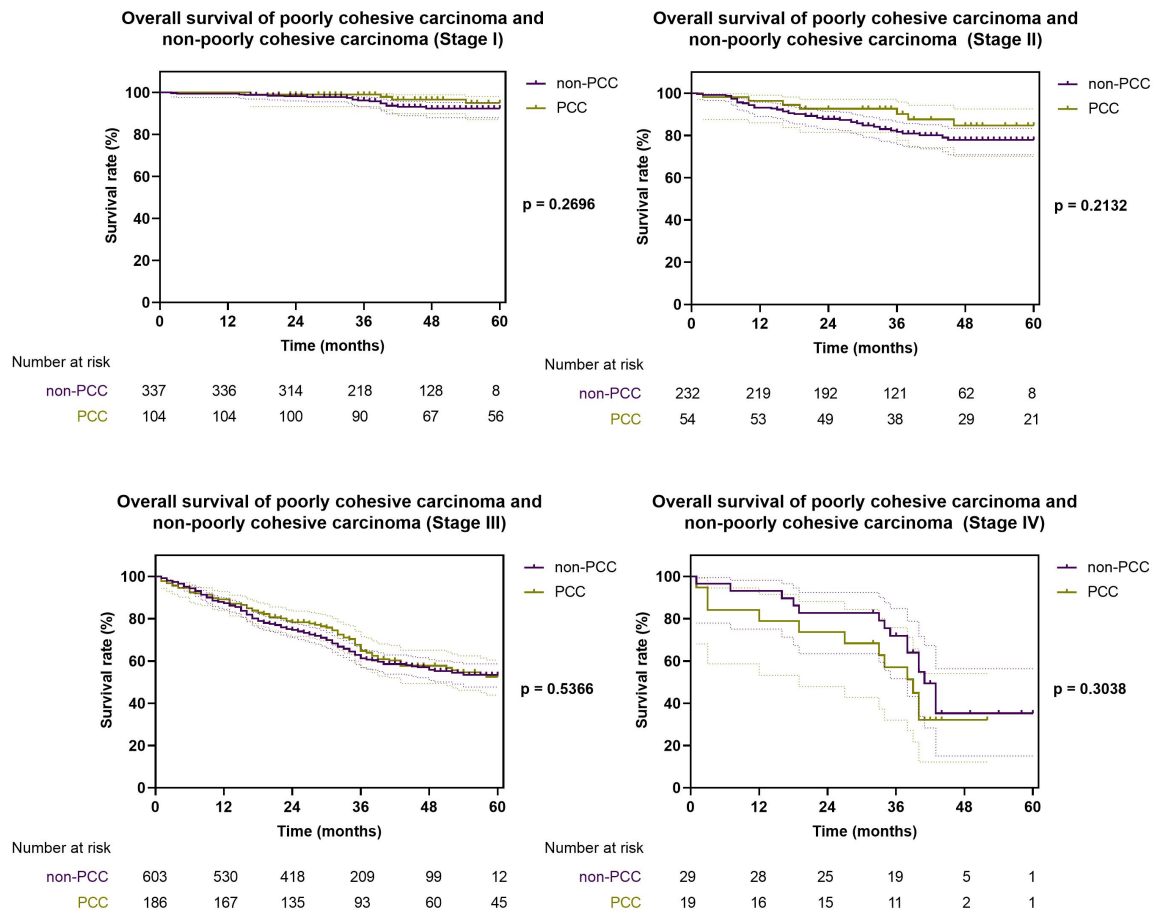


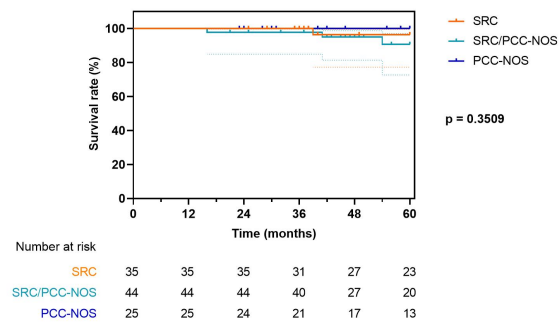
SUPPLEMENTARY MATERIAL

Supplementary Figure 1 Overall survival of poorly cohesive carcinoma and non-poorly cohesive carcinoma by stage

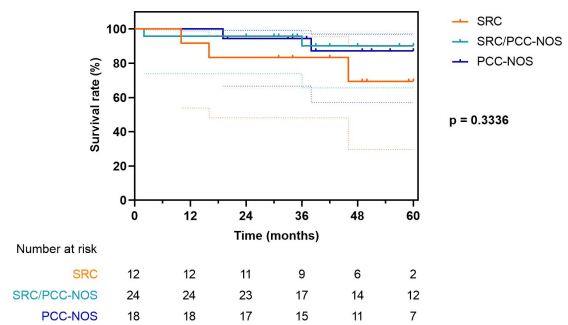


Supplementary Figure 2 Overall survival of defined subtypes within poorly cohesive carcinoma by stage

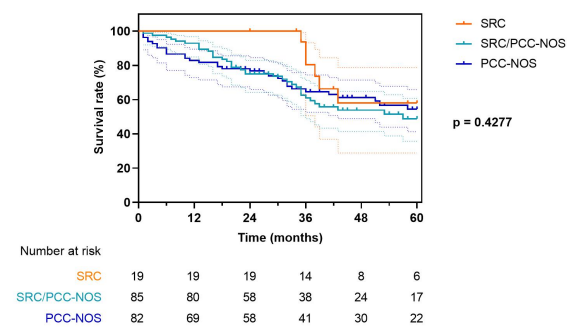
Overall survival of defined subtypes within poorly cohesive carcinoma (Stage I)



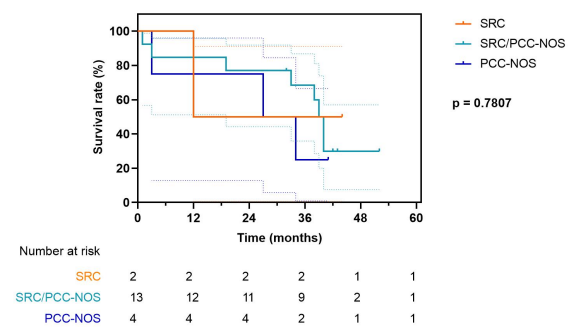
Overall survival of defined subtypes within poorly cohesive carcinoma (Stage II)



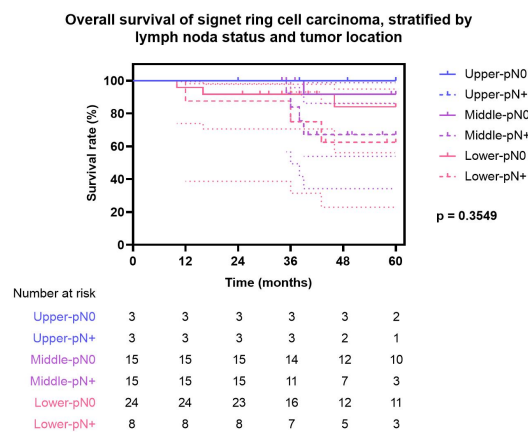
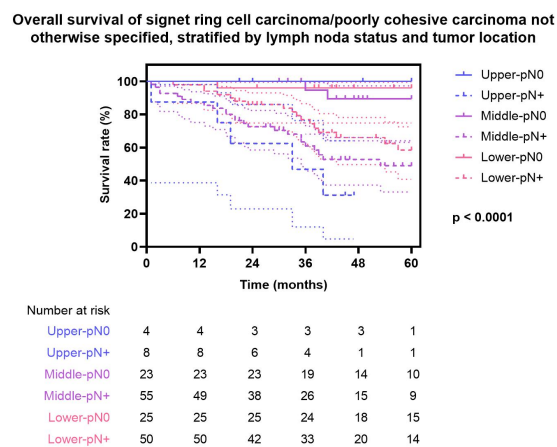
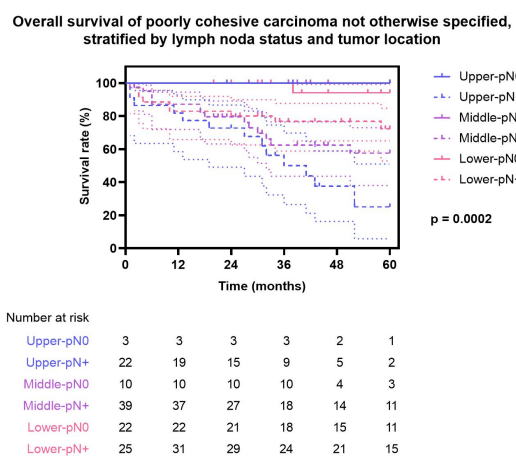
Overall survival of defined subtypes within poorly cohesive carcinoma (Stage III)



Overall survival of defined subtypes within poorly cohesive carcinoma (Stage IV)

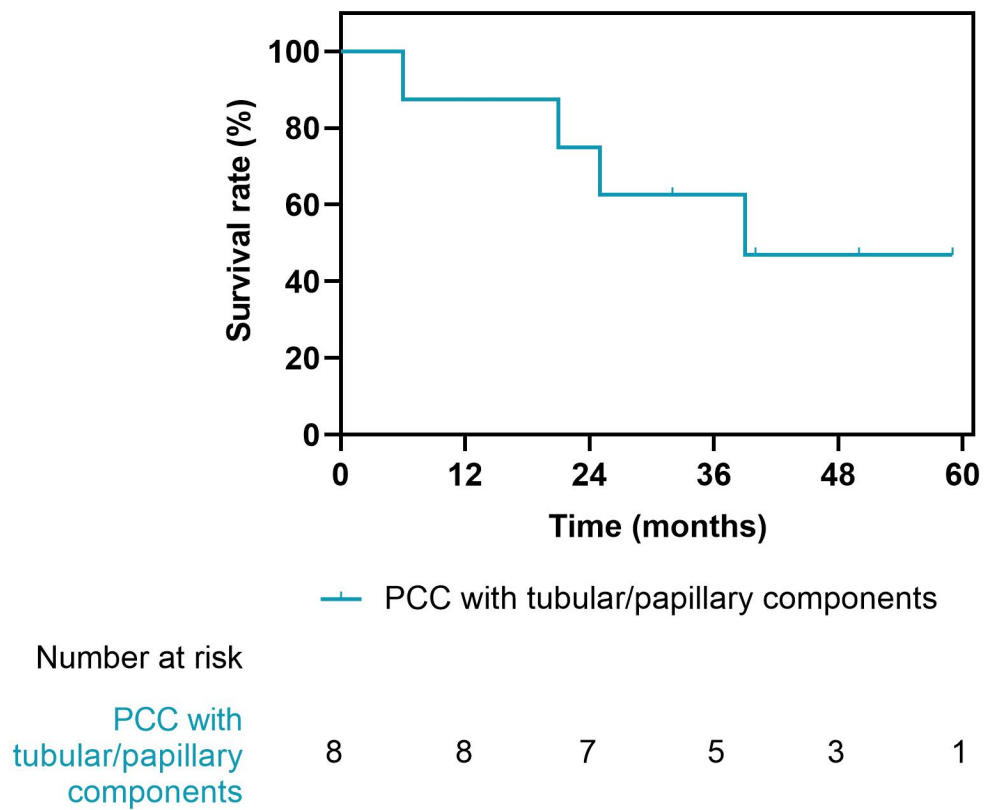


Supplementary Figure 3 Overall survival of defined subtypes within poorly cohesive carcinoma stratified by lymph node status and tumor location



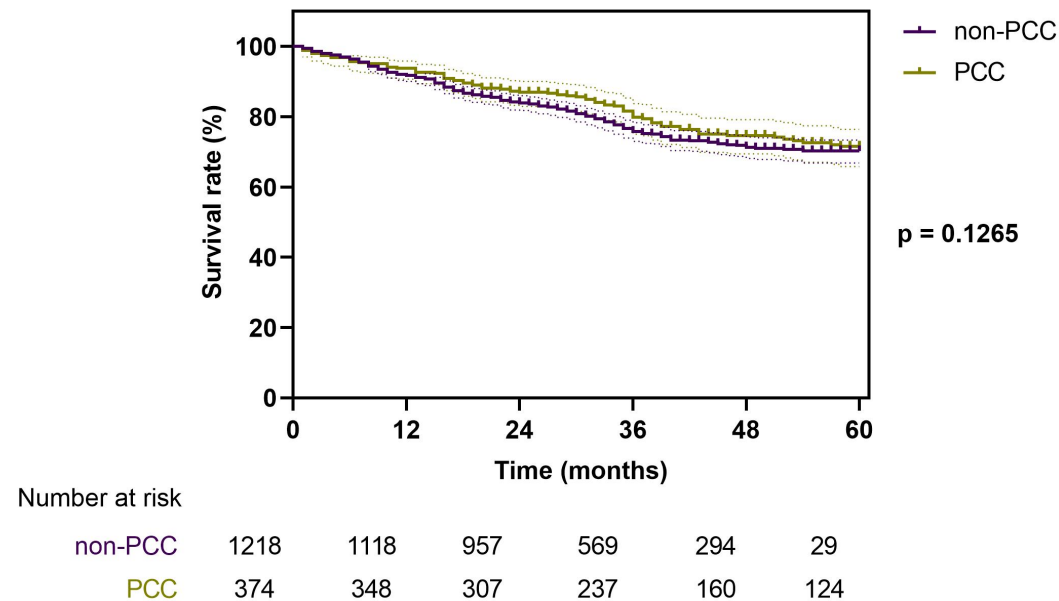
Supplementary Figure 4 Overall survival of poorly cohesive carcinoma with tubular/papillary components.

Overall survival of poorly cohesive carcinoma with tubular/papillary components



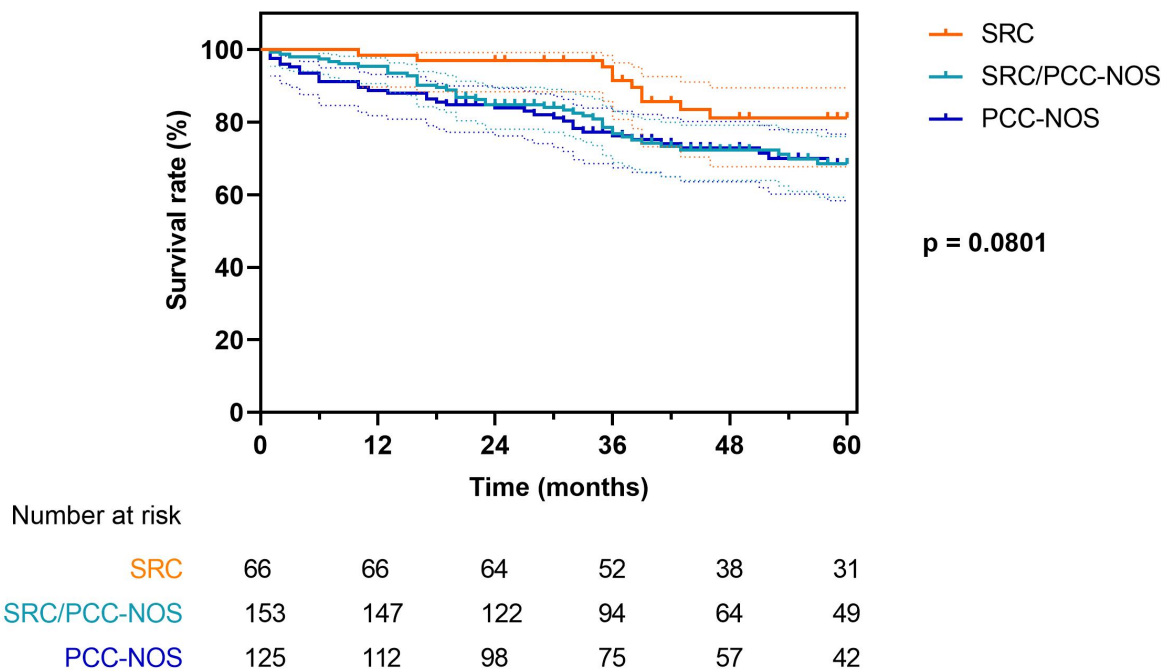
Supplementary Figure 5 Overall survival of poorly cohesive carcinoma and non-poorly cohesive carcinoma restricted to Stage I-III

Overall survival of poorly cohesive carcinoma and non-poorly cohesive carcinoma
(Stage I - III)

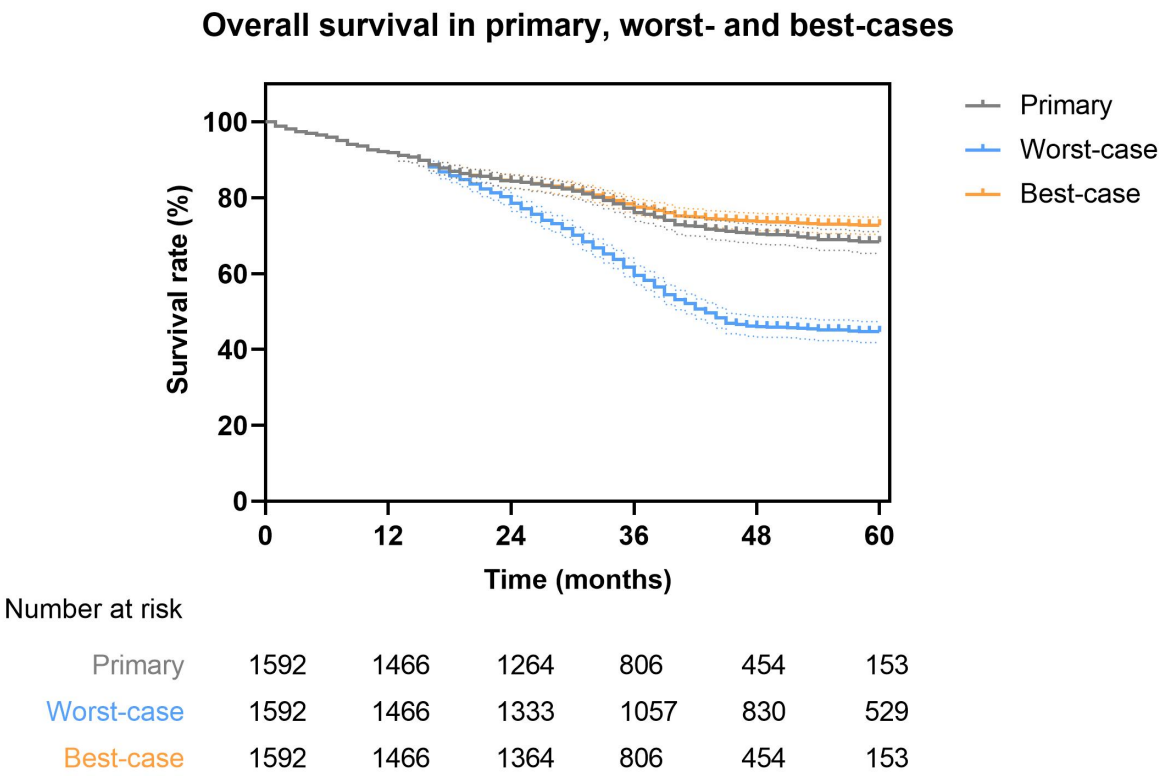


Supplementary Figure 6 Overall survival of defined subtypes within poorly cohesive carcinoma restricted to Stage I-III

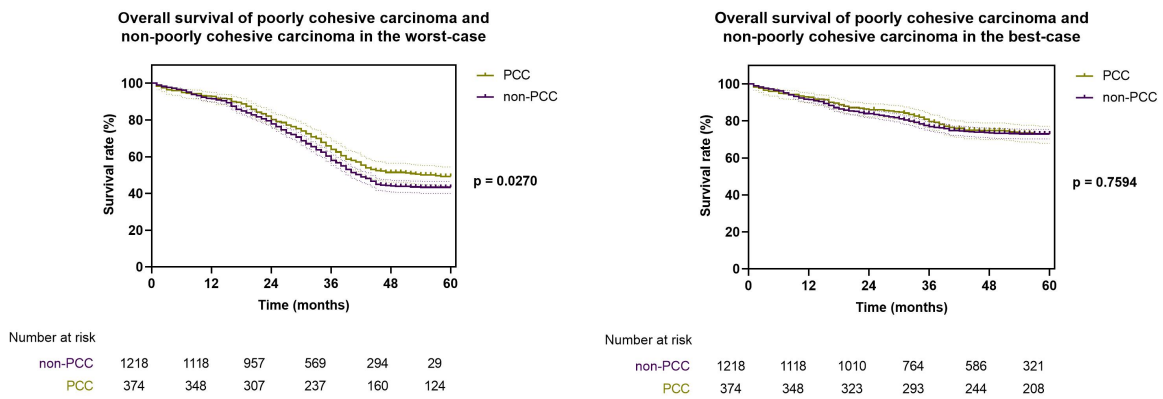
Overall survival of defined subtypes within poorly cohesive carcinoma
(Stage I - III)



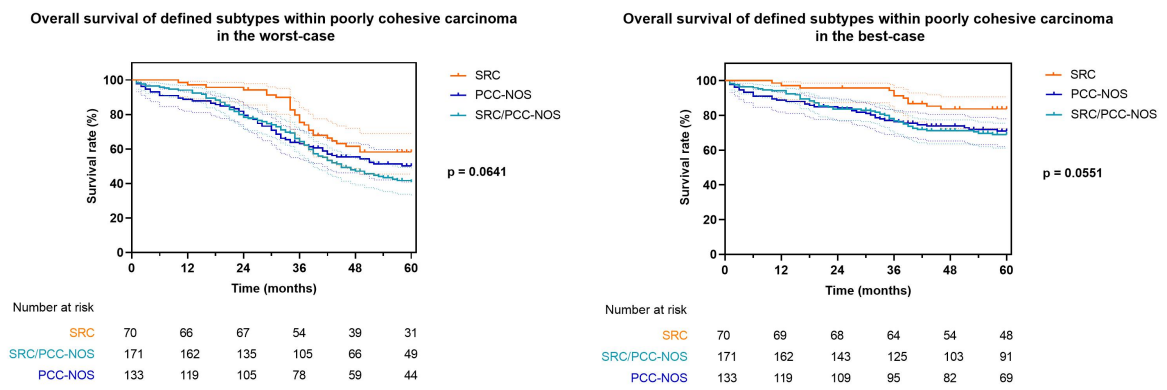
Supplementary Figure 7 Overall survival under primary, worst-case, and best-case scenarios



Supplementary Figure 8 Overall survival of poorly cohesive carcinoma and non-poorly cohesive carcinoma in the worst- and best-case scenarios



Supplementary Figure 9 Overall survival of defined subtypes within poorly cohesive carcinoma in the worst- and best-case scenarios



Supplementary Table 1 Expression of mismatch repair proteins in deficient mismatch repair cases

	Subgroup	MLH1	MSH2	MSH6	PMS2
Case 1	PCC-NOS	-	+	-	-
Case 2	PCC-NOS	-	+	+	-
Case 3	PCC-NOS	-	+	+	-
Case 4	PCC-NOS	-	+	+	-

MLH1: MutL homolog 1; MSH: MutS homolog; PCC-NOS: Poorly cohesive carcinoma-not otherwise specified; PMS2: Postmeiotic segregation increased 2.

Supplementary Table 2 Clinicopathological characteristics of patients stratified by MMR data evaluability

		with MMR	without MMR	P
n		63	311	
Sex, n (%)	Female	27 (42.857)	149 (47.910)	0.464
	Male	36 (57.143)	162 (52.090)	
Age, Mean±SD		59.286±11.549	59.994±11.908	0.666
Stage, n (%)	I	21 (33.333)	85 (27.778)	0.509
	II	10 (15.873)	46 (15.033)	
	III	31 (49.206)	157 (51.307)	
	IV	1 (1.587)	18 (5.882)	
Year	2016	1 (1.587)	42 (13.505)	<0.001
	2017	5 (7.937)	139 (44.695)	
	2018	57 (90.476)	130 (41.801)	

Supplementary Table 3 Clinicopathological characteristics of patients stratified by PD-L1 data evaluability

		with PD-L1	without PD-L1	P
n		171	203	
Sex, n (%)	Female	77 (45.029)	99 (48.768)	0.470
	Male	94 (54.971)	104 (51.232)	
Age, Mean±SD		60.018±11.786	59.754±11.906	0.830
Stage, n (%)	I	48 (28.743)	58 (28.713)	0.018
	II	26 (15.569)	30 (14.851)	
	III	91 (54.491)	97 (48.020)	
	IV	2 (1.198)	17 (8.416)	
Year	2016	1 (0.585)	42 (20.690)	<0.001
	2017	50 (29.240)	94 (46.305)	
	2018	120 (70.175)	67 (33.005)	

Supplementary Table 4 Univariable hazard ratio for overall survival of poorly cohesive carcinoma and non-poorly cohesive carcinoma

		HR	95% CI	P
Primary	Non-PCC	reference		
	PCC	0.9158	0.7337-1.143	0.4425
36 months	Non-PCC			
	PCC	0.8560	0.6701-1.093	0.2131
PSM	Non-PCC	reference		
	PCC	1.018	0.7190-1.442	0.9189

Stage I	Non-PCC	reference		
	PCC	0.5505	0.2187-1.386	0.2696
Stage II	Non-PCC	reference		
	PCC	0.6066	0.3077-1.196	0.2132
Stage III	Non-PCC	reference		
	PCC	0.9215	0.7121-1.192	0.5366
Stage IV	Non-PCC	reference		
	PCC	1.471	0.6677-0.3230	0.3038
Stage I-III	Non-PCC	reference		
	PCC	0.8668	0.6871-1.093	0.2399

Supplementary Table 5 Univariable hazard ratio for overall survival within defined subtypes of poorly cohesive carcinoma

		HR	95% CI	P
Primary	SRC	reference		
	SRC/PCC-NOS	2.212	1.299-3.766	0.0137
	PCC-NOS	2.078	1.161-3.720	0.0123
PSM	SRC	reference		
	SRC/PCC-NOS	1.176	0.4770-2.901	0.7243
	PCC-NOS	0.6976	0.2535-1.920	0.4912
Stage I	SRC	reference		
	SRC/PCC-NOS	2.426	0.3379-17.41	0.4265

	PCC-NOS	Undefined		
Stage II	SRC	reference		
	SRC/PCC-NOS	0.3112	0.04741-2.043	0.1759
	PCC-NOS	0.3954	0.06450-2.424	0.2919
Stage III	SRC	reference		
	SRC/PCC-NOS	1.811	0.8846-3.708	0.1666
	PCC-NOS	1.534	0.7194-3.291	0.3287
Stage IV	SRC	reference		
	SRC/PCC-NOS	1.232	0.1803-8.412	0.8392
	PCC-NOS	1.472	0.1829-11.85	0.7345
Stage I-III	SRC	reference		
	SRC/PCC-NOS	2.064	1.154-3.692	0.0348
	PCC-NOS	2.107	1.147-3.870	0.0333

Supplementary Table 6 Proportional-hazards assumptions for non-PCC versus PCC and PCC subtypes before and after PSM

	Global χ^2	df	P
Non-PCC vs PCC	0.84	1	0.36
Non-PCC vs PCC (PSM)	0.323	1	0.57
SRC vs SRC/PCC-NOS vs PCC-NOS	4.71	2	0.095
SRC vs SRC/PCC-NOS vs PCC-NOS (PSM)	0.61	2	0.74

Supplementary Table 7 Clinicopathological features of non-PCC and PCC after propensity score matching

		Before PSM				After PSM			
		non-PCC	PCC	P	SMD	non-PCC	PCC	P	SMD
n		1218	374			349	349		
Sex, n (%)	Female	323 (26.5)	176 (47.1)	<0.001	0.436	122 (41.8)	121 (41.4)	0.933	0.007
	Male	895 (73.5)	198 (52.9)			170 (58.2)	171 (58.6)		
Age, Mean±SD		64.8±10.2	59.9±11.8	<0.001	0.442	61.9±10.7	61.3±11.4	0.501	0.056
T, n (%)	T1	240 (19.9)	68 (18.7)	0.216	0.131	61 (20.9)	66 (22.6)	0.856	0.073
	T2	161 (13.3)	57 (15.7)			42 (14.4)	47 (16.1)		
	T3	81 (6.7)	15 (4.1)			15 (5.1)	15 (5.1)		
	T4	725 (60.1)	224 (61.5)			174 (59.6)	164 (56.2)		
N, n (%)	N0	492 (40.4)	140 (37.5)	0.006	0.208	115 (39.4)	124 (42.5)	0.709	0.098
	N1	187 (15.4)	44 (11.8)			40 (13.7)	39 (13.4)		
	N2	225 (18.5)	59 (15.8)			49 (16.8)	53 (18.2)		
	N3	314 (25.8)	130 (34.9)			88 (30.1)	76 (26.0)		
M, n (%)	M0	1175 (97.591)	353 (94.892)	0.008	0.142	276 (94.5)	279 (95.5)	0.568	0.047
	M1	29 (2.409)	19 (5.108)			16 (5.5)	13 (4.5)		

PCC: Poorly cohesive carcinoma; SMD: Standardized mean difference.

Supplementary Table 8 Distribution of defined subtypes of poorly cohesive carcinoma, stratified by lymph nodal status and tumor location

		Upper	Middle	Lower	
SRC, <i>n</i> (%)	pN0	3 (4.41)	15 (22.06)	24 (35.29)	0.3549
	pN+	3 (4.41)	15 (22.06)	8 (11.76)	
SRC/PCC-NOS, <i>n</i> (%)	pN0	4 (2.41)	23 (13.86)	25 (15.06)	<0.0001
	pN+	8 (4.82)	56 (33.73)	50 (30.12)	
PCC-NOS, <i>n</i> (%)	pN0	3 (2.29)	10 (7.63)	22 (16.79)	0.0002
	pN+	22 (16.79)	39 (29.77)	35 (26.72)	

Supplementary Table 9 Clinicopathological features of poorly cohesive carcinoma and non-poorly cohesive carcinoma restricted to Stage I-III

		Non-PCC	PCC	P
n		1189	355	
Sex, n (%)	Female	311 (26.156)	166 (46.761)	<0.001
	Male	878 (73.844)	189 (53.239)	
Age, Mean (SD)		64.807 (10.192)	59.992 (11.790)	<0.001
Stage, n (%)	I	337 (28.681)	104 (30.145)	0.232
	II	232 (19.745)	54 (15.652)	
	III	606 (51.574)	187 (54.203)	
T, n (%)	T1	240 (20.374)	68 (19.710)	0.238
	T2	160 (13.582)	57 (16.522)	

	T3	80 (6.791)	15 (4.348)	
	T4	698 (59.253)	205 (59.420)	
N, n (%)	N0	488 (41.043)	139 (39.266)	0.065
	N1	185 (15.559)	44 (12.429)	
	N2	217 (18.251)	58 (16.384)	
	N3	299 (25.147)	113 (31.921)	

Supplementary Table 10 Clinicopathological features of defined subtypes
of poorly cohesive carcinoma restricted to Stage I-III

		SRC	SRC/PCC-NOS	PCC-NOS	P
n		68	158	129	
Sex, n (%)	Female	37 (54.412)	87 (55.063)	42 (32.558)	<0.001
	Male	31 (45.588)	71 (44.937)	87 (67.442)	
Age, Mean (SD)		60.221 (11.201)	58.551 (12.615)	61.636 (10.875)	0.086
Site, n (%)	Upper	6 (9.091)	10 (6.494)	25 (19.685)	0.013
	Middle	30 (45.455)	73 (47.403)	47 (37.008)	
	Lower	30 (45.455)	71 (46.104)	55 (43.307)	
Stage, n (%)	I	36 (52.941)	45 (28.846)	25 (19.841)	<0.001
	II	13 (19.118)	25 (16.026)	18 (14.286)	
	III	19 (27.941)	86 (55.128)	83 (65.873)	
T, n (%)	T1	29 (42.647)	29 (18.354)	12 (9.302)	<0.001

	T2	10 (14.706)	27 (17.089)	21 (16.279)	
	T3	2 (2.941)	8 (5.063)	6 (4.651)	
	T4	27 (39.706)	94 (59.494)	90 (69.767)	
N, n (%)	N0	44 (64.706)	53 (33.544)	36 (27.907)	<0.001
	N1	6 (8.824)	22 (13.924)	16 (12.403)	
	N2	8 (11.765)	25 (15.823)	29 (22.481)	
	N3	10 (14.706)	58 (36.709)	48 (37.209)	

Supplementary Table 11 Clinicopathological characteristics of patients stratified by loss-to-follow-up status

		Follow-up	Lost to follow-up	P
n		1,216	376	
Group, n (%)	non-PCC	926 (76.151)	292 (77.660)	0.547
	PCC	290 (23.849)	84 (22.340)	
Sex, n (%)	Female	378 (31.086)	121 (32.181)	0.689
	Male	838 (68.914)	255 (67.819)	
Age, n (%)	< 60	348 (28.618)	115 (30.585)	0.463
	≥ 60	868 (71.382)	261 (69.415)	
Stage, n (%)	I	364 (30.283)	77 (21.038)	<0.001
	II	227 (18.885)	59 (16.120)	
	III	579 (48.170)	214 (58.470)	
	IV	32 (2.662)	16 (4.372)	

Supplementary Table 12 Clinicopathological characteristics of patients stratified by loss-to-follow-up status within defined subtypes of poorly cohesive carcinoma

		Follow-up	Lost to follow-up	<i>P</i>
n		289	85	
Group, n (%)	SRC	55 (19.031)	15 (17.647)	0.738
	SRC/PCC-NOS	129 (44.637)	42 (49.412)	
	PCC-NOS	105 (36.332)	28 (32.941)	
Sex, n (%)	Female	134 (46.367)	42 (49.412)	0.621
	Male	155 (53.633)	43 (50.588)	
Age, n (%)	<60	123 (42.561)	40 (47.059)	0.462
	≥60	166 (57.439)	45 (52.941)	
Stage, n (%)	I	86 (30.070)	20 (24.096)	0.591
	II	43 (15.035)	13 (15.663)	
	III	144 (50.350)	44 (53.012)	
	IV	13 (4.545)	6 (7.229)	

Supplementary Table 13 Univariable hazard ratios for overall survival of each group under primary, worst-case, and best-case scenarios

Scenario	Primary	Worst-case	Best-case
Total	68.297%	44.627%	72.712%

Non-PCC	68.869%	43.451%	73.226%
PCC	69.108%	49.452	72.984%
SRC	80.767%	58.231%	83.692%
SRC/PCC-NOS	65.034%	41.071%	69.375%
PCC-NOS	67.798%	50.194%	70.897%

Five-year OS was estimated by the KM method, with follow-up censored at 60 months. Primary: patients lost to follow-up were censored at the last known contact. Worst-case: patients lost to follow-up were assumed dead at the last contact. Best-case: patients lost to follow-up were assumed alive at the cutoff and censored at 60 months.

Supplementary Table 14 Univariable hazard ratios for overall survival between poorly cohesive carcinoma and non-poorly cohesive carcinoma in worst- and best-case scenarios

		HR	95% CI	P
Worst-case	Non-PCC	reference		
	PCC	0.8319	0.7102-0.9744	0.0270
Best-case	Non-PCC	reference		
	PCC	0.9654	0.7712-1.209	0.7594

Supplementary Table 15 Univariable hazard ratios for overall survival within defined subtypes of poorly cohesive carcinoma in worst- and best-case scenarios

		HR	95% CI	P
Worst-case	SRC	reference		
	SRC/PCC-NOS	1.671	1.147-2.436	0.0150
	PCC-NOS	1.422	0.9314-2.172	0.1171
Best-case	SRC	reference		
	SRC/PCC-NOS	2.170	1.272-3.702	0.0164
	PCC-NOS	2.041	1.139-3.658	0.0333

Supplementary Table 16 Univariate and multivariate analysis of overall survival

			Univariate			Multivariate		
		<i>n</i>	HR	95% CI	<i>P</i>	HR	95% CI	<i>P</i>
Group	SRC	70	reference			reference		
	SRC/PCC-NOS	171	2.21	1.15-4.24	0.0173	1.32	0.684-2.56	0.4049
	PCC-NOS	133	2.09	1.07-4.11	0.0315	1.19	0.597-2.36	0.6258
Sex	Female	176	reference			reference		
	Male	198	1.26	0.847-1.88	0.2522	1.11	0.730-1.70	0.6206
Age, yr	<60	244	reference			reference		

	≥60	130	1.53	1.03-2.28	0.0345	1.43	0.948-2.17	0.0877
T	T1	68	reference			reference		
	T2	57	5.16	0.577-46.2	0.1422	3.78	0.416-34.37	0.2376
	T3	15	32.6	3.924-270.8	0.0013	13.44	1.508-119.73	0.0199
	T4	224	38.75	5.393-278.4	<0.001	14.41	1.864-111.30	0.0106
N	N0	140	reference			reference		
	N1	44	3.99	1.62-9.82	0.0026	2.16	0.823-5.68	0.1177
	N2	59	5.88	2.68-12.92	<0.001	2.37	0.993-5.65	0.0519
	N3	130	10.85	5.37-21.93	<0.001	3.87	1.730-8.64	<0.001
M	M0	345	reference			reference		
	M1	19	3.33	1.81-6.11	<0.001	1.54	0.810-2.94	0.1868

CI: confidence interval; HR: Hazard ratio; PCC-NOS: Poorly cohesive carcinoma-not otherwise specified; mean difference; SRC: Signet ring cell.