

Supplementary Materials

Construction of a nomogram prediction model for opportunistic sarcopenia in patients with malignant tumors

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Supplementary Table 1. Baseline characteristics according to inclusion in the final analysis

Variable	Total (n = 522)	Training (n = 365)	Validation (n = 157)	Statistic	<i>p</i>
Calcium, Mean ± SD	2.22 ± 0.17	2.22 ± 0.17	2.22 ± 0.16	F = 0.01	0.9
BUN, Mean ± SD	5.72 ± 4.84	5.65 ± 4.44	5.88 ± 5.67	F = 0.13	0.8
Creatinine, Mean ± SD	68.9 ± 36.7	69.1 ± 42.1	68.4 ± 18.9	F = 0.02	0.9
Uric Acid, Mean ± SD	308 ± 117	305 ± 114	316 ± 125	F = 0.47	0.6
Blood glucose, Mean ± SD	5.40 ± 1.96	5.44 ± 2.06	5.29 ± 1.72	F = 0.32	0.7
Triglycerides, Mean ± SD	1.44 ± 0.86	1.42 ± 0.84	1.51 ± 0.90	F = 0.62	0.5
Total cholesterol, Mean ± SD	5.32 ± 7.60	5.16 ± 6.56	5.70 ± 9.61	F = 0.29	0.7
HDL-C, Mean ± SD	1.24 ± 1.61	1.20 ± 1.41	1.35 ± 1.99	F = 0.46	0.6
LDL-C, Mean ± SD	4.41 ± 21.7	4.00 ± 18.4	5.36 ± 28.0	F = 0.22	0.8
ALT, Mean ± SD	23.9 ± 26.9	23.0 ± 25.0	25.9 ± 31.0	F = 0.62	0.5
AST, Mean ± SD	28.3 ± 31.1	27.3 ± 28.2	30.7 ± 37.1	F = 0.67	0.5
Total Bilirubin, Mean ± SD	18.4 ± 33.1	17.4 ± 29.2	20.9 ± 40.7	F = 0.63	0.5
Direct Bilirubin, Mean ± SD	6.72 ± 22.9	5.94 ± 19.9	8.54 ± 28.7	F = 0.70	0.4
Total Protein, Mean ± SD	65.9 ± 7.74	65.4 ± 7.96	67.0 ± 7.09	F = 2.53	0.08
Albumin, Mean ± SD	36.0 ± 7.08	36.1 ± 6.68	35.8 ± 7.96	F = 0.09	0.9
Hemoglobin, Mean ± SD	117 ± 24.0	117 ± 22.8	115 ± 26.5	F = 0.58	0.5
White blood cell count, Mean ± SD	8.02 ± 9.06	7.70 ± 8.03	8.75 ± 11.1	F = 0.72	0.4
Neutrophil count, Mean ± SD	5.73 ± 5.88	5.66 ± 6.21	5.91 ± 5.05	F = 0.10	0.9
Lymphocyte count, Mean ± SD	1.55 ± 3.82	1.60 ± 4.49	1.42 ± 1.33	F = 0.12	0.8
Red blood cell count, Mean ± SD	3.90 ± 0.72	3.90 ± 0.70	3.88 ± 0.77	F = 0.09	0.9
Platelet Count, Mean ± SD	219 ± 97.0	219 ± 94.5	221 ± 103	F = 0.02	0.9
CRP, Mean ± SD	19.7 ± 33.2	20.1 ± 33.3	18.8 ± 33.1	F = 0.08	0.9
ALT/AST, Mean ± SD	1.41 ± 5.34	1.30 ± 4.62	1.65 ± 6.74	F = 0.23	0.7
Creatine kinase, M (Q ₁ , Q ₃)	52.0 (33.0,78.0)	52.0 (33.0,78.0)	53.0 (32.0,76.0)	u = 2.80 x 10 ⁴ †	0.7
CK-MB, M (Q ₁ , Q ₃)	12.0 (9.00,18.0)	12.0 (9.00,18.0)	12.0 (9.00,18.0)	u = 2.79 x 10 ⁴ †	0.6
SII, M (Q ₁ , Q ₃)	724.7 (397.6, 1436.4)	717.7 (402.9, 1392.7)	741.8 (372.5, 1622.7)	u = 2.82 x 10 ⁴ †	0.8
NLR, Mean ± SD	6.60 ± 11.8	6.49 ± 12.3	6.88 ± 10.6	F = 0.06	0.9
PLR, Mean ± SD	252 ± 615	261 ± 721	231 ± 225	F = 0.13	0.8
TyG, Mean ± SD	53.0 ± 107	53.0 ± 110	52.9 ± 100	F = 0.00	1
PNI, Mean ± SD	43.8 ± 20.5	44.1 ± 23.4	42.9 ± 10.9	F = 0.18	0.8
Transform, n (%)				χ ² = 13.8	<0.001***
No metastasis	386 (73.9)	287 (78.6)	99 (63.1)		
Metastasis	136 (26.1)	78 (21.4)	58 (36.9)		
Gender, n (%)				χ ² = 0.16	0.9
Men	299 (57.3)	207 (56.7)	92 (58.6)		
Women	223 (42.7)	158 (43.3)	65 (41.4)		
Opportunistic sarcopenia, n (%)				χ ² = 0.02	0.9
No	177 (33.9)	123 (33.7)	54 (34.4)		
Yes	345 (66.1)	242 (66.3)	103 (65.6)		
BMI group, n (%)				χ ² = 1.84	0.9
≤ 18.4 kg/m ²	42 (8.05)	29 (7.95)	13 (8.28)		
18.5 - 23.9 kg/m ²	239 (45.8)	173 (47.4)	66 (42.0)		
24.0 - 27.9 kg/m ²	156 (29.9)	108 (29.6)	48 (30.6)		
≥ 28 kg/m ²	85 (16.3)	55 (15.1)	30 (19.1)		
Age group, n (%)				χ ² = 2.93	0.8
< 45 years	42 (8.05)	25 (6.85)	17 (10.8)		
45 - 55 years	54 (10.3)	38 (10.4)	16 (10.2)		
55 - 65 years	143 (27.4)	98 (26.9)	45 (28.7)		
≥ 65 years	283 (54.2)	204 (55.9)	79 (50.3)		

BUN: blood urea nitrogen; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol; ALT: alanine aminotransferase; AST: aspartate aminotransferase; CRP: C-reactive protein; CK-MB: creatine kinase-MB; SII: systemic immune-inflammation index; NLR: neutrophil-to-lymphocyte ratio; PLR: platelet lymphocyte ratio; TyG: triglyceride-glucose index; PNI: prognostic nutritional index; BMI: body mass index.

†Data did not conform to normal distribution. Median (IQR) was used for statistical description and Kruskal-Wallis H test was used for p-values

****p*<0.001.

Supplementary Table 1. Baseline characteristics according to inclusion in the final analysis (cont.)

Variable	Total (n = 522)	Training (n = 365)	Validation (n = 157)	Statistic	<i>p</i>
Cancer type, n (%)				$\chi^2 = 15.1$	0.1
Respiratory system cancer	206 (39.5)	156 (42.7)	50 (31.9)		
Digestive system cancer	163 (31.2)	111 (30.4)	52 (33.1)		
Urinary system cancer	38 (7.28)	25 (6.85)	13 (8.28)		
Reproductive system cancer	81 (15.5)	49 (13.4)	32 (20.4)		
Nervous system cancer	3 (0.57)	0 (0.00)	3 (1.91)		
Others	31 (5.94)	24 (6.58)	7 (4.46)		

BUN: blood urea nitrogen; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol; ALT: alanine aminotransferase; AST: aspartate aminotransferase; CRP: C-reactive protein; CK-MB: creatine kinase-MB; SII: systemic immune-inflammation index; NLR: neutrophil-to-lymphocyte ratio; PLR: platelet lymphocyte ratio; TyG: triglyceride-glucose index; PNI: prognostic nutritional index; BMI: body mass index.

†Data did not conform to normal distribution. Median (IQR) was used for statistical description and Kruskal-Wallis H test was used for p-values

****p*<0.001.

Supplementary Table 2. Distribution of categorical variables by opportunistic sarcopenia status

Variable	Opportunistic sarcopenia (n/%) (242/66.3)	Non-opportunistic sarcopenia (n/%) (123/33.7)	χ^2	<i>p</i>
Gender, n (%)			60.3	<0.001***
Men	172 (71.1)	35 (28.5)		
Women	70 (28.9)	88 (71.5)		
Age group, n (%)			5.77	0.1
< 45 years	15 (6.20)	10 (8.13)		
45 - 55 years	23 (9.50)	15 (12.2)		
55 - 65 years	58 (24.0)	40 (32.5)		
≥ 65 years	146 (60.3)	58 (47.2)		
BMI group, n (%)			86.1	<0.001***
≤ 18.4 kg/m ²	26 (10.7)	3 (2.44)		
18.5 - 23.9 kg/m ²	146 (60.3)	27 (22.0)		
24.0 - 27.9 kg/m ²	57 (23.6)	51 (41.5)		
≥ 28 kg/m ²	13 (5.38)	42 (34.2)		
Cancer type			9.23	0.06
Head and neck tumor	4 (1.65)	0		
Abdominal tumor	75 (31.0)	32 (26.0)		
Thoracic tumor	128 (52.9)	68 (55.3)		
Urinary and men reproductive system tumors	22 (9.09)	8 (6.50)		
Gynecological tumor	13 (5.37)	15 (12.2)		
Whether the primary cancer has metastasized			9.29	0.002**
Yes	63 (26.0)	15 (12.2)		
No	179 (74.0)	108 (87.8)		
SII-PNI			14.0	0.001**
0	129 (53.3)	90 (73.2)		
1	42 (73.7)	15 (26.3)		
2	71 (79.8)	18 (29.3)		

BMI: body mass index; SII: systemic immune-inflammation index; PNI: prognostic nutritional index.

The SII-PNI classification was defined as follows: (1) 0 points: high SII and low PNI; (2) 1 point: high SII and high PNI, or low SII and low PNI; (3) 2 points: low SII and high PNI.

p*<0.01, *p*<0.001.

Supplementary Table 3. Distribution of categorical variables by opportunistic sarcopenia status

Variable	Opportunistic sarcopenia (n=242)	Non-opportunistic sarcopenia (n=123)	t/u	p
Calcium, mmol/L	2.19 ± 0.17	2.28 ± 0.15	4.67	<0.001***
Urea nitrogen, mg/dL	5.74 ± 5.10	5.46 ± 2.75	0.57	0.5
Creatinine, μmol/L	69.4 ± 49.5	68.4 ± 21.0	0.23	0.8
Uric acid, μmol/L	299 ± 122	319 ± 94.6	1.63	0.1
Blood Sugar, mmol/L	5.45 ± 2.22	5.44 ± 1.71	0.02	0.9
Triglyceride, mmol/L	1.37 ± 0.85	1.50 ± 0.83	1.36	0.2
Total cholesterol, mmol/L	5.29 ± 8.00	4.90 ± 1.42	0.54	0.5
HDL-C, mmol/L	1.21 ± 1.62	1.18 ± 0.88	0.22	0.8
LDL-C, mmol/L	3.03 ± 2.19	5.91 ± 31.5	1.42	0.2
Total bilirubin, μmol/L	18.3 ± 31.7	15.5 ± 23.4	0.85	0.4
Direct bilirubin, μmol/L	6.53 ± 20.2	4.78 ± 19.1	0.80	0.4
Total protein, g/L	64.9 ± 7.66	66.4 ± 8.47	1.66	0.1
Albumin, g/L	35.6 ± 7.24	37.2 ± 5.27	2.21	0.03*
Creatine kinase, U/L	50.0 (54.3)	57.0 (58.5)	1.26×10 ^{4†}	0.02*
Creatine kinase isoenzyme, U/L	12.0 (13.5)	12.0 (13.0)	1.55×10 ^{4†}	0.6
CRP, mg/dL	22.4 ± 34.4	13.3 ± 22.8	3.02	0.003**
Hemoglobin, g/L	116.1 ± 23.1	121 ± 22.1	1.86	0.06
White blood cell count, ×10 ⁹ /L	8.09 ± 9.44	6.94 ± 3.91	1.30	0.2
Neutrophil, ×10 ⁹ /L	5.96 ± 6.96	4.99 ± 4.29	1.40	0.2
Lymphocyte, ×10 ⁹ /L	1.35 ± 1.52	1.49 ± 0.88	0.97	0.3
Red blood cell count, ×10 ¹² /L	3.82 ± 0.69	4.07 ± 0.71	3.28	<0.001***
Platelet count, ×10 ⁹ /L	220 ± 94.4	227 ± 81.9	0.68	0.5
Inflammatory Index				
SII	1.57×10 ³ ±2.70×10 ³	1.05×10 ³ ±1.33×10 ³	2.46	0.01*
NLR	6.83 ± 9.86	4.48 ± 4.70	3.08	0.002**
PNI	42.3 ± 10.9	44.6 ± 7.5	2.15	0.03*

HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol; CRP: C-reactive protein; SII: systemic immune-inflammation index; NLR: neutrophil-to-lymphocyte ratio; PNI: prognostic nutritional index.

†Data did not conform to normal distribution. Median (IQR) was used for statistical description and Wilcoxon-Mann-Whitney test was used for p-values.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.