

Appendix 1 CT scanning protocol

Thoracic CT examinations of all patients were performed by using one of the following multidetector CT Systems and their respective acquisition parameters:

- (I) Somatom Definition AS (Siemens Medical Systems): tube energy as 120 kVp, tube current as 130 mA, rotation time as 0.5 seconds, detector collimation as 64 mm × 0.63 mm, CT reconstruction at 1.0 mm slice thickness with the standard soft kernel (Siemens B31 filter, Siemens Medical Solutions).
- (II) Brilliance 40 (Philips Medical Systems): tube energy as 120 kV, tube current as 200 mA, rotation time as 0.75 seconds, detector collimation as 32 mm × 1.25 mm, CT reconstruction at 0.75 mm slice thickness with sharp reconstruction kernel (C filter, Philips). Contrast-enhanced CT was performed after intravenous injection of ioversol (350 mg of iodine per milliliter; Jiangsu Hengrui Medicine) at a dose of 1.3–1.5 mL per kilogram of body weight at a rate of 2.5 mL/sec by using an automated injector.
- (III) Discovery 750 (GE Healthcare): tube energy as 120 kV, tube current as 50–350 mA, rotation time as 0.5 seconds, detector collimation as 32 mm × 1.25 mm, pitch of 0.64, section thickness of 0.75 mm without overlap, matrix of 512×512 or 1,024×1,024, field of view (FOV) of 350–400 mm.
- (IV) Somatom Definition Flash (Siemens Healthineers): tube energy as 120 kV, tube current as 120 mA, rotation time as 0.5 seconds, detector collimation as 32 mm × 1.25 mm, pitch of 0.64, section thickness of 0.6 mm without overlap, matrix of 512×512 or 1,024×1,024, FOV of 350–400 mm.

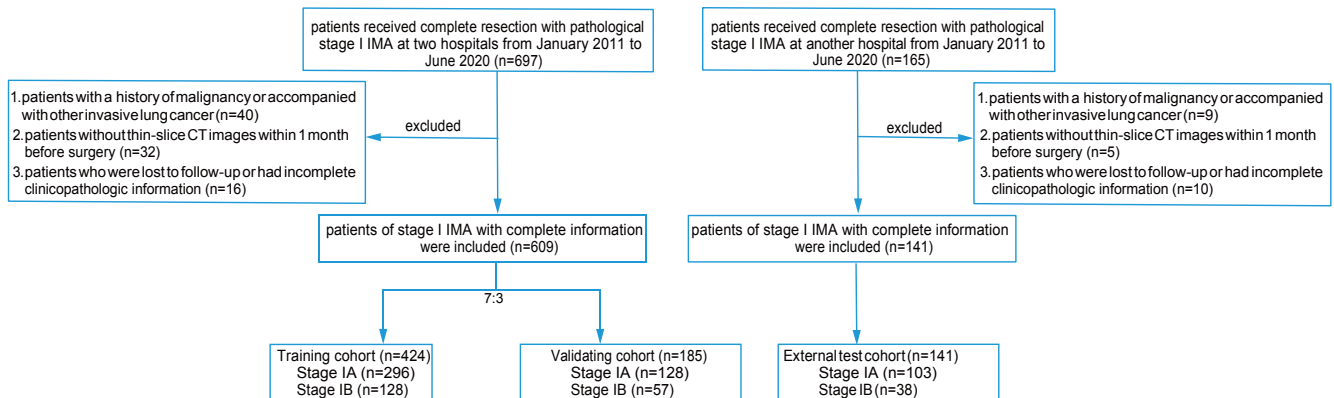


Figure S1 Flow diagram of patient selection in the training, validating and external test cohorts.

Table S1 Point assignment of each prognostic factor in nomogram

Prognostic factor	Score
Lobulation	
Absent	0
Shallow	30.4
Deep	60.8
Smoking history	
No	0
Yes	42.6
VPI	
Absent	0
Present	64.3
LVI	
Absent	0
Present	66.7
Tumor size (cm)	
0-<1	0
1-<2	33.3
2-<3	66.7
3-<4	100

Table S2 RFS rate corresponding to RS

RS	3-year RFS (%)	RS	5-year RFS (%)
112	0.95	42	0.95
148	0.90	78	0.90
170	0.85	99	0.85
185	0.80	115	0.80
198	0.75	127	0.75
218	0.65	147	0.65
234	0.55	164	0.55
255	0.40	185	0.40
276	0.25	205	0.25
		231	0.10

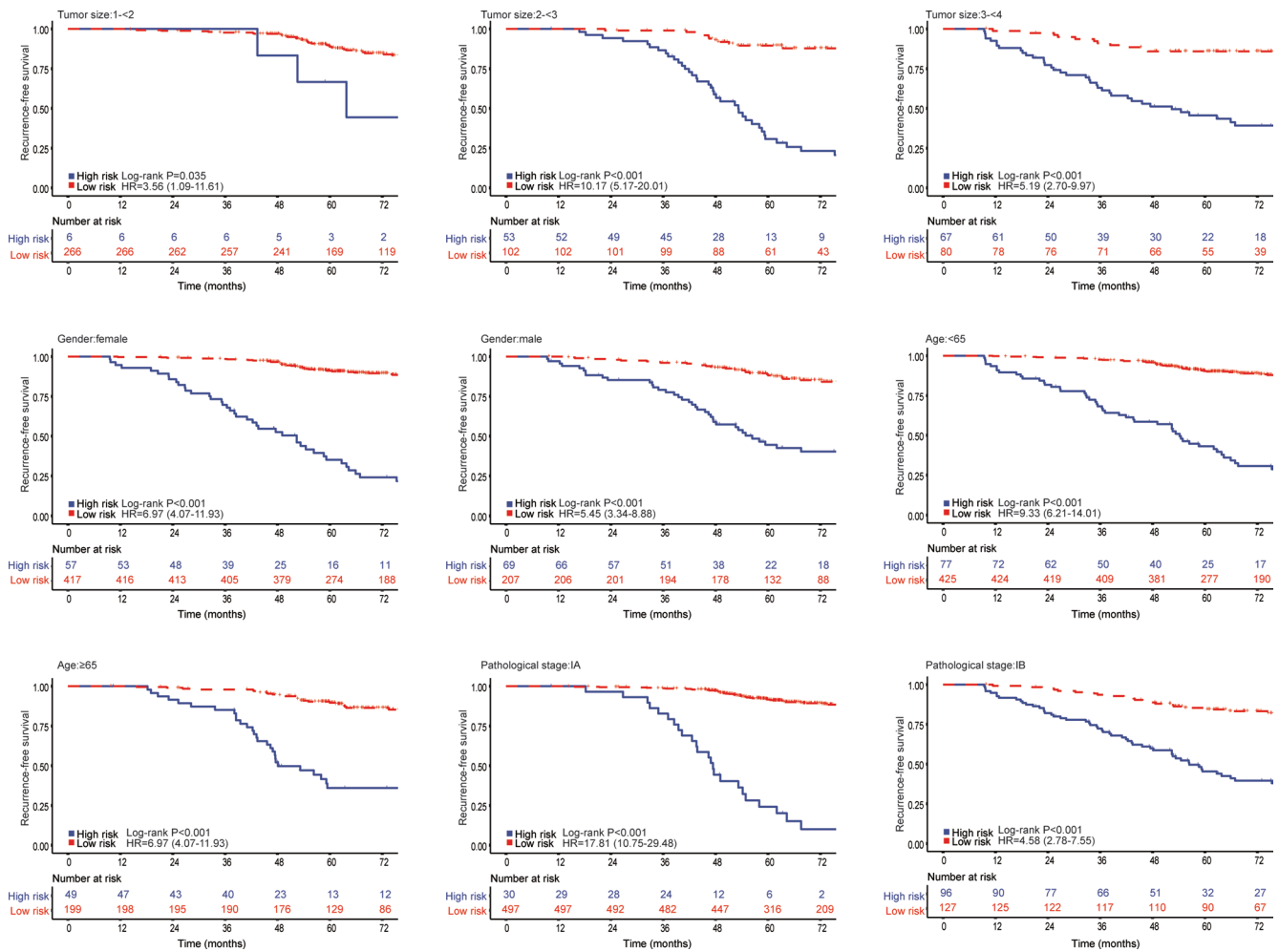


Figure S2 Kaplan-Meier curves of RFS for all 750 patients with stage I IMA according to risk stratification based on the nomogram stratified by clinical factors.

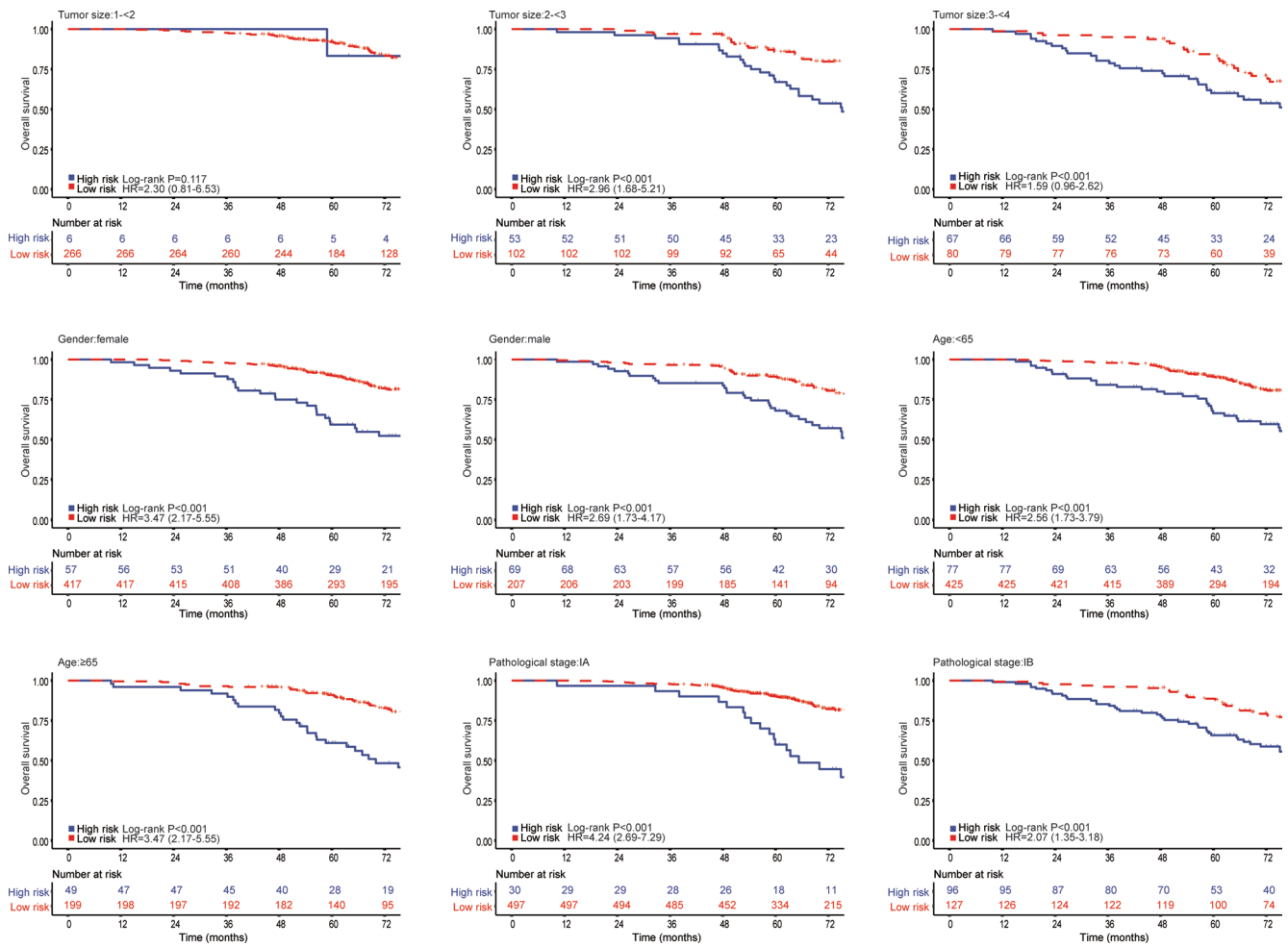


Figure S3 Kaplan-Meier curves of OS for all 750 patients with stage I IMA according to risk stratification based on the nomogram stratified by clinical factors.

Table S3 Demographic and clinicopathological characteristics of high-risk and low-risk groups

Characteristics	High-risk group (N=126)	Low-risk group (N=624)	P value
Age, n (%)			0.128
<65 years	77 (61.1)	425 (68.1)	
≥65 years	49 (38.9)	199 (31.9)	
Gender, n (%)			<0.001
Male	69 (54.8)	207 (33.2)	
Female	57 (45.2)	417 (66.8)	
Smoking history, n (%)			<0.001
No	37 (29.4)	563 (90.2)	
Yes	89 (70.6)	61 (9.8)	
Tumor location, n (%)			0.992
Upper lobe	36 (28.6)	178 (28.5)	
Non-upper lobe	90 (71.4)	446 (71.5)	
Tumor size (cm)			<0.001
0–<1	0	176 (28.2)	
1–<2	6 (4.8)	266 (42.6)	
2–<3	53 (42.1)	102 (16.3)	
3–<4	67 (53.2)	80 (12.8)	
LVI, n (%)			<0.001
Presence	19 (15.1)	3 (0.5)	
Absence	107 (84.9)	621 (99.5)	
VPI, n (%)			<0.001
Presence	57 (45.2)	44 (7.1)	
Absence	69 (54.8)	580 (92.9)	
Surgery types, n (%)			<0.001
Lobectomy	118 (93.7)	489 (78.4)	
Segmentectomy	8 (6.3)	135 (21.6)	
Adjuvant chemotherapy, n (%)			<0.001
ACT	57 (45.2)	76 (12.2)	
Non-ACT	69 (54.8)	548 (87.8)	
Pathological subtype, n (%)			0.077
MMNA	11 (8.7)	30 (4.8)	
IMA	115 (91.3)	594 (95.2)	
Tumor density, n (%)			<0.001
Sub-solid	7 (5.6)	213 (34.1)	
Pure-solid	119 (94.4)	411 (65.9)	

Table S3 (continued)

Table S3 (continued)

Characteristics	High-risk group (N=126)	Low-risk group (N=624)	P value
UIP pattern, n (%)			0.844
Absence	7 (5.6)	32 (5.1)	
Presence	119 (94.4)	592 (94.9)	
Obstructive pneumonia, n (%)			0.404
Absence	120 (95.2)	606 (97.1)	
Presence	6 (4.8)	18 (2.9)	
Lesion in non-tumor lobe, n (%)			0.714
Absence	118 (93.7)	578 (92.6)	
Presence	8 (6.3)	46 (7.4)	
Lymphadenopathy, n (%)			0.219
Absence	116 (92.1)	549 (88.0)	
Presence	10 (7.9)	75 (12.0)	
Air bronchogram, n (%)			0.001
Absence	107 (84.9)	589 (94.4)	
Presence	19 (15.1)	35 (5.6)	
Bubblelike lucency, n (%)			0.132
Absence	106 (84.1)	555 (88.9)	
Presence	20 (15.9)	69 (11.1)	
Cavitation, n (%)			0.586
Absence	21 (16.7)	92 (14.7)	
Presence	105 (83.3)	532 (85.3)	
Pleural attachment, n (%)			0.005
Absence	86 (68.3)	499 (80.0)	
Presence	40 (31.7)	125 (20.0)	
Pleural retraction, n (%)			0.901
Absence	101 (80.2)	505 (80.9)	
Presence	25 (19.8)	119 (19.1)	
Spiculation, n (%)			0.083
Absence	82 (65.1)	454 (72.8)	
Fine	33 (26.2)	110 (17.6)	
Coarse	11 (8.7)	60 (9.6)	
Border, n (%)			0.598
Obscure	18 (14.3)	102 (16.3)	
Clear	108 (85.7)	522 (83.7)	

Table S3 (continued)

Table S3 (continued)

Characteristics	High-risk group (N=126)	Low-risk group (N=624)	P value
Lobulation, n (%)			<0.001
Absence	22 (17.5)	386 (61.9)	
Shallow	42 (33.3)	156 (25.0)	
Deep	62 (49.2)	82 (13.1)	
Location, n (%)			
Peripheral	14 (11.1)	33 (5.3)	0.014
Central	112 (88.9)	591 (94.7)	
Emphysema, n (%)			0.744
Absence	115 (91.3)	561 (89.9)	
Presence	11 (8.7)	63 (10.1)	
Overall shape, n (%)			0.603
Round	38 (30.2)	204 (32.7)	
Irregular	88 (69.8)	420 (67.3)	
Stage, n (%)			<0.001
IA	30 (23.8)	497 (79.6)	
IB	96 (76.2)	127 (20.4)	

Table S4 Demographic and clinicopathological characteristics of ACT and non-ACT group

Characteristics	ACT (N=133)	Non-ACT (N=617)	P value
Age, n (%)			0.103
<65 years	81 (60.9)	421 (68.2)	
≥65 years	52 (39.1)	196 (31.8)	
Gender, n (%)			0.003
Male	64 (48.1)	212 (34.4)	
Female	69 (51.9)	405 (65.6)	
Smoking history, n (%)			<0.001
No	81 (60.9)	519 (84.1)	
Yes	52 (39.1)	98 (15.9)	
Tumor location, n (%)			0.518
Upper lobe	41 (30.8)	173 (28)	
Non-upper lobe	92 (69.2)	444 (72)	
Tumor size (cm)			<0.001
0–<1	3 (2.3)	173 (28.0)	
1–<2	16 (12.0)	256 (41.5)	
2–<3	43 (32.3)	112 (18.2)	
3–<4	71 (53.4)	76 (12.3)	

Table S4 (continued)

Table S4 (continued)

Characteristics	ACT (N=133)	Non-ACT (N=617)	P value
LVI, n (%)			0.235
Presence	6 (4.5)	16 (2.6)	
Absence	127 (95.5)	601 (97.4)	
VPI, n (%)			<0.001
Presence	45 (33.8)	56 (9.1)	
Absence	88 (66.2)	561 (90.9)	
Surgery types, n (%)			
Lobectomy	129 (97.0)	478 (77.5)	<0.001
Segmentectomy	4 (3.0)	139 (22.5)	
Pathological subtype, n (%)			0.047
MMNA	12 (9.0)	29 (4.7)	
IMA	121 (91.0)	588 (95.3)	
Tumor density, n (%)			<0.001
Sub-solid	13 (9.8)	207 (33.5)	
Pure-solid	120 (90.2)	410 (66.5)	
UIP pattern, n (%)			0.370
Absence	124 (93.2)	587 (95.1)	
Presence	9 (6.8)	30 (4.9)	
Obstructive pneumonia, n (%)			<0.001
Absence	12 (9.0)	12 (1.9)	
Presence	121 (91.0)	605 (98.1)	
Lesion in non-tumor lobe, n (%)			0.875
Absence	123 (92.5)	573 (92.9)	
Presence	10 (7.5)	44 (7.1)	
Lymphadenopathy, n (%)			0.561
Absence	116 (87.2)	549 (89.0)	
Presence	17 (12.8)	68 (11.0)	
Air bronchogram, n (%)			<0.001
Absence	25 (18.8)	29 (4.7)	
Presence	108 (81.2)	588 (95.3)	
Bubblelike lucency, n (%)			0.213
Absence	113 (85.0)	548 (88.8)	
Presence	20 (15.0)	69 (11.2)	

Table S4 (continued)

Table S4 (continued)

Characteristics	ACT (N=133)	Non-ACT (N=617)	P value
Cavitation, n (%)			0.504
Absence	110 (82.7)	527 (85.4)	
Presence	23 (17.3)	90 (14.6)	
Pleural attachment, n (%)			0.527
Absence	101 (75.9)	484 (78.4)	
Presence	32 (24.1)	133 (21.6)	
Pleural retraction, n (%)			0.709
Absence	109 (82.0)	497 (80.6)	
Presence	24 (18.0)	120 (19.4)	
Spiculation, n (%)			0.251
Absence	88 (66.2)	448 (72.6)	
Fine	32 (24.1)	111 (18.0)	
Coarse	13 (9.8)	58 (9.4)	
Border, n (%)			0.552
Obscure	19 (14.3)	101 (16.4)	
Clear	114 (85.7)	516 (83.6)	
Lobulation, n (%)			0.007
Absence	58 (43.6)	350 (56.7)	
Shallow	38 (28.6)	160 (25.9)	
Deep	37 (27.8)	107 (17.3)	
Location, n (%)			0.031
Peripheral	119 (89.5)	584 (94.7)	
Central	14 (10.5)	33 (5.3)	
Emphysema, n (%)			0.719
Absence	121 (91.0)	555 (90.0)	
Presence	12 (9.0)	62 (10.0)	
Overall shape, n (%)			0.315
Round	38 (28.6)	204 (33.1)	
Irregular	95 (71.4)	413 (66.9)	
Stage, n (%)			<0.001
IA	29 (21.8)	498 (80.7)	
IB	104 (78.2)	119 (19.3)	

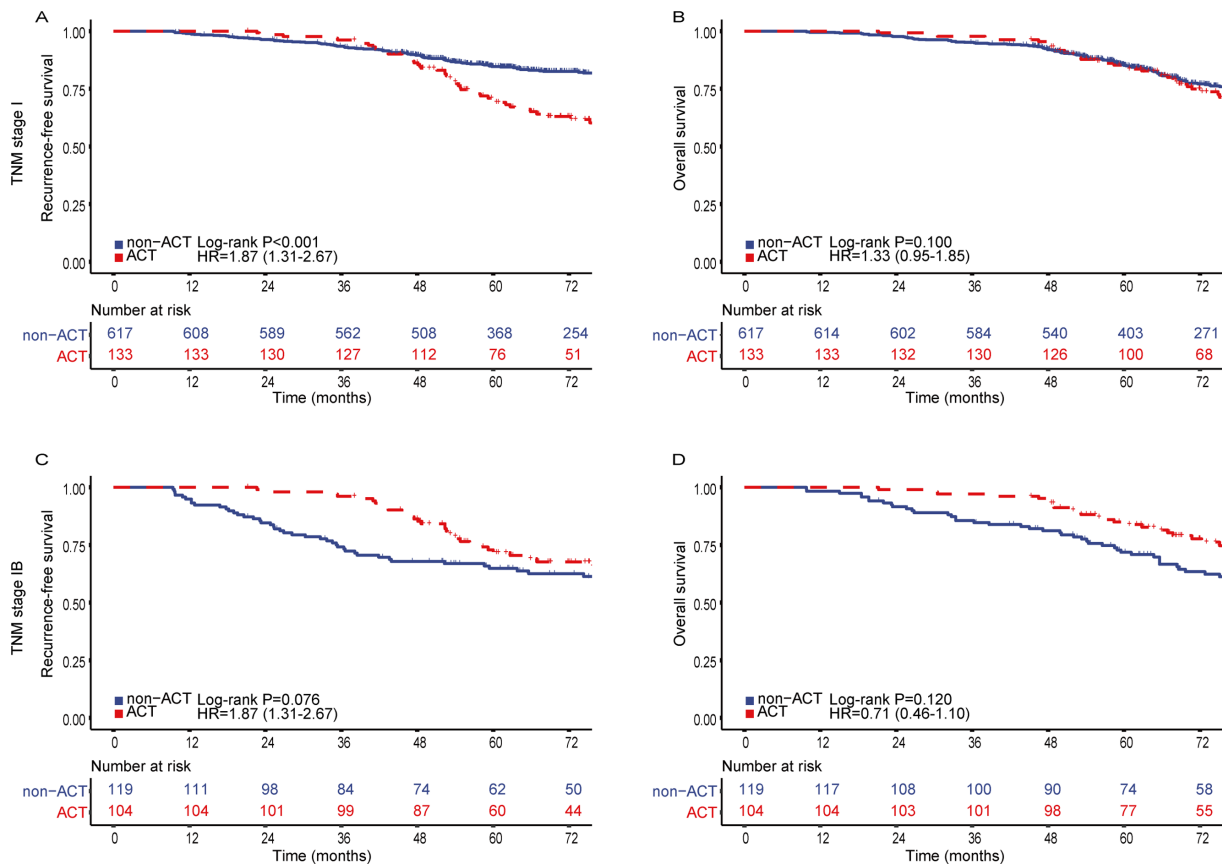


Figure S4 Kaplan-Meier curves of RFS and OS is stratified by treatment with nonselective ACT vs. non-ACT in all patients with stage I IMA (A,B), stage IB (C,D).