Table S1 Univariable and multivariable analysis of OS in patients with T4

Variable	Univariable		Multivariate	
	HR (95% CI)	P value	HR (95% CI)	P value
Gender				
Male *vs.* female	1.52 (1.36–1.69)	<0.001*	1.44 (1.28–1.61)	<0.001*
Age	1.03 (1.02–1.03)	<0.001*	1.03 (1.02–1.03)	<0.001*
Race				
Black *vs.* White	1.02 (0.86–1.22)	0.79	1.23 (1.02–1.47)	0.03
Other *vs.* White	0.75 (0.60–0.94)	0.01	0.77 (0.61–0.96)	0.02
Histologic type				
SQC *vs.* ADC	1.31 (1.16–1.47)	<0.001*	1.09 (0.97–1.24)	0.15
Other *vs.* ADC	0.82 (0.68–0.98)	0.03	0.89 (0.74–1.07)	0.22
Tumor location				
RM *vs.* RU	0.85 (0.65–1.13)	0.26	0.98 (0.74–1.30)	0.91
RL *vs.* RU	1.04 (0.89–1.22)	0.59	1.10 (0.94–1.30)	0.23
LU *vs.* RU	1.1 (0.94–1.29)	0.24	1.05 (0.89–1.23)	0.57
LL *vs.* RU	1.07 (0.90–1.28)	0.45	1.14 (0.95–1.36)	0.15
Other *vs.* RU	1 (0.83–1.19)	0.96	1.09 (0.91–1.30)	0.38
Surgical type				
Segmentectomy *vs.* wedge	0.67 (0.45–1.00)	0.048	0.67 (0.45–1.00)	0.052
Lobectomy *vs.* wedge	1.11 (0.95–1.29)	0.19	1.08 (0.92–1.27)	0.32
Pneumonectomy *vs.* wedge	1.18 (0.83–1.67)	0.36	1.30 (0.91–1.86)	0.15
Chemotherapy				
Yes *vs.* no	0.87 (0.79–0.97)	0.02	0.82 (0.72–0.92)	0.001
Radiotherapy				
Yes *vs.* no	1.44 (1.26–1.66)	<0.001*	1.49 (1.28–1.73)	<0.001*
PI				
PL1/2 *vs.* PL0	1.51 (1.32–1.71)	<0.001*	1.42 (1.25–1.62)	<0.001*
PL3 *vs.* PL0	2.03 (1.70–2.42)	<0.001*	1.91 (1.58–2.30)	<0.001*

*, significant at P<0.001. OS, overall survival; PL, pleural layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe; PI, pleural invasion; HR, hazard ratio; CI, confidence interval; ADC, adenocarcinoma; SQC, squamous cell carcinoma.

Table S2 Univariable and multivariable analysis of OS in patients with T3

Variable	Univariable		Multivariate	
	HR (95% CI)	P value	HR (95% CI)	P value
Gender				
Male *vs.* female	1.5 (1.39–1.63)	<0.001*	1.42 (1.31–1.55)	<0.001*
Age	1.03 (1.03–1.04)	<0.001*	1.03 (1.03–1.03)	<0.001*
Race				
Black *vs.* White	1.02 (0.88–1.18)	0.8	1.13 (0.97–1.31)	0.12
Other *vs.* White	0.89 (0.75–1.05)	0.15	0.91 (0.77–1.08)	0.29
Histologic type				
SQC *vs.* ADC	1.4 (1.29–1.53)	<0.001*	1.25 (1.14–1.37)	<0.001*
Other *vs.* ADC	0.78 (0.68–0.90)	<0.001*	0.86 (0.74–1.00)	0.052
Tumor location				
RM *vs.* RU	0.84 (0.68–1.03)	0.09	0.90 (0.73–1.11)	0.34
RL *vs.* RU	1.05 (0.93–1.17)	0.44	1.06 (0.95–1.19)	0.31
LU *vs.* RU	0.99 (0.89–1.10)	0.84	0.93 (0.84–1.03)	0.17
LL *vs.* RU	1.01 (0.89–1.14)	0.87	0.99 (0.88–1.13)	0.93
Other *vs.* RU	0.93 (0.72–1.20)	0.56	1.05 (0.81–1.36)	0.71
Surgical type				
Segmentectomy *vs.* wedge	1 (0.78–1.27)	0.98	0.95 (0.75–1.21)	0.70
Lobectomy *vs.* wedge	0.73 (0.65–0.82)	<0.001*	0.75 (0.67–0.85)	<0.001*
Pneumonectomy *vs.* wedge	0.73 (0.47–1.14)	0.17	0.86 (0.55–1.34)	0.50
Chemotherapy				
Yes *vs.* no	0.77 (0.70–0.84)	<0.001*	0.78 (0.71–0.86)	<0.001*
Radiotherapy				
Yes *vs.* no	1.46 (1.30–1.64)	<0.001*	1.41 (1.24–1.60)	<0.001*
PI				
PL1/2 *vs.* PL0	1.37 (1.23–1.52)	<0.001*	1.26 (1.13–1.41)	<0.001*
PL3 *vs.* PL0	1.54 (1.38–1.72)	<0.001*	1.34 (1.19–1.51)	<0.001*

*, significant at P<0.001. OS, overall survival; PL, pleural layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe; PI, pleural invasion; HR, hazard ratio; CI, confidence interval; ADC, adenocarcinoma; SQC, squamous cell carcinoma.

Table S3 Characteristics of T4 PL0 and T4 PL1/2 before and after PSM

Variable	Before PSM			After PSM		
	T4PL0 (N=2,037)	T4PL1/2 (N=630)	P value	T4PL0 (N=626)	T4PL1/2 (N=626)	P value
Gender			0.86			0.96
Female	1,003 (49.2)	307 (48.7)		301 (48.1)	303 (48.4)	
Male	1,034 (50.8)	323 (51.3)		325 (51.9)	323 (51.6)	
Age, years	67.89±9.8	69.46±9.4	<0.001[*]	69.41±8.7	69.46±9.4	0.63
Race			0.21			0.77
White	1,693 (83.1)	505 (80.2)		514 (82.1)	504 (80.5)	
Black	195 (9.6)	68 (10.8)		63 (10.1)	68 (10.9)	
Other	149 (7.3)	57 (9.0)		49 (7.8)	54 (8.6)	
Histologic type			0.03			0.45
Adenocarcinoma	1,281 (62.9)	398 (63.2)		408 (65.2)	395 (63.1)	
Squamous cell carcinoma	498 (24.4)	174 (27.6)		172 (27.5)	173 (27.6)	
Other	258 (12.7)	58 (9.2)		46 (7.3)	58 (9.3)	
Tumor location			0.02			0.053
RU	453 (22.2)	168 (26.7)		127 (20.3)	167 (26.7)	
RM	111 (5.4)	23 (3.7)		36 (5.8)	23 (3.7)	
RL	464 (22.8)	133 (21.1)		146 (23.3)	132 (21.1)	
LU	362 (17.8)	131 (20.8)		125 (20.0)	130 (20.8)	
LL	319 (15.7)	82 (13.0)		99 (15.8)	81 (12.9)	
Other	328 (16.1)	93 (14.8)		93 (14.9)	93 (14.9)	
Surgical type			0.57			0.33
Wedge	322 (15.8)	90 (14.3)		76 (12.1)	89 (14.2)	
Segmentectomy	64 (3.1)	15 (2.4)		8 (1.3)	14 (2.2)	
Lobectomy	1,601 (78.6)	510 (81.0)		530 (84.7)	508 (81.2)	
Pneumonectomy	50 (2.5)	15 (2.4)		12 (1.9)	15 (2.4)	
Chemotherapy			0.18			0.69
Yes	884 (43.4)	293 (46.5)		283 (45.2)	291 (46.5)	
No	1,153 (56.6)	337 (53.5)		343 (54.8)	335 (53.5)	
Radiotherapy			0.02			0.63
Yes	239 (11.7)	97 (15.4)		87 (13.9)	94 (15.0)	
No	1,798 (88.3)	533 (84.6)		539 (86.1)	532 (85.0)	

Data are presented as mean ± standard deviation or n (%). *, significant at P<0.001. PSM, propensity score matching; PL, pleural layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe.

Table S4 Characteristics of T4 PL1/2 and T4 PL3 before and after PSM

Variable	Before PSM			After PSM		
	T4PL1/2 (N=630)	T4PL3 (N=220)	P value	T4PL1/2 (N=196)	T4PL3 (N=196)	P value
Gender			0.002			0.76
Female	307 (48.7)	80 (36.4)		72(36.7)	76 (38.8)	
Male	323 (51.3)	140 (63.6)		124 (63.3)	120 (61.2)	
Age, years	69.46±9.5	67.07±9.2	0.001	67.88±9.5	67.34±9.1	0.51
Race			0.17			0.98
White	505 (80.2)	188 (85.5)		169 (86.2)	168 (85.7)	
Black	68 (10.8)	15 (6.8)		11 (5.6)	12 (6.1)	
Other	57 (9.0)	17 (7.7)		16 (8.2)	16 (8.2)	
Histologic type			<0.001[*]			0.93
Adenocarcinoma	398 (63.2)	95 (43.2)		86 (43.9)	89 (45.4)	
Squamous cell carcinoma	174 (27.6)	102 (46.4)		87 (44.4)	86 (43.9)	
Other	58 (9.2)	23 (10.5)		23 (11.7)	21 (10.7)	
Tumor location			<0.001[*]			0.24
RU	168 (26.7)	68 (30.9)		70 (35.7)	56 (28.6)	
RM	23 (3.7)	4 (1.8)		4 (2.0)	3 (1.5)	
RL	133 (21.1)	22 (10.0)		21 (10.7)	21 (10.7)	
LU	131 (20.8)	77 (35.0)		73 (37.2)	69 (35.2)	
LL	82 (13.0)	32 (14.5)		20 (10.2)	32 (16.3)	
Other	93 (14.8)	17 (7.7)		8 (4.1)	15 (7.7)	
Surgical type			0.35			0.69
Wedge	90 (14.3)	21 (9.5)		20 (10.2)	19 (9.7)	
Segmentectomy	15 (2.4)	5 (2.3)		2 (1.0)	5 (2.6)	
Lobectomy	510 (81.0)	189 (85.9)		167 (85.2)	167 (85.2)	
Pneumonectomy	15 (2.4)	5 (2.3)		7 (3.6)	5 (2.6)	
Chemotherapy			<0.001[*]			>0.99
Yes	293 (46.5)	144 (65.5)		123 (62.8)	122 (62.2)	
No	337 (53.5)	76 (34.5)		73 (37.2)	74 (37.8)	
Radiotherapy			<0.001[*]			0.58
Yes	97 (15.4)	87 (39.5)		57 (29.1)	63 (32.1)	
No	533 (84.6)	133 (60.5)		139 (70.9)	133 (67.9)	

Data are presented as mean ± standard deviation or n (%). *, significant at P<0.001. PSM, propensity score matching; PL, pleural layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe.

Table S5 Characteristics of T3 PL0 and T3 PL1/2 before and after PSM

Variable	Before PSM			After PSM		
	T3PL0 (N=4,371)	T3PL1/2 (N=1,140)	P value	T3PL0 (N=1,138)	T3PL1/2 (N=1,138)	P value
Gender			0.009			0.65
Female	2,339 (53.5)	560 (49.1)		548 (48.2)	560 (49.2)	
Male	2,032 (46.5)	580 (50.9)		590 (51.8)	578 (50.8)	
Age, years	68.26±9.8	69.66±9.3	<0.001*	69.84±9.0	69.65±9.3	0.75
Race			0.006			0.16
White	3,724 (85.2)	933 (81.8)		962 (84.5)	933 (82.0)	
Black	348 (8.0)	99 (8.7)		76 (6.7)	99 (8.7)	
Other	299 (6.8)	108 (9.5)		100 (8.8)	106 (9.3)	
Histologic type			<0.001*			0.90
Adenocarcinoma	2,631 (60.2)	719 (63.1)		719 (63.2)	718 (63.1)	
Squamous cell carcinoma	1,188 (27.2)	347 (30.4)		340 (29.9)	346 (30.4)	
Other	552 (12.6)	74 (6.5)		79 (6.9)	74 (6.5)	
Tumor location			0.15			0.056
RU	1,385 (31.7)	393 (34.5)		372 (32.7)	391 (34.4)	
RM	214 (4.9)	57 (5.0)		42 (3.7)	57 (5.0)	
RL	883 (20.2)	209 (18.3)		221 (19.4)	209 (18.4)	
LU	1,038 (23.7)	279 (24.5)		274 (24.1)	279 (24.5)	
LL	727 (16.6)	163 (14.3)		204 (17.9)	163 (14.3)	
Other	124 (2.8)	39 (3.4)		25 (2.2)	39 (3.4)	
Surgical type			0.93			0.01
Wedge	475 (10.9)	118 (10.4)		93 (8.2)	117 (10.3)	
Segmentectomy	128 (2.9)	36 (3.2)		23 (2.0)	36 (3.2)	
Lobectomy	3,730 (85.3)	977 (85.7)		1,020 (89.6)	976 (85.8)	
Pneumonectomy	38 (0.9)	9 (0.8)		2 (0.2)	9 (0.8)	
Chemotherapy			<0.001*			0.34
Yes	1,384 (31.7)	474 (41.6)		496 (43.6)	472 (41.5)	
No	2,987 (68.3)	666 (58.4)		642 (56.4)	666 (58.5)	
Radiotherapy			<0.001*			0.51
Yes	267 (6.1)	139 (12.2)		126 (11.1)	137 (12.0)	
No	4,104 (93,9)	1,001 (87.8)		1,012 (88.9)	1,001 (88.0)	

Data are presented as mean ± standard deviation or n (%). *, significant at P<0.001. PSM, propensity score matching; PL, pleural layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe.

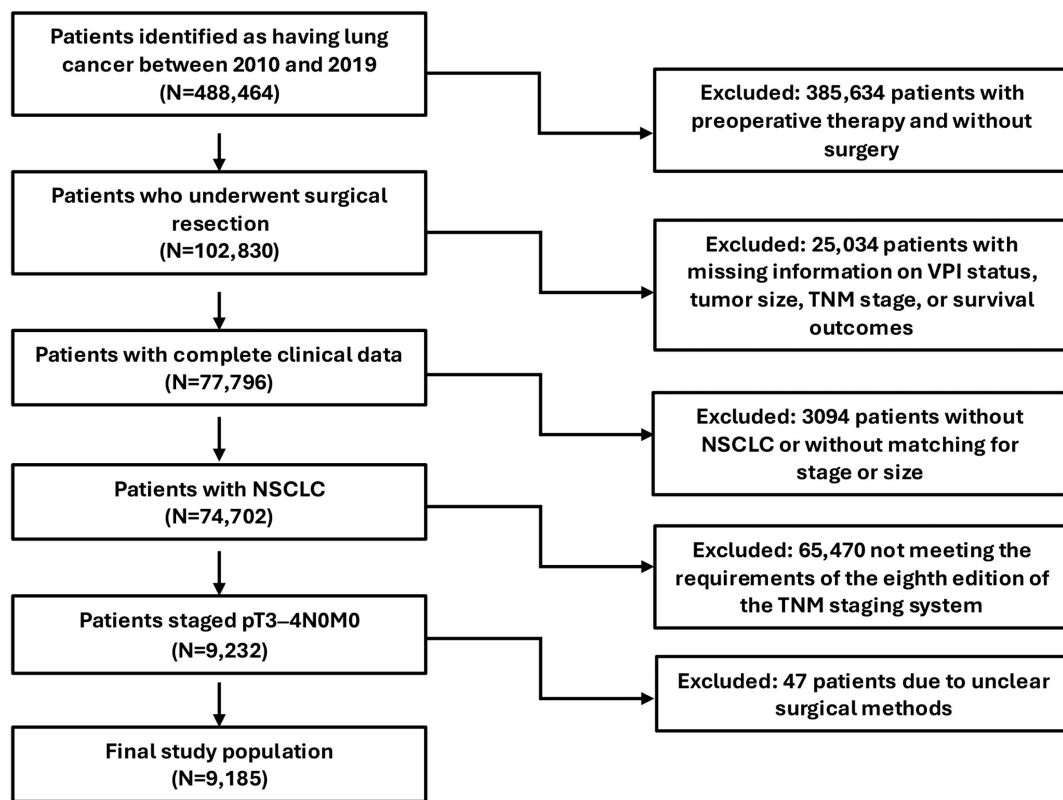**Table S6** Characteristics of T3 PL1/2 and T3 PL3 before and after PSM

Variable	Before PSM			After PSM		
	T3PL1/2 (N=1,140)	T3PL3 (N=787)	P value	T3PL1/2 (N=663)	T3PL3 (N=663)	P value
Gender			0.05			0.96
Female	561 (49.1)	227 (44.5)		289 (43.6)	287 (43.3)	
Male	580 (50.9)	437 (55.5)		374 (56.4)	376 (56.7)	
Age, years	69.66±9.3	68.23±9.2	0.001	68.78±9.5	68.48±9.3	0.71
Race			0.003			>0.99
White	933 (81.8)	688 (87.4)		572 (86.3)	573 (86.4)	
Black	99 (8.7)	54 (6.9)		51 (7.7)	50 (7.5)	
Other	108 (9.5)	45 (5.7)		40 (6.0)	40 (6.0)	
Histologic Type			<0.001*			0.65
Adenocarcinoma	719 (63.1)	387 (49.2)		343 (51.7)	327 (49.3)	
Squamous cell carcinoma	347 (30.4)	333 (42.3)		265 (40.0)	281 (42.4)	
Other	74 (6.5)	67 (8.5)		55 (8.3)	55 (8.3)	
Tumor location			<0.001*			0.99
RU	393 (34.5)	358 (45.5)		295 (44.5)	288 (43.4)	
RM	57 (5.0)	19 (2.4)		17 (2.6)	19 (2.9)	
RL	209 (18.3)	55 (7.0)		49 (7.4)	55 (8.3)	
LU	279 (24.5)	268 (34.1)		222 (33.5)	222 (33.5)	
LL	163 (14.3)	71 (9.0)		65 (9.8)	64 (9.7)	
Other	39 (3.4)	16 (2.0)		15 (2.3)	15 (2.3)	
Surgical type			0.04			0.97
Wedge	118 (10.4)	114 (14.5)		92 (13.9)	94 (14.2)	
Segmentectomy	36 (3.2)	25 (3.2)		22 (3.3)	20 (3.0)	
Lobectomy	977 (85.7)	645 (82.0)		545 (82.2)	546 (82.4)	
Pneumonectomy	9 (0.8)	3 (0.4)		4 (0.6)	3 (0.5)	
Chemotherapy			0.02			0.96
Yes	474 (41.6)	369 (46.9)		288 (43.4)	286 (43.1)	
No	666 (58.4)	418 (53.1)		642 (56.4)	666 (58.5)	
Radiotherapy			<0.001*			0.45
Yes	139 (12.2)	255 (32.4)		128 (19.3)	140 (21.1)	
No	1,001 (87.8)	532 (67.6)		535 (80.7)	523 (78.9)	

Data are presented as mean ± standard deviation or n (%). *, significant at P<0.001. PSM, propensity score matching; PL, pleura layer; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe.

Table S7 Characteristics of T3 PI and T4 without PI before and after PSM

Variable	Before PSM			After PSM		
	T3 PI (N=1,927)	T4PL0 (N=2,037)	P value	T3 PI (N=1,646)	T4PL0 (N=1,646)	P value
Gender			0.22			0.58
Female	910 (47.2)	1,003 (49.2)		769 (46.7)	786 (47.8)	
Male	1,017 (52.8)	1,034 (50.8)		877 (53.3)	860 (52.2)	
Age	69.07±9.29	67.89±9.84	<0.001*	68.67±9.4	67.17±9.4	0.13
Race			0.16			0.90
White	1,621 (84.1)	1,693 (83.1)		1,378 (83.7)	1,368 (83.1)	
Black	153 (7.9)	195 (9.6)		142 (8.6)	147 (8.9)	
Other	153 (7.9)	149 (7.3)		126 (7.7)	131 (8.0)	
Histologic type			<0.001*			0.91
Adenocarcinoma	1,106 (57.4)	1,281 (62.9)		1,036 (62.9)	1,047 (63.6)	
Squamous cell carcinoma	680 (35.3)	498 (24.4)		471 (28.6)	460 (27.9)	
Other	141 (7.3)	258 (12.7)		139 (8.4)	139 (8.4)	
Tumor location			<0.001*			<0.001*
RU	751 (39.0)	453 (22.2)		60 (40.1)	369 (22.4)	
RM	76 (3.9)	111 (5.4)		71 (4.3)	84 (5.1)	
RL	264 (13.7)	464 (22.8)		224 (13.6)	389 (23.6)	
LU	547 (28.4)	362 (17.8)		455 (27.6)	294 (17.9)	
LL	234 (12.1)	319 (15.7)		189 (11.5)	267 (16.2)	
Other	55 (2.9)	328 (16.1)		47 (2.9)	243 (14.8)	
Surgical type			<0.001*			0.66
Wedge	232 (12.0)	322 (15.8)		222 (13.5)	198 (12.0)	
Segmentectomy	61 (3.2)	64 (3.1)		51 (3.1)	51 (3.1)	
Lobectomy	1,622 (84.2)	1,601 (78.6)		1,361 (82.7)	1,384 (84.1)	
Pneumonectomy	12 (0.6)	50 (2.5)		12 (0.7)	13 (0.8)	
Chemotherapy			0.85			0.23
Yes	843 (43.7)	884 (43.4)		732 (44.5)	767 (46.6)	
No	1,084 (56.3)	1,153 (56.6)		914 (55.5)	879 (53.4)	
Radiotherapy			<0.001*			0.40
Yes	394 (20.4)	239 (11.7)		247 (15.0)	229 (13.9)	
No	1,533 (79.6)	1,798 (88.3)		1,399 (85.0)	1,417 (86.1)	

Data are presented as mean ± standard deviation or n (%). *, significant at P<0.001. PSM, propensity score matching; PL, pleura layer; PI, pleural invasion; RU, right upper lobe; RM, right middle lobe; RL, right lower lobe; LU, left upper lobe; LL, left lower lobe.

Figure S1 The flowchart of patient selection. NSCLC, non-small cell lung cancer; VPI, visceral pleural invasion; TNM, tumor, node, metastasis.