

Supplementary materials

Supplementary Table 1 The lack of information on peripheral blood indicators

Feature	Indeed proportion (%)
lymphocyte	7.6923
monocyte	8.0586
eosinophil	8.0586
basophilic granulocyte	8.0586
red blood cell	7.6923
mean corpuscular volume	7.6923
mean corpuscular hemoglobin	7.6923
red cell distribution width	12.4542
platelet	7.6923
Plateletcrit	10.2564
aspartate aminotransferase	8.7912
γ -glutamyl transpeptidase	9.8901
alkaline phosphatase	8.4249
direct bilirubin	8.0586
indirect bilirubin	8.0586
total protein	8.0586
albumin	8.0586
prealbumin	12.0879
urea	8.4249
creatinine	8.4249
carbon dioxide combining power	9.8901
glucose	12.4542
Kalium ion	18.6813
Natrium ion	18.6813
Chloride ion	18.6813

Calcium ion	18.6813
Phosphonium ion	19.0476
Magnesian ion	19.0476
Carcinoembryonic antigen	28.5714
Carbohydrate antigen 199	28.5714

Supplementary Table 2 Distribution of clinicopathological features

	Overall
n	273
Sex(%)	
male	185 (67.8)
female	88 (32.2)
Age (median [IQR])	60.00 [52.00, 66.00]
Operation (%)	
no	172 (63.0)
yes	101 (37.0)
Smoking (%)	
no	198 (72.5)
yes	75 (27.5)
Alcohol.drinking (%)	
no	222 (81.3)

yes	51 (18.7)
BMI (mean (SD))	21.95 (3.15)
Number of Metastatic site (%)	
≤2	203 (74.4)
>2	70 (25.6)
LMR (median [IQR])	3.05 [2.20, 4.45]
DIR (median [IQR])	0.26 [0.23, 0.32]
PNI (mean (SD))	46.29 (5.97)
AGR (median [IQR])	1.24 [1.06, 1.37]
APRI (median [IQR])	0.11 [0.07, 0.17]
RPR (median [IQR])	0.07 [0.05, 0.10]
PLPR (median [IQR])	0.75 [0.47, 1.26]
APR (median [IQR])	0.56 [0.39, 0.77]
Eosinophil (median [IQR])	0.08 [0.04, 0.14]
Basophilic granulocyte (median [IQR])	0.02 [0.02, 0.03]
RBC (mean (SD))	4.06 (0.64)
Mean corpuscular volume (median [IQR])	92.00 [87.10, 97.60]
Mean corpuscular hemoglobin (median [IQR])	30.30 [28.40, 32.10]
Platelet crit (median [IQR])	0.23 [0.17, 0.28]
γ-glutamyl transpeptidase (median [IQR])	33.00 [20.00, 65.00]
Urea (median [IQR])	5.40 [4.50, 6.50]
Creatinine (median [IQR])	71.20 [63.00, 83.00]
Carbondioxide combining power (median [IQR])	26.30 [24.64, 27.98]
Glucose (median [IQR])	5.20 [4.80, 5.90]
Kalium ion (median [IQR])	4.10 [3.90, 4.30]
Natrium ion (median [IQR])	139.00 [138.00, 141.00]
Chloride ion (median [IQR])	103.60 [101.00, 105.00]
Calcium ion (median [IQR])	2.30 [2.20, 2.34]
Phosphonium ion (median [IQR])	1.11 [1.01, 1.22]

Magnesian ion (median [IQR])	0.90 [0.85, 0.97]
Carcinoembryonic antigen (median [IQR])	6.22 [2.61, 17.48]
Carbohydrate antigen 199 (median [IQR])	60.29 [15.07, 175.50]

Abbreviations: IQR, interquartile range; SD, standard deviation; n, number of patients; BMI, body mass index; LMR, lymphocyte count/monocyte count; DIR, serum direct bilirubin level/indirect bilirubin level; PNI, serum albumin + 5 * lymphocyte count; AGR = serum albumin/(serum total protein-serum albumin); APRI = aspartate aminotransferase level/platelet count; RPR = red cell distribution width/platelet count; PLPR = platelet count/(lymphocyte count * serum prealbumin); APR = alkaline phosphatase level / serum prealbumin; RBC, red blood cell.

Supplementary Table 3 The number of metastatic sites in patients who underwent surgery and patients who did not undergo surgery

	Overall	unoperated	operation	p
n	273	172	101	
Number of metastatic site (median [IQR])	2.00 [1.00, 3.00]	2.00 [1.00, 3.00]	1.00 [1.00, 2.00]	0.001

Supplementary Table 4 Random grouping of training set and test set based on survival status

	Overall	Training set	Test set	p
n	273	191	82	
Sex (%)				0.386
male	185 (67.8)	133 (69.6)	52 (63.4)	
female	88 (32.2)	58 (30.4)	30 (36.6)	
Age (median [IQR])	60.00 [52.00, 66.00]	59.00 [51.00, 65.00]	62.00 [54.25, 67.75]	0.032
Operation (%)				1
no	172 (63.0)	120 (62.8)	52 (63.4)	
yes	101 (37.0)	71 (37.2)	30 (36.6)	
Smoking (%)				0.234
no	198 (72.5)	134 (70.2)	64 (78.0)	
yes	75 (27.5)	57 (29.8)	18 (22.0)	
Alcohol.drinking (%)				0.34
no	222 (81.3)	152 (79.6)	70 (85.4)	
yes	51 (18.7)	39 (20.4)	12 (14.6)	
BMI (mean (SD))	21.95 (3.15)	22.07 (3.25)	21.68 (2.90)	0.343
Number.of.Metastatic.site (%)				0.286
≤2	203 (74.4)	138 (72.3)	65 (79.3)	
>2	70 (25.6)	53 (27.7)	17 (20.7)	
LMR (median [IQR])	3.05 [2.20, 4.45]	3.10 [2.24, 4.27]	3.00 [2.14, 4.45]	0.482
DIR (median [IQR])	0.26 [0.23, 0.32]	0.26 [0.23, 0.31]	0.27 [0.23, 0.36]	0.139
PNI (mean (SD))	46.29 (5.97)	46.83 (5.75)	45.03 (6.31)	0.022

AGR	(median [IQR])	1.24 1.37]	[1.06, 1.25 1.38]	[1.07, 1.21 1.37]	[1.00, 0.255
APRI	(median [IQR])	0.11 0.17]	[0.07, 0.10 0.16]	[0.07, 0.11 0.18]	[0.08, 0.366
RPR	(median [IQR])	0.07 0.10]	[0.05, 0.06 0.10]	[0.05, 0.07 0.09]	[0.05, 0.237
PLPR	(median [IQR])	0.75 1.26]	[0.47, 0.69 1.17]	[0.46, 0.91 1.47]	[0.54, 0.029
APR	(median [IQR])	0.56 0.77]	[0.39, 0.56 0.77]	[0.40, 0.57 0.77]	[0.37, 0.953
Eosinophil	(median [IQR])	0.08 0.14]	[0.04, 0.09 0.15]	[0.05, 0.07 0.12]	[0.03, 0.022
Basophilic granulocyte	(median [IQR])	0.02 0.03]	[0.02, 0.02 0.04]	[0.02, 0.02 0.03]	[0.01, 0.228
RBC (mean (SD))		4.06 (0.64)	4.10 (0.64)	3.97 (0.64)	0.106
Mean corpuscular volume	(median [IQR])	92.00 97.60]	[87.10, 92.96 97.45]	[88.15, 89.71 97.85]	[86.00, 0.087
Mean corpuscular hemoglobin	(median [IQR])	30.30 32.10]	[28.40, 30.60 32.25]	[28.70, 29.56 31.82]	[27.68, 0.028
Platelet crit	(median [IQR])	0.23 0.28]	[0.17, 0.23 0.28]	[0.17, 0.22 0.29]	[0.17, 0.77
γ-glutamyl transpeptidase	(median [IQR])	33.00 65.00]	[20.00, 36.00 63.00]	[21.00, 27.00 66.50]	[18.00, 0.16
UREA	(median [IQR])	5.40 6.50]	[4.50, 5.40 6.50]	[4.56, 5.45 6.30]	[4.50, 0.925

Creatinine (median [IQR])	71.20 [63.00, 83.00]	71.00 [63.75, 80.00]	73.50 [62.25, 87.75]	0.284
Carbondioxide combining power (median [IQR])	26.30 [24.64, 27.98]	26.10 [24.50, 28.00]	26.60 [24.95, 27.70]	0.741
Glucose (median [IQR])	5.20 [4.80, 5.90]	5.24 [4.80, 5.90]	5.10 [4.80, 5.90]	0.765
Kalium ion (median [IQR])	4.10 [3.90, 4.30]	4.10 [3.89, 4.30]	4.20 [3.90, 4.38]	0.359
Natrium ion (median [IQR])	139.00 [138.00, 141.00]	139.60 [138.00, 141.00]	139.00 [137.00, 140.00]	0.063
Chloride ion (median [IQR])	103.60 [101.00, 105.00]	103.60 [102.00, 105.00]	103.00 [101.00, 105.00]	0.326
Calcium ion (median [IQR])	2.30 [2.20, 2.34]	2.30 [2.20, 2.32]	2.30 [2.20, 2.40]	0.372
Phosphonium ion (median [IQR])	1.11 [1.01, 1.22]	1.11 [1.00, 1.21]	1.10 [1.02, 1.22]	0.803
Magnesian ion (median [IQR])	0.90 [0.85, 0.97]	0.90 [0.85, 0.97]	0.91 [0.86, 0.96]	0.844
Carcinoembryonic antigen (median [IQR])	6.22 [2.61, 17.48]	6.34 [2.63, 18.13]	5.24 [2.50, 17.03]	0.709
Carbohydrate antigen 199 (median [IQR])	60.29 [15.07, 175.50]	40.43 [13.02, 190.59]	71.85 [18.74, 148.31]	0.49

Abbreviations: IQR, interquartile range; SD, standard deviation; n, number of patients; BMI, body mass index; LMR, lymphocyte count/monocyte count;

DIR, serum direct bilirubin level/indirect bilirubin level; PNI, serum albumin + 5 * lymphocyte count; AGR = serum albumin/(serum total protein-serum albumin); APRI = aspartate aminotransferase level/platelet count; RPR = red cell distribution width/platelet count; PLPR = platelet count/(lymphocyte count * serum prealbumin); APR = alkaline phosphatase level / serum prealbumin; RBC, red blood cell.

Supplementary Table 5 Random grouping of training set and test set based on tumor progression status

	Overall	Training set	Test set	P
n	273	191	82	
Sex (%)				1
male	185 (67.8)	129 (67.5)	56 (68.3)	
female	88 (32.2)	62 (32.5)	26 (31.7)	
Age (median [IQR])	60.00 [52.00, 66.00]	59.00 [52.00, 65.50]	60.50 [52.25, 67.00]	0.463
operation (%)				1
no	172 (63.0)	120 (62.8)	52 (63.4)	
yes	101 (37.0)	71 (37.2)	30 (36.6)	
smoking (%)				0.24
no	198 (72.5)	143 (74.9)	55 (67.1)	
yes	75 (27.5)	48 (25.1)	27 (32.9)	
alcohol.drinking (%)				0.951
no	222 (81.3)	156 (81.7)	66 (80.5)	
yes	51 (18.7)	35 (18.3)	16 (19.5)	
BMI (mean (SD))	21.95 (3.15)	22.07 (3.19)	21.69 (3.05)	0.369
number.of.Metastatic.s				0.454

ite (%)							
≤2	203 (74.4)		145 (75.9)		58 (70.7)		
>2	70 (25.6)		46 (24.1)		24 (29.3)		
LMR (median [IQR])	3.05 [2.20, 4.45]		3.17 [2.18, 4.46]		2.90 [2.24, 4.11]		0.498
DIR (median [IQR])	0.26 [0.23, 0.32]		0.26 [0.22, 0.32]		0.26 [0.23, 0.33]		0.837
PNI (mean (SD))	46.29 (5.97)		46.48 (5.80)		45.85 (6.36)		0.425
AGR (median [IQR])	1.24 [1.06, 1.37]		1.23 [1.07, 1.37]		1.24 [1.03, 1.37]		0.825
APRI (median [IQR])	0.11 [0.07, 0.17]		0.11 [0.08, 0.18]		0.09 [0.07, 0.15]		0.169
RPR (median [IQR])	0.07 [0.05, 0.10]		0.07 [0.05, 0.10]		0.07 [0.05, 0.11]		0.426
PLPR (median [IQR])	0.75 [0.47, 1.26]		0.73 [0.48, 1.19]		0.78 [0.47, 1.32]		0.781
APR (median [IQR])	0.56 [0.39, 0.77]		0.57 [0.38, 0.76]		0.56 [0.41, 0.78]		0.694
Eosinophil (median [IQR])	0.08 [0.04, 0.14]		0.09 [0.04, 0.14]		0.07 [0.04, 0.15]		0.458
Basophilic granulocyte (median [IQR])	0.02 [0.02, 0.03]		0.02 [0.01, 0.03]		0.02 [0.02, 0.03]		0.834
RBC (mean (SD))	4.06 (0.64)		4.05 (0.64)		4.10 (0.66)		0.574
Mean corpuscular volume (median [IQR])	92.00 [87.10, 97.60]		92.40 [87.62, 97.65]		90.20 [86.73, 96.88]		0.304
Mean corpuscular hemoglobin (median [IQR])	30.30 [28.40, 32.10]		30.50 [28.60, 32.18]		29.90 [28.07, 31.98]		0.195

Platelet crit (median [IQR])	0.23 0.28]	[0.17, 0.23 0.28]	0.23 0.28]	[0.17, 0.22 0.28]	0.22 0.28]	[0.18, 0.763
γ-glutamyl transpeptidase (median [IQR])	33.00 65.00]	[20.00, 34.00 65.90]	34.00 65.90]	[20.00, 30.50 49.75]	30.50 49.75]	[20.00, 0.447
UREA (median [IQR])	5.40 6.50]	[4.50, 5.40 6.50]	5.40 6.50]	[4.54, 5.41 6.20]	5.41 6.20]	[4.51, 0.615
Creatinine (median [IQR])	71.20 83.00]	[63.00, 71.00 82.30]	71.00 82.30]	[63.00, 71.60 88.00]	71.60 88.00]	[63.62, 0.38
Carbondioxide combining power (median [IQR])	26.30 27.98]	[24.64, 26.40 27.92]	26.40 27.92]	[24.62, 26.25 27.98]	26.25 27.98]	[24.72, 0.879
Glucose (median [IQR])	5.20 5.90]	[4.80, 5.20 5.90]	5.20 5.90]	[4.77, 5.30 5.90]	5.30 5.90]	[4.90, 0.533
Kalium ion (median [IQR])	4.10 4.30]	[3.90, 4.10 4.34]	4.10 4.34]	[3.90, 4.10 4.30]	4.10 4.30]	[3.87, 0.563
Natrium ion (median [IQR])	139.00 141.00]	[138.00, 139.00 141.00]	139.00 141.00]	[138.00, 139.00 137.00, 140.75]	139.00 137.00, 140.75]	[0.532
Chloride ion (median [IQR])	103.60 105.00]	[101.00, 103.80 105.00]	103.80 105.00]	[102.00, 103.00 101.00, 105.00]	103.00 101.00, 105.00]	[0.448
Calcium ion (median [IQR])	2.30 2.34]	[2.20, 2.30 2.35]	2.30 2.35]	[2.20, 2.30 2.32]	2.30 2.32]	[2.20, 0.43
Phosphonium ion (median [IQR])	1.11 1.22]	[1.01, 1.11 1.20]	1.11 1.20]	[1.00, 1.12 1.26]	1.12 1.26]	[1.01, 0.262
Magnesian ion (median [IQR])	0.90 0.97]	[0.85, 0.90 0.96]	0.90 0.96]	[0.85, 0.91 0.98]	0.91 0.98]	[0.85, 0.521
Carcinoembryonic	6.22	[2.61, 6.19	6.19	[2.62, 6.34	6.34	[2.59, 0.734

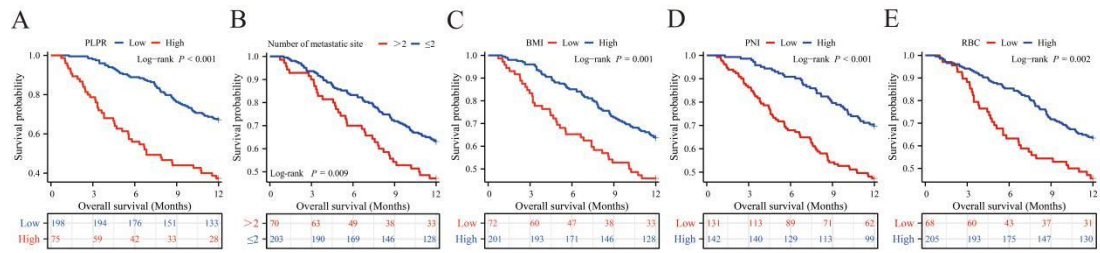
antigen	(median 17.48]	18.50]	16.60]	
[IQR]				
Carbohydrate antigen 199 (median [IQR])	60.29 [15.07, 175.50]	60.29 [15.66, 157.89]	54.74 [12.67, 196.59]	0.788

Abbreviations: IQR, interquartile range; SD, standard deviation; n, number of patients; BMI, body mass index; LMR, lymphocyte count/monocyte count; DIR, serum direct bilirubin level/indirect bilirubin level; PNI, serum albumin + 5 * lymphocyte count; AGR = serum albumin/(serum total protein-serum albumin); APRI = aspartate aminotransferase level/platelet count; RPR = red cell distribution width/platelet count; PLPR = platelet count/(lymphocyte count * serum prealbumin); APR = alkaline phosphatase level / serum prealbumin.; RBC, red blood cell.

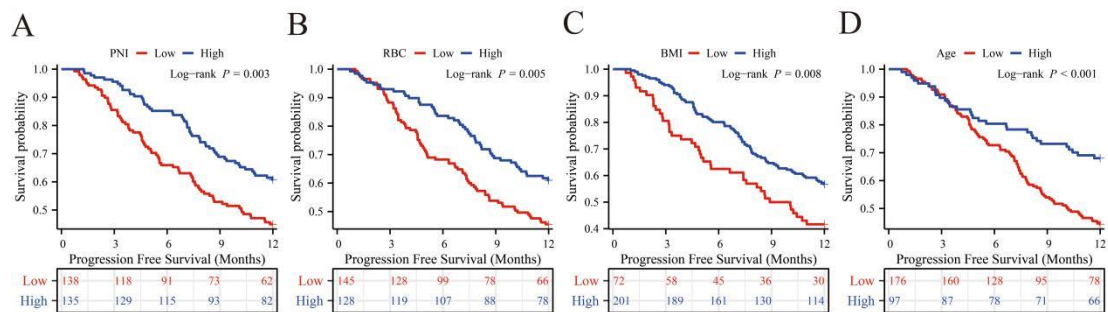
Supplementary Table 6 Comparison of AUC of XGBoost and nomogram in training set and test set

Training set		
	OS	PFS
Nomogram	0.653	0.661
XGBoost	0.732	0.835
Test set		
Nomogram	0.633	0.622
XGBoost	0.695	0.677

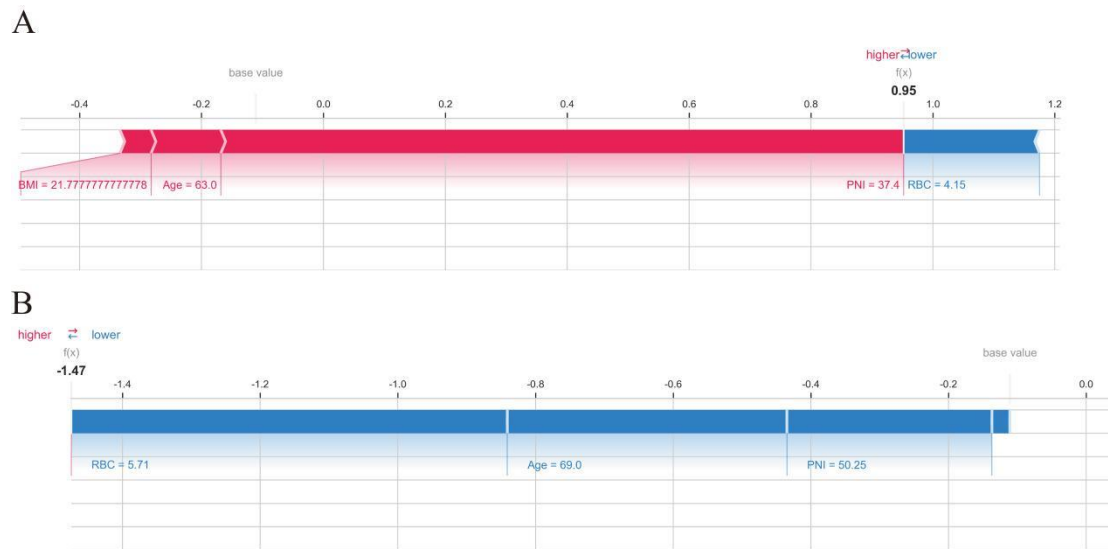
Abbreviations: OS, overall survival; PFS, progression-free survival



Supplementary Figure 1 Kaplan-Meier curves of OS-related features. PLPR (A). Number of metastatic site (B). BMI (C). PNI (D). RBC (E).



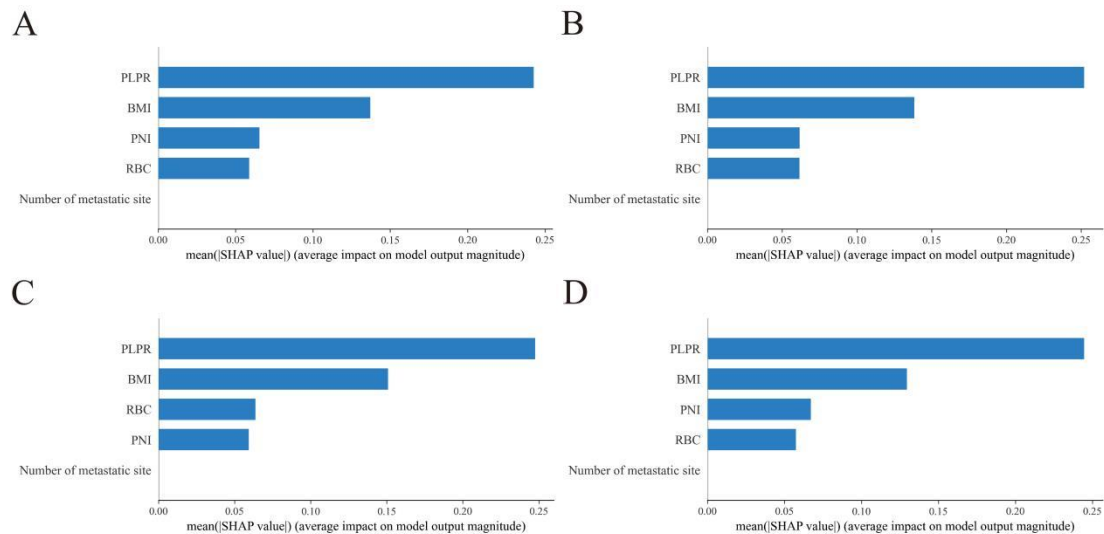
Supplementary Figure 2 Kaplan-Meier curves of PFS-related features. PNI (A). RBC (B). BMI (C). Age (D).



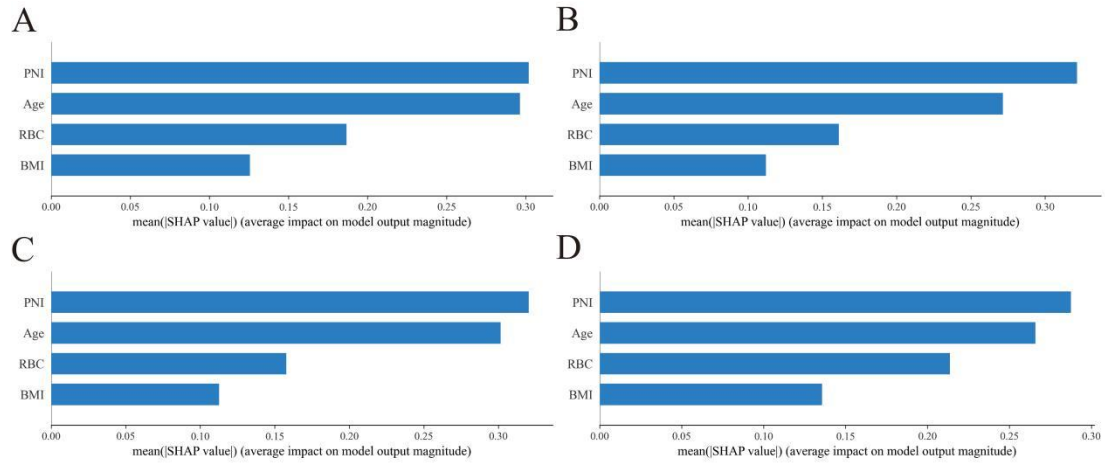
Supplementary Figure 3 Two samples are used to explain the prediction results of the model. One patient died (A) and one patient survived (B).



Supplementary Figure 4 Two samples are used to explain the prediction results of the model. One patient's tumor progressed (A), and the other patient's tumor did not progress (B).



Supplementary Figure 5 When XGBoost is used to predict the OS of patients, the importance of features in the male patient group (A), the female patient group (B), the operation group (C), and the non-operation group (D).



Supplementary Figure 6 When XGBoost is used to predict the PFS of patients, the importance of features in the male patient group (A), the female patient group (B), the operation group (C), and the non-operation group (D).