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Prognostic nomogram for overall survival in resectable gastric cancer: incorporating prognostic nutritional index and fibrinogen.

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Nomograma pronóstico de supervivencia global en cáncer gástrico resecable: incorporación del índice nutricional pronóstico y el fibrinógeno

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ABSTRACT

Introduction: few studies have investigated the combined prognostic value of the prognostic nutritional index (PNI) and plasma fibrinogen (FIB) in predicting long-term survival in patients undergoing

radical gastrectomy for gastric cancer.

Objectives: this study aimed to examine the association between preoperative PNI, FIB, and overall survival (OS) in patients undergoing radical gastrectomy, and to develop a prognostic nomogram for predicting postoperative OS in gastric cancer patients.

Methods: this retrospective study included 395 patients who underwent radical gastrectomy. Univariate and multivariate Cox proportional hazards regressions were used to identify independent prognostic factors and develop a nomogram for predicting overall survival (OS). The nomogram's accuracy and discriminatory performance were evaluated using the Receiver Operating Characteristic (ROC) curve, concordance index (C-index), and calibration curve. Decision curve analysis (DCA) was also applied to assess its clinical utility.

Results: the findings from the multivariate COX regression analysis revealed that preoperative PNI, plasma FIB, nerve invasion, and pathological TNM stage were identified as independent predictive variables for postoperative OS in patients who underwent radical gastrectomy ($p < 0.05$). Patients with high PNI (PNI > 49.3) and low FIB (FIB < 3.6) had a substantially greater OS. The nomogram, developed from independent prognostic factors, exhibited a C-index of 0.782, surpassing the predictive accuracy of pathological TNM staging alone (C-index = 0.719) in predicting overall survival (OS).

Conclusions: the prognostic nomogram incorporating PNI and FIB is a reliable tool for forecasting postoperative survival in GC patients and aiding surgeons in devising individualized treatment strategies.

Keywords: Gastric cancer. Nutrition. Prognostic factor. Plasma

fibrinogen. Nomogram.

RESUMEN

Introducción: pocos estudios han examinado el valor pronóstico combinado del índice nutricional pronóstico (PNI) y el fibrinógeno plasmático (FIB) para predecir la supervivencia a largo plazo en pacientes sometidos a gastrectomía radical.

Objetivos: el objetivo de este estudio fue analizar la asociación entre el PNI preoperatorio, el FIB y la supervivencia global (SG) en pacientes sometidos a gastrectomía radical, así como desarrollar un nomograma pronóstico para predecir la SG postoperatoria en pacientes con cáncer gástrico (CG).

Métodos: este estudio retrospectivo incluyó a 395 pacientes sometidos a gastrectomía radical. Se utilizaron regresiones de riesgos proporcionales de Cox univariantes y multivariantes para identificar los factores pronósticos independientes y desarrollar un nomograma para predecir la supervivencia global (SG). La precisión del nomograma y su capacidad discriminatoria fueron evaluadas mediante la curva de Característica Operativa del Receptor (ROC), el índice de concordancia (índice C) y la curva de calibración. Además, se aplicó el análisis de curvas de decisión (ACD) para evaluar su utilidad clínica.

Resultados: los resultados del análisis de regresión de Cox multivariante revelaron que el PNI preoperatorio, el FIB plasmático, la invasión nerviosa y el estadio TNM patológico se identificaron como variables predictivas independientes de la SG postoperatoria en pacientes sometidos a gastrectomía radical ($p < 0,05$). Los pacientes

con un PNI alto (PNI > 49,3) y un FIB bajo (FIB < 3,6) tuvieron una SG considerablemente mayor. El nomograma, desarrollado a partir de los factores pronósticos independientes, mostró un índice C de 0,782, superando la precisión predictiva de la estadificación TNM patológica por sí sola (índice C = 0,719) en la predicción de la supervivencia global (SG).

Conclusiones: el nomograma pronóstico que incorpora el PNI y el FIB es una herramienta fiable para predecir la supervivencia postoperatoria en pacientes con cáncer gástrico (CG) y para ayudar a los cirujanos en el diseño de estrategias de tratamiento individualizadas.

Palabras clave: Cáncer gástrico. Nutrición. Factor pronóstico. Fibrinógeno plasmático. Nomograma.

INTRODUCTION

Gastric cancer (GC) ranks as the fifth most prevalent malignant tumour and is the fourth leading contributor to cancer-related mortality globally (1). Despite the implementation of many therapeutic modalities, including chemotherapy, surgery, and immunotherapy, the overall survival rate for GC individuals remains suboptimal (2-4). The primary treatment of individuals with resectable GC is surgical removal. Nevertheless, the prognosis of GC patients exhibits variability despite undergoing radical resection owing to many variables, including patient age, malnutrition, tumour stage, lymph node metastases, and postoperative complications (5).

The American Joint Committee on Cancer Tumor Node Metastasis (AJCC-TNM) staging system is extensively utilised in clinical settings to assess cancer patients' progression and prognosis (6). Nevertheless, this approach needs to include the prognostic importance of additional variables, like the patient's nutritional status and level of inflammation. Hence, it is crucial to identify a predictor that can effectively forecast the prognosis of GC patients in a simple, intuitive, and comprehensive approach to facilitate the design of personalised treatment interventions.

Previous studies have indicated that various factors influence the prognosis of GC patients. These factors include the specific type of cancer, treatment approach, and tumour stage. Additionally, host-specific factors such as nutritional status, inflammation, and immunity have significantly impacted the prognosis of GC patients (7-9). Several nutritional risk screening and malnutrition assessment tools, including the nutritional risk screening 2002 (NRS2002), the subjective global assessment (SGA), and patient-generated subjective global assessment (PG-SGA), have been extensively employed in medical practices. However, it is essential to acknowledge that these assessment tools possess subjectivity and limitations when accurately reflecting patients' nutritional status (10). The prognostic, predictive value of the Prognostic Nutritional Index (PNI), derived from the analysis of serum albumin and lymphocyte counts, has been validated in various gastrointestinal cancers (11-14). Fibrinogen (FIB), a crucial coagulation factor, has a robust correlation with the extent of inflammatory reaction and substantially influences tumours' advancement (15-17). Recent work has indicated a correlation between FIB and the prognosis of individuals with GC. Also, FIB has

been employed as a predictor for estimating the long-term outcomes of patients with GC (16,18,19). However, few studies have investigated the combined predictive value of PNI and FIB for long-term survival in patients treated with radical gastrectomy.

This study examined the relationship of preoperative PNI and FIB with OS following radical gastrectomy in patients with GC. Furthermore, we created a prognostic nomogram incorporating PNI and FIB to forecast individual survival in GC patients.

MATERIAL AND METHODS

Patients

This study analysed the sequential clinical information of patients who underwent radical gastrectomy for gastric cancer at the Lu'an Hospital of Anhui Medical University from March 2019 to February 2021. The following criteria were used for inclusion: 1) age greater than eighteen years old; 2) GC identified pathologically by gastroscopic biopsy; and 3) radical gastrectomy. Exclusion criteria included 1) neoadjuvant treatment before gastrectomy; 2) R1/2 resection; 3) identification of residual stomach cancer; 4) GC in conjunction with distant metastases (liver, colon, ovary, etc.); 5) protracted or palliative surgery; and 6) insufficient follow-up data. In the end, 395 patients were added to the study. The Institutional Review Board of Lu'an Hospital, Anhui Medical University, approved the study and followed the guidelines outlined in the Declaration of Helsinki.

Data collection

Demographic information, comorbidities, preoperative haematology

test results (albumin, haemoglobin, total lymphocyte count, and plasma fibrinogen), surgical characteristics, pathological characteristics (including tumour size, extent of differentiation, nerve invasion, and vascular invasion), and follow-up information were gathered via the hospital medical record system. This study used the American Joint Committee on Cancer (AJCC, 8th edition, 2018) as the basis for the tumour pathological TNM (pTNM) stage. The method used to calculate PNI is ten times the serum albumin value (g/dL) plus 0.005 times the total lymphocyte count in the peripheral blood (per mm^3) (20).

Follow-ups

The patients underwent telephone follow-up and outpatient assessment until February 2021. The patients were monitored at three-month intervals for the initial two years following the surgical procedure and then at six-month intervals until the patient was either lost to follow-up or deceased. The OS is the duration between the surgical procedure and the final follow-up appointment or death for any reason.

Statistical analysis

The statistical analysis was performed using SPSS software (version 26.0) and R software (version 4.3.0). Continuous variables were represented using medians and quartiles. An independent-sample t-test was employed to assess disparities between groups, while categorical variables were represented as frequencies. The chi-squared or Fisher's exact test evaluated disparities between groups. We used the x-tile software to determine the most appropriate

threshold for continuous data (e.g., PNI vs FIB) (21). Survival differences were assessed using the Kaplan-Meier technique with the log-rank test. The study employed the Cox proportional hazards regression model to conduct univariate and multivariate analyses. The construction of nomograms was conducted using the R software. The utilisation of calibration curves assessed the precision of the nomogram. The nomogram's predictive capability was evaluated by employing the concordance index (C-index) and the AUROC (area under the receiver operating characteristic curve) (22). The nomogram and TNM stage's predictive performance were evaluated using the decision curve analysis (DCA). A two-sided *p*-value below 0.05 was used to determine statistical significance.

RESULTS

Baseline characteristics

The study included 395 patients, with 288 (72.9 %) being male and 107 (27.1 %) female. The patients exhibited a median age of 68 years and an interquartile range (IQR) from 63 to 74 years. A total of 107 patients (27.1 %) were categorised as pTNM stage I, 103 patients (26.1 %) were classified as pTNM stage II, and 185 patients (46.8 %) were classified as TNM stage III. The frequencies of highly differentiated, moderately differentiated, and poorly differentiated or undifferentiated individuals were 42 (10.6 %), 66 (16.7 %), and 287 (72.7 %), correspondingly. Table I presents the clinicopathologic characteristics of all participants.

Correlation between preoperative PNI and plasma FIB levels with clinicopathologic characteristics and OS

There was a significant link seen between increased levels of plasma FIB and advanced age ($p < 0.001$), higher ASA scores ($p < 0.001$), inferior tumour differentiation ($p = 0.050$), vascular invasion ($p = 0.021$), nerve invasion ($p < 0.001$), and higher pTNM stage ($p = 0.002$). A notable association was seen between decreased PNI and older age ($p < 0.001$), inferior tumour differentiation ($p = 0.031$), nerve invasion ($p = 0.002$), and higher TNM stage ($p < 0.001$). Table II presents the correlation between preoperative PNI, plasma FIB levels, and clinicopathologic characteristics.

The results of the Kaplan-Meier analysis revealed that individuals with both low PNI and high FIB had a lower OS ($p < 0.001$, Fig. 1G, H). In order to undertake a more comprehensive examination of the efficacy of low PNI and high FIB in individuals with varying pTNM stages, we carried out a subgroup analysis. The findings of the subgrouping based on the pTNM stage indicate that low PNI did not significantly impact the OS in individuals with stage II GC ($p = 0.45$; Fig. 1B). However, it remained a significant predictive factor for OS in individuals with stage I and III GC ($p = 0.025$ and $p < 0.001$; Fig. 1A, C). Similarly, high FIB did not have a significant effect on OS in individuals with stage I and II GC ($p = 0.660$ and $p = 0.110$; Fig. 1D, E), but it continued to be a significant predictive factor for OS in individuals with stage III GC ($p = 0.041$; Fig. 1F).

Univariate and multivariate analyses of OS-related factors

The univariate analysis indicated that age, BMI, PNI < 49.3, FIB ≤ 3.60, ASA score, tumour size, degree of differentiation, neurological invasion, and pTNM stage were all significantly linked with

postoperative OS in GC patients (all $p < 0.05$) (Table III). Multivariate analysis revealed that PNI < 49.3 (HR: 0.42; 95 % CI: 0.29-0.62; $p < 0.001$), FIB ≥ 3.60 (HR: 1.60; 95 % CI: 1.12-2.29; $p = 0.011$), nerve invasion (HR: 1.58; 95 % CI: 1.03-2.42; $p = 0.035$) and pTNM stage (II vs I, HR: 3.12; 95 % CI: 1.15-8.46; $p = 0.026$; III vs I, HR: 9.46; 95 % CI: 3.65-24.49; $p < 0.001$) were independent prognostic factors for postoperative OS in GC patients. Figure 2 displays the outcomes of the multivariate analysis through the forest plot.

Construction and validation of a nomogram

The nomogram was constructed using the multivariate Cox proportional risk model to predict GC patients' 1-, 2-, and 3-year OS. This nomogram includes PNI, FIB, nerve invasion, and pTNM staging factors, as depicted in figure 3. The nomogram's AUCs for predicting 1-, 2-, and 3-year OS were 0.815, 0.796, and 0.822, respectively (Fig. 4). These AUCs were higher than those obtained by utilising pTNM staging alone (0.815, 0.796, and 0.822, respectively), suggesting that the nomogram had a high degree of discrimination. The C-index of the nomogram was determined to be 0.782 (95 % CI: 0.744-0.820), which suggests a better predictive capacity than the pTNM stage alone (0.719, 95 % CI: 0.683-0.755). The calibration curves demonstrate a good agreement between the nomograms' predictions and the actual results (Fig. 5).

Decision curve analysis

The DCA was conducted to evaluate the clinical value of the nomogram and pTNM stage, as depicted in figure 6. The findings revealed that the nomogram exhibited a significant net advantage

and substantial clinical usefulness in forecasting the 1-, 2-, and 3-year OS in GC patients and outperformed the use of the pTNM stage alone.

DISCUSSION

In 1968, the initial edition of the pTNM Classification of Malignant Tumors was jointly published by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC). Since then, the pTNM classification and histopathology have been extensively employed in the prognostic prediction and clinical management of GC patients. Nevertheless, despite individuals with the same clinical stage being administered the same treatment regimen, their prognosis might vary significantly. Hence, the existing scoring method needs to be revised for a thorough and precise evaluation of the prognosis of GC patients. Consequently, there is a pressing requirement to research other elements that influence tumour prognosis and to develop a straightforward and precise scoring system.

The clinical prognosis of patients with malignancies is influenced by several factors, including their nutritional status and inflammatory levels. However, unlike age, comorbidities, tumour location, tumour stage, and degree of differentiation, these parameters may be altered by focused therapies. Hence, the crucial aspect in enhancing patients' postoperative prognosis is directing attention towards these modifiable risk factors that may be partially or entirely modified. The timely identification and treatment of patients who exhibit malnutrition or elevated inflammatory levels is essential to improving the prognosis of GC patients. A retrospective study was performed on a set of 395 individuals who had radical gastrectomy to examine

prognostic factors following this surgery surgical procedure. Our study's outcomes suggest that preoperative PNI, FIB, nerve invasion, and high pTNM stage are independent factors that can forecast postoperative OS in GC patients.

The onset and progression of cancer are closely associated with the nutritional status and level of inflammation in patients (23). The PNI is a complete evaluation index measuring patients' nutritional and immunological levels. It comprises albumin and lymphocytes and is an excellent indicator for evaluating surgical risk and prognosis in surgical patients (24,25). Albumin is well recognised as a biomarker for certain kinds of cancer, and its concentrations are correlated with the advancement and prognosis of cancer (26). Lymphocytes, being the fundamental cells involved in cell-mediated immunity, play a crucial role in determining the strength of the host's immune response. A decrease in lymphocyte levels can reduce immune function, perhaps facilitating the evasion of cancer cells and worsening the patient's prognosis (26,27). The PNI reflects patients' nutritional and immunological status and may be readily computed to offer an initial evaluation of the GC patients' prognosis (28). Interestingly, PNI exhibited a significant positive correlation with OS in stage I/III patients but not in stage II patients. This discrepancy may be due to the single-center design and inherent data limitations.

Fibronectin (FIB) is a glycoprotein synthesised in the liver in response to stimulation by serum cells. It comprises a central nodule, a complex helical structural domain, and C-terminal domains labelled α, β, and γ. FIB is crucial for blood coagulation and inflammatory reactions. Multiple recent reports have indicated a correlation between elevated levels of preoperative FIB and the advancement

and prognosis of various malignant tumours, such as GC (17,29-31). However, comprehending the precise mechanisms linking FIB and GC prognosis remains challenging. FIB may impact the development of cancer through many mechanisms. FIB can modulate the inflammatory process by stimulating monocytes to generate TNF-α and IL-6, crucial cytokines linked to tumour development and patient survival (32). Additionally, FIB can interact with cells like leukocytes and platelets, exerting its pro-inflammatory and pro-tumor effects through various mechanisms (33). Previous studies have shown that preoperative serum FIB levels in GC patients correlate positively with tumor stage and poor survival. Elevated fibrinogen levels are more pronounced in advanced disease and are associated with increased tumor burden, metastasis, and worse prognosis (34). This aligns with our findings that while FIB was not significantly associated with OS in stage I and II patients, it was in stage III, suggesting that FIB levels increase with tumor progression. Although the impact of PNI and FIB on OS did not exhibit the same degree of relevance across different TNM staging subgroups, the model integrating these factors demonstrated a more superior predictive efficacy compared to the traditional TNM staging system. Therefore, we believe this study holds significant clinical relevance. To enhance the robustness of our findings, future studies will incorporate multicenter cohorts with larger sample sizes for validation.

The nomogram plays a crucial function in the individualised management of individuals with tumours, as it integrates several variables to compute the likelihood of clinical prognostic outcomes (35). In this study, we created a nomogram that included PNI, FIB, pTNM stage, and nerve invasion to forecast the postoperative OS in

patients with radical gastrectomy. Notably, the nomogram demonstrated a higher OS prediction than the usual pTNM stage. Patients with a high likelihood of an unfavourable prognosis had a more excellent overall score on the nomogram. They should be promptly provided with personalised therapeutic interventions and supplementary care to enhance the postoperative prognosis of GC patients.

Although this study has shown favourable findings, it is essential to acknowledge its limitations. Due to the nature of our study being a retrospective analysis conducted at a single location, we could not wholly exclude potential bias. Furthermore, it is essential to note that this study did not undergo external validation, therefore necessitating the evaluation of the predictive efficacy of this nomogram model in other populations. Insufficient data was obtained regarding postoperative complications and diverse nutritional supplements, indicating the need for further investigation. Therefore, we will undertake multicenter, comprehensive population studies to validate our findings further. Our nomogram worked well in forecasting the OS of GC patients despite certain limitations, and it may be utilised to inform patients' individualised treatment plans, improving the quality of patient survival.

CONCLUSION

In conclusion, our study concluded that preoperative PNI, FIB, pTNM stage and nerve invasion were independent OS predictors after radical gastrectomy in GC patients. The nomogram, created by combining PNI and FIB, is a straightforward and dependable tool for forecasting postoperative OS in GC patients. The nomogram can aid

doctors in implementing personalised intervention approaches to enhance patients' prognoses.

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Table I. The clinicopathological characteristics of the patients

Clinicopathological characteristics	**All (*n* = 395)**
Age (years), median (IQR)	68 (63-74)
Gender	
Female	107 (27.1)
Male	288 (72.9)
Comorbidity (hypertensive/diabetes/COPD) No Yes	 242 (61.3) 153 (38.7)
BMI (kg/m^2), Median (IQR)	21.9 (19.5-24.1)
ALB(g/L), Median (IQR)	41.8 (38.0-45.3)
PNI, Median (IQR)	49.8 (45.0-53.6)
FIB, Median (IQR)	3.4 (2.9-4.1)
ASA score, n (%)	
1	330 (83.5)
2	57 (14.4)
3	8 (2.0)
Clinicopathological characteristics	**All (*n* = 395)**
Tumour location, n (%)	
Upper	179 (45.3)
Middle	87 (22.0)
Lower	129 (32.7)
Type of gastrectomy, n (%)	
Subtotal	138 (34.9)
Total	257 (65.1)
Tumour differentiation, n (%)	
Poorly	42 (10.6)

Moderate	66 (16.7)
Well	287 (72.7)
Vascular invasion, n (%)	
No	216 (54.7)
Yes	179 (45.3)
Nerve invasion, n (%)	
No	208 (52.7)
Yes	187 (47.3)
Complications, n (%)	
No	251 (63.5)
Yes	144 (36.5)
Clinicopathological characteristics	All (n = 395)
pTNM stage, n (%)	
I	107 (27.1)
II	103 (26.1)
III	185 (46.8)

BMI: body mass index; IQR: interquartile range; ALB: albumin; PNI: prognostic nutritional index; FIB: fibrinogen; ASA: American Society of Anesthesiologists; pTNM: pathological tumour node metastasis.

Table II. Relationship between preoperative PNI, plasma FIB level and clinicopathologic features

Variables	**PNI (*n* = 395)**			**FIB (*n* = 395)**		
	≤ 49.3	**> 49.3**	***p*-value**	**≤ 3.6**	**> 3.6**	***p*-value**
Age (years), Median (IQR)	71 (66-75)	66 (59-72)	< 0.001	67 (61-72)	71 (66-75)	< 0.001
Gender, *n*						
Female	134	154	0.595	167	121	0.601
Male	53	54		59	48	
Comorbidity, *n*						
No	110	132	0.345	136	106	0.264
Variables	**PNI (*n* = 395)**			**FIB (*n* = 395)**		
	≤ 49.3	**> 49.3**	***p*-value**	**≤ 3.6**	**≤ 49.3**	> 49.3
Yes	77	76		90	63	
BMI (kg/m^2), Median (IQR)	21 (19-24)	22 (20-24)	< 0.001	22 (20-24)	21 (19-24)	0.025
ALB (g/L), Median (IQR)	38 (35-41)	45 (43-47)	0.721	42 (38-45)	42 (38-45)	0.022
ASA score, n			< 0.001			0.234
1	142	188		195	135	
2	38	19		27	30	

3	7	1		4	4	
Tumour location, n						
Upper	81	98	0.737	97	82	0.542
Middle	42	45		52	35	
Lower	64	65		77	52	
Differentiation, n						
Poor	145	142	0.050	157	130	0.031
Moderate	29	37		37	29	
Well	13	29		32	10	
Vascular invasion, n						
No	87	121	0.021	128	80	0.067
Yes	100	87		98	89	
Variables	**PNI (*n* = 395)**			**FIB (*n* = 395)**		
	≤ 49.3	**> 49.3**	***p*-value**	**≤ 3.6**	**≤ 49.3**	> 49.3
Nerve invasion, *n*						
No	85	131	< 0.001	139	77	0.002
Yes	102	77		87	92	

Complications, n						
No	100	151	< 0.001	146	105	0.614
Yes	87	57		80	64	
pTNM stage, *n*						
I	35	72	0.002	79	28	< 0.001
II	54	49		59	44	
III	98	87		88	97	

PNI: prognostic nutritional index; FIB: fibrinogen; BMI: body mass index; IQR: interquartile range; ALB: albumin; ASA: American Society of Anesthesiologists; pTNM: pathological tumour node metastasis.

Table III. Univariate Cox regression analyses for OS in GC patients

Characteristics	**Univariate analysis**	
	HR (95 % CI)	***p*-value**
Gender		0.098
Female	1	
Male	1.434 (0.935-2.198)	
Age (year)		0.002
< 69.5	1	
> 69.5	1.771 (1.237-2.536)	
Comorbidity		0.172
No	1	
Yes	1.283 (0.897-1.836)	
BMI (kg/m^2)		0.037
< 18.5	1	
18.5-24	0.645 (0.404-1.029)	0.066
> 24	0.474 (0.267-0.840)	0.011
HGB (g/L)		0.010
< 110	1	
> 110	0.625 (0.438-0.893)	
PNI		< 0.001
< 49.3	1	
Characteristics	**Univariate analysis**	
	HR (95 % CI)	***p*-value**
> 49.3	0.387 (0.266-0.563)	
FIB		< 0.001
< 3.6		
> 3.6	1.988 (1.392-2.840)	
ASA score		0.029

1	1	
2	1.279 (0.782-2.091)	0.327
3	3.229 (1.314-7.937)	0.011
Surgical approach		0.065
Open	1	
Laparoscopic assisted	1.398 (0.980-1.993)	
Tumour location		0.360
Upper	1	
Middle	0.925 (0.591-1.448)	0.734
Lower	0.738 (0.485-1.122)	0.155
pTNM stage		< 0.001
I	1	
II	4.645 (1.743-12.378)	0.002
III	15.557 (6.329-38.240)	< 0.001
Characteristics	**Univariate analysis**	
	HR (95 % CI)	***p*-value**
Vascular invasion		< 0.001
No	1	
Yes	2.747 (1.893-3.985)	
Nerve invasion		< 0.001
No		
Yes	3.476 (2.345-5.154)	
Differentiation		0.007
Poor	1	
Moderate	12.059 (1.604-90.651)	0.016
Well	17.510 (7.443-125.487)	0.004
Postoperative chemotherapy		< 0.001
No	1	

Yes	6.728 (2.484-18.225)	

BMI: body mass index; HGB: haemoglobin; PNI: prognostic nutritional index; FIB: fibrinogen; ASA: American Society of Anesthesiologists; pTNM: pathological tumour node metastasis.

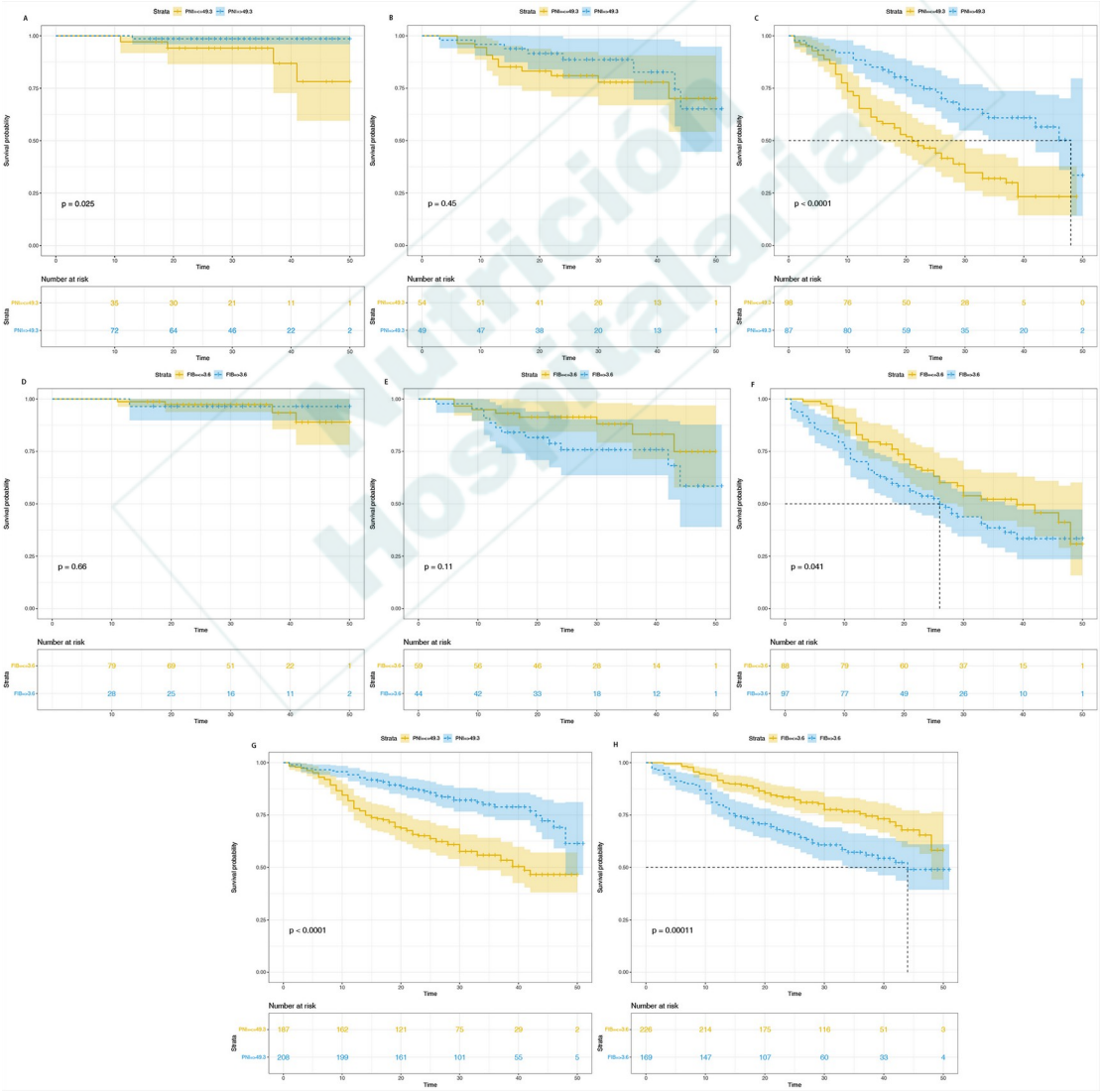

Figure 1. Kaplan-Meier analysis of OS per pTNM stage based on FIB

and PNI. Kaplan-Meier analysis of OS at per pTNM stage based on PNI (A-C); Kaplan-Meier analysis of OS at per pTNM stage based on FIB (D-F); Kaplan-Meyer analysis of OS in total pTNM stage based on PNI and FIB (G-H) (PNI: prognostic nutritional index; FIB: fibrinogen).

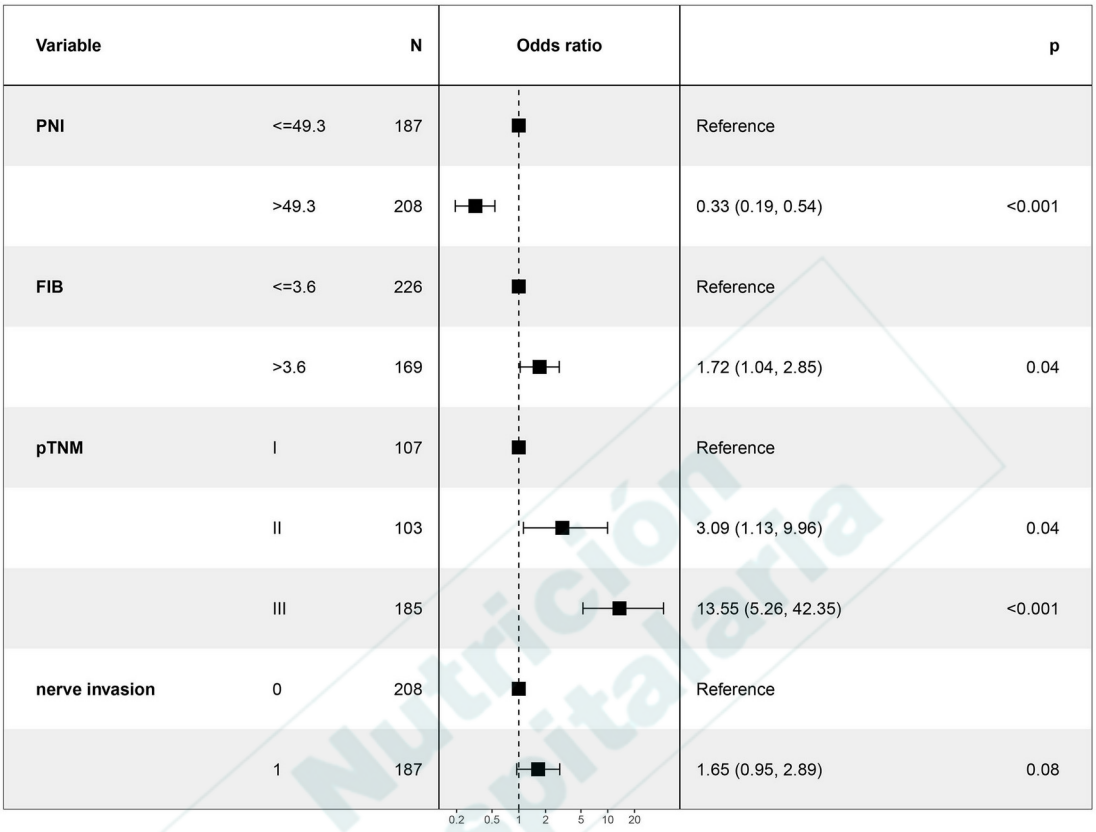

Figure 2. Forest plot showing multivariate Cox regression analysis for OS (PNI: prognostic nutritional index; FIB: fibrinogen; pTNM: pathological tumour node metastasis; HR: hazard ratio).

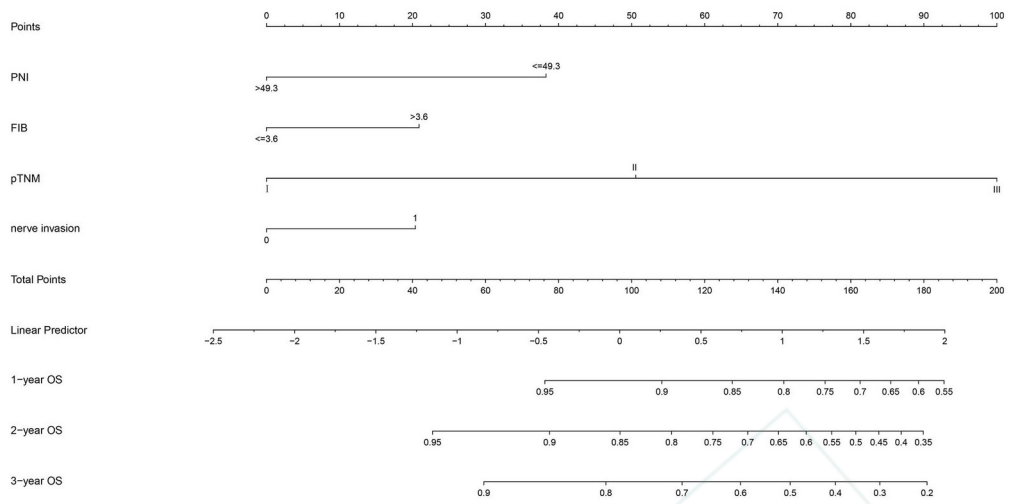

Figure 3. Nomogram for forecasting 1-, 2-, and 3-year OS of GC patients following surgery

(PNI: prognostic nutritional index; FIB: fibrinogen; pTNM: pathological tumour node metastasis).

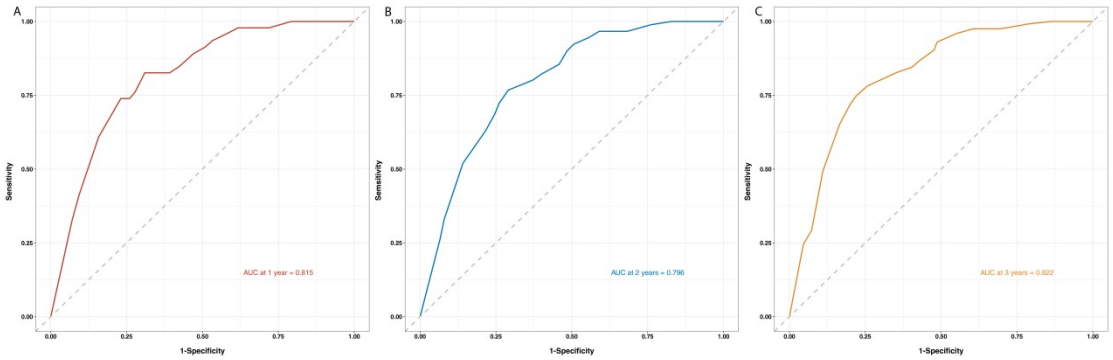

Figure 4. ROC analysis for forecasting OS in GC patients. A. 1-year. B. 2-year. C. 3-year.

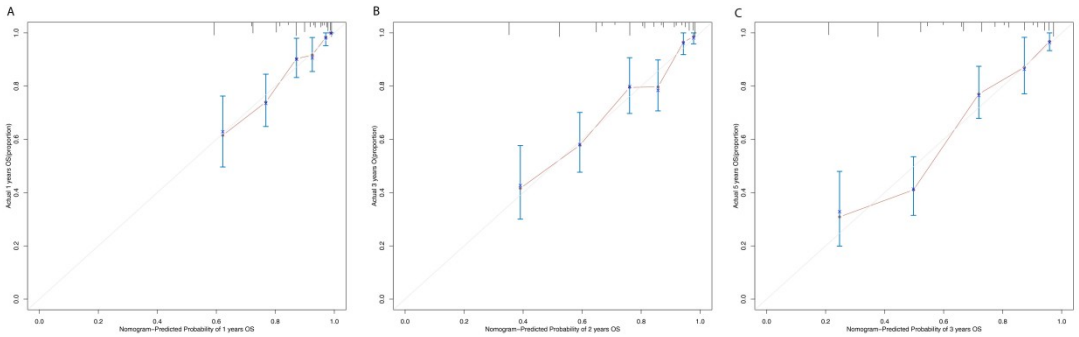

Figure 5. Calibration curves for the nomogram for forecasting OS in GC patients. A.) 1-year. B. 2-year. C. 3-year.

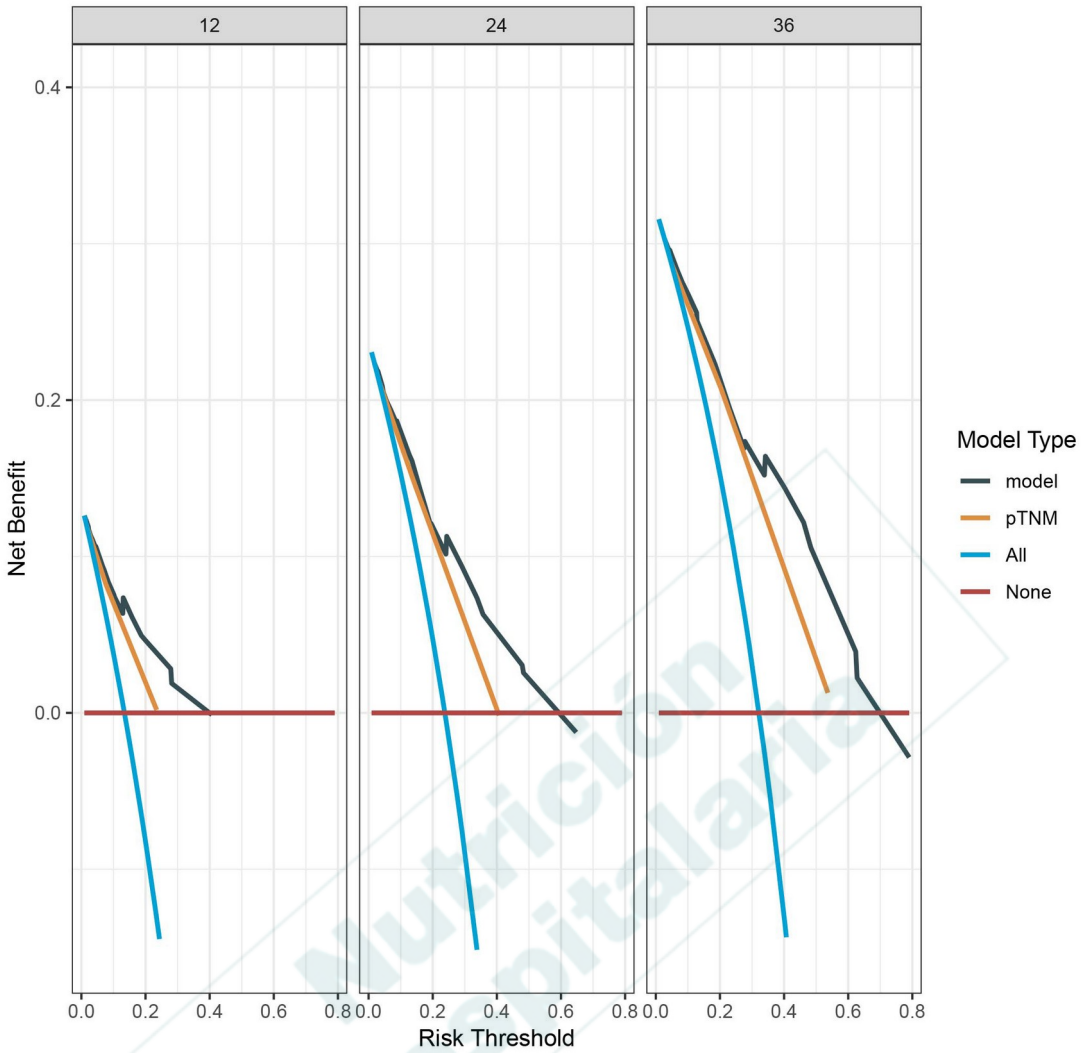

Figure 6. The DCA of the nomogram and pTNM stage for predicting OS.