

**Table S1** Baseline characteristics of thymoma and thymic carcinoma at Masaoka stage III/IV before PSM

Variables	Nonsurgical patients (n=422)		Surgical patients (n=684)		P
	n	%	n	%	
Histological type					<0.001
Thymoma, NOS	102	24.2	377	55.1	
Thymic carcinoma	320	75.8	307	44.9	
Differentiation grade					0.009
Well	12	2.8	40	5.8	
Moderately	8	1.9	22	3.2	
Poorly	77	18.2	85	12.4	
Undifferentiated	13	3.1	28	4.1	
Unknown	312	73.9	509	74.4	
Age (years)					0.014
<60	214	50.7	383	56.0	
60–75	141	33.4	232	33.9	
>75	67	15.9	69	10.1	
Race					0.241
Black	76	18.0	97	14.2	
White	268	63.5	455	66.5	
Other/unknown	78	18.5	132	19.3	
Gender					0.215
Male	239	56.6	361	52.8	
Female	183	43.4	323	47.2	
Tumor size (cm)					<0.001
≤6.1	75	17.8	215	31.4	
>6.1	203	48.1	398	58.2	
Unknown	144	34.1	71	10.4	
T stage					<0.001
TX-T1	99	23.5	20	2.9	
T2-3	280	66.4	544	79.5	
T4	43	10.1	120	17.5	
N stage					<0.001
NX-N0	256	60.7	566	82.8	
N1/N2	166	39.3	118	17.2	
M stage					<0.001
M0	151	35.8	526	76.9	
M1/MX	271	64.2	158	23.1	

Table S1 (continued)

Table S1 (continued)

Variables	Nonsurgical patients (n=422)		Surgical patients (n=684)		P
	n	%	n	%	
Met at bone					<0.001
No	205	48.6	319	46.6	
Yes	32	7.6	4	0.6	
Unknown	185	43.8	361	52.8	
Met at brain					<0.001
No	227	53.8	323	47.2	
Yes	9	2.1	1	0.2	
Unknown	186	44.1	360	52.6	
Met at liver					<0.001
No	214	50.7	318	46.5	
Yes	23	5.5	4	0.6	
Unknown	185	43.8	362	52.9	
Met at lung					<0.001
No	150	35.5	280	40.9	
Yes	85	20.1	44	6.4	
Unknown	187	44.3	360	52.6	
Met at regional lymph nodes					<0.001
No	172	40.8	509	74.4	
Yes	152	36.0	111	16.2	
Unknown	98	23.2	64	9.4	
Met at distant lymph nodes					<0.001
No	324	76.8	621	90.8	
Yes	85	20.1	33	4.4	
Unknown	13	3.1	30	4.8	
Met at distant organs					<0.001
No	164	38.9	531	77.6	
Yes	245	58.1	123	18.0	
Unknown	13	3.1	30	4.4	
Insurance status					0.003
Insured, NOS	330	78.2	479	70.0	
Uninsured/unknown	92	21.8	205	30.0	
Marital status					0.015
Married	221	52.4	409	59.8	
Single/unknown	201	47.6	275	40.2	

PSM, propensity score matching; Met, metastasis; NOS, not otherwise specific.

**Table S2** Baseline characteristics of thymoma and thymic carcinoma at Masaoka stage III/IV after PSM

Variables	Surgery group (n=237)		Non-surgery group (n=237)		P
	n	%	n	%	
Histological type					0.356
Thymoma, NOS	124	52.3	135	57.0	
Thymic carcinoma, NOS	113	47.7	102	43.0	
Differentiation grade					0.414
Well	9	3.8	11	4.6	
Moderately	8	3.4	5	2.1	
Poorly	43	18.1	45	19	
Undifferentiated	15	6.3	7	3.0	
Unknown	162	68.4	169	71.3	
Age (years)					0.421
<60	121	51.1	126	53.2	
60–75	88	37.1	76	32.1	
>70	28	11.8	35	14.8	
Race					0.670
Black	34	14.4	41	17.3	
White	158	66.6	151	63.7	
Other/unknown	45	19.0	45	19.0	
Gender					0.266
Male	141	59.5	128	54.0	
Female	96	40.5	109	46.0	
Tumor size (cm)					0.640
≤6.1	48	20.2	54	22.8	
>6.1	153	64.6	143	60.3	
Unknown	36	15.2	40	16.9	
T stage					0.915
TX-T1	17	7.2	18	7.6	
T2-3	189	79.7	185	78.1	
T4	31	13.1	34	14.3	
N stage					0.689
NX-N0	168	70.9	163	68.8	
N1/N2	69	29.1	74	31.2	
M stage					1.000
M0	134	56.5	133	56.1	
M1/MX	103	43.5	104	43.9	

Table S2 (continued)

Table S2 (continued)

Variables	Surgery group (n=237)		Non-surgery group (n=237)		P
	n	%	n	%	
Met at bone					0.835
No	112	47.2	113	47.7	
Yes	4	1.7	6	2.5	
Unknown	121	51.1	118	49.8	
Met at brain					0.473
No	115	48.5	115	48.5	
Yes	1	0.4	4	1.7	
Unknown	121	51.1	118	49.8	
Met at liver					0.416
No	114	48.1	112	47.3	
Yes	2	0.8	6	2.5	
Unknown	121	51.1	119	50.2	
Met at lung					0.625
No	87	36.7	94	39.7	
Yes	30	12.7	24	10.1	
Unknown	120	50.6	119	50.2	
Met at regional lymph nodes					0.668
No	141	59.5	131	55.3	
Yes	64	27.0	71	30.0	
Unknown	32	13.5	35	14.7	
Met at distant lymph nodes					0.468
No	205	86.5	196	82.7	
Yes	22	9.3	31	13.1	
Unknown	10	4.2	10	4.2	
Met at distant organs					0.959
No	139	58.7	135	57.0	
Yes	88	37.1	92	38.8	
Unknown	10	4.2	10	4.2	
Insurance status					0.406
Insured, NOS	169	71.3	176	74.3	
Uninsured/unknown	68	28.7	61	25.7	
Marital status					0.819
Married	132	55.7	129	54.4	
Single/unknown	105	44.3	108	45.6	

PSM, propensity score matching; Met, metastasis; NOS, not otherwise specific.

**Table S3** Multivariate Cox regression analyses of PSM population

Variables	OS		
	HR	95% CI	P value
Histological type			0.001
Thymoma, NOS	0.599	0.441-0.813	0.001
Thymic carcinoma	Reference		
Differentiation grade			0.143
Well	0.690	0.347-1.370	0.289
Moderately	1.020	0.460-2.265	0.960
Poorly	1.251	0.880-1.777	0.212
Undifferentiated	1.805	1.035-3.148	0.037
Unknown	Reference		
Age (years)			<0.001
<60	0.485	0.340-0.691	<0.001
60–75	0.703	0.482-1.025	0.067
>75	Reference		
Race			0.445
White	1.200	0.842-1.710	0.314
Black	1.329	0.844-2.093	0.220
Other/unknown	Reference		
Gender			0.570
Male	1.082	0.825-1.419	0.570
Female	Reference		
Tumor size (cm)			0.025
≤6.1	0.574	0.384-0.857	0.007
>6.1	0.737	0.530-1.025	0.070
Unknown	Reference		
T value			0.483
TX-T1	0.810	0.447-1.468	0.487
T2-T3	1.088	0.731-1.619	0.678
T4	Reference		
N value			0.022
NX-N0	0.341	0.136-0.856	0.022
N1/N2	Reference		
M value			0.208
M0	0.516	0.184-1.445	0.208
M1/MX	Reference		

**Table S3** (continued)**Table S3** (continued)

Variables	OS		
	HR	95% CI	P value
Met at regional lymph nodes			0.344
No	1.111	0.726-1.701	0.628
Yes	0.545	0.222-1.335	0.184
Unknown	Reference		
Met at distant lymph nodes			0.087
No	1.677	0.876-3.209	0.119
Yes	2.358	1.097-5.069	0.028
Unknown	Reference		
Met at distant organs			0.880
No	1.079	0.404-2.879	0.880
Yes	1.079	0.404-2.879	0.880
Unknown	Reference		
Insurance status			0.294
Insured, NOS	0.825	0.619-1.098	0.187
Uninsured	0.587	0.237-1.454	0.250
Unknown	Reference		
Marital status			0.028
Married	1.378	0.650-2.925	0.403
Single	1.911	0.910-4.017	0.087
Unknown	Reference		
Surgery intervention			<0.001
Yes	0.446	0.342-0.582	<0.001
None	Reference		

OS, overall survival; HR, hazard ratio; CI, confidence interval; Met, metastasis; NOS, not otherwise specific; PSM, propensity score matching.

**Table S4** Clinical characteristics of patients with Masaoka III/IV stage thymoma/thymic carcinoma in the training cohort and internal validation cohort

Variables	Training cohort (n=759)		Internal validation cohort (n=347)		P
	n	%	n	%	
Histological type					0.228
Type A, thymoma	40	5.3	11	3.2	
Type AB, thymoma	51	6.7	27	7.8	
Type B1, thymoma	57	7.5	31	8.9	
Type B2, thymoma	80	10.5	28	8.1	
Type B3, thymoma	112	14.8	42	12.1	
Thymoma, NOS/thymic carcinoma	419	55.2	208	59.9	
Differentiation grade					0.768
Well	38	5	14	4.0	
Moderately	22	2.9	8	2.3	
Poorly	107	14.1	55	15.9	
Undifferentiated	26	3.4	15	4.3	
Unknown	566	74.6	255	73.5	
Age (years)					0.865
<60	391	51.5	182	52.5	
60–75	272	35.8	125	36.0	
>75	96	12.7	40	11.5	
Race					0.524
Black	118	15.6	55	15.9	
White	490	64.6	233	67.1	
Other/unknown	151	19.9	59	17.0	
Gender					0.795
Male	414	54.5	186	53.6	
Female	345	45.5	161	46.4	
Tumor size (cm)					0.946
≤6.1	196	25.8	93	26.8	
>6.1	414	54.6	187	53.9	
Unknown	149	19.6	67	19.3	
T stage					0.406
TX-T1	87	11.5	32	9.2	
T2-3	557	73.4	267	77.0	
T4	115	15.1	48	13.8	

**Table S4** (continued)

**Table S4** (continued)

Variables	Training cohort (n=759)		Internal validation cohort (n=347)		P
	n	%	n	%	
N stage					0.205
NX-N0	558	73.5	268	77.2	
N1/N2	201	26.5	79	22.8	
M stage					0.550
M0	460	60.6	217	62.5	
M1/MX	299	39.4	130	37.5	
Met at regional lymph nodes					0.334
No	475	62.6	215	61.9	
Yes	191	25.2	79	22.8	
Unknown	93	12.2	53	15.3	
Met at distant lymph nodes					0.494
No	460	60.6	217	62.5	
Yes	228	30.0	105	30.3	
Unknown	71	9.4	25	7.2	
Met at distant organs					0.663
No	470	61.9	225	64.8	
Yes	245	32.3	104	30.0	
Unknown	44	5.8	18	5.2	
Insurance status					0.349
Insured, NOS	552	72.7	257	74.1	
Uninsured/unknown	207	27.3	90	25.9	
Marital status					0.472
Married	438	57.7	192	55.3	
Single/unknown	321	42.3	155	44.7	

Met, metastasis; NOS, not otherwise specific.

**Table S5** Characteristics of external validation cohort

Characteristic	n	%
Gender		
Male	25	59.5
Female	17	40.5
Age (years)		
<60	21	50
60–75	18	42.9
>75	3	7.1
Masaoka stage		
III	16	38.1
IVa	4	9.5
IVb	22	52.4
Differentiation grade		
Well	0	0
Moderately	4	9.5
Poorly	10	23.8
Undifferentiated	11	26.2
Unknown	27	64.3
Tumor size (cm)		
≤6.1	15	35.7
>6.1	26	61.9
Unknown	1	2.4
Met at bone		
No	37	88.1
Yes	5	11.9
Met at brain		
No	40	95.2
Yes	2	4.8
Met at liver		
No	41	97.6
Yes	1	2.4
Met at lung		
No	26	61.9
Yes	16	38.1
Treatment		
Surgery	23	54.8
Non-surgery	19	45.2