

Table S1 Characteristics of patients

Characteristics	Training set (n=503)	Testing set (n=241)	Total (n=744)
Age			
Mean [SD]	65.9 [12.7]	66.5 [13.0]	66.1 [12.8]
Median [Min, Max]	66.0 [26.0, 96.0]	67.0 [33.0, 95.0]	66.0 [26.0, 96.0]
Gender			
Male	322 (63.1%)	147 (62.8%)	469 (63%)
Female	188 (36.9%)	87 (37.2%)	275 (37%)
Race			
White	390 (76.5%)	185 (79.1%)	575 (77.3%)
Black	55 (10.8%)	26 (11.1%)	81 (10.9%)
Other	65 (12.7%)	23 (9.8%)	88 (11.8%)
Marital status			
Married	318 (62.4%)	148 (63.2%)	466 (62.6%)
Unmarried	192 (37.6%)	86 (36.8%)	278 (37.4%)
Histological type			
Adenocarcinoma	471 (92.4%)	217 (92.7%)	688 (92.5%)
Mucinous adenocarcinoma and signet ring cell	39 (7.6%)	17 (7.3%)	56 (7.5%)
P. Histological type			
Adenocarcinoma	483 (94.7%)	229 (97.9%)	712 (95.7%)
Mucinous adenocarcinoma and signet ring cell	27 (5.3%)	5 (2.1%)	32 (4.3%)
Grade			
I, II	441 (86.5%)	206 (88%)	647 (87%)
III, IV	69 (13.5%)	28 (12%)	97 (13%)
P. Grade			
I, II	456 (89.4%)	211 (90.2%)	667 (89.7%)
III, IV	54 (10.6%)	23 (9.8%)	77 (10.3%)
M stage			
M0	421 (82.5%)	196 (83.8%)	617 (82.9%)
M1	89 (17.5%)	38 (16.2%)	127 (17.1%)
P. Stage			
0, I	386 (75.7%)	176 (75.2%)	562 (75.5%)
II, III	124 (24.3%)	58 (24.8%)	182 (24.5%)
Surgery			
No surgery	199 (39%)	95 (40.6%)	294 (39.5%)
Local tumor excision	47 (9.2%)	19 (8.1%)	66 (8.9%)
Wedge or segmental resection	256 (50.2%)	118 (50.4%)	374 (50.3%)
Resection with other organs	8 (1.6%)	2 (0.9%)	10 (1.3%)
P. Surgery			
Local tumor excision	185 (36.3%)	71 (30.3%)	256 (34.4%)
Wedge or segmental resection	316 (62%)	157 (67.1%)	473 (63.6%)
Resection with other organs	9 (1.8%)	6 (2.6%)	15 (2%)
Treatment gap			
Mean [SD]	1.23 [1.37]	1.32 [1.65]	1.26 [1.46]
Median [Min, Max]	1 [0, 9]	1 [0, 10]	1 [0, 10]
Radiotherapy			
No radiotherapy	379 (74.3%)	180 (76.9%)	559 (75.1%)
Radiotherapy before surgery	72 (14.1%)	32 (13.7%)	104 (14%)
Radiotherapy after surgery	48 (9.4%)	19 (8.1%)	67 (9%)
Other type	11 (2.2%)	3 (1.3%)	14 (1.9%)
P. Radiotherapy			
No radiotherapy	367 (72%)	163 (69.7%)	530 (71.2%)
Radiotherapy before surgery	87 (17.1%)	37 (15.8%)	124 (16.7%)
Radiotherapy after surgery	52 (10.2%)	34 (14.5%)	86 (11.6%)
Other type	4 (0.8%)	0 (0.0%)	4 (0.5%)
Systemic therapy			
No therapy	341 (66.9%)	165 (70.5%)	506 (68%)
Systemic therapy before surgery	62 (12.2%)	21 (9%)	83 (11.2%)
Systemic therapy after surgery	78 (15.3%)	34 (14.5%)	112 (15.1%)
Other type	29 (5.7%)	14 (6%)	43 (5.8%)
Chemotherapy			
No/unknown	254 (49.8%)	124 (63.2%)	378 (50.8%)
Yes	256 (50.2%)	110 (36.8%)	366 (49.2%)
P. Chemotherapy			
No/unknown	339 (66.5%)	148 (63.2%)	487 (65.5%)
Yes	171 (33.5%)	86 (36.8%)	257 (34.5%)
Regional nodes examined			
<12	401 (78.6%)	184 (78.6%)	585 (78.6%)
≥12	109 (21.4%)	50 (21.4%)	159 (21.4%)
P. Regional nodes examined			
<12	262 (51.4%)	113 (48.3%)	375 (50.4%)
≥12	248 (48.6%)	121 (51.7%)	369 (49.6%)
Tumor size			
<3 cm	204 (40%)	95 (40.6%)	299 (40.2%)
≥3 cm	306 (60%)	139 (59.4%)	445 (59.8%)
CEA			
Negative	265 (52%)	134 (57.3%)	399 (53.6%)
Positive	245 (48%)	100 (42.7%)	345 (46.4%)
Tumor deposits			
Negative	483 (94.7%)	220 (94%)	703 (94.5%)
Positive	27 (5.3%)	14 (6%)	41 (5.5%)
Perineural invasion			
Negative	468 (91.8%)	205 (87.6%)	673 (90.5%)
Positive	42 (8.2%)	29 (12.4%)	71 (9.5%)
P. Perineural invasion			
Negative	497 (97.5%)	224 (95.7%)	721 (96.9%)
Positive	13 (2.5%)	10 (4.3%)	23 (3.1%)
Time of recurrence			
Mean [SD]	38.4 [26.9]	40.7 [30.1]	39.1 [28]
Median [Min, Max]	31 [1, 163]	32.5 [1, 167]	31 [1, 167]
1-year survival			
Death	136 (26.7%)	50 (21.4%)	186 (25%)
Alive	374 (73.3%)	184 (78.6%)	558 (75%)
3-year survival			
Death	313 (61.4%)	149 (63.7%)	462 (62.1%)
Alive	197 (38.6%)	85 (36.3%)	282 (37.9%)
5-year survival			
Death	401 (78.6%)	188 (80.3%)	589 (79.2%)
Alive	109 (21.4%)	46 (19.7%)	155 (20.8%)

SD, standard deviation; P., the indicators were related to the primary tumor; CEA, carcinoembryonic antigen.

Table S2 The univariate and multivariate analyses of factors associated with overall survival in training set

Variable	Univariate Cox regression		Multivariate Cox regression	
	HR (95% CI)	P value	HR (95% CI)	P value
Age	1.025 (1.015–1.035)	<0.001	1.0189 (1.0089–1.029)	<0.001
Gender				
Male	1			
Female	0.8916 (0.6987–1.138)	0.357		
Race				
White	1			
Black	1.037 (0.7187–1.498)	0.844		
Other	1.195 (0.8482–1.684)	0.308		
Marital status				
Married	1		1	
Unmarried	1.497 (1.183–1.895)	<0.001	1.3454 (1.0443–1.7334)	0.0217
Histology type				
Adenocarcinoma	1		1	
Mucinous adenocarcinoma and signet ring cell carcinoma	1.518 (1.027–2.243)	0.0364	1.3143 (0.8707–1.984)	0.1933
P. Histology type				
Adenocarcinoma	1		1	
Mucinous adenocarcinoma and signet ring cell carcinoma	2.653 (1.681–4.189)	<0.001	1.5389 (0.9299–2.5466)	0.0934
Grade				
I, II	1			
III, IV	1.226 (0.8832–1.701)	0.223		
P. Grade				
I, II	1			
III, IV	1.328 (0.9316–1.892)	0.117		
P. Stage				
0, I	1		1	
II, III	1.602 (1.245–2.06)	<0.001	1.6906 (1.2712–2.2473)	<0.001
M stage				
M0	1		1	
M1	2.889 (2.206–3.783)	<0.001	1.9461 (1.4349–2.6394)	<0.001
Surgery				
No surgery	1		1	
Local tumor excision	0.4249 (0.2824–0.6395)	<0.001	0.7774 (0.4815–1.2553)	0.3031
Wedge or segmental resection	0.2644 (0.2040–0.3426)	<0.001	0.4789 (0.3317–0.6914)	<0.001
Resection with other organs	0.4146 (0.1688–1.0184)	0.0548	0.8412 (0.3208–2.2057)	0.7251
P. Surgery				
Local tumor excision	1			
Wedge or segmental resection	1.107 (0.8629–1.42)	0.424		
Resection with other organs	1.586 (0.6928–3.632)	0.275		
Radiotherapy				
No radiotherapy	1		1	
Radiotherapy before surgery	0.374 (0.2435–0.5745)	<0.001	0.6695 (0.3168–1.4147)	0.2932
Radiotherapy after surgery	0.5821 (0.3949–0.8580)	<0.001	0.9466 (0.5708–1.5699)	0.8317
Other type	0.3311 (0.106–1.0347)	0.05727	0.4837 (0.1246–1.877)	0.2938
P. Radiotherapy				
No radiotherapy	1		1	
Radiotherapy before surgery	1.093 (0.7956–1.502)	0.5825	1.1391 (0.7899–1.6426)	0.4858
Radiotherapy after surgery	0.847 (0.5795–1.238)	0.3911	0.848 (0.566–1.2703)	0.4239
Other type	3.644 (1.155–11.496)	0.0274	2.6543 (0.8181–8.6115)	0.104
Systemic therapy				
No systemic therapy	1		1	
Systemic therapy before surgery	0.3786 (0.2393–0.599)	<0.001	0.866 (0.4021–1.8652)	0.7133
Systemic therapy after surgery	0.5608 (0.4008–0.7848)	<0.001	0.8176 (0.5204–1.2844)	0.3821
Other type	0.3932 (0.2085–0.7416)	0.0039	1.095 (0.4316–2.7559)	0.8546
Chemotherapy				
No/unknown	1			
Yes	0.8097 (0.6417–1.022)	0.0752		
P. Chemotherapy				
No/unknown	1			
Yes	1.145 (0.8972–1.462)	0.276		
Regional nodes examined				
<12	1		1	
≥12	0.4538 (0.3247–0.6342)	<0.001	0.6816 (0.462–1.006)	0.0533
P. Regional nodes examined				
<12	1			
≥12	0.8283 (0.6559–1.046)	0.114		
Treatment gap				
Perineural Invasion	1.027 (0.9472–1.113)	0.519		
Negative	1			
Positive	0.8644 (0.5537–1.35)	0.522		
P. Perineural invasion				
Negative	1			
Positive	1.604 (0.8778–2.932)	0.124		
Tumor size (cm)				
<3	1		1	
≥3	1.958 (1.528–2.508)	<0.001	1.4434 (1.1020–1.8905)	0.0077
CEA				
Negative	1		1	
Positive	2.126 (1.678–2.695)	<0.001	1.8954 (1.4491–2.479)	<0.001
Tumor deposits				
Negative	1		1	
Positive	1.719 (1.034–2.86)	0.0369	1.0867 (0.6359–1.8572)	0.761
Time of recurrence(months)	1.003 (0.9981–1.008)	0.232		

HR, hazard ratio; CI, confidence interval; P., the indicators were related to the primary tumor; CEA, carcinoembryonic antigen.