

Figure S1 Calibration plot of the model 1 in the training set (A), the testing set (B) and the validation set (C). Model 1 utilized clinical characteristics and morphological features on pre-surgical CT.

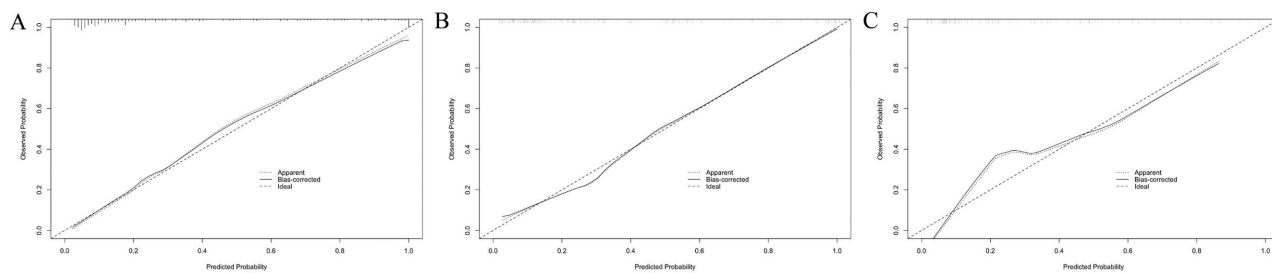


Figure S2 Calibration plot of the model 2 in the training set (A), the testing set (B) and the validation set (C). Model 2 incorporated clinical characteristics, morphological features and quantitative parameters on pre-surgical CT.

Table S1 Clinicopathological and radiological characteristics of 710 patients in pGGN, GGO-dominant mGGN, and solid-dominant mGGN groups

Factor	Total patients (N=710)	pGGN (N=297)	GGO-dominant mGGN (N=350)	Solid-dominant mGGN (N=63)	P value
Sex					0.08
Female	492 (69.30%)	193 (64.98%)	256 (73.14%)	43 (68.25%)	
Male	218 (30.70%)	104 (35.02%)	94 (26.86%)	20 (31.75%)	
Age, years	55.00 (46.00, 62.00)	52.00 (42.00, 59.00)	57.00 (49.00, 64.00)	57.00 (51.50, 62.50)	<0.001*
Smoking history	92 (12.96%)	36 (12.12%)	43 (12.29%)	13 (20.63%)	0.16
History of another malignant tumor	59 (8.31%)	32 (10.77%)	21 (6.00%)	6 (9.52%)	0.08
pT stage [†]					<0.001*
Tis	207 (29.15%)	141 (47.47%)	64 (18.29%)	2 (3.17%)	
T1mi	255 (35.92%)	114 (38.38%)	134 (38.29%)	7 (11.11%)	
T1a	78 (10.99%)	14 (4.71%)	47 (13.43%)	17 (26.98%)	
T1b	131 (18.45%)	22 (7.41%)	83 (23.71%)	26 (41.27%)	
T1c	26 (3.66%)	0 (0.00%)	19 (5.43%)	7 (11.11%)	
T2a	6 (0.85%)	1 (0.34%)	1 (0.29%)	4 (6.35%)	
Histologic subtypes					<0.001*
AHH	7 (0.99%)	5 (1.68%)	2 (0.57%)	0 (0.00%)	
AIS	207 (29.15%)	141 (47.47%)	64 (18.29%)	2 (3.17%)	
MIA	255 (35.92%)	114 (38.38%)	134 (38.29%)	7 (11.11%)	
LPA	48 (6.76%)	7 (2.36%)	36 (10.29%)	5 (7.94%)	
APA	125 (17.61%)	16 (5.39%)	78 (22.29%)	31 (49.21%)	
MPA	2 (0.28%)	0 (0.00%)	2 (0.57%)	0 (0.00%)	
PPA	58 (8.17%)	14 (4.71%)	31 (8.86%)	13 (20.63%)	
SPA	4 (0.56%)	0 (0.00%)	2 (0.57%)	2 (3.17%)	
MA	4 (0.56%)	0 (0.00%)	1 (0.29%)	3 (4.76%)	
Lymphatic invasion	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	-
Perineural invasion	1 (0.14%)	0 (0.00%)	1 (0.29%)	0 (0.00%)	>0.99
Pleural invasion	6 (0.85%)	1 (0.34%)	1 (0.29%)	4 (6.35%)	<0.001*
Surgical margin	1 (0.14%)	0 (0.00%)	1 (0.29%)	0 (0.00%)	>0.99
Spread through air space	18 (2.54%)	1 (0.34%)	13 (3.71%)	4 (6.35%)	0.001*
Vascular invasion	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	-
ALK rearrangement	9 (1.27%)	0 (0.00%)	7 (2.00%)	2 (3.17%)	0.01*
EGFR	56 (7.89%)	15 (5.05%)	29 (8.29%)	12 (19.05%)	0.002*
Follow-up, months	5.00 (3.00, 8.00)	5.00 (3.00, 9.00)	4.00 (2.00, 8.00)	5.00 (3.00, 7.50)	0.053
Location					<0.001*
LUL	199 (28.03%)	109 (36.70%)	75 (21.43%)	15 (23.81%)	
LLL	85 (11.97%)	28 (9.43%)	43 (12.29%)	14 (22.22%)	
RUL	259 (36.48%)	111 (37.37%)	135 (38.57%)	13 (20.63%)	
RML	47 (6.62%)	17 (5.72%)	27 (7.71%)	3 (4.76%)	
RLL	120 (16.90%)	32 (10.77%)	70 (20.00%)	18 (28.57%)	
Shape					<0.001*
Round or oval	440 (61.97%)	226 (76.09%)	180 (51.43%)	34 (53.97%)	
Irregular	270 (38.03%)	71 (23.91%)	170 (48.57%)	29 (46.03%)	
Uniformity					<0.001*
Homogeneous	176 (24.36%)	176 (59.26%)	0 (0.00%)	0 (0.00%)	
Heterogeneous	534 (75.63%)	121 (40.74%)	350 (100.00%)	63 (100.00%)	
Margin					<0.001*
Smooth	479 (67.46%)	259 (87.21%)	198 (56.57%)	22 (34.92%)	
Coarse	231 (32.54%)	38 (12.79%)	152 (43.43%)	41 (65.08%)	

Table S1 (continued)

Table S1 (continued)

Factor	Total patients (N=710)	pGGN (N=297)	GGO-dominant mGGN (N=350)	Solid-dominant mGGN (N=63)	P value
Nodule lung interface					0.002*
Well-defined	510 (71.83%)	218 (73.40%)	236 (67.43%)	56 (88.89%)	
Ill-defined	200 (28.17%)	79 (26.60%)	114 (32.57%)	7 (11.11%)	
Pleural indentation	243 (34.23%)	51 (17.17%)	147 (42.00%)	45 (71.43%)	<0.001*
Lobulation	494 (69.58%)	168 (56.57%)	270 (77.14%)	56 (88.89%)	<0.001*
Spiculation	176 (24.79%)	21 (7.07%)	119 (34.00%)	36 (57.14%)	<0.001*
Air bronchogram	164 (23.10%)	43 (14.48%)	89 (25.43%)	32 (50.79%)	<0.001*
Vascular convergence sign	4 (0.56%)	0 (0.00%)	3 (0.86%)	1 (1.59%)	0.14
Vacuole sign	368 (51.83%)	144 (48.48%)	195 (55.71%)	29 (46.03%)	0.12
Cavity	21 (2.96%)	3 (1.01%)	12 (3.43%)	6 (9.52%)	0.002*
Vessel changes					<0.001*
Type I	584 (82.25%)	265 (89.23%)	259 (74.00%)	60 (95.24%)	
Type II	126 (17.75%)	32 (10.77%)	91 (26.00%)	3 (4.76%)	
Halo sign	2 (0.28%)	0 (0.00%)	0 (0.00%)	2 (3.17%)	0.008*
Pleural effusion	2 (0.28%)	1 (0.34%)	1 (0.29%)	0 (0.00%)	>0.99
Pleural thickening	96 (13.52%)	25 (8.42%)	55 (15.71%)	16 (25.40%)	<0.001*
Calcification	1 (0.14%)	0 (0.00%)	0 (0.00%)	1 (1.59%)	0.09
Lymphadenopathy	7 (0.99%)	3 (1.01%)	3 (0.86%)	1 (1.59%)	0.72
Diameter, mm	10.00 (8.00, 14.00)	9.00 (8.00, 11.00)	11.00 (8.00, 16.00)	12.00 (10.00, 17.00)	<0.001*
Diameter growth rate, mm/month	0.00 (0.00, 0.25)	0.00 (0.00, 0.20)	0.00 (0.00, 0.33)	0.14 (0.00, 0.37)	0.29
Relative diameter growth rate, %/month	0.00 (0.00, 1.92)	0.00 (0.00, 1.54)	0.00 (0.00, 2.10)	0.91 (0.00, 2.22)	0.48
Mass, mg	171.65 (95.20, 463.73)	112.44 (72.82, 200.51)	242.25 (117.60, 699.30)	481.72 (271.37, 1506.99)	<0.001*
Mass growth rate, mg/month	2.09 (-0.61, 9.98)	1.06 (-0.64, 5.09)	2.37 (-0.80, 12.84)	11.43 (4.36, 36.67)	<0.001*
Relative mass growth rate, %/month	1.43 (-0.50, 4.42)	1.16 (-0.82, 4.13)	1.39 (-0.49, 4.13)	2.92 (0.82, 6.08)	0.003*
Mean density, HU	-550.50 (-632.75, -442.25)	-624.00 (-678.00, -566.00)	-513.00 (-575.75, -423.00)	-231.00 (-281.00, -189.00)	<0.001*
Mean density growth rate, HU/month	-1.15 (-7.66, 4.53)	-1.30 (-7.00, 2.80)	-1.15 (-7.73, 6.33)	1.00 (-10.40, 10.19)	0.23
Relative mean density growth rate, %/month	0.20 (-0.85, 1.49)	0.20 (-0.40, 1.12)	0.21 (-1.22, 1.56)	-0.52 (-2.91, 6.42)	0.49
PSC, %	7.67 (1.87, 20.96)	1.71 (0.00, 5.08)	13.39 (7.24, 25.73)	60.82 (50.73, 67.06)	<0.001*
PSC growth rate, %/month	-0.04 (-0.61, 0.36)	-0.03 (-0.40, 0.07)	-0.08 (-0.82, 0.78)	0.14 (-1.71, 1.83)	0.40
Relative PSC growth rate, %/month	-0.59 (-6.86, 4.83)	-1.10 (-9.09, 2.86)	-0.61 (-5.75, 6.88)	0.59 (-2.13, 3.87)	0.003*
SV, mm ³	26.50 (6.00, 129.50)	5.00 (0.00, 18.00)	58.00 (22.00, 203.00)	392.00 (184.00, 1122.50)	<0.001*
SV growth rate, mm ³ /month	0.00 (-1.00, 3.30)	0.00 (-0.71, 0.50)	0.33 (-1.98, 6.00)	10.60 (2.35, 26.56)	<0.001*
Relative SV growth rate, %/month	0.00 (-5.51, 8.33)	0.00 (-8.33, 5.00)	0.92 (-4.30, 9.74)	2.63 (1.32, 7.55)	<0.001*
Volume, mm ³	322.00 (176.50, 1110.25)	241.00 (145.00, 433.00)	405.50 (191.25, 1450.75)	546.00 (284.00, 1976.00)	<0.001*
Volume growth rate, mm ³ /month	5.00 (-1.31, 25.58)	3.00 (-1.00, 16.00)	7.13 (-2.25, 30.19)	11.50 (-2.56, 43.38)	0.04*
Relative volume growth rate, %/month	1.82 (-0.57, 5.65)	1.38 (-0.50, 4.67)	1.98 (-0.74, 6.04)	2.92 (-0.48, 6.46)	0.32

Data are presented as median (IQR) or n (%). * P values <0.05. †, pathological T staging was based on the IASLC 8th TNM Lung Cancer Staging System. AHH, atypical adenomatous hyperplasia; AIS, adenocarcinoma in situ; MIA, minimally invasive adenocarcinoma; LPA, lepidic-predominant adenocarcinoma; APA, acinar-predominant adenocarcinoma; MPA, micropapillary-predominant adenocarcinoma; PPA, papillary-predominant adenocarcinoma; SPA, solid-predominant adenocarcinoma; MA, mucinous adenocarcinoma; ALK, anaplastic lymphoma kinase; EGFR, epidermal growth factor receptor; GGN, ground-glass nodule; pGGN, pure ground-glass nodule; mGGN, mixed ground-glass nodule; LUL, left upper lobe; LLL, left lower lobe; RUL, right upper lobe; RML, right middle lobe; RLL, right lower lobe; PSC, percentage of solid components; SV, solid component volume; IQR, interquartile range.