

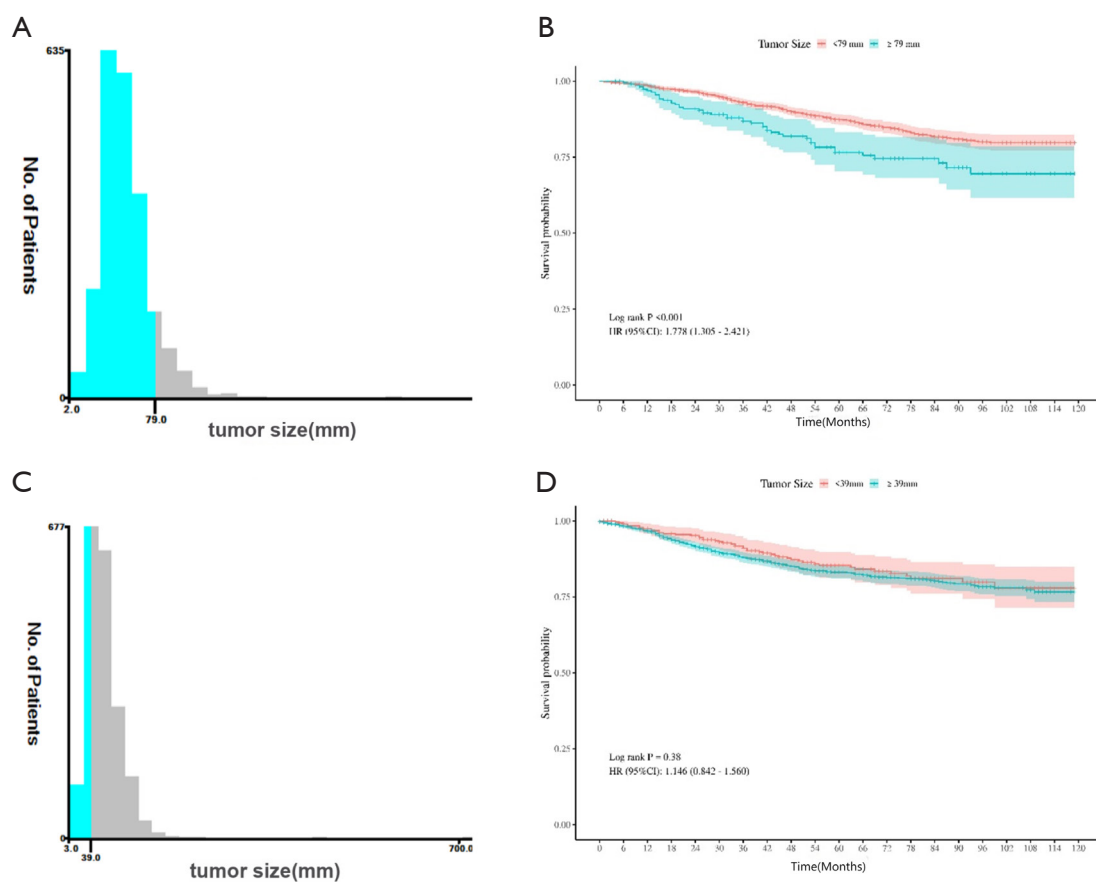


Figure S1 X-tile software and Kaplan-Meier survival curve analysis were used to determine optimal cutoff values of the tumor size for left-sided EOCC (A,B) and right-sided EOCC (C,D). EOCC, early-onset colorectal cancer; HR, hazard ratio; CI, confidence interval.

Table S1 Baseline information for the left-sided group of training set and validation set

Variables	Total (n=2,164)	Validation (n=650)	Train (n=1,514)	P
Sex, n (%)				0.46
Female	1,108 (51.20)	325 (50.00)	783 (51.72)	
Male	1,056 (48.80)	325 (50.00)	731 (48.28)	
Race, n (%)				0.46
White	1,612 (74.49)	491 (75.54)	1,121 (74.04)	
Others	552 (25.51)	159 (24.46)	393 (25.96)	
Grade, n (%)				0.38
I/II	1,827 (84.43)	542 (83.38)	1,285 (84.87)	
III/IV	337 (15.57)	108 (16.62)	229 (15.13)	
Histologic type, n (%)				0.22
Adenocarcinoma	2,019 (93.30)	613 (94.31)	1,406 (92.87)	
Others	145 (6.70)	37 (5.69)	108 (7.13)	
T stage, n (%)				0.18
T1/T2	155 (7.16)	54 (8.31)	101 (6.67)	
T3/T4	2,009 (92.84)	596 (91.69)	1,413 (93.33)	
N stage, n (%)				0.92
N0	800 (36.97)	236 (36.31)	564 (37.25)	
N1	821 (37.94)	249 (38.31)	572 (37.78)	
N2	543 (25.09)	165 (25.38)	378 (24.97)	
Lymph nodes examined, n (%)				0.96
<12	56 (2.59)	17 (2.62)	39 (2.58)	
≥12	2,108 (97.41)	633 (97.38)	1,475 (97.42)	
Radiation, n (%)				0.42
No	2,094 (96.77)	632 (97.23)	1,462 (96.57)	
Yes	70 (3.23)	18 (2.77)	52 (3.43)	
Chemotherapy, n (%)				0.42
No	598 (27.63)	172 (26.46)	426 (28.14)	
Yes	1,566 (72.37)	478 (73.54)	1,088 (71.86)	
Treatment options, n (%)				0.33
Only surgery	597 (27.59)	172 (26.46)	425 (28.07)	
Adjuvant therapy with surgery	1,549 (71.58)	475 (73.08)	1,074 (70.94)	
Neoadjuvant therapy with surgery	18 (0.83)	3 (0.46)	15 (0.99)	
Carcinoembryonic antigen level, n (%)				0.455
Negative	1,413 (65.30)	432 (66.46)	981 (64.80)	
Positive	751 (34.70)	218 (33.54)	533 (35.20)	

Table S1 (continued)

Table S1 (*continued*)

Variables	Total (n=2,164)	Validation (n=650)	Train (n=1,514)	P
Perineural invasion, n (%)				0.40
No	1,785 (82.49)	543 (83.54)	1,242 (82.03)	
Yes	379 (17.51)	107 (16.46)	272 (17.97)	
Tumor deposits, n (%)				0.16
No	1,799 (83.13)	529 (81.38)	1,270 (83.88)	
Yes	365 (16.87)	121 (18.62)	244 (16.12)	
Tumor size (mm), n (%)				0.88
<79	1,931 (89.23)	579 (89.08)	1,352 (89.30)	
≥79	233 (10.77)	71 (10.92)	162 (10.70)	

Table S2 Baseline information for the right-sided group of training set and validation set

Variables	Total (n=1,881)	Validation (n=565)	Train (n=1,316)	P
Sex, n (%)				0.68
Female	832 (44.23)	254 (44.96)	578 (43.92)	
Male	1,049 (55.77)	311 (55.04)	738 (56.08)	
Race, n (%)				0.09
White	1,293 (68.74)	404 (71.50)	889 (67.55)	
Others	588 (31.26)	161 (28.50)	427 (32.45)	
Grade, n (%)				0.98
I/II	1,381 (73.42)	415 (73.45)	966 (73.40)	
III/IV	500 (26.58)	150 (26.55)	350 (26.60)	
Histologic type, n (%)				0.93
Adenocarcinoma	1,600 (85.06)	480 (84.96)	1,120 (85.11)	
Others	281 (14.94)	85 (15.04)	196 (14.89)	
T stage, n (%)				0.40
T1/T2	74 (3.93)	19 (3.36)	55 (4.18)	
T3/T4	1,807 (96.07)	546 (96.64)	1,261 (95.82)	
N stage, n (%)				0.66
N0	875 (46.52)	259 (45.84)	616 (46.81)	
N1	622 (33.07)	195 (34.51)	427 (32.45)	
N3	384 (20.41)	111 (19.65)	273 (20.74)	
Lymph nodes examined, n (%)				0.13
<12	39 (2.07)	16 (2.83)	23 (1.75)	
≥12	1,842 (97.93)	549 (97.17)	1,293 (98.25)	

Table S2 (*continued*)

Table S2 (continued)

Variables	Total (n=1,881)	Validation (n=565)	Train (n=1,316)	P
Radiation, n (%)				0.49
No	1,852 (98.46)	558 (98.76)	1,294 (98.33)	
Yes	29 (1.54)	7 (1.24)	22 (1.67)	
Chemotherapy, n (%)				0.53
No	679 (36.10)	198 (35.04)	481 (36.55)	
Yes	1,202 (63.90)	367 (64.96)	835 (63.45)	
Treatment options, n (%)				0.76
Only surgery	677 (35.99)	197 (34.87)	480 (36.47)	
Adjuvant therapy with surgery	1,189 (63.21)	364 (64.42)	825 (62.69)	
Neoadjuvant therapy with surgery	15 (0.80)	4 (0.71)	11 (0.84)	
Carcinoembryonic antigen level, n (%)				0.26
Negative	1,247 (66.29)	364 (64.42)	883 (67.10)	
Positive	634 (33.71)	201 (35.58)	433 (32.90)	
Perineural invasion, n (%)				>0.99
No	1,628 (86.55)	489 (86.55)	1,139 (86.55)	
Yes	253 (13.45)	76 (13.45)	177 (13.45)	
Tumor deposits, n (%)				0.76
No	1,615 (85.86)	483 (85.49)	1,132 (86.02)	
Yes	266 (14.14)	82 (14.51)	184 (13.98)	
Tumor size, n (%)				0.42
<39 mm	326 (17.33)	104 (18.41)	222 (16.87)	
≥39 mm	1,555 (82.67)	461 (81.59)	1,094 (83.13)	

Table S3 Univariate and multivariate Cox analysis for overall survival in the right-sided group of early-onset colon cancer patients

Characteristics	Univariate analysis		Multivariate analysis	
	Hazard ratio (95% CI) [†]	P-value	Hazard ratio (95% CI)	P-value
Sex				
Female	Ref			
Male	0.86 (0.66–1.13)	0.27		
Histology				
Adenocarcinoma	Ref		Ref	
Others	1.77 (1.28–2.43)	<0.001*	1.36 (0.97–1.91)	0.07

Table S3 (continued)

Table S3 (continued)

Characteristics	Univariate analysis		Multivariate analysis	
	Hazard ratio (95% CI) [†]	P-value	Hazard ratio (95% CI)	P-value
Lymph nodes examined				
<12	Ref			
≥12	2.08 (0.52–8.38)	0.30		
Radiation				
No	Ref			
Yes	4.01 (2.29–7.02)	<0.001*	3.27 (1.79–5.97)	<0.001*
Chemotherapy				
No/unknown	Ref			
Yes	1.56 (1.15–2.11)	0.004*	0.56 (0.39–0.80)	0.001*
Grade				
I/II	Ref		Ref	
III/IV	2.00 (1.52–2.64)	<0.001*	1.40 (1.05–1.87)	0.02*
Carcinoembryonic antigen level				
Negative	Ref		Ref	
Positive	1.81 (1.38–2.37)	<0.001*	1.36 (1.02–1.81)	0.03*
Perineural invasion				
No	Ref		Ref	
Yes	2.49 (1.83–3.38)	<0.001*	1.44 (1.05–2.00)	0.03*
Tumor deposits				
No	Ref		Ref	
Yes	3.89 (2.91–5.20)	<0.001*	2.14 (1.56–2.94)	0.01*
Tumor size (mm)				
<39	Ref			
≥39	1.10 (0.76–1.58)	0.61		
Race				
White	Ref			
Others	1.29 (0.98–1.70)	0.07		
N stage				
N0	Ref		Ref	
N1	2.47 (1.67–3.64)	<0.001*	2.51 (1.62–3.90)	<0.001*
N2	7.28 (5.07–10.45)	<0.001*	6.17 (3.96–9.61)	<0.001*
T stage				
T1/T2	Ref			
T3/T4	1.06 (0.54–2.07)	0.86		

*Statistical significance; CI, confidence interval.

Table S4 Univariate and multivariate Cox analysis for cancer-specific survival in the right-sided group of early-onset colon cancer patients

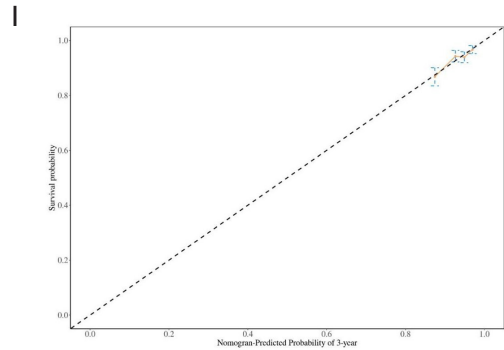
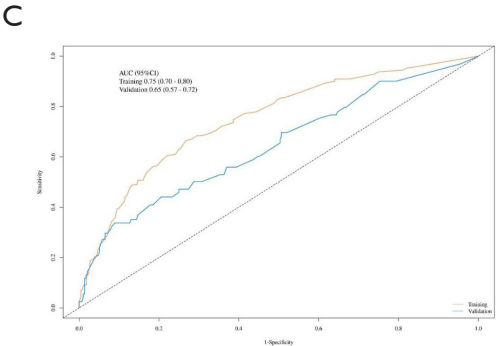
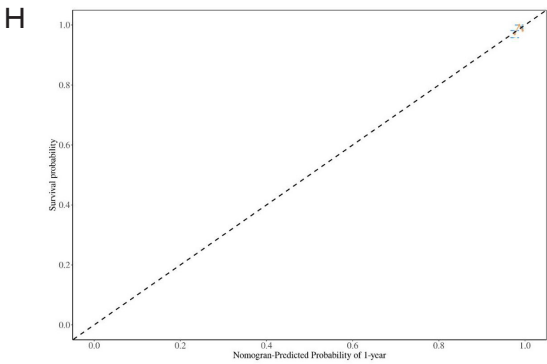
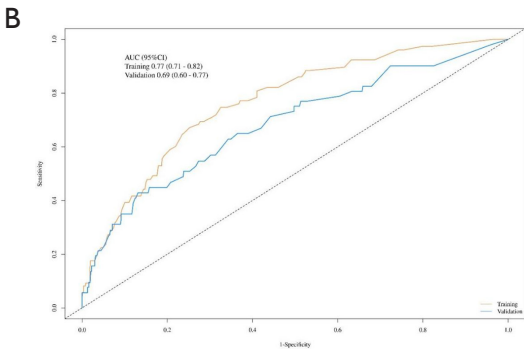
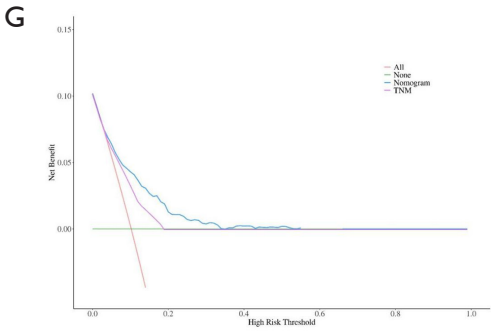
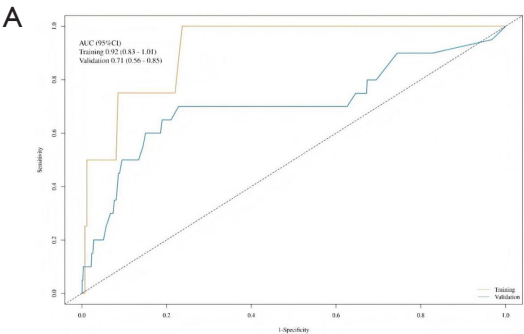
Characteristics	Univariate analysis		Multivariate analysis	
	Hazard ratio (95% CI) [†]	P-value	Hazard ratio (95% CI)	P-value
Sex				
Female	Ref			
Male	0.88 (0.66–1.17)	0.37		
Histology				
Adenocarcinoma	Ref		Ref	
Others	1.77 (1.26–2.49)	<0.001*	1.58 (1.11–2.25)	0.01*
Lymph nodes examined				
<12	Ref			
≥12	1.52 (0.38–6.12)	0.56		
Radiation				
No	Ref			
Yes	3.43 (1.87–6.31)	<0.001*	2.62 (1.38–4.98)	0.003*
Chemotherapy				
No/unknown	Ref			
Yes	1.56 (1.15–2.11)	0.004*	0.60 (0.41–0.89)	0.01*
Grade				
I/II	Ref		Ref	
III/IV	2.10 (1.57–2.81)	<0.001*	1.42 (1.05–1.93)	0.02*
Carcinoembryonic antigen level				
Negative	Ref		Ref	
Positive	1.79 (1.34–2.38)	<0.001*	1.39 (1.03–1.87)	0.03*
Perineural invasion				
No	Ref		Ref	
Yes	2.71 (1.96–3.74)	<0.001*	1.47 (1.04–2.08)	0.03*
Tumor deposits				
No	Ref		Ref	
Yes	3.49 (2.55–4.76)	<0.001*	1.85 (1.32–2.60)	<0.001*
Tumor size (mm)				
<39	Ref			
≥39	1.04 (0.71–1.52)	0.83		
Race				
White	Ref			
Others	1.31 (0.97–1.77)	0.08		

Table S4 (continued)

Table S4 (continued)

Characteristics	Univariate analysis		Multivariate analysis	
	Hazard ratio (95% CI) [†]	P-value	Hazard ratio (95% CI)	P-value
N stage				
N0	Ref		Ref	
N1	2.71 (1.77–4.15)	<0.001*	2.84 (1.76–4.60)	<0.001*
N2	8.54 (5.75–12.68)	<0.001*	7.17 (4.44–11.56)	<0.001*
T stage				
T1/T2	Ref			
T3/T4	0.86 (0.44–1.69)	0.67		

*Statistical significance; CI: confidence interval.



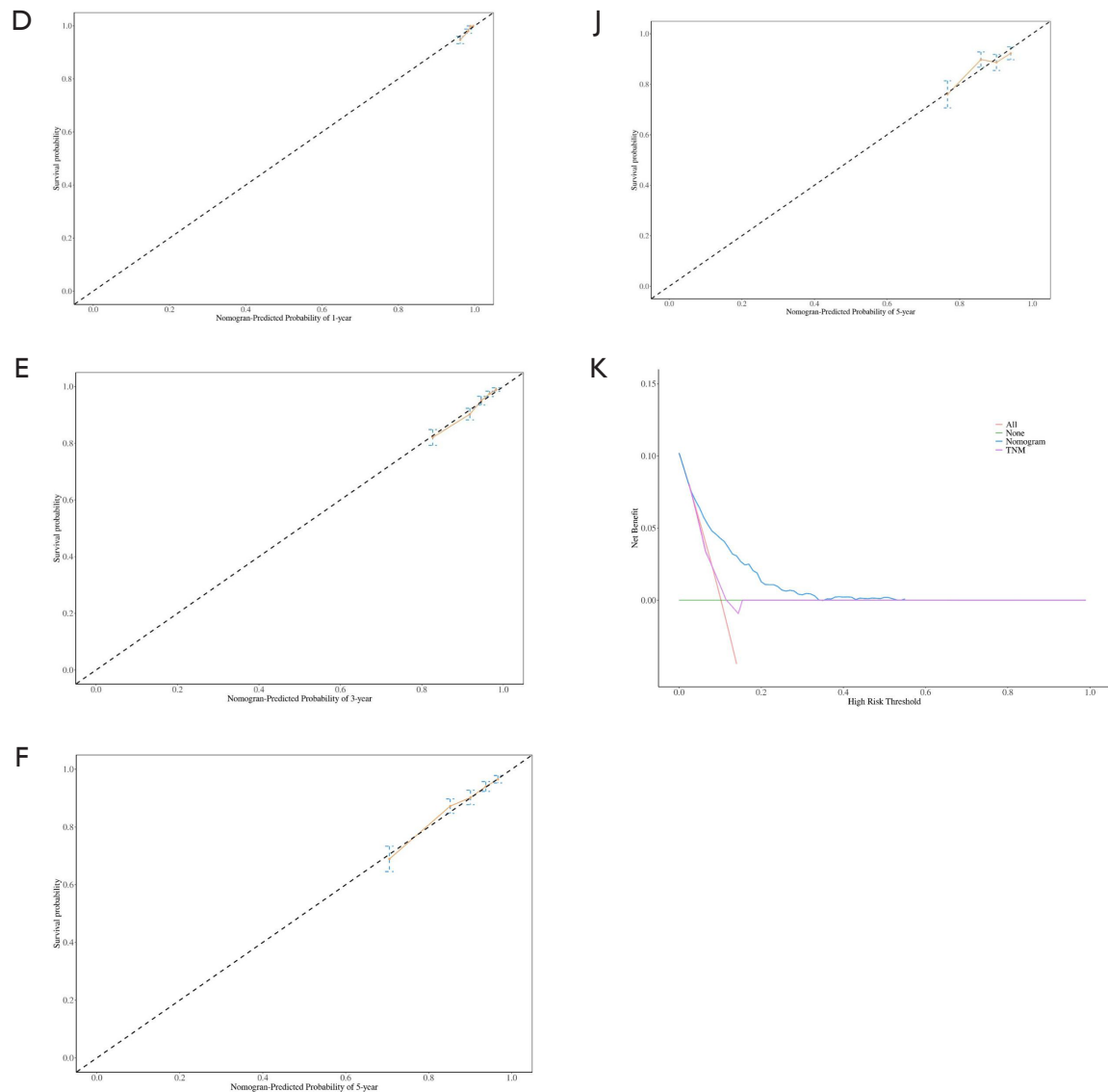
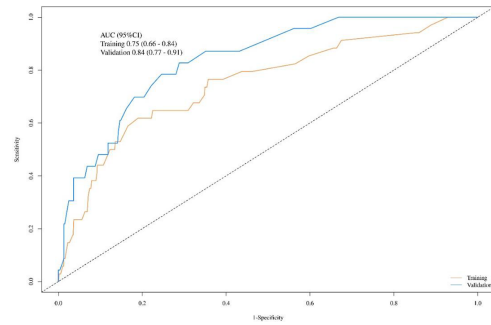
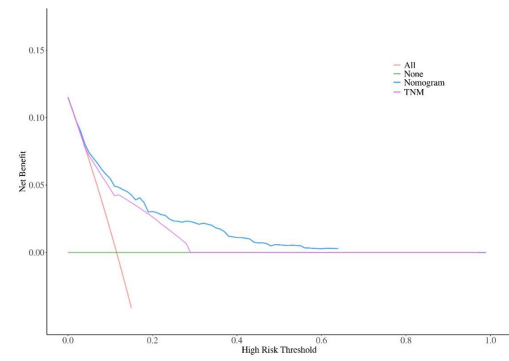


Figure S2 The ROC curves, Calibration plots and DCA for 1-year, 3-year, and 5-year CSS for the left-sided group. (A) ROC curves for 1-year CSS; (B) ROC curves for 3-year CSS; (C) ROC curves for 5-year CSS; (D) calibration plots for 1-year CSS in training set; (E) calibration plots for 3-year CSS in training set; (F) calibration plots for 5-year CSS in training set; (G) DCA in training set; (H) calibration plots for 1-year CSS in validation set; (I) calibration plots for 3-year CSS in validation set; (J) calibration plots for 5-year CSS in validation set; (K) DCA in validation set. ROC, receiver operating characteristic; DCA, decision curve analysis; CCS, cancer-specific survival; AUC, area under the curve; TNM, Tumor Node Metastasis classification; CI, confidence interval.

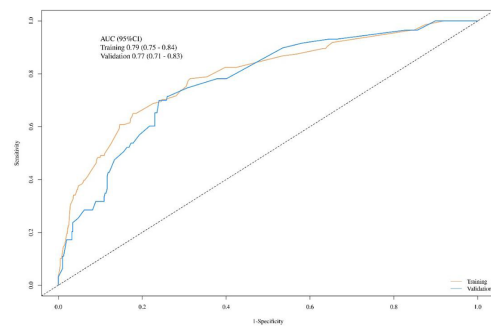
A



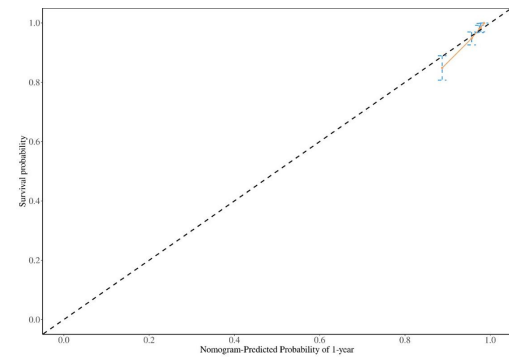
G



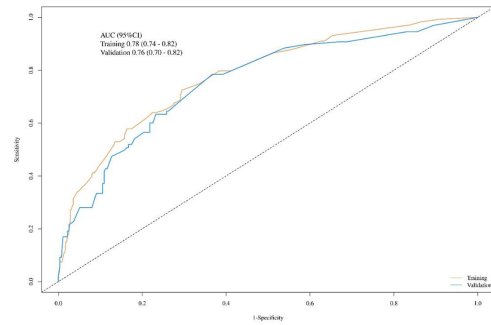
B



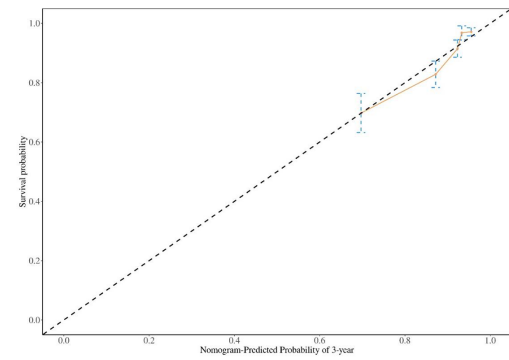
H



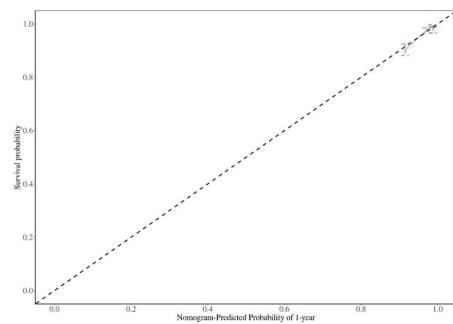
C



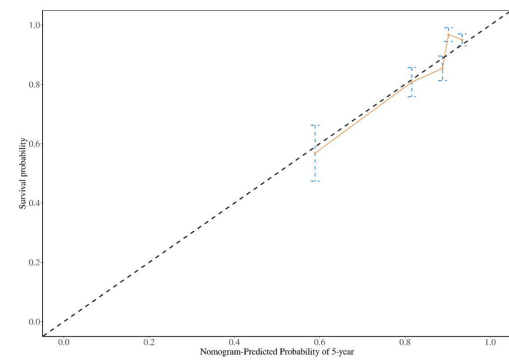
I



D



J



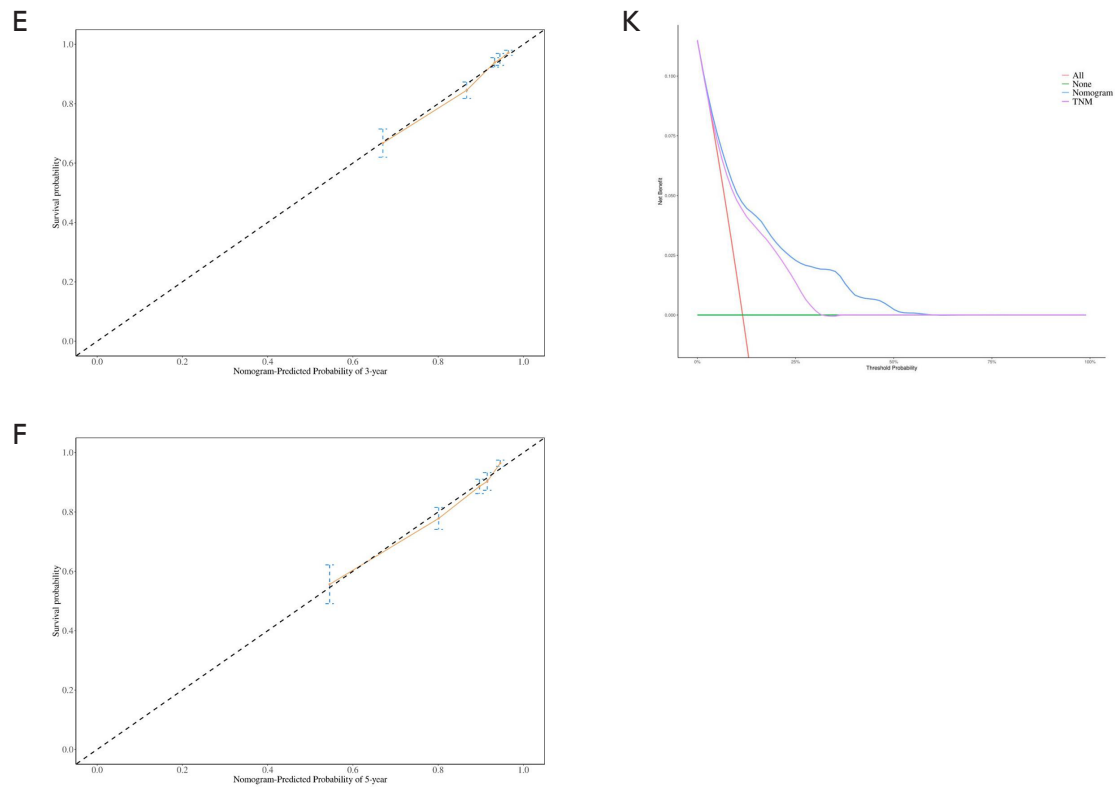
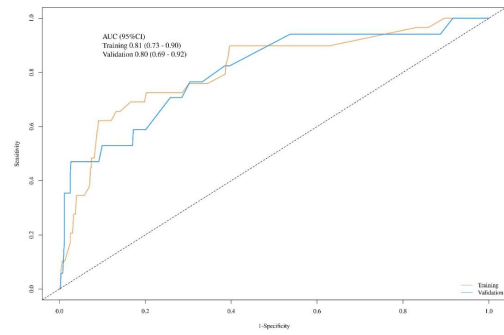
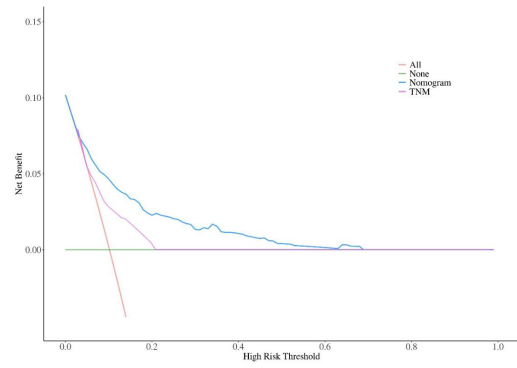


Figure S3 The ROC curves, Calibration plots and DCA for 1-year, 3-year, and 5-year OS for the right-sided group. (A) ROC curves for 1-year OS; (B) ROC curves for 3-year OS; (C) ROC curves for 5-year OS; (D) calibration plots for 1-year OS in training set; (E) calibration plots for 3-year OS in training set; (F) calibration plots for 5-year OS in training set; (G) DCA in training set; (H) calibration plots for 1-year OS in validation set; (I) calibration plots for 3-year OS in validation set; (J) calibration plots for 5-year OS in validation set; (K) DCA in validation set. ROC, receiver operating characteristic; DCA, decision curve analysis; OS, overall survival; AUC, area under the curve; TNM, Tumor Node Metastasis classification; CI, confidence interval.

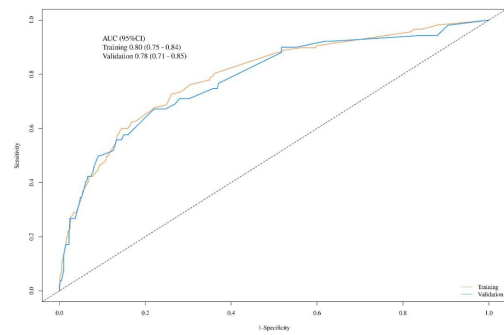
A



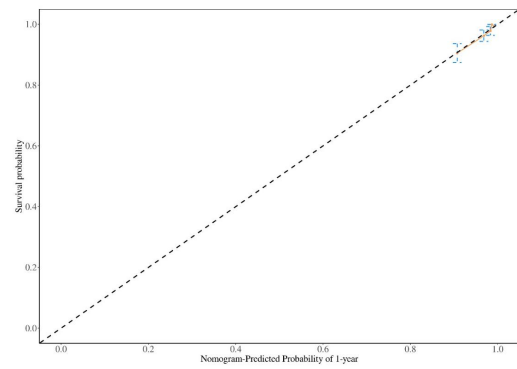
G



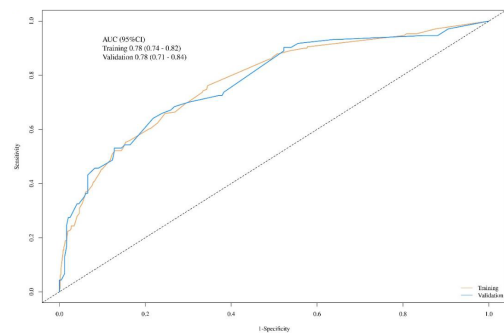
B



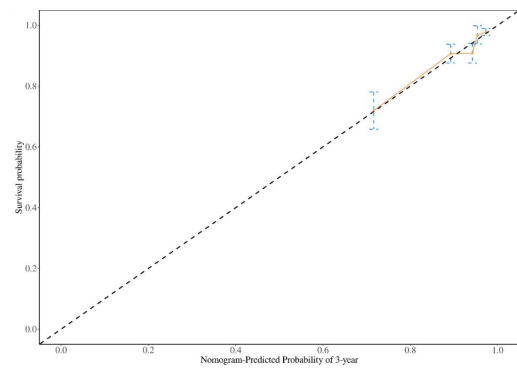
H



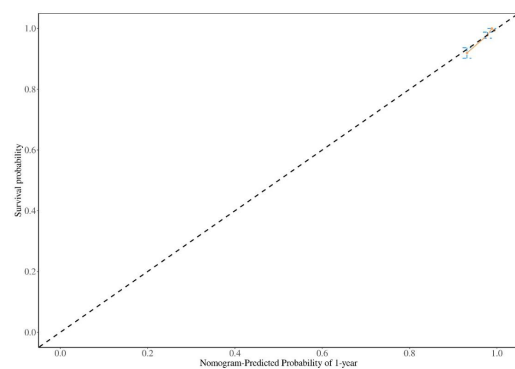
C



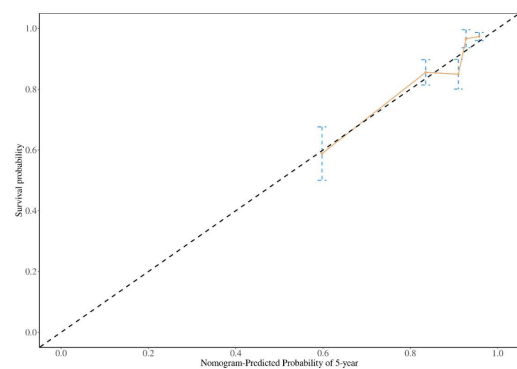
I



D



J



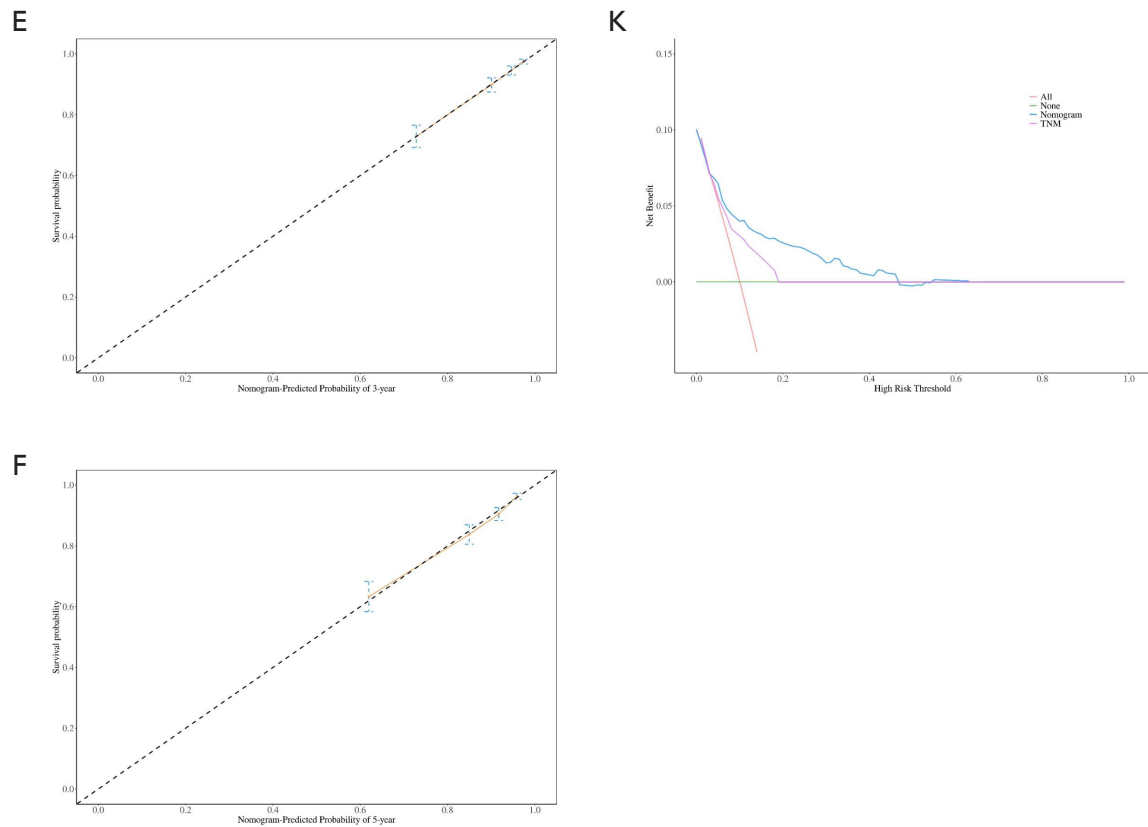


Figure S4 The ROC curves, Calibration plots and DCA for 1-year, 3-year, and 5-year CSS for the right-sided group. (A) ROC curves for 1-year CSS; (B) ROC curves for 3-year CSS; (C) ROC curves for 5-year CSS; (D) calibration plots for 1-year CSS in training set; (E) calibration plots for 3-year CSS in training set; (F) calibration plots for 5-year CSS in training set; (G) DCA in training set; (H) calibration plots for 1-year CSS in validation set; (I) calibration plots for 3-year CSS in validation set; (J) calibration plots for 5-year CSS in validation set; (K) DCA in validation set. ROC, receiver operating characteristic; DCA, decision curve analysis; CCS, cancer-specific survival; AUC, area under the curve; TNM, Tumor Node Metastasis classification; CI, confidence interval.

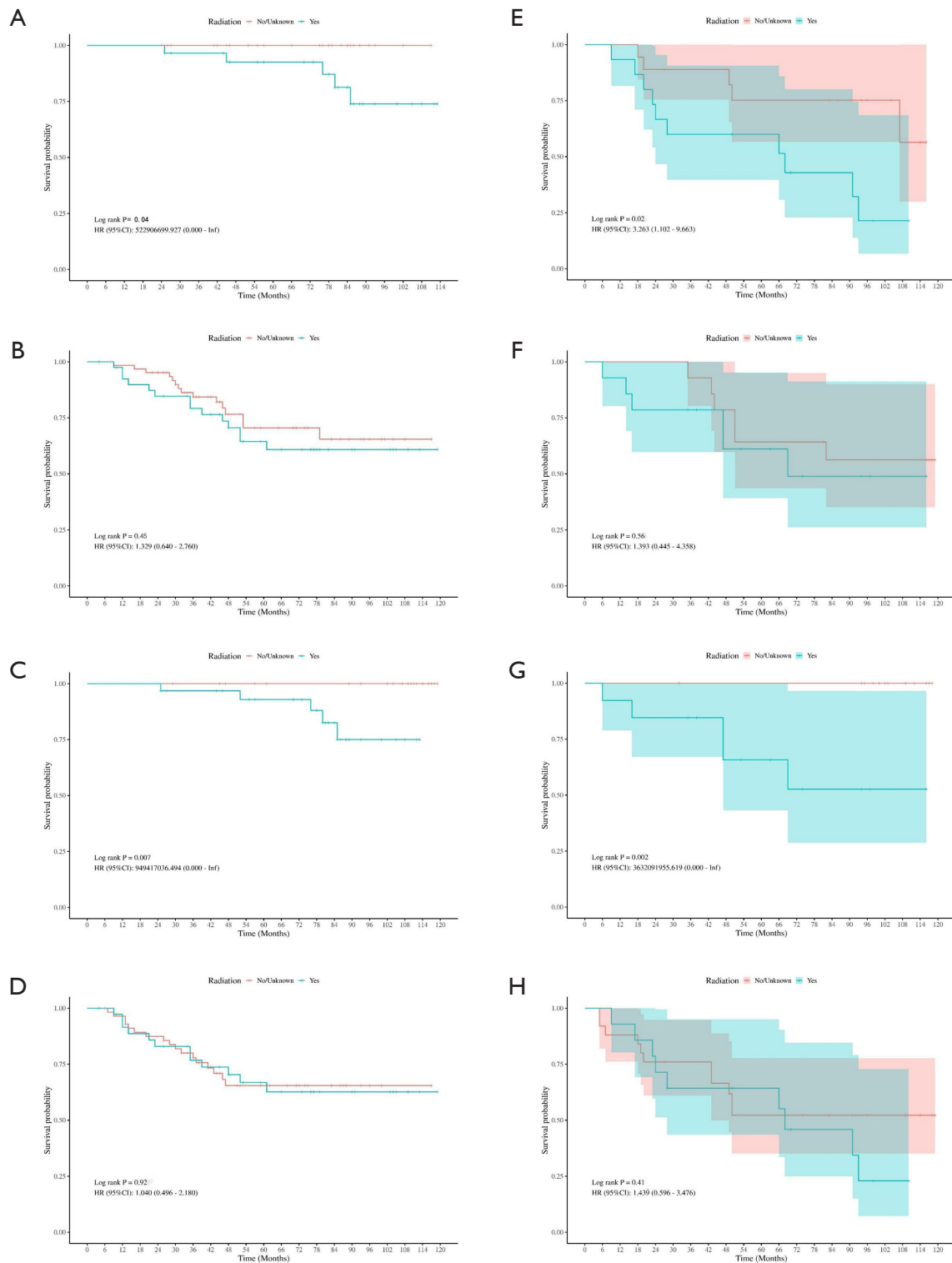


Figure S5 The impact of radiation on OS and CSS in subgroups. (A) OS of the left-sided group with low risk. (B) OS of the left-sided group with high risk. (C) CSS of the left-sided group with low risk. (D) CSS of the left-sided group with high risk. (E) OS of the right-sided group with low risk. (F) OS of the right-sided group with high risk. (G) CSS of the right-sided group with low risk. (H) CSS of the right-sided group with high risk. OS, overall survival; CSS, cancer-specific survival; HR, hazard ratio; CI, confidence interval.

Appendix 1 Propensity score matching for Analysis

A

Baseline characteristics of the cancer-specific survival study on the right-sided and low-risk group for radiation												
Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,036)	Others (n=1,023)	Radiation (n=13)	Statistic	P	Standardized mean difference	Total (n=26)	Others(n=13)	Radiation(n=13)	Statistic	P	Standardized mean difference
Histologic type, n (%)				$\chi^2=3.688$	0.055					-	>0.99	
Adenocarcinoma	926 (89.38)	917 (89.64)	9 (69.23)			-0.442	18 (69.23)	9 (69.23)	9 (69.23)			0.000
Others	110 (10.62)	106 (10.36)	4 (30.77)			0.442	8 (30.77)	4 (30.77)	4 (30.77)			0.000
N stage, n (%)				$\chi^2=0.447$	0.504					-	>0.99	
N0	842 (81.27)	830 (81.13)	12 (92.31)			0.419	24 (92.31)	12 (92.31)	12 (92.31)			0.000
N1/N2	194 (18.73)	193 (18.87)	1 (7.69)			-0.419	2 (7.69)	1 (7.69)	1 (7.69)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=0.116$	0.73					-	>0.99	
Negative	798 (77.03)	789 (77.13)	9 (69.23)			-0.171	18 (69.23)	9 (69.23)	9 (69.23)			0.000
Positive	238 (22.97)	234 (22.87)	4 (30.77)			0.171	8 (30.77)	4 (30.77)	4 (30.77)			0.000
Perineural invasion, n (%)				-	0.46					-	>0.99	
No	988 (95.37)	976 (95.41)	12 (92.31)			-0.116	24 (92.31)	12 (92.31)	12 (92.31)			0.000
Yes	48 (4.63)	47 (4.59)	1 (7.69)			0.116	2 (7.69)	1 (7.69)	1 (7.69)			0.000
Tumor deposits, n (%)				-	0.17					-	>0.99	
No	1,021 (98.55)	1,009 (98.63)	12 (92.31)			-0.237	24 (92.31)	12 (92.31)	12 (92.31)			0.000
Yes	15 (1.45)	14 (1.37)	1 (7.69)			0.237	2 (7.69)	1 (7.69)	1 (7.69)			0.000
Chemotherapy, n (%)				$\chi^2=10.509$	0.001					-	>0.99	
Yes	494 (47.68)	482 (47.12)	12 (92.31)			1.696	24 (92.31)	12 (92.31)	12 (92.31)			0.000
Others	542 (52.32)	541 (52.88)	1 (7.69)			-1.696	2 (7.69)	1 (7.69)	1 (7.69)			0.000
Grade, n (%)				1.202	0.27					-	>0.99	
I/II	886(85.52)	873(85.34)	13(100.00)			0.417	26(100.00)	13(100.00)	13(100.00)			0.000
III/IV	150(14.48)	150(14.66)	0(0.00)			-0.417	0(0.00)	0(0.00)	0(0.00)			0.000

B

Baseline characteristics of the cancer-specific survival study on the right-sided and low-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,036)	Chemotherapy (n=494)	Others (n=542)	Statistic	P	Standardized mean difference	Total (n=626)	Chemotherapy (n=313)	Others (n=313)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.199$	0.66					$\chi^2=0.911$	0.34	
I/II	886 (85.52)	425 (86.03)	461 (85.06)			-0.027	484 (77.32)	247 (78.91)	237 (75.72)			-0.075
III/IV	150 (14.48)	69 (13.97)	81 (14.94)			0.027	142 (22.68)	66 (21.09)	76 (24.28)			0.075
Histologic type, n (%)				$\chi^2=2.264$	0.13					$\chi^2=1.498$	0.22	
Adenocarcinoma	926 (89.38)	449 (90.89)	477 (88.01)			-0.089	550 (87.86)	270 (86.26)	280 (89.46)			0.104
Others	110 (10.62)	45 (9.11)	65 (11.99)			0.089	76 (12.14)	43 (13.74)	33 (10.54)			-0.104
N stage, n (%)				$\chi^2=190.201$	<0.001					$\chi^2=0.000$	>0.99	
N0	842 (81.27)	315 (63.77)	527 (97.23)			2.040	596 (95.21)	298 (95.21)	298 (95.21)			0.000
N1/N2	194 (18.73)	179 (36.23)	15 (2.77)			-2.040	30 (4.79)	15 (4.79)	15 (4.79)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=1.968$	0.16					$\chi^2=0.622$	0.43	
Negative	798 (77.03)	390 (78.95)	408 (75.28)			-0.085	441 (70.45)	216 (69.01)	225 (71.88)			0.064
Positive	238 (22.97)	104 (21.05)	134 (24.72)			0.085	185 (29.55)	97 (30.99)	88 (28.12)			-0.064
Perineural invasion, n (%)				$\chi^2=0.001$	0.97					$\chi^2=0.027$	0.87	
No	988 (95.37)	471 (95.34)	517 (95.39)			0.002	587 (93.77)	294 (93.93)	293 (93.61)			-0.013
Yes	48 (4.63)	23 (4.66)	25 (4.61)			-0.002	39 (6.23)	19 (6.07)	20 (6.39)			0.013
Tumor deposits, n (%)				$\chi^2=0.926$	0.34					$\chi^2=0.093$	0.76	
No	1,021 (98.55)	485 (98.18)	536 (98.89)			0.068	615 (98.24)	307 (98.08)	308 (98.40)			0.025
Yes	15 (1.45)	9 (1.82)	6 (1.11)			-0.068	11 (1.76)	6 (1.92)	5 (1.60)			-0.025
Radiation, n (%)				$\chi^2=10.509$	0.001					$\chi^2=0.000$	>0.99	
Others	,1023 (98.75)	482 (97.57)	541 (99.82)			0.523	624 (99.68)	312 (99.68)	312 (99.68)			0.000
Yes	13 (1.25)	12 (2.43)	1 (0.18)			-0.523	2 (0.32)	1 (0.32)	1 (0.32)			0.000

Baseline characteristics of the overall survival study on the right-sided and low-risk group for radiation												
Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,087)	Others(n=1,073)	Radiation (n=14)	Statistic	P	Standardized mean difference	Total (n=28)	Others (n=14)	Radiation (n=14)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.160$	0.69					-	>0.99	
I/II	930 (85.56)	917 (85.46)	13 (92.86)			0.287	26 (92.86)	13 (92.86)	13 (92.86)			0.000
III/IV	157 (14.44)	156 (14.54)	1 (7.14)			-0.287	2 (7.14)	1 (7.14)	1 (7.14)			0.000
N stage, n (%)				$\chi^2=0.901$	0.34					-	>0.99	
N0	859 (79.02)	846 (78.84)	13 (92.86)			0.544	26 (92.86)	13 (92.86)	13 (92.86)			0.000
Others	228 (20.98)	227 (21.16)	1 (7.14)			-0.544	2 (7.14)	1 (7.14)	1 (7.14)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=0.685$	0.41					-	>0.99	
Negative	838 (77.09)	829 (77.26)	9 (64.29)			-0.271	18 (64.29)	9 (64.29)	9 (64.29)			0.000
Positive	249 (22.91)	244 (22.74)	5 (35.71)			0.271	10 (35.71)	5 (35.71)	5 (35.71)			0.000
Perineural invasion, n (%)				-	0.48					-	>0.99	
No	1,038 (95.49)	1,025 (95.53)	13 (92.86)			-0.104	26 (92.86)	13 (92.86)	13 (92.86)			0.000
Yes	49 (4.51)	48 (4.47)	1 (7.14)			0.104	2 (7.14)	1 (7.14)	1 (7.14)			0.000
Tumor deposits, n (%)				-	0.11					-	>0.99	
No	1,078 (99.17)	1,065 (99.25)	13 (92.86)			-0.248	26 (92.86)	13 (92.86)	13 (92.86)			0.000
Yes	9 (0.83)	8 (0.75)	1 (7.14)			0.248	2 (7.14)	1 (7.14)	1 (7.14)			0.000
Chemotherapy, n (%)				$\chi^2=11.087$	<0.001					-	>0.99	
Yes	529 (48.67)	516 (48.09)	13 (92.86)			1.738	26 (92.86)	13 (92.86)	13 (92.86)			0.000
Others	558 (51.33)	557 (51.91)	1 (7.14)			-1.738	2 (7.14)	1 (7.14)	1 (7.14)			0.000

D

Baseline characteristics of the overall survival study on the right-sided and low-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,087)	Chemotherapy (n=529)	Others (n=558)	Statistic	P	Standardized mean difference	Total (n=644)	Chemotherapy (n=322)	Others (n=322)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.059$	0.81					$\chi^2=0.000$	>0.99	
I/II	930 (85.56)	454 (85.82)	476 (85.30)			-0.015	508 (78.88)	254 (78.88)	254 (78.88)			0.000
III/IV	157 (14.44)	75 (14.18)	82 (14.70)			0.015	136 (21.12)	68 (21.12)	68 (21.12)			0.000
N stage, n (%)				$\chi^2=209.211$	<0.001					$\chi^2=0.000$	>0.99	
N0	859 (79.02)	321 (60.68)	538 (96.42)			1.922	604 (93.79)	302 (93.79)	302 (93.79)			0.000
Others	228 (20.98)	208 (39.32)	20 (3.58)			-1.922	40 (6.21)	20 (6.21)	20 (6.21)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=2.606$	0.11					$\chi^2=0.264$	0.61	
Negative	838 (77.09)	419 (79.21)	419 (75.09)			-0.095	448 (69.57)	221 (68.63)	227 (70.50)			0.041
Positive	249 (22.91)	110 (20.79)	139 (24.91)			0.095	196 (30.43)	101 (31.37)	95 (29.50)			-0.041
Perineural invasion, n (%)				$\chi^2=0.292$	0.59					$\chi^2=0.810$	0.37	
No	1,038 (95.49)	507 (95.84)	531 (95.16)			-0.032	596 (92.55)	301 (93.48)	295 (91.61)			-0.067
Yes	49 (4.51)	22 (4.16)	27 (4.84)			0.032	48 (7.45)	21 (6.52)	27 (8.39)			0.067
Tumor deposits, n (%)				$\chi^2=0.563$	0.45					$\chi^2=0.000$	>0.99	
No	1,078 (99.17)	523 (98.87)	555 (99.46)			0.082	638 (99.07)	319 (99.07)	319 (99.07)			0.000
Yes	9 (0.83)	6 (1.13)	3 (0.54)			-0.082	6 (0.93)	3 (0.93)	3 (0.93)			0.000
Radiation, n (%)				$\chi^2=11.087$	<0.001					$\chi^2=0.000$	>0.99	
Others	1,073 (98.71)	516 (97.54)	557 (99.82)			0.539	642 (99.69)	321 (99.69)	321 (99.69)			0.000
Yes	14 (1.29)	13 (2.46)	1 (0.18)			-0.539	2 (0.31)	1 (0.31)	1 (0.31)			0.000

Baseline characteristics of the cancer-specific survival study on the right-sided and high-risk group for radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=797)	Others (n=783)	Radiation (n=14)	Statistic	P	Standardized mean difference	Total (n=28)	Others (n=14)	Radiation (n=14)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.359$	0.55					-	>0.99	
I/II	461 (57.84)	454 (57.98)	7 (50.00)			-0.160	14 (50)	7 (50.00)	7 (50.00)			0.000
III/IV	336 (42.16)	329 (42.02)	7 (50.00)			0.160	14 (50)	7 (50.00)	7 (50.00)			0.000
Histologic type, n (%)				$\chi^2=0.181$	0.67					-	>0.99	
Adenocarcinoma	634 (79.55)	624 (79.69)	10 (71.43)			-0.183	20 (71.43)	10 (71.43)	10 (71.43)			0.000
Others	163 (20.45)	159 (20.31)	4 (28.57)			0.183	8 (28.57)	4 (28.57)	4 (28.57)			0.000
N stage, n (%)				$\chi^2=0.411$	0.81					-	>0.99	
N0	16 (2.01)	16 (2.04)	0 (0.00)			-0.146						
N1	411 (51.57)	403 (51.47)	8 (57.14)			0.115	16 (57.14)	8 (57.14)	8 (57.14)			0.000
N2	370 (46.42)	364 (46.49)	6 (42.86)			-0.073	12 (42.86)	6 (42.86)	6 (42.86)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=3.328$	0.07					-	>0.99	
Negative	420 (52.7)	416 (53.13)	4 (28.57)			-0.544	8 (28.57)	4 (28.57)	4 (28.57)			0.000
Positive	377 (47.3)	367 (46.87)	10 (71.43)			0.544	20 (71.43)	10 (71.43)	10 (71.43)			0.000
Perineural invasion, n (%)				$\chi^2=0.001$	0.97					-	>0.99	
No	601 (75.41)	591 (75.48)	10 (71.43)			-0.090	20 (71.43)	10 (71.43)	10 (71.43)			0.000
Yes	196 (24.59)	192 (24.52)	4 (28.57)			0.090	8 (28.57)	4 (28.57)	4 (28.57)			0.000
Tumor deposits, n (%)				$\chi^2=0.000$	>0.99					-	>0.99	
No	554 (69.51)	544 (69.48)	10 (71.43)			0.043	20 (71.43)	10 (71.43)	10 (71.43)			0.000
Yes	243 (30.49)	239 (30.52)	4 (28.57)			-0.043	8 (28.57)	4 (28.57)	4 (28.57)			0.000
Chemotherapy, n (%)				$\chi^2=1.339$	0.25					-	>0.99	
Yes	683(85.7)	669(85.44)	14(100.00)			0.416	28(100.00)	14(100.00)	14(100.00)			0.000
Others	114(14.3)	114(14.3)	0(0.00)			-0.416	0(0.00)	0(0.00)	0(0.00)			0.000

Baseline characteristics of the cancer-specific survival study on the right-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=797)	Chemotherapy (n=683)	Others (n=114)	Statistic	P	Standardized mean difference	Total (n=224)	Chemotherapy (n=112)	Others (n=112)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.393$	0.53					$\chi^2=0.000$	>0.99	
I/II	461 (57.84)	392 (57.39)	69 (60.53)			0.064	138 (61.61)	69 (61.61)	69 (61.61)			0.000
III/IV	336 (42.16)	291 (42.61)	45 (39.47)			-0.064	86 (38.39)	43 (38.39)	43 (38.39)			0.000
Histologic type, n (%)				$\chi^2=0.179$	0.67					$\chi^2=0.000$	>0.99	
Adenocarcinoma	634 (79.55)	545 (79.80)	89 (78.07)			-0.042	178 (79.46)	89 (79.46)	89 (79.46)			0.000
Others	163 (20.45)	138 (20.20)	25 (21.93)			0.042	46 (20.54)	23 (20.54)	23 (20.54)			0.000
N stage, n (%)				$\chi^2=1.571$	0.46					-	>0.99	
N0	16 (2.01)	13 (1.90)	3 (2.63)			0.045	3 (1.34)	1 (0.89)	2 (1.79)			0.067
N1	411 (51.57)	347 (50.81)	64 (56.14)			0.108	127 (56.7)	64 (57.14)	63 (56.25)			-0.018
N2	370 (46.42)	323 (47.29)	47 (41.23)			-0.123	94 (41.96)	47 (41.96)	47 (41.96)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=2.678$	0.10					$\chi^2=0.000$	>0.99	
Negative	420 (52.7)	368 (53.88)	52 (45.61)			-0.166	104 (46.43)	52 (46.43)	52 (46.43)			0.000
Positive	377 (47.3)	315 (46.12)	62 (54.39)			0.166	120 (53.57)	60 (53.57)	60 (53.57)			0.000
Perineural invasion, n (%)				$\chi^2=1.361$	0.24					$\chi^2=0.000$	>0.99	
No	601 (75.41)	520 (76.13)	81 (71.05)			-0.112	162 (72.32)	81 (72.32)	81 (72.32)			0.000
Yes	196 (24.59)	163 (23.87)	33 (28.95)			0.112	62 (27.68)	31 (27.68)	31 (27.68)			0.000
Tumor deposits, n (%)				$\chi^2=0.028$	0.87					$\chi^2=0.000$	>0.99	
No	554 (69.51)	474 (69.40)	80 (70.18)			0.017	156 (69.64)	78 (69.64)	78 (69.64)			0.000
Yes	243 (30.49)	209 (30.60)	34 (29.82)			-0.017	68 (30.36)	34 (30.36)	34 (30.36)			0.000
Radiation, n (%)				$\chi^2=0.028$	0.25					$\chi^2=0.000$	>0.99	
Others	783(98.24)	669(97.95)	114(100.00)			0.156	224(100.00)	112(100.00)	112(100.00)			0.000
Yes	14(1.76)	14(2.05)	0(0.00)			-0.156	0(0.00)	0(0.00)	0(0.00)			0.000

Baseline characteristics of the overall survival study on the right-sided and high-risk group for radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=794)	Others (n=779)	Radiation (n=15)	Statistic	P	Standardized mean difference	Total (n=30)	Others(n=15)	Radiation (n=15)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.640$	0.42					-	>0.99	
I/II	451 (56.8)	444 (57.00)	7 (46.67)			-0.207	14 (46.67)	7 (46.67)	7 (46.67)			0.000
III/IV	343 (43.2)	335 (43.00)	8 (53.33)			0.207	16 (53.33)	8 (53.33)	8 (53.33)			0.000
N stage, n (%)				$\chi^2=0.360$	0.84					-	>0.99	
N0	16 (2.02)	16 (2.05)	0 (0.00)			-0.146						
N1	394 (49.62)	386 (49.55)	8 (53.33)			0.076	16 (53.33)	8 (53.33)	8 (53.33)			0.000
N2	384 (48.36)	377 (48.40)	7 (46.67)			-0.035	14 (46.67)	7 (46.67)	7 (46.67)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=2.023$	0.16					-	>0.99	
Negative	409 (51.51)	404 (51.86)	5 (33.33)			-0.393	10 (33.33)	5 (33.33)	5 (33.33)			0.000
Positive	385 (48.49)	375 (48.14)	10 (66.67)			0.393	20 (66.67)	10 (66.67)	10 (66.67)			0.000
Perineural invasion, n (%)				$\chi^2=0.000$	>0.99					-	>0.99	
No	590 (74.31)	579 (74.33)	11 (73.33)			-0.022	22 (73.33)	11 (73.33)	11 (73.33)			0.000
Yes	204 (25.69)	200 (25.67)	4 (26.67)			0.022	8 (26.67)	4 (26.67)	4 (26.67)			0.000
Tumor deposits, n (%)				$\chi^2=0.039$	0.84					-	>0.99	
No	537 (67.63)	526 (67.52)	11 (73.33)			0.131	22 (73.33)	11 (73.33)	11 (73.33)			0.000
Yes	257 (32.37)	253 (32.48)	4 (26.67)			-0.131	8 (26.67)	4 (26.67)	4 (26.67)			0.000
Chemotherapy, n (%)				$\chi^2=1.678$	0.20					-	>0.99	
Yes	673(84.76)	658(84.47)	15(100.00)			0.433	30(100.00)	15(100.00)	15(100.00)			0.000
Others	121(15.24)	121(15.53)	0(0.00)			-0.433	0(0.00)	0(0.00)	0(0.00)			0.000

Baseline characteristics of the overall survival study on the right-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=794)	Chemotherapy (n=673)	Others (n=121)	Statistic	P	Standardized mean difference	Total (n=240)	Chemotherapy (n=120)	Others (n=120)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=1.104$	0.29					$\chi^2=0.000$	>0.99	
I/II	451 (56.8)	377 (56.02)	74 (61.16)			0.105	146 (60.83)	73 (60.83)	73 (60.83)			0.000
III/IV	343 (43.2)	296 (43.98)	47 (38.84)			-0.105	94 (39.17)	47 (39.17)	47 (39.17)			0.000
N stage, n (%)				$\chi^2=5.336$	0.07					-	>0.99	
N0	16 (2.02)	11 (1.63)	5 (4.13)			0.125	8 (3.33)	4 (3.33)	4 (3.33)			0.000
N1	394 (49.62)	328 (48.74)	66 (54.55)			0.117	132 (55)	66 (55.00)	66 (55.00)			0.000
N2	384 (48.36)	334 (49.63)	50 (41.32)			-0.169	100 (41.67)	50 (41.67)	50 (41.67)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=2.097$	0.15					$\chi^2=0.000$	>0.99	
Negative	409 (51.51)	354 (52.60)	55 (45.45)			-0.144	110 (45.83)	55 (45.83)	55 (45.83)			0.000
Positive	385 (48.49)	319 (47.40)	66 (54.55)			0.144	130 (54.17)	65 (54.17)	65 (54.17)			0.000
Perineural invasion, n (%)				$\chi^2=1.232$	0.27					$\chi^2=0.000$	>0.99	
No	590 (74.31)	505 (75.04)	85 (70.25)			-0.105	168 (70)	84 (70.00)	84 (70.00)			0.000
Yes	204 (25.69)	168 (24.96)	36 (29.75)			0.105	72 (30)	36 (30.00)	36 (30.00)			0.000
Tumor deposits, n (%)				$\chi^2=0.031$	0.86					$\chi^2=0.019$	0.89	
No	537 (67.63)	456 (67.76)	81 (66.94)			-0.017	163 (67.92)	82 (68.33)	81 (67.50)			-0.018
Yes	257 (32.37)	217 (32.24)	40 (33.06)			0.017	77 (32.08)	38 (31.67)	39 (32.50)			0.018
Radiation, n (%)				$\chi^2=1.678$	0.20					$\chi^2=0.000$	>0.99	
Others	779(98.11)	658(97.77)	121(100.00)			0.164	240(100.00)	120(100.00)	120(100.00)			0.000
Yes	15(1.89)	15(2.23)	0(0.00)			-0.164	0(0.00)	0(0.00)	0(0.00)			0.000

Baseline characteristics of the cancer-specific survival study on the left-sided and low-risk group for radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,165)	Others (n=1,134)	Radiation(n=31)	Statistic	P	Standardized mean difference	Total (n=62)	Others (n=31)	Radiation (n=31)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=0.453$	0.50					$\chi^2=0.000$	>0.99	
White	962 (82.58)	935 (82.45)	27 (87.10)			0.139	53 (85.48)	26 (83.87)	27 (87.10)			0.096
Others	203 (17.42)	199 (17.55)	4 (12.90)			-0.139	9 (14.52)	5 (16.13)	4 (12.90)			-0.096
Grade, n (%)				$\chi^2=0.096$	0.76					$\chi^2=0.000$	>0.99	
I/II	1,087 (93.3)	1,059 (93.39)	28 (90.32)			-0.104	56 (90.32)	28 (90.32)	28 (90.32)			0.000
III/IV	78 (6.7)	75 (6.61)	3 (9.68)			0.104	6 (9.68)	3 (9.68)	3 (9.68)			0.000
T stage, n (%)				$\chi^2=0.057$	0.81					$\chi^2=0.000$	>0.99	
I/II	148 (12.7)	145 (12.79)	3 (9.68)			-0.105	6 (9.68)	3 (9.68)	3 (9.68)			0.000
III/IV	1,017 (87.3)	989 (87.21)	28 (90.32)			0.105	56 (90.32)	28 (90.32)	28 (90.32)			0.000
N stage, n (%)				$\chi^2=0.614$	0.74					-	>0.99	
N0	704 (60.43)	684 (60.32)	20 (64.52)			0.088	40 (64.52)	20 (64.52)	20 (64.52)			0.000
N1	337 (28.93)	328 (28.92)	9 (29.03)			0.002	19 (30.65)	10 (32.26)	9 (29.03)			-0.071
N2	124 (10.64)	122 (10.76)	2 (6.45)			-0.175	3 (4.84)	1 (3.23)	2 (6.45)			0.131
Carcinoembryonic antigen level, n (%)				$\chi^2=0.323$	0.57					$\chi^2=0.000$	>0.99	
Negative	971 (83.35)	944 (83.25)	27 (87.10)			0.115	55 (88.71)	28 (90.32)	27 (87.10)			-0.096
Positive	194 (16.65)	190 (16.75)	4 (12.90)			-0.115	7 (11.29)	3 (9.68)	4 (12.90)			0.096
Perineural invasion, n (%)				$\chi^2=0.968$	0.33					$\chi^2=0.000$	>0.99	
No	1,113 (95.54)	1,085 (95.68)	28 (90.32)			-0.181	56 (90.32)	28 (90.32)	28 (90.32)			0.000
Yes	52 (4.46)	49 (4.32)	3 (9.68)			0.181	6 (9.68)	3 (9.68)	3 (9.68)			0.000
Tumor deposits, n (%)				$\chi^2=0.135$	0.71					$\chi^2=0.000$	>0.99	
No	1,090 (93.56)	1,060 (93.47)	30 (96.77)			0.187	59 (95.16)	29 (93.55)	30 (96.77)			0.183
Yes	75 (6.44)	74 (6.53)	1 (3.23)			-0.187	3 (4.84)	2 (6.45)	1 (3.23)			-0.183
Tumor size, n (%)				$\chi^2=1.886$	0.17					$\chi^2=0.000$	>0.99	
<79mm	1,099 (94.33)	1,072 (94.53)	27 (87.10)			-0.222	54 (87.1)	27 (87.10)	27 (87.10)			0.000
≥79mm	66 (5.67)	62 (5.47)	4 (12.90)			0.222	8 (12.9)	4 (12.90)	4 (12.90)			0.000
Chemotherapy, n (%)				$\chi^2=17.040$	<0.001					$\chi^2=0.000$	>0.99	
Others	453 (38.88)	452 (39.86)	1 (3.23)			-2.073	2 (3.23)	1 (3.23)	1 (3.23)			0.000
Yes	712 (61.12)	682 (60.14)	30 (96.77)			2.073	60 (96.77)	30 (96.77)	30 (96.77)			0.000

Baseline characteristics of the cancer-specific survival study on the left-sided and low-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,165)	Others (n=453)	Chemotherapy (n=712)	Statistic	P	Standardized mean difference	Total (n=616)	Others (n=308)	Chemotherapy (n=308)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=36.374$	<0.001					$\chi^2=0.188$	0.67	
White	962 (82.58)	336 (74.17)	626 (87.92)			0.422	514 (83.44)	259 (84.09)	255 (82.79)			-0.034
Others	203 (17.42)	117 (25.83)	86 (12.08)			-0.422	102 (16.56)	49 (15.91)	53 (17.21)			0.034
Grade, n (%)				$\chi^2=0.641$	0.42					$\chi^2=0.021$	0.88	
I/II	1,087 (93.3)	426 (94.04)	661 (92.84)			-0.047	565 (91.72)	283 (91.88)	282 (91.56)			-0.012
III/IV	78 (6.7)	27 (5.96)	51 (7.16)			0.047	51 (8.28)	25 (8.12)	26 (8.44)			0.012
T stage, n (%)				$\chi^2=61.768$	<0.001					$\chi^2=0.161$	0.69	
I/II	148 (12.7)	14 (3.09)	134 (18.82)			0.402	26 (4.22)	14 (4.55)	12 (3.90)			-0.034
III/IV	1,017 (87.3)	439 (96.91)	578 (81.18)			-0.402	590 (95.78)	294 (95.45)	296 (96.10)			0.034
N stage, n (%)				$\chi^2=252.949$	<0.001					$\chi^2=0.070$	0.97	
N0	704 (60.43)	403 (88.96)	301 (42.28)			-0.945	518 (84.09)	258 (83.77)	260 (84.42)			0.018
N1	337 (28.93)	33 (7.28)	304 (42.70)			0.716	64 (10.39)	33 (10.71)	31 (10.06)			-0.022
N2	124 (10.64)	17 (3.75)	107 (15.03)			0.316	34 (5.52)	17 (5.52)	17 (5.52)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=9.962$	0.002					$\chi^2=0.009$	0.93	
Negative	971 (83.35)	358 (79.03)	613 (86.10)			0.204	469 (76.14)	235 (76.30)	234 (75.97)			-0.008
Positive	194 (16.65)	95 (20.97)	99 (13.90)			-0.204	147 (23.86)	73 (23.70)	74 (24.03)			0.008
Perineural invasion, n (%)				$\chi^2=5.723$	0.02					$\chi^2=0.000$	>0.99	
No	1,113 (95.54)	441 (97.35)	672 (94.38)			-0.129	592 (96.1)	296 (96.10)	296 (96.10)			0.000
Yes	52 (4.46)	12 (2.65)	40 (5.62)			0.129	24 (3.9)	12 (3.90)	12 (3.90)			0.000
Tumor deposits, n (%)				$\chi^2=29.456$	<0.001					$\chi^2=0.000$	>0.99	
No	1,090 (93.56)	446 (98.45)	644 (90.45)			-0.272	609 (98.86)	304 (98.70)	305 (99.03)			0.033
Yes	75 (6.44)	7 (1.55)	68 (9.55)			0.272	7 (1.14)	4 (1.30)	3 (0.97)			-0.033
Tumor size, n (%)				$\chi^2=0.752$	0.39					$\chi^2=0.019$	0.89	
<79mm	1,099 (94.33)	424 (93.60)	675 (94.80)			0.054	559 (90.75)	280 (90.91)	279 (90.58)			-0.011
≥79mm	66 (5.67)	29 (6.40)	37 (5.20)			-0.054	57 (9.25)	28 (9.09)	29 (9.42)			0.011
Radiation, n (%)				$\chi^2=17.040$	<0.001					$\chi^2=0.252$	0.62	
Others	1,134 (97.34)	452 (99.78)	682 (95.79)			-0.199	612 (99.35)	307 (99.68)	305 (99.03)			-0.066
Yes	31 (2.66)	1 (0.22)	30 (4.21)			0.199	4 (0.65)	1 (0.32)	3 (0.97)			0.066

Baseline characteristics of the overall survival study on the left-sided and low-risk group for Radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,086)	Others (n=1,057)	Radiation (n=29)	Statistic	P	Standardized mean difference	Total (n=58)	Others (n=29)	Radiation (n=29)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=0.842$	0.36					$\chi^2=0.000$	>0.99	
Others	158 (14.55)	156 (14.76)	2 (6.90)			-0.310	4 (6.9)	2 (6.90)	2 (6.90)			0.000
White	928 (85.45)	901 (85.24)	27 (93.10)			0.310	54 (93.1)	27 (93.10)	27 (93.10)			0.000
Grade, n (%)				$\chi^2=0.000$	>0.99					$\chi^2=0.000$	>0.99	
I/II	1,016 (93.55)	989 (93.57)	27 (93.10)			-0.018	54 (93.1)	27 (93.10)	27 (93.10)			0.000
III/IV	70 (6.45)	68 (6.43)	2 (6.90)			0.018	4 (6.9)	2 (6.90)	2 (6.90)			0.000
Histologic type, n (%)				-	0.57					$\chi^2=0.000$	>0.99	
Adenocarcinoma	1,055 (97.15)	1,027 (97.16)	28 (96.55)			-0.033	56 (96.55)	28 (96.55)	28 (96.55)			0.000
Others	31 (2.85)	30 (2.84)	1 (3.45)			0.033	2 (3.45)	1 (3.45)	1 (3.45)			0.000
N stage, n (%)				$\chi^2=1.441$	0.49					-	>0.99	
N0	705 (64.92)	685 (64.81)	20 (68.97)			0.090	40 (68.97)	20 (68.97)	20 (68.97)			0.000
N1	272 (25.05)	264 (24.98)	8 (27.59)			0.058	16 (27.59)	8 (27.59)	8 (27.59)			0.000
N2	109 (10.04)	108 (10.22)	1 (3.45)			-0.371	2 (3.45)	1 (3.45)	1 (3.45)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=0.422$	0.52					$\chi^2=0.000$	>0.99	
Negative	907 (83.52)	881 (83.35)	26 (89.66)			0.207	52 (89.66)	26 (89.66)	26 (89.66)			0.000
Positive	179 (16.48)	176 (16.65)	3 (10.34)			-0.207	6 (10.34)	3 (10.34)	3 (10.34)			0.000
Perineural invasion, n (%)				$\chi^2=1.926$	0.17					$\chi^2=0.000$	>0.99	
No	1,045 (96.22)	1,019 (96.40)	26 (89.66)			-0.222	52 (89.66)	26 (89.66)	26 (89.66)			0.000
Yes	41 (3.78)	38 (3.60)	3 (10.34)			0.222	6 (10.34)	3 (10.34)	3 (10.34)			0.000
Tumor deposits, n (%)				$\chi^2=0.035$	0.85					$\chi^2=0.000$	>0.99	
No	1,021 (94.01)	993 (93.95)	28 (96.55)			0.143	56 (96.55)	28 (96.55)	28 (96.55)			0.000
Yes	65 (5.99)	64 (6.05)	1 (3.45)			-0.143	2 (3.45)	1 (3.45)	1 (3.45)			0.000
Tumor size, n (%)				$\chi^2=2.239$	0.14					$\chi^2=0.000$	>0.99	
<79mm	1,024 (94.29)	999 (94.51)	25 (86.21)			-0.241	50 (86.21)	25 (86.21)	25 (86.21)			0.000
≥79mm	62 (5.71)	58 (5.49)	4 (13.79)			0.241	8 (13.79)	4 (13.79)	4 (13.79)			0.000
T stage, n (%)				$\chi^2=0.226$	0.64					$\chi^2=0.000$	>0.99	
T1/T2	81 (7.46)	80 (7.57)	1 (3.45)			-0.226	2 (3.45)	1 (3.45)	1 (3.45)			0.000
T3/T4	1,005 (92.54)	977 (92.43)	28 (96.55)			0.226	56 (96.55)	28 (96.55)	28 (96.55)			0.000
Chemotherapy, n (%)				$\chi^2=17.719$	<0.001					$\chi^2=0.000$	>0.99	
Others	450 (41.44)	449 (42.48)	1 (3.45)			-2.139	2 (3.45)	1 (3.45)	1 (3.45)			0.000
Yes	636 (58.56)	608 (57.52)	28 (96.55)			2.139	56 (96.55)	28 (96.55)	28 (96.55)			0.000

Baseline characteristics of the overall survival study on the left-sided and low-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,086)	Others(n=450)	Chemotherapy (n=636)	Statistic	P	Standardized mean difference	Total (n=606)	Others (n=303)	Chemotherapy (n=303)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=60.524$	<0.001					$\chi^2=0.323$	0.57	
Others	158 (14.55)	110 (24.44)	48 (7.55)			-0.640	91 (15.02)	43 (14.19)	48 (15.84)			0.045
White	928 (85.45)	340 (75.56)	588 (92.45)			0.640	515 (84.98)	260 (85.81)	255 (84.16)			-0.045
Grade, n (%)				$\chi^2=0.064$	0.80					$\chi^2=0.349$	0.56	
I/II	1,016 (93.55)	422 (93.78)	594 (93.40)			-0.015	556 (91.75)	276 (91.09)	280 (92.41)			0.050
III/IV	70 (6.45)	28 (6.22)	42 (6.60)			0.015	50 (8.25)	27 (8.91)	23 (7.59)			-0.050
Histologic type, n (%)				$\chi^2=5.183$	0.02					$\chi^2=0.407$	0.52	
Adenocarcinoma	1,055 (97.15)	431 (95.78)	624 (98.11)			0.172	583 (96.2)	290 (95.71)	293 (96.70)			0.055
Others	31 (2.85)	19 (4.22)	12 (1.89)			-0.172	23 (3.8)	13 (4.29)	10 (3.30)			-0.055
N stage, n (%)				$\chi^2=209.305$	<0.001					$\chi^2=8.052$	0.06	
N0	705 (64.92)	404 (89.78)	301 (47.33)			-0.850	515 (84.98)	257 (84.82)	258 (85.15)			0.009
N1	272 (25.05)	29 (6.44)	243 (38.21)			0.654	44 (7.26)	29 (9.57)	15 (4.95)			-0.213
N2	109 (10.04)	17 (3.78)	92 (14.47)			0.304	47 (7.76)	17 (5.61)	30 (9.90)			0.144
Carcinoembryonic antigen level, n (%)				$\chi^2=11.959$	<0.001					$\chi^2=0.078$	0.78	
Negative	907 (83.52)	355 (78.89)	552 (86.79)			0.233	451 (74.42)	227 (74.92)	224 (73.93)			-0.023
Positive	179 (16.48)	95 (21.11)	84 (13.21)			-0.233	155 (25.58)	76 (25.08)	79 (26.07)			0.023
Perineural invasion, n (%)				$\chi^2=1.662$	0.20					$\chi^2=0.326$	0.57	
No	1,045 (96.22)	437 (97.11)	608 (95.60)			-0.074	577 (95.21)	290 (95.71)	287 (94.72)			-0.044
Yes	41 (3.78)	13 (2.89)	28 (4.40)			0.074	29 (4.79)	13 (4.29)	16 (5.28)			0.044
Tumor deposits, n (%)				$\chi^2=26.795$	<0.001					$\chi^2=0.079$	0.78	
No	1,021 (94.01)	443 (98.44)	578 (90.88)			-0.263	593 (97.85)	297 (98.02)	296 (97.69)			-0.022
Yes	65 (5.99)	7 (1.56)	58 (9.12)			0.263	13 (2.15)	6 (1.98)	7 (2.31)			0.022
Tumor size, n (%)				$\chi^2=0.007$	0.94					$\chi^2=0.376$	0.54	
<79mm	1,024 (94.29)	424 (94.22)	600 (94.34)			0.005	560 (92.41)	278 (91.75)	282 (93.07)			0.052
≥79mm	62 (5.71)	26 (5.78)	36 (5.66)			-0.005	46 (7.59)	25 (8.25)	21 (6.93)			-0.052
T stage, n (%)				$\chi^2=23.247$	<0.001					$\chi^2=1.233$	0.27	
T1/T2	81 (7.46)	13 (2.89)	68 (10.69)			0.253	21 (3.47)	13 (4.29)	8 (2.64)			-0.103
T3/T4	1,005 (92.54)	437 (97.11)	568 (89.31)			-0.253	585 (96.53)	290 (95.71)	295 (97.36)			0.103
Radiation, n (%)				$\chi^2=17.719$	<0.001					$\chi^2=0.807$	0.37	
Others	1,057 (97.33)	449 (99.78)	608 (95.60)			-0.204	601 (99.17)	302 (99.67)	299 (98.68)			-0.087
Yes	29 (2.67)	1 (0.22)	28 (4.40)			0.20	5 (0.83)	1 (0.33)	4 (1.32)			0.087

Baseline characteristics of the cancer-specific survival study on the left-sided and high-risk group for radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=965)	Others (n=928)	Radiation (n=37)	Statistic	P	Standardized mean difference	Total (n=72)	Others (n=36)	Radiation (n=36)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=0.534$	0.47					$\chi^2=0.000$	>0.99	
White	628 (65.08)	606 (65.30)	22 (59.46)			-0.119	42 (58.33)	21 (58.33)	21 (58.33)			0.000
Others	337 (34.92)	322 (34.70)	15 (40.54)			0.119	30 (41.67)	15 (41.67)	15 (41.67)			0.000
Grade, n (%)				$\chi^2=0.277$	0.60					$\chi^2=0.071$	0.79	
I/II	714 (73.99)	688 (74.14)	26 (70.27)			-0.085	53 (73.61)	27 (75.00)	26 (72.22)			-0.062
III/IV	251 (26.01)	240 (25.86)	11 (29.73)			0.085	19 (26.39)	9 (25.00)	10 (27.78)			0.062
N stage, n (%)				$\chi^2=1.457$	0.48					-	>0.99	
N0	81 (8.39)	76 (8.19)	5 (13.51)			0.156	9 (12.5)	4 (11.11)	5 (13.89)			0.080
N1	472 (48.91)	456 (49.14)	16 (43.24)			-0.119	32 (44.44)	16 (44.44)	16 (44.44)			0.000
N2	412 (42.69)	396 (42.67)	16 (43.24)			0.012	31 (43.06)	16 (44.44)	15 (41.67)			-0.056
Carcinoembryonic antigen level, n (%)				$\chi^2=0.543$	0.46					$\chi^2=0.000$	>0.99	
Negative	422 (43.73)	408 (43.97)	14 (37.84)			-0.126	28 (38.89)	14 (38.89)	14 (38.89)			0.000
Positive	543 (56.27)	520 (56.03)	23 (62.16)			0.126	44 (61.11)	22 (61.11)	22 (61.11)			0.000
Perineural invasion, n (%)				$\chi^2=2.311$	0.13					$\chi^2=0.000$	>0.99	
No	645 (66.84)	616 (66.38)	29 (78.38)			0.291	56 (77.78)	28 (77.78)	28 (77.78)			0.000
Yes	320 (33.16)	312 (33.62)	8 (21.62)			-0.291	16 (22.22)	8 (22.22)	8 (22.22)			0.000
Tumor deposits, n (%)				$\chi^2=0.155$	0.69					$\chi^2=0.000$	>0.99	
No	680 (70.47)	655 (70.58)	25 (67.57)			-0.064	48 (66.67)	24 (66.67)	24 (66.67)			0.000
Yes	285 (29.53)	273 (29.42)	12 (32.43)			0.064	24 (33.33)	12 (33.33)	12 (33.33)			0.000
Tumor size, n (%)				$\chi^2=1.564$	0.21					$\chi^2=0.077$	0.78	
<79mm	803 (83.21)	775 (83.51)	28 (75.68)			-0.183	55 (76.39)	27 (75.00)	28 (77.78)			0.067
≥79mm	162 (16.79)	153 (16.49)	9 (24.32)			0.183	17 (23.61)	9 (25.00)	8 (22.22)			-0.067
T stage, n (%)				-	>0.99					$\chi^2=0.000$	>0.99	
I/II	3(0.31)	3(0.32)	0(0.00)			-0.058	0(0.00)	0(0.00)	0(0.00)			0.000
III/IV	962(99.69)	925(99.68)	37(100.00)			0.058	72(100.00)	36(100.00)	36(100.00)			0.000
Chemotherapy, n (%)				$\chi^2=6.258$	0.01					$\chi^2=0.000$	>0.99	
Others	135(13.99)	135(14.55)	0(0.00)			-0.421	0(0.00)	0(0.00)	0(0.00)			0.000
Yes	830(86.01)	793(85.45)	37(100.00)			0.421	72(100.00)	36(100.00)	36(100.00)			0.000

Baseline characteristics of the cancer-specific survival study on the left-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=965)	Others(n=135)	Chemotherapy (n=830)	Statistic	P	Standardized mean difference	Total (n=264)	Others (n=132)	Chemotherapy (n=132)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=3.680$	0.055					$\chi^2=4.983$	0.09	
White	628 (65.08)	78 (57.78)	550 (66.27)			0.180	181 (68.56)	78 (59.09)	103 (78.03)			0.457
Others	337 (34.92)	57 (42.22)	280 (33.73)			-0.180	83 (31.44)	54 (40.91)	29 (21.97)			-0.457
Grade, n (%)				$\chi^2=0.035$	0.85					$\chi^2=0.296$	0.59	
I/II	714 (73.99)	99 (73.33)	615 (74.10)			0.017	188 (71.21)	96 (72.73)	92 (69.70)			-0.066
III/IV	251 (26.01)	36 (26.67)	215 (25.90)			-0.017	76 (28.79)	36 (27.27)	40 (30.30)			0.066
T stage, n (%)				-	0.36					$\chi^2=0.000$	>0.99	
I/II	3 (0.31)	1 (0.74)	2 (0.24)			-0.102	2 (0.76)	1 (0.76)	1 (0.76)			0.000
III/IV	962 (99.69)	134 (99.26)	828 (99.76)			0.102	262 (99.24)	131 (99.24)	131 (99.24)			0.000
N stage, n (%)				$\chi^2=75.012$	<0.001					$\chi^2=8.167$	0.08	
N0	81 (8.39)	37 (27.41)	44 (5.30)			-0.987	68 (25.76)	34 (25.76)	34 (25.76)			0.000
N1	472 (48.91)	58 (42.96)	414 (49.88)			0.138	96 (36.36)	58 (43.94)	38 (28.79)			-0.335
N2	412 (42.69)	40 (29.63)	372 (44.82)			0.305	100 (37.88)	40 (30.30)	60 (45.45)			0.304
Carcinoembryonic antigen level, n (%)				$\chi^2=1.275$	0.26					$\chi^2=3.304$	0.07	
Negative	422 (43.73)	53 (39.26)	369 (44.46)			0.105	90 (34.09)	52 (39.39)	38 (28.79)			-0.234
Positive	543 (56.27)	82 (60.74)	461 (55.54)			-0.105	174 (65.91)	80 (60.61)	94 (71.21)			0.234
Perineural invasion, n (%)				$\chi^2=2.344$	0.13					$\chi^2=0.177$	0.67	
No	645 (66.84)	98 (72.59)	547 (65.90)			-0.141	195 (73.86)	96 (72.73)	99 (75.00)			0.052
Yes	320 (33.16)	37 (27.41)	283 (34.10)			0.141	69 (26.14)	36 (27.27)	33 (25.00)			-0.052
Tumor deposits, n (%)				$\chi^2=1.953$	0.16					$\chi^2=2.856$	0.09	
No	680 (70.47)	102 (75.56)	578 (69.64)			-0.129	211 (79.92)	100 (75.76)	111 (84.09)			0.228
Yes	285 (29.53)	33 (24.44)	252 (30.36)			0.129	53 (20.08)	32 (24.24)	21 (15.91)			-0.228
Tumor size, n (%)				$\chi^2=30.760$	<0.001					$\chi^2=0.424$	0.52	
<79mm	803 (83.21)	90 (66.67)	713 (85.90)			0.553	175 (66.29)	90 (68.18)	85 (64.39)			-0.079
≥79mm	162 (16.79)	45 (33.33)	117 (14.10)			-0.553	89 (33.71)	42 (31.82)	47 (35.61)			0.079
Radiation, n (%)				$\chi^2=6.258$	0.01					$\chi^2=0.000$	>0.99	
Others	928(96.17)	135(100.00)	793(95.54)			-0.216	264(100.00)	132(100.00)	132(100.00)			0.00
Yes	37(3.83)	0(0.00)	37(4.46)			0.216	0(0.00)	0(0.00)	0(0.00)			0.00

Baseline characteristics of the overall survival study on the left-sided and high-risk group for radiation

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,078)	Others (n=1,037)	Radiation (n=41)	Statistic	P	Standardized mean difference	Total (n=82)	Others (n=41)	Radiation (n=41)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=0.444$	0.51					$\chi^2=0.050$	0.82	
Others	684 (63.45)	660 (63.65)	24 (58.54)			-0.104	47 (57.32)	23 (56.10)	24 (58.54)			0.050
White	394 (36.55)	377 (36.35)	17 (41.46)			0.104	35 (42.68)	18 (43.90)	17 (41.46)			-0.050
Grade, n (%)				$\chi^2=0.463$	0.50					$\chi^2=0.248$	0.62	
I/II	811 (75.23)	782 (75.41)	29 (70.73)			-0.103	60 (73.17)	31 (75.61)	29 (70.73)			-0.107
III/IV	267 (24.77)	255 (24.59)	12 (29.27)			0.103	22 (26.83)	10 (24.39)	12 (29.27)			0.107
Histologic type, n (%)				$\chi^2=0.000$	>0.99					$\chi^2=0.000$	>0.99	
Adenocarcinoma	964 (89.42)	927 (89.39)	37 (90.24)			0.029	73 (89.02)	36 (87.80)	37 (90.24)			0.082
Others	114 (10.58)	110 (10.61)	4 (9.76)			-0.029	9 (10.98)	5 (12.20)	4 (9.76)			-0.082
N stage, n (%)				$\chi^2=2.067$	0.36					$\chi^2=0.107$	0.95	
N0	95 (8.81)	89 (8.58)	6 (14.63)			0.171	13 (15.85)	7 (17.07)	6 (14.63)			-0.069
N1	549 (50.93)	531 (51.21)	18 (43.90)			-0.147	36 (43.9)	18 (43.90)	18 (43.90)			0.000
N2	434 (40.26)	417 (40.21)	17 (41.46)			0.025	33 (40.24)	16 (39.02)	17 (41.46)			0.050
Carcinoembryonic antigen level, n (%)				$\chi^2=1.072$	0.30					$\chi^2=0.051$	0.82	
Negative	506 (46.94)	490 (47.25)	16 (39.02)			-0.169	33 (40.24)	17 (41.46)	16 (39.02)			-0.050
Positive	572 (53.06)	547 (52.75)	25 (60.98)			0.169	49 (59.76)	24 (58.54)	25 (60.98)			0.050
Perineural invasion, n (%)				$\chi^2=2.777$	0.10					$\chi^2=0.082$	0.78	
No	740 (68.65)	707 (68.18)	33 (80.49)			0.311	67 (81.71)	34 (82.93)	33 (80.49)			-0.062
Yes	338 (31.35)	330 (31.82)	8 (19.51)			-0.311	15 (18.29)	7 (17.07)	8 (19.51)			0.062
Tumor deposits, n (%)				$\chi^2=0.044$	0.83					$\chi^2=0.058$	0.81	
No	778 (72.17)	749 (72.23)	29 (70.73)			-0.033	57 (69.51)	28 (68.29)	29 (70.73)			0.054
Yes	300 (27.83)	288 (27.77)	12 (29.27)			0.033	25 (30.49)	13 (31.71)	12 (29.27)			-0.054
Tumor size, n (%)				$\chi^2=2.322$	0.13					$\chi^2=0.064$	0.80	
<79mm	907 (84.14)	876 (84.47)	31 (75.61)			-0.206	61 (74.39)	30 (73.17)	31 (75.61)			0.057
≥79mm	171 (15.86)	161 (15.53)	10 (24.39)			0.206	21 (25.61)	11 (26.83)	10 (24.39)			-0.057
T stage, n (%)				$\chi^2=0.000$	>0.99					$\chi^2=0.000$	>0.99	
T1/T2	74 (6.86)	71 (6.85)	3 (7.32)			0.018	5 (6.1)	2 (4.88)	3 (7.32)			0.094
T3/T4	1,004 (93.14)	966 (93.15)	38 (92.68)			-0.018	77 (93.9)	39 (95.12)	38 (92.68)			-0.094
Chemotherapy, n (%)				$\chi^2=6.783$	0.009					$\chi^2=0.000$	>0.99	
Others	148(13.73)	148(14.27)	0(0.00)			-0.416	0(0.00)	0(0.00)	0(0.00)			0.00
Yes	930(86.27)	889(85.73)	41(100.00)			0.416	82(100.00)	41(100.00)	41(100.00)			0.00

Baseline characteristics of the overall survival study on the left-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=1,078)	Others (n=148)	Chemotherapy (n=930)	Statistic	P	Standardized mean difference	Total (n=288)	Others (n=144)	Chemotherapy (n=144)	Statistic	P	Standardized mean difference
Race, n (%)				$\chi^2=4.788$	0.03					$\chi^2=7.995$	0.053	
Others	684 (63.45)	82 (55.41)	602 (64.73)			0.195	185 (64.24)	81 (56.25)	104 (72.22)			0.357
White	394 (36.55)	66 (44.59)	328 (35.27)			-0.195	103 (35.76)	63 (43.75)	40 (27.78)			-0.357
Grade, n (%)				$\chi^2=0.115$	0.73					$\chi^2=0.168$	0.68	
I/II	811 (75.23)	113 (76.35)	698 (75.05)			-0.030	217 (75.35)	110 (76.39)	107 (74.31)			-0.048
III/IV	267 (24.77)	35 (23.65)	232 (24.95)			0.030	71 (24.65)	34 (23.61)	37 (25.69)			0.048
Histologic type, n (%)				$\chi^2=2.369$	0.12					$\chi^2=1.205$	0.27	
Adenocarcinoma	964 (89.42)	127 (85.81)	837 (90.00)			0.140	239 (82.99)	123 (85.42)	116 (80.56)			-0.123
Others	114 (10.58)	21 (14.19)	93 (10.00)			-0.140	49 (17.01)	21 (14.58)	28 (19.44)			0.123
N stage, n (%)				$\chi^2=93.937$	<0.001					$\chi^2=5.527$	0.052	
N0	95 (8.81)	44 (29.73)	51 (5.48)			-1.065	80 (27.78)	40 (27.78)	40 (27.78)			0.000
N1	549 (50.93)	62 (41.89)	487 (52.37)			0.210	88 (30.56)	62 (43.06)	26 (18.06)			-0.650
N2	434 (40.26)	42 (28.38)	392 (42.15)			0.279	120 (41.67)	42 (29.17)	78 (54.17)			0.502
Carcinoembryonic antigen level, n (%)				$\chi^2=0.941$	0.33					$\chi^2=5.262$	0.06	
Negative	506 (46.94)	64 (43.24)	442 (47.53)			0.086	93 (32.29)	62 (43.06)	31 (21.53)			-0.524
Positive	572 (53.06)	84 (56.76)	488 (52.47)			-0.086	195 (67.71)	82 (56.94)	113 (78.47)			0.524
Perineural invasion, n (%)				$\chi^2=2.570$	0.11					$\chi^2=1.091$	0.30	
No	740 (68.65)	110 (74.32)	630 (67.74)			-0.141	206 (71.53)	107 (74.31)	99 (68.75)			-0.120
Yes	338 (31.35)	38 (25.68)	300 (32.26)			0.141	82 (28.47)	37 (25.69)	45 (31.25)			0.120
Tumor deposits, n (%)				$\chi^2=2.014$	0.16					$\chi^2=2.217$	0.14	
No	778 (72.17)	114 (77.03)	664 (71.40)			-0.125	232 (80.56)	111 (77.08)	121 (84.03)			0.190
Yes	300 (27.83)	34 (22.97)	266 (28.60)			0.125	56 (19.44)	33 (22.92)	23 (15.97)			-0.190
Tumor size, n (%)				$\chi^2=44.453$	<0.001					$\chi^2=0.407$	0.52	
<79mm	907 (84.14)	97 (65.54)	810 (87.10)			0.643	199 (69.1)	97 (67.36)	102 (70.83)			0.076
≥79mm	171 (15.86)	51 (34.46)	120 (12.90)			-0.643	89 (30.9)	47 (32.64)	42 (29.17)			-0.076
T stage, n (%)				$\chi^2=8.156$	0.004					$\chi^2=0.000$	>0.99	
T1/T2	74 (6.86)	2 (1.35)	72 (7.74)			0.239	4 (1.39)	2 (1.39)	2 (1.39)			0.000
T3/T4	1,004 (93.14)	146 (98.65)	858 (92.26)			-0.239	284 (98.61)	142 (98.61)	142 (98.61)			0.000
Radiation, n (%)				$\chi^2=6.783$	0.009					-	>0.99	
Others	1,037 (96.2)	148 (100.00)	889 (95.59)			-0.215	287 (99.65)	144 (100.00)	143 (99.31)			-0.084
Yes	41 (3.8)	0 (0.00)	41 (4.41)			0.215	1 (0.35)	0 (0.00)	1 (0.69)			0.084

Baseline characteristics of the cancer-specific survival study on the right-sided and low-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=494)	Adjuvant chemotherapy (n=487)	Noeoadjuvant chemotherapy (n=7)	Statistic	P	Standardized mean difference	Total (n=14)	Adjuvant chemotherapy (n=7)	Noeoadjuvant chemotherapy (n=7)	Statistic	P	Standardized mean difference
Grade, n (%)				-	>0.99					-	>0.99	
I/II	425 (86.03)	419 (86.04)	6 (85.71)			-0.009	12 (85.71)	6 (85.71)	6 (85.71)			0.000
III/IV	69 (13.97)	68 (13.96)	1 (14.29)			0.009	2 (14.29)	1 (14.29)	1 (14.29)			0.000
Histologic type, n (%)				-	0.13					-	>0.99	
Adenocarcinoma	449 (90.89)	444 (91.17)	5 (71.43)			-0.437	10 (71.43)	5 (71.43)	5 (71.43)			0.000
Others	45 (9.11)	43 (8.83)	2 (28.57)			0.437	4 (28.57)	2 (28.57)	2 (28.57)			0.000
N stage, n (%)				$\chi^2=0.674$	0.41					-	>0.99	
N0	315 (63.77)	309 (63.45)	6 (85.71)			0.636	12 (85.71)	6 (85.71)	6 (85.71)			0.000
N1/N2	179 (36.23)	178 (36.55)	1 (14.29)			-0.636	2 (14.29)	1 (14.29)	1 (14.29)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=3.580$	0.06					-	>0.99	
Negative	390 (78.95)	387 (79.47)	3 (42.86)			-0.740	6 (42.86)	3 (42.86)	3 (42.86)			0.000
Positive	104 (21.05)	100 (20.53)	4 (57.14)			0.740	8 (57.14)	4 (57.14)	4 (57.14)			0.000
Perineural invasion, n (%)				-	>0.99					-	>0.99	
No	471(95.34)	464(95.28)	7(100.00)			0.224	14	7	7			0.000
Yes	23(4.66)	23(4.72)	0(0.00)			-0.224	0	0	0			0.000
Tumor deposits, n (%)					>0.99					-	>0.99	
No	485(98.18)	478(98.15)	7(100.00)			0.138	14	7	7			0.000
Yes	9(1.82)	9(1.85)	0(0.00)			-0.138	0	0	0			0.000
Radiation, n (%)					>0.99					-	>0.99	
Others	482(97.57)	475(97.54)	7(100.00)			0.160	14	7	7			0.000
Yes	12(2.43)	12(2.46)	0(0.00)			-0.160	0	0	0			0.000

Baseline characteristics of the cancer-specific survival study on the right-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=685)	Adjuvant chemotherapy (n=678)	Neoadjuvant chemotherapy (n=7)	Statistic	P	Standardized mean difference	Total (n=14)	Adjuvant chemotherapy (n=7)	Neoadjuvant chemotherapy (n=7)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.157$	0.69					-	>0.99	
I/II	393 (57.37)	390 (57.52)	3 (42.86)			-0.296	6 (42.86)	3 (42.86)	3 (42.86)			0.000
III/IV	292 (42.63)	288 (42.48)	4 (57.14)			0.296	8 (57.14)	4 (57.14)	4 (57.14)			0.000
Histologic type, n (%)				$\chi^2=0.006$	0.94					-	>0.99	
Adenocarcinoma	546 (79.71)	541 (79.79)	5 (71.43)			-0.185	10 (71.43)	5 (71.43)	5 (71.43)			0.000
Others	139 (20.29)	137 (20.21)	2 (28.57)			0.185	4 (28.57)	2 (28.57)	2 (28.57)			0.000
N stage, n (%)				-	0.75					-	>0.99	
N0	13 (1.9)	13 (1.92)	0 (0.00)			-0.141						
N1	348 (50.8)	345 (50.88)	3 (42.86)			-0.162	6 (42.86)	3 (42.86)	3 (42.86)			0.000
N2	324 (47.3)	320 (47.20)	4 (57.14)			0.201	8 (57.14)	4 (57.14)	4 (57.14)			0.000
Perineural invasion, n (%)				$\chi^2=0.000$	>0.99					-	>0.99	
No	521 (76.06)	516 (76.11)	5 (71.43)			-0.104	10 (71.43)	5 (71.43)	5 (71.43)			0.000
Yes	164 (23.94)	162 (23.89)	2 (28.57)			0.104	4 (28.57)	2 (28.57)	2 (28.57)			0.000
Tumor deposits, n (%)				$\chi^2=0.085$	0.77					-	>0.99	
No	475 (69.34)	471 (69.47)	4 (57.14)			-0.249	8 (57.14)	4 (57.14)	4 (57.14)			0.000
Yes	210 (30.66)	207 (30.53)	3 (42.86)			0.249	6 (42.86)	3 (42.86)	3 (42.86)			0.000
Radiation, n (%)				-	0.14					-	>0.99	
Others	671 (97.96)	665 (98.08)	6 (85.71)			-0.353	12 (85.71)	6 (85.71)	6 (85.71)			0.000
Yes	14 (2.04)	13 (1.92)	1 (14.29)			0.353	2 (14.29)	1 (14.29)	1 (14.29)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=6.172$	0.01					-	>0.99	
Negative	368(53.72)	368(54.28)	0(0.00)				0	0	0			0.000
Positive	317(46.28)	310(45.72)	7(100.00)				14	7	7			0.000

Baseline characteristics of the overall survival study on the right-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=675)	Adjuvant therapy after surgery (n=667)	Neoadjuvant therapy before surgery (n=8)	Statistic	P	Standardized mean difference	Total (n=16)	Adjuvant therapy after surgery (n=8)	Neoadjuvant therapy before surgery (n=8)	Statistic	P	Standardized mean difference
Grade, n (%)				$\chi^2=0.493$	0.48					-	>0.99	
I/II	378 (56)	375 (56.22)	3 (37.50)			-0.387	6 (37.5)	3 (37.50)	3 (37.50)			0.000
III/IV	297 (44)	292 (43.78)	5 (62.50)			0.387	10 (62.5)	5 (62.50)	5 (62.50)			0.000
N stage, n (%)				-	0.76					-	>0.99	
N0	11 (1.63)	11 (1.65)	0 (0.00)			-0.130						
N1	329 (48.74)	326 (48.88)	3 (37.50)			-0.235	6 (37.5)	3 (37.50)	3 (37.50)			0.000
N2	335 (49.63)	330 (49.48)	5 (62.50)			0.269	10 (62.5)	5 (62.50)	5 (62.50)			0.000
Carcinoembryonic antigen level, n (%)				$\chi^2=3.685$	0.055					-	>0.99	
Negative	354 (52.44)	353 (52.92)	1 (12.50)			-1.222	2 (12.5)	1 (12.50)	1 (12.50)			0.000
Positive	321 (47.56)	314 (47.08)	7 (87.50)			1.222	14 (87.5)	7 (87.50)	7 (87.50)			0.000
Perineural invasion, n (%)				$\chi^2=0.000$	>0.99					-	>0.99	
No	506 (74.96)	500 (74.96)	6 (75.00)			0.001	12 (75)	6 (75.00)	6 (75.00)			0.000
Yes	169 (25.04)	167 (25.04)	2 (25.00)			-0.001	4 (25)	2 (25.00)	2 (25.00)			0.000
Tumor deposits, n (%)				$\chi^2=0.000$	>0.99					-	>0.99	
No	457 (67.7)	452 (67.77)	5 (62.50)			-0.109	10 (62.5)	5 (62.50)	5 (62.50)			0.000
Yes	218 (32.3)	215 (32.23)	3 (37.50)			0.109	6 (37.5)	3 (37.50)	3 (37.50)			0.000
Radiation, n (%)				-	0.17					-	>0.99	
Others	660 (97.78)	653 (97.90)	7 (87.50)			-0.314	14 (87.5)	7 (87.50)	7 (87.50)			0.000
Yes	15 (2.22)	14 (2.10)	1 (12.50)			0.314	2 (12.5)	1 (12.50)	1 (12.50)			0.000

Baseline characteristics of the cancer-specific survival study on the left-sided and high-risk group for chemotherapy

Variable	Before propensity score matching						After propensity score matching					
	Total (n=830)	Adjuvant chemotherapy (n=819)	Neoadjuvant chemotherapy (n=11)	Statistic	P	Standardized mean difference	Total (n=18)	Adjuvant chemotherapy (n=9)	Neoadjuvant chemotherapy (n=9)	Statistic	P	Standardized mean difference
N stage, n (%)				-	>0.99					-	>0.99	
N0	44 (5.3)	44 (5.37)	0 (0.00)			-0.240						
N1	414 (49.88)	408 (49.82)	6 (54.55)			0.095	11 (61.11)	6 (66.67)	5 (55.56)			-0.224
N2	372 (44.82)	367 (44.81)	5 (45.45)			0.013	7 (38.89)	3 (33.33)	4 (44.44)			0.224
Carcinoembryonic antigen level, n (%)				$\chi^2=0.057$	0.81					-	>0.99	
Negative	369 (44.46)	365 (44.57)	4 (36.36)			-0.171	4 (22.22)	2 (22.22)	2 (22.22)			0.000
Positive	461 (55.54)	454 (55.43)	7 (63.64)			0.171	14 (77.78)	7 (77.78)	7 (77.78)			0.000
Perineural invasion, n (%)				$\chi^2=0.641$	0.42					-	>0.99	
No	547 (65.9)	538 (65.69)	9 (81.82)			0.418	14 (77.78)	7 (77.78)	7 (77.78)			0.000
Yes	283 (34.1)	281 (34.31)	2 (18.18)			-0.418	4 (22.22)	2 (22.22)	2 (22.22)			0.000
Tumor deposits, n (%)				$\chi^2=1.475$	0.23					-	>0.99	
No	578 (69.64)	568 (69.35)	10 (90.91)			0.750	16 (88.89)	8 (88.89)	8 (88.89)			0.000
Yes	252 (30.36)	251 (30.65)	1 (9.09)			-0.750	2 (11.11)	1 (11.11)	1 (11.11)			0.000
Tumor size, n (%)				$\chi^2=0.686$	0.41					-	>0.99	
<79mm	713 (85.9)	705 (86.08)	8 (72.73)			-0.300	12 (66.67)	6 (66.67)	6 (66.67)			0.000
≥79mm	117 (14.1)	114 (13.92)	3 (27.27)			0.300	6 (33.33)	3 (33.33)	3 (33.33)			0.000
Radiation, n (%)				-	<0.001					-	>0.99	
Others	793 (95.54)	788 (96.21)	5 (45.45)			-1.019	10 (55.56)	5 (55.56)	5 (55.56)			0.000
Yes	37 (4.46)	31 (3.79)	6 (54.55)			1.019	8 (44.44)	4 (44.44)	4 (44.44)			0.000
T stage					<0.001					-	>0.99	
I/II	2(0.24)	2(0.04)	0(0.00)	-		-0.050	0	0	0			0.000
III/IV	828(99.76)	817(99.76)	11(100.00)			0.050	18	9	9			0.000

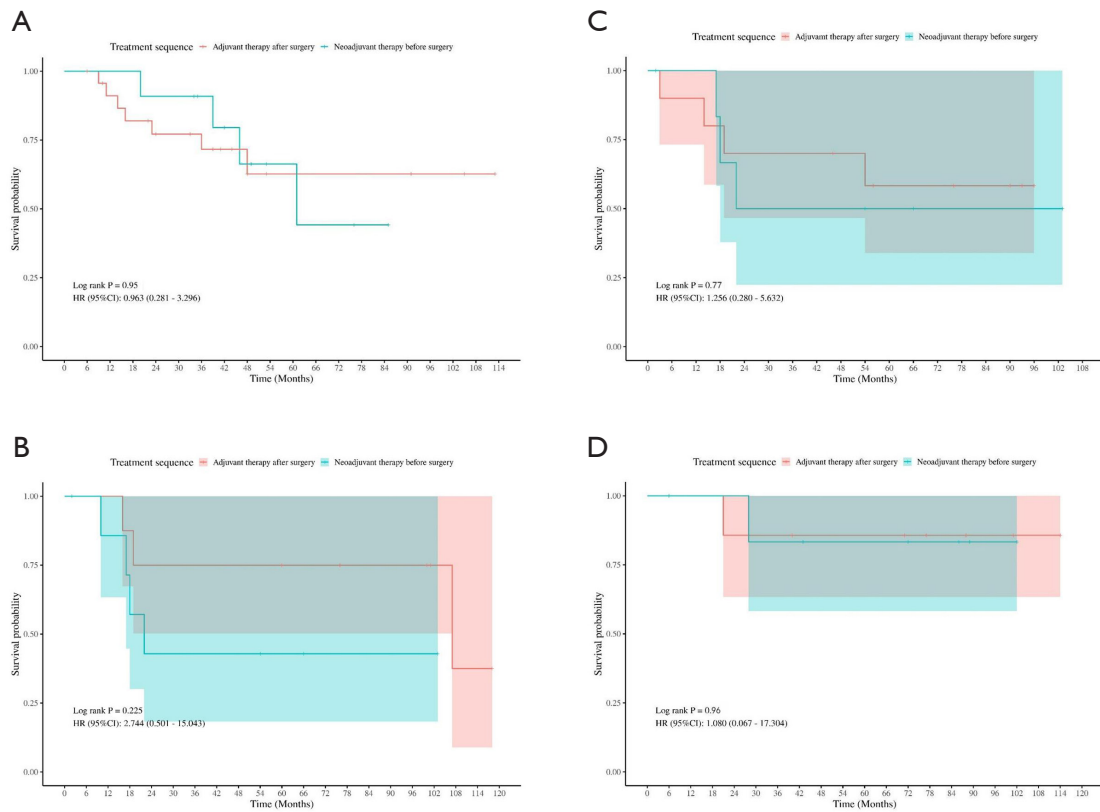


Figure S6 The Kaplan-Meier survival curves of patients after adjuvant versus neoadjuvant chemotherapy. (A) CSS for the left-sided group with high risk (B) OS for the right-sided group with high risk (C) CSS for the right-sided group with high risk (D) CSS for the right-sided group with low risk. CCS, cancer-specific survival; OS, overall survival; HR, hazard ratio; CI, confidence interval.