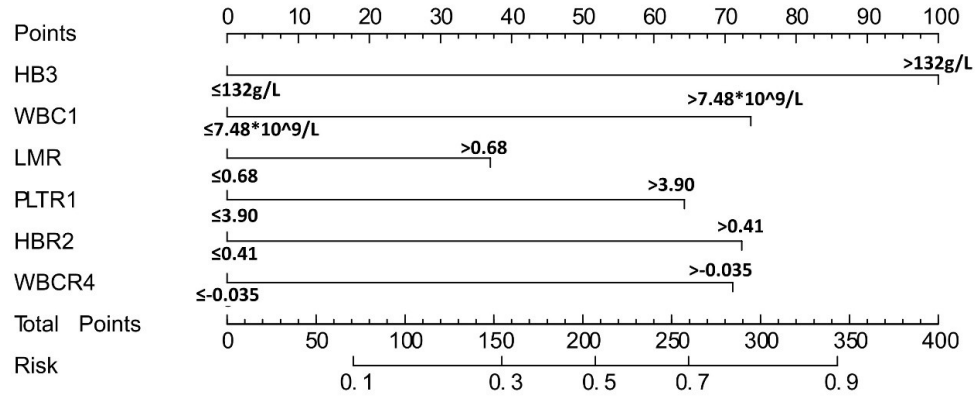

Figure S2 Nomogram of the LR_C model. HB3: hemoglobin post radiotherapy; WBC1: white blood cell before radiotherapy; LMR: Lymphocyte-to-monocyte ratio; WBC: White Blood Cell; WBCR4: ratio of change in WBC before and after radiotherapy; PLTR: ratio of change in platelet before and after radiotherapy; HBR2: ratio of change in hemoglobin before and after radiotherapy.

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Table S3 Comparative analysis of baseline and key clinical characteristics in PCI *vs.* Non-PCI cohorts

Variables	Total (n = 141)	non-PCI (n = 92)	PCI (n = 49)	Statistic	P
Age (years), mean ± SD	59.03 ± 9.32	60.51 ± 8.93	56.24 ± 9.50	t=2.64	0.009
KPS scores, mean ± SD	84.18 ± 6.31	83.97 ± 5.72	84.59 ± 7.35	t=-0.56	0.58
GTV volume (mm^3), mean ± SD	44.03 ± 41.58	46.44 ± 42.57	39.49 ± 39.68	t=0.95	0.35
EDRIC (Gy), mean ± SD	1258.82 ± 172.94	1252.22 ± 174.89	1271.22 ± 170.30	t=-0.62	0.54
Radiotherapy technology, n (%)				χ^2=1.97	0.16
IMRT	102 (72.34)	63 (68.48)	39 (79.59)		
VMRT	39 (27.66)	29 (31.52)	10 (20.41)		
Sex, n (%)				χ^2=0.22	0.64
Male	109 (77.30)	70 (76.09)	39 (79.59)		
Female	32 (22.70)	22 (23.91)	10 (20.41)		
Smoking status, n (%)				χ^2=1.48	0.22
No	32 (22.70)	18 (19.57)	14 (28.57)		
Yes	109 (77.30)	74 (80.43)	35 (71.43)		
T, n (%)				χ^2=1.65	0.20
≤2	73 (51.77)	44 (47.83)	29 (59.18)		
>2	68 (48.23)	48 (52.17)	20 (40.82)		
N, n (%)				χ^2=0.41	0.52
≤2	108 (76.60)	72 (78.26)	36 (73.47)		
>2	33 (23.40)	20 (21.74)	13 (26.53)		
HB3 (g/L), mean ± SD	125.45 ± 15.12	124.59 ± 14.91	127.05 ± 15.55	t=-0.92	0.36
WBC1 (*10^9/L), mean ± SD	5.89 ± 3.30	6.09 ± 3.88	5.50 ± 1.71	t=1.01	0.31
WBCR4, mean ± SD	0.33 ± 0.50	0.31 ± 0.51	0.35 ± 0.48	t=-0.51	0.61
LMR, mean ± SD	6.91 ± 11.20	5.95 ± 11.45	8.70 ± 10.61	t=-1.39	0.16
PLTR1, mean ± SD	0.30 ± 0.26	0.30 ± 0.25	0.29 ± 0.27	t=0.12	0.91
HBR2, mean ± SD	0.07 ± 0.13	0.08 ± 0.13	0.06 ± 0.11	t=1.30	0.20
RadScore, mean ± SD	-0.67 ± 2.27	-0.49 ± 2.58	-0.99 ± 1.49	t=1.25	0.21

SD: Standard Deviation; OR: Odds Ratio; CI: Confidence Interval; EDRIC: Estimated Dose of Radiation to Immune Cells; KPS: Karnofsky Performance Status; GTV volume: Gross Tumor Volume; PTV volume: Planning Target Volume; IMRT: Intensity-Modulated Radiation Therapy; VMRT: Volumetric Modulated Arc Therapy; PCI: Prophylactic Cranial Irradiation ; HB3: hemoglobin post radiotherapy;WBC1: white blood cell before radiotherapy; LMR: Lymphocyte-to-monocyte ratio; RadScore: Radiomics scores; WBCR4: ratio of change in white blood cell before and after radiotherapy; PLTR: ratio of change in platelet before and after radiotherapy; WBC: White Blood Cell; HBR2: ratio of change in hemoglobin before and after radiotherapy.

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Table S4 Univariate logistic regression analysis results for clinical T and N staging

Variables	β	SE	Z	P	OR (95% CI)
T					
≤2					1.00 (Reference)
>2	0.34	0.43	0.78	0.43	1.40 (0.60–3.25)
N					
≤2					1.00 (Reference)
>	-0.35	0.51	-0.69	0.49	0.70 (0.26–1.90)

SE, standard error; OR, odds ratio; CI, confidence interval.

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