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RESEARCH ARTICLE

Analysis of the correlation between the systemic inflammatory response index and the severity of coronary vasculopathy

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ABSTRACT

This study aims to analyze the correlation between Systemic Inflammatory Response Index (SIRI) and the severity of coronary artery stenosis in patients with coronary heart disease (CHD). It also aims to assess the predictive value of SIRI for the severity of coronary artery stenosis. A total of 2990 patients who underwent coronary angiography were included in this study. The Gensini score was used to estimate the severity of coronary vascular lesions. The predictive ability of SIRI for CHD was evaluated using Receiver Operating Characteristic (ROC) curves. Binary multivariate logistic regression analysis was used to predict the likelihood of CHD based on the SIRI index. The results showed that people with higher SIRI index were more likely to have CHD ($P < 0.001$). After controlling for other risk factors, the highest quartile had a significantly higher incidence of coronary artery disease compared to the lowest quartile (odds ratio [OR]=2.25, 95% confidence interval [CI] 1.73-3.92, $P < 0.001$). Furthermore, the Gensini score was significantly higher in the fourth quartile group (T4) compared to the first (T1) and second (T2) quartile groups ($P < 0.001$). Additionally, the SIRI index was significantly higher in the group with severe coronary artery lesions compared to the mild and moderate groups ($P < 0.001$). The SIRI index also showed a higher predictive ability for the extent of coronary lesions under the ROC curve compared to other commonly used markers, including platelet-to-lymphocyte ratio (PLR), monocyte-to-lymphocyte ratio (MLR), and neutrophil-to-lymphocyte ratio (NLR) ($P < 0.001$). Therefore, SIRI index positively correlates with coronary artery stenosis in CHD patients, serving as an effective early screening marker for assessing stenosis

severity. **KEYWORDS:** Systemic inflammatory response index, coronary heart disease, Gensini score, severity of coronary artery disease.

INTRODUCTION

Globally, cardiovascular diseases (CVDs), particularly coronary heart disease (CHD), continue to have significant rates of morbidity and mortality. Nowadays, the main methods for lowering the risk of cardiovascular disease are lifestyle modifications and the care of conventional risk factors, such as diabetes, high blood pressure, and high cholesterol[1]. Even with the growing focus on managing health and successfully reducing traditional risk factors, the frequency of cardiovascular events is still quite high. Chronic inflammation is one element that cannot be disregarded. Numerous clinical and experimental research have provided compelling evidence that vascular inflammation plays a critical role in the development of atherosclerosis and acute coronary syndrome[2]-[5]. Inflammatory cells and their products, which are commonly used as indicators of inflammation in clinical practice[6]. Combining two or three blood indicators can better reflect the inflammatory state in the body and have a synergistic effect on the clinical prognosis of patients with cardiovascular disease as well as the prediction of the risk of acquiring cardiovascular disease[7]-[9].

A recently proposed marker of the systemic inflammatory response, the Systemic Inflammatory Response Index (SIRI) has the benefit of being widely accessible and reasonably priced. Qi et al. first proposed the index in 2016[10]. It was shown in a cohort research that the SIRI index might represent both the level of systemic inflammation and the local immune response. The

application of SIRI index in cardiovascular disorders has grown in popularity as the significance of inflammation in these conditions has been increasingly highlighted. Compared to the previous single and two composite indices, SIRI combines three blood parameters for a more stable and comprehensive response to the systemic inflammatory response. Lymphocytes are an important component of the SIRI index, which is a good indicator of the immune status of the organism and provides a good response to the prognosis of many diseases. Low lymphocyte count is closely related to the poor prognosis of cardiovascular and cerebrovascular diseases[11]. Similarly, the current research on SIRI index mainly focuses on the risk of cardiovascular and cerebrovascular diseases, all-cause mortality and prognosis. Studies have shown that SIRI index is positively correlated with the degree of coronary artery stenosis in elderly patients with acute coronary syndrome (ACS)[12]. More recent and thorough research is needed to confirm whether this discovery is also applicable to the broader population of patients with CHD. Therefore, this study used a retrospective study method to explore the relationship between SIRI index and coronary artery vascular disease in patients with coronary heart disease, aiming to provide new predictors for the early assessment, prevention and intervention of coronary heart disease, and help people at high risk of coronary heart disease to better manage their health.

MATERIALS AND METHODS

General information

This study investigated patients who were hospitalized and underwent coronary angiography in the Department of Cardiology at the Tujia-Miao Central Hospital of Enshi Autonomous

Prefecture in 2023. The following were the exclusion criteria for this study:(1) cases with more than 20% missing data;(2) patients with congenital heart disease, heart failure, and other cardiac diseases;(3) patients with immune system disorders, malignant tumors, severe hepatic and renal insufficiency, and hematological disorders;(4) patients who have had acute inflammatory diseases, such as acute pneumonia, acute gastroenteritis, acute pancreatitis, and localized infections in the last month; (5) patients with recent history of major surgical operation or medical history of cerebral hemorrhage or stroke; 2990 people who met the requirements were finally included in this study(Figure 1).

Data collection

General demographic data of all patients were collected, such as age, gender, and smoking history; past medical history, mainly including history of hypertension, diabetes mellitus, and cerebrovascular disease (stroke, cerebral infarction); laboratory and clinical data. The first blood biochemical indexes of the patients were collected after admission. Based on these laboratory results, the SIRI index of the patients was calculated[10], was calculated from peripheral blood neutrophil count ($\times 10^9$ /L) × monocyte count ($\times 10^9$ /L)/ lymphocyte count ($\times 10^9$ /L). And the patients were divided into four groups according to the quartiles of the SIRI index; using the Gensini score[13] to assess the severity of coronary artery vasculopathy, and record the number of coronary artery vasculopathy of each patient. This study was approved by the Ethics Committee of Enshi Autonomous Prefecture Central Hospital in accordance with the Helsinki Declaration, Decision No:2024-052-01. All patient data used in this article is

completely anonymous and the data has been anonymised prior to access and analysis, thus there is no potential risk to individual patients or their personal privacy that would threaten it. As the committee did not require patient consent for the review of their medical records, obtaining informed consent from patients is not necessary for this retrospective study.

Statistical methods

SPSS 23.0 statistical software was used for data analysis. Continuous variables were expressed as mean ± standard deviation (SD) or median and interquartile spacing. For normally and non-normally distributed data, differences between groups were assessed using the independent samples t-test or Mann-Whitney U test, respectively. Categorical variables were expressed as numbers (percentages) and compared by chi-square test. When multivariate logistic regression was used to test the association of the SIRI index with different groups of coronary angiography data, the effect of confounders on the model was reduced by adjusting for age, sex, and other common risk factors. Subjects' work characteristic curves (ROC) and area under the curve (AUC) were used to assess the ability of the SIRI index to predict atherosclerosis. p-values <0.05 were considered statistically significant. As this was a retrospective study, it was inevitably subject to some selection bias and recall bias.

RESULTS

Baseline characteristics

Data were obtained from 2990 patients who underwent coronary angiography. Patients were

categorized into quartiles according to the SIRI index. Demographics and characteristics of the four patient groups were as follows Table 1 Shown. The four groups of subjects did not show differences in SBP (systolic blood pressure), TC((total cholesterol), LDL-C(low-density lipoprotein), and ApoB(apolipoprotein B). The proportion of males, hypertension, diabetes mellitus, and smoking was higher in patients in the highest quartile of the SIRI index (P<0.001); WBC(white blood cell count), NEUT(neutrophil count), MONO(monocyte count), PLT(platelet count), ALT(alanine aminotransferase), AST(aspartate aminotransferase), TG(triglyceride), LPa(lipoprotein a), Cr(creatinine), GLU(glucose), and UA(uric acid) levels were elevated (P<0.001); LYMPH(lymphocyte count), ALB(albumin), HDL-C(high-density lipoprotein), and ApoA1(apolipoprotein A1) levels were decreased (P<0.001).

The relationship between the SIRI index and risk factors for cardiovascular disease

According to the coronary angiography results, all the population was divided into a group with normal coronary arteries and a group with coronary artery disease. The results showed (Table 2), there were significant differences between the CHD group and the normal group in terms of gender, age, SIRI index, TG, LPa, and GLU, with higher values in the CHD group (P<0.001), indicating that males and the older age group had a higher risk of CHD, and that the likelihood of CHD was significantly increased in the groups with higher SIRI index, TG, LPa, and GLU, of which significantly more patients were found in the SIRI index quartile group, T2, T3, and T4 groups than the normal coronary artery group. The HDL-C and ApoA1 levels were significantly lower in the CHD group (P<0.001). In addition, the proportion of hypertension,

diabetes mellitus and smoking in the coronary artery disease group was greater than that in the coronary artery normal group (P<0.001).

Application of multifactorial logistic regression analysis of coronary heart disease by SIRI index quartiles

Table 3 The results of the analysis using patients with normal coronary arteries as the reference group are shown. According to the results of the study, the fourth quartile of the SIRI index was significantly associated with a high prevalence of CHD. In addition, the risk of CHD in the T4 group was 2.25 times higher than that in the T1 group [OR= 2.25 (95% CI1.73,2.92)] (P<0.05), irrespective of social characteristics (gender, age), lifestyle (smoking) and disease characteristics (hypertension, diabetes mellitus, and lipid levels).

The relationship between the SIRI index and the severity of coronary artery lesions

Patients with CHD were categorized according to the Gensini score and the number of branches of coronary artery lesions. Based on the Gensini score tertiles, these patients were categorized into three groups as follows (**Table 4**): mild, moderate and severe coronary lesions. The results of the study showed that the severity of coronary lesions varied significantly according to the SIRI index. In addition, in the group with multiple coronary lesions, the number of patients in the T4 group was significantly higher than in the other three groups. Figure 2 Gensini scores by quartiles of SIRI index and SIRI index by tertiles of Gensini index in CHD patients are shown. Gensini scores were significantly higher in the T4 group compared with the T1 and T2 groups (P<0.001). The SIRI index was significantly higher in the severe coronary artery lesion

group than in the mild and moderate coronary artery injury groups (P<0.001). Poisson regression analysis between SIRI index and Gensini score resulted in a significant positive effect of SIRI on Gensini score, and when the value of SIRI increased, the value of Gensini score also increased (P<0.001) (Table 5).

Comparison of SIRI and common leukocyte subtype ratio ROC curves and area under the curve

Table 6 The results of ROC analysis of SIRI, PLR(platelet-lymphocyte ratio), MLR(monocyte-lymphocyte ratio) and NLR(neutrophil-lymphocyte ratio) were summarized. The results showed that the SIRI index had a greater AUC than PLR, MLR and NLR, indicating that the predictive ability of SIRI for CHD was better than that of PLR, MLR and NLR. The critical SIRI index for CHD was 0.247 (sensitivity, 54.3%; specificity, 70.4%) (Figure 3)

DISCUSSION

The main pathophysiological mechanism of coronary heart disease is coronary atherosclerosis (AS). Recent studies have shown that AS is more than just lipid deposition; it is also an inflammatory disease[14], and that the onset, course, and outcomes of AS are significantly influenced by both local and systemic inflammatory responses[15]-[16]. Currently, electrocardiograms, markers of myocardial injury, imaging signs, and other complete assessments are the most often utilized clinical approaches to identify coronary heart disease. Finding clinical indications is a straightforward process, and identifying inflammatory markers

is useful in the diagnosis of coronary heart disease.

According to considerable literature, white blood cells, neutrophils[17], monocytes[18]-[19], and lymphocytes[20]-[22]are inexpensive and readily available biomarkers of systemic inflammation, they are closely related to the occurrence of cardiovascular adverse events such as coronary heart disease[23]-[24], stroke[25]-[26], and all-cause mortality[27]. Additionally, to the classic inflammatory markers of blood cells, emerging composite metrics including NLR, MLR and PLR are also gaining attention. Study found that the NLR was the strongest predictive marker for ACS and that it could be used as an adjunctive biomarker for the diagnosis of ACS. Furthermore, neutrophil and monocyte counts were significantly higher in ACS patients compared to healthy controls, and that lymphocyte counts were significantly higher in controls compared to the ACS group[28]. Fan et al. showed elevated levels of MLR and NLR were independent predictors of long-term MACE in patients treated with primary PCI for NSTEMI, and that the prognostic value for long-term MACE prediction was enhanced by combining these two inflammatory markers[29]. In summary, numerous studies have been conducted on the calculation and analysis of NLR, PLR, and MLR as prognostic indicators[30]-[32]. Compared to white blood cell and subpopulation counts acquired directly from standard blood tests, they have a greater predictive value for the prediction of all-cause and cardiovascular mortality, as well as for the prognosis of disease[33]-[34]. However, there has been no report on the relationship between these new indicators of inflammation and cardiovascular disease.

SIRI, as a new inflammatory marker, combined with three blood markers, more systematically

and comprehensively reflects the inflammatory state of the body, and is highly correlated with systemic diseases. Research has demonstrated that elevated SIRI was associated with higher mortality and sepsis risks and higher stroke severity, and its predictive ability was better than that of NLR, PLR, LMR, and RDW[35]. In a multicenter retrospective study, the SIRI was used as a neonatal inflammatory marker in patients with rheumatoid arthritis (RA) to aid in the diagnosis and demonstrate disease activity of RA, compared with NLR, MLR and PLR, SIRI had a larger area under the ROC curve for predicting RA-associated interstitial lung disease (ILD) [36]. Elevated SIRI were associated with an increased risk of stroke, both stroke subtypes, and all-cause mortality in a large prospective follow-up study, and were associated with an increased incidence of myocardial infarction in subjects older than 60 years[37]. Studies indicate that SIRI is a strong and independent risk factor for adverse outcomes in patients with ACS undergoing percutaneous coronary intervention, with higher SIRI leading to more severe disease and improved prognostic value of the GRACE risk score [38]. In a large follow-up cohort study, two new inflammatory composite indices, SII and SIRI, were strongly associated with cardiovascular mortality and all-cause mortality, suggesting that more attention should be paid to systemic inflammation to provide better prevention strategies[39]. Having shown that SIRI is also a strong independent predictor of MACE in patients with NSTEMI[40], that elevated levels of SIRI may reflect a dysregulation of the immune response characterized by an imbalance between pro- and anti-atherosclerotic immune networks, and that this imbalance leads to a transition from a stable to an unstable state of the plaque, which in turn leads to the occurrence of acute coronary events[41].

It is evident that SIRI is becoming a popular and non-invasive marker of inflammation in many scientific fields. Moreover, SIRI is a strong predictor of a variety of inflammation-related disorders, including as cardiovascular disease. In the present investigation, we observed the relationship between SIRI index and the risk of coronary heart disease. The number of patients with coronary artery disease in the T2, T3 and T4 groups was significantly higher than that in the group with normal coronary arteries when the SIRI index was grouped into quartiles. The multifactorial logistic regression analysis of the relationship between the SIRI index and coronary heart disease concluded that, after controlling for confounding factors, the risk of coronary artery disease was significantly higher in the T3 and T4 groups than in the normal coronary artery group. The highest quartile was associated with a higher incidence of CHD compared with the lowest SIRI index quartile [OR=2.25 (95% CI 1.73,2.92)] ($P<0.05$). Furthermore, we evaluated the severity of coronary lesions in the afflicted population by using Gensini scores, and the Gensini score tertiles were used to represent mild, moderate, and severe coronary artery disease. SIRI in the third quantile of Gensini score was significantly higher than in the first and second quantiles, suggesting that patients with multi-vessel and severe coronary artery lesions typically had higher SIRI. When the value of the SIRI index grew, the value of the Gensini score similarly increased ($P<0.05$) in the Poisson regression analysis. The SIRI index had a bigger area under the ROC curve (AUC=0.657, $P<0.05$) than the inflammation indices NLR, MLR, and PLR, which were based on the combination of two blood indicators. As a result, the SIRI index was more valuable for identifying CHD.

At present, the cardiovascular application of systemic inflammation is mainly about prognosis

and adverse cardiovascular events (MACE), and few studies have discussed the diagnostic significance of inflammation-related indices in cardiovascular disease. In the early stage of the disease, some markers of myocardial injury and electrocardiogram may not show abnormalities. The gold standard for diagnosing coronary heart disease is coronary angiography, an invasive and costly procedure that cannot be carried out in rural or remote locations with inadequate medical resources. Additionally, some patients who do not exhibit symptoms or who have pre-existing coronary heart disease may be reluctant to undergo this invasive procedure. Therefore, our study initially evaluated the correlation between SIRI and the diagnosis of coronary artery disease, and the analysis of the results showed that SIRI is expected to be an independent predictor of the development of coronary artery disease and to be used as an auxiliary diagnostic index for coronary artery disease.

Also noteworthy is albumin, which is the most abundant protein in human plasma and is commonly used to reflect the nutritional status of the body[42], and whose production is adversely affected by chronic inflammation. Studies have shown that serum albumin levels are valuable in predicting long-term mortality in patients implanted with dual-chamber permanent pacemakers[43]. A combination-Naples score (NS) used to predict adverse cardiovascular events, an important component of which is albumin, can be used to risk stratify long-term mortality in STEMI patients undergoing primary percutaneous coronary intervention[44]. The Naples prognostic score (NPS) may have the potential to predict long-term mortality in patients with acute pulmonary embolism (APE)[45]. Albumin in the development and progression of CHD is a topic that deserves to be explored in depth in future studies.

CONCLUSION

Regardless of the traditional influencing factors, SIRI index was positively correlated with atherosclerosis, and higher SIRI was significantly correlated with the severity of the disease. According to the results of this study, the SIRI can help to recognize patients with high-risk coronary artery disease in a timely manner, and early intervention is important for the prognosis of these patients. The discovery of new inflammatory markers in cardiovascular disease will be a popular trend in future research.

Limitations

There are several limitations to this study. First, because this was a retrospective observational study, the results may be subject to recall bias. Second, this was a single-center study, which limited our study. Therefore, future multicenter data studies with more extensive experiments on this topic are needed to increase the accuracy and generalizability of SIRI.

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TABLES AND FIGURES WITH LEGENDS

Table 1. Clinical characteristics of individuals by SIRI index quartile.

Characteristics	SIRI index quartiles				P
	T1(lowest) (n=747)	T2 (n=746)	T3 (n=750)	T4(highest) (n=747)	
Age(years)	59(54,68)	60(53,69)	61(54,70)[a]	64(55,72)[ab]	<0.001
SBP(mmHg)	130(120,146)	130(120,144)	130(120,148)	130(120,150)	0.813
HR(bpm)	72(70,78)	72(70,78)	72(70,79)	72(70,80)[abc]	<0.001
Male(n%)	281(37.6%)	404(54.2%)	526(70.1%)	564(75.5%)	<0.001
Smoking(n%)	194(26.0%)	299(40.1%)	377(50.3%)	404(54.1%)	<0.001
Hypertensio (n%)	285(38.2%)	322(43.2%)	358(47.7%)	347(46.5%)	0.001
Diabetes(n%)	87(11.6%)	113(15.1%)	115(15.3%)	148(19.8%)	<0.001
WBC(10^9/L)	4.86 (4.15,5.63)	5.64 (4.84,6.52)[a]	6.34 (5.46,7.34)[ab]	8.57 (6.94,10.51)[abc]	<0.001
NEUT(10^9/L)	2.68 (2.23,3.18)	3.48 (2.96,4.02)[a]	4.23 (3.64,4.96)[ab]	6.48 (5.05,8.37)[abc]	<0.001
LYMPH(10^9/L)	1.73 (1.40,2.14)	1.63 (1.31,2.02)[a]	1.46 (1.14,1.81)[ab]	1.29 (0.96,1.68)[abc]	<0.001
MONO(10^9/L)	0.28 (0.23,0.33)	0.35 (0.29,0.41)[a]	0.39 (0.32,0.46)[ab]	0.48 (0.38,0.63)[abc]	<0.001
Hb(g/L)	137(127,147)	141(130,153)[a]	145(132,157)[ab]	146(133,157)[ab]	<0.001
PLT(10^9/L)	193(158,226)	195(161,236)	198(164,235)	202(165,238)[a]	0.003

			[a]		
ALT(U/L)	18(13,27)	20(14,28)	20(15,30)[a]	24(16,36)[abc]	<0.001
AST(U/L)	23(19,29)	23(19,29)	24(19,30)[a]	29(21,53)[abc]	<0.001
ALB(g/L)	40.61 (37.74,43.44)	40.12 (37.39,43.41)	40.41 (37.20,43.51)	39.35 (36.34,42.98)[abc]	<0.001
TC(mmol/L)	4.55 (3.81,5.28)	4.39 (3.66,5.12)	4.39 (3.58,5.31)	4.39 (3.65,5.27)	0.154
TG(mmol/L)	1.22 (0.88,1.83)	1.31 (0.97,1.92)	1.36 (0.97,1.87)	1.38 (1.01,2.12)[a]	<0.001
LDL-C(mmol/L)	2.74 (2.22,3.26)	2.71 (2.12,3.22)	2.71 (2.16,3.33)	2.72 (2.18,3.30)	0.599
HDL-C(mmol/L)	1.19 (0.99,1.41)	1.15 (0.98,1.34)[a]	1.09 (0.92,1.29)[b]	1.08 (0,90,1.28)[ab]	<0.001
ApoA1(g/L)	1.40 (1.23,1.65)	1.37 (1.21,1.61)	1.33 (1.16,1.57)[ab]	1.30 (1.15,1.55)[ab]	<0.001
ApoB(g/L)	0.86 (0.67,1.06)	0.86 (0.67,1.06)	0.86 (0.69,1.07)	0.87 (0.68,1.10)	0.234
LPa (g/L)	0.102 (0.046,0.262)	0.105 (0.049,0.264)	0.119 (0.053,0.271)	0.131 (0.053,0.301)[a]	0.043
Cr(μmol/L)	61.9 (51.9,74.4)	65.7 (55.9,78.8)[a]	72.5 (60.9,86.3)[ab]	75.3 (63.1,89.8)[ab]	<0.001
GLU(mmol/L)	4.96 (4.45,5.68)	5.05 (4.51,5.96)	5.21 (4.61,6.33)[a]	6.17 (5.11,8.07)[abc]	<0.001
UA(μmol/L)	306.04 (257.03,369.67)	326.30 (274.94,392.95)[a]	345.67 (290.15,407.75)[ab]	356.76 (294.89,433.11)[ab]	<0.001

Note: T1 the first SIRI index quartile, T4 the fourth SIRI index quartile, SBP systolic blood pressure, HR heart rate, WBC white blood cell count, NEUT neutrophil count, LYMPH lymphocyte, MONO monocyte, Hb hemoglobin, PLT platelet count, ALT alanine aminotransferase, AST aspartate aminotransferase, ALB albumin, TC total cholesterol, TG

triglyceride, LDL-C low-density lipoprotein, HDL-C high-density lipoprotein, ApoA1 apolipoprotein A1, ApoB apolipoprotein B, LPa lipoprotein a, Cr creatinine, GLU glucose, UA uric acid. *P*<0.001 were considered statistically significant; a *P*<0.001 vs. T1; b *P*<0.001 vs. T2; c *P*<0.001 vs. T3.

Table 2. Clinical characteristics of CHD patients based on coronary angiography.

Characteristics	Coronary normal(n=1124)	Coronary lesion(n=1866)	p
Age(years)	57(51,66)	64(56,71)	<0.001
Male(n%)	492(43.8)	1283(68.8)	<0.001
SIRI index(n%)			<0.001
T1(lowest)	394(35.1)	353(18.9)	
T2	321(28.6)	425(22.8)	
T3	260(23.1)	490(26.3)	
T4(highest)	149(13.3)	598(32.0)	
TC	4.55(3.86,5.26)	4.35(3.56,5.21)	<0.001
TG	1.26(0.93,1.83)	1.34(0.97,2.02)	0.004
LDL-C	2.80(2.27,3.28)	2.67(2.10,3.28)	<0.001
HDL-C	1.20(1.01,1.41)	1.09(0.92,1.28)	<0.001
ApoA1	1.40(1.22,1.66)	1.32(1.16,1.56)	<0.001
ApoB	0.87(0.69,1.05)	0.85(0.66,1.08)	0.652
Lp(a)	0.100(0.044,0.247)	0.124(0.051,0.296)	0.001
PLT	204(169,242)	193(158,229)	<0.001
GLU	4.94(4.43,5.65)	5.50(4.72,7.10)	<0.001
Smoking(n%)	330(29.4)	944(50.6)	<0.001
Hypertension(n%)	377(33.5)	935(50.1)	<0.001
Diabetes(n%)	81(7.2)	382(20.5)	<0.001

Note: T1 the first SIRI index quartile, T4 the fourth SIRI index quartile, TC total cholesterol, TG triglyceride, LDL-C low-density lipoprotein, HDL-C high-density lipoprotein, ApoA1 apolipoprotein A1, ApoB apolipoprotein B, LPa lipoprotein a, PLT platelet count, GLU glucose $P<0.001$ were considered statistically significant.

Table 3. Multivariate logistic regression analysis of CHD by SIRI index quartile.

Coronary angiography Normal(n=1124) Ref. CHD(n=1866)	SIRI index quartiles			
	T1(lowest) OR (95%CI)	T2	T3	T4(highest)
Model 1	Ref.	1.47(1.21,1.81)*	2.10(1.71,2.59)*	4.48(3.56,5.64)*
Model 2	Ref.	1.23(0.99,1.53)	1.48(1.18,1.85)*	2.92(2.28,3.75)*
Model 3	Ref.	1.13(0.90,1.41)	1.29(1.02,1.64)*	2.25(1.73,2.92)*

Note: Data are odds ratios (95% CI) of multivariate logistic regression; Model 1: crude Model 2: sex and age adjustments; Model 3: adjusted for model 2, smoking, hypertension, dia betes, GLU, LDL-C, TC, TG, ApoA1, LPa; CHD coronary heart disease, OR odds ratios, CI c onfidence intervals; * $P<0.05$

Table 4. Association between the SIRI index and coronary lesion severity in CHD patients.

	SIRI index quartiles				p
	T1(lowest) (n=466)	T2 (n=465)	T3 (n=469)	T4(highest) (n=466)	
Gensini score(tertiles)					<0.001
Mild(n=574)	184	178	131	81	
Moderate(n=657)	171	178	175	133	
Severe(n=635)	111	109	163	252	
Coronary lesion branches					<0.001
Single vessel(n=880)	259	252	206	163	
Multi-vessel(n=986)	207	213	263	303	

Note: CHD coronary heart disease, T1 the first SIRI index quartile, T4 the fourth SIRI index quartile; *P*<0.001 were considered statistically significant.

Table 5. Poisson regression analysis of SIRI index and Gensini score.

Variable	Estimate	St. Error	Z value	P value	RR (95%CI)
Intercept	3.196	0.029	12571.369	<0.001	24.427(23.100,25.830)
SIRI	0.069	0.010	51.103	<0.001	1.071(1.051,1.092)

Dependent variable: Gensini score.

Table 6. ROC analyses of the SIRI index.

Characteristic	AUC	95%CI	P	Sensitivity	Specificity	Youden's index
SIRI	0.657	0.638-0.677	<0.001	0.543	0.704	0.247
PLR	0.504	0.483-0.525	0.716	0.202	0.843	0.045
MLR	0.625	0.605-0.645	<0.001	0.655	0.535	0.190
NLR	0.628	0.608-0.648	<0.001	0.522	0.675	0.197

Note: CHD coronary heart disease, PLR platelet-lymphocyte ratio, MLR monocyte-lymphocyte ratio, NLR neutrophil-lymphocyte ratio, CI confidence intervals, ROC receiver operating characteristic curve, AUC area under the curve. $P<0.001$ were considered statistically significant

Figure 1. The selection procession of selected subjects.

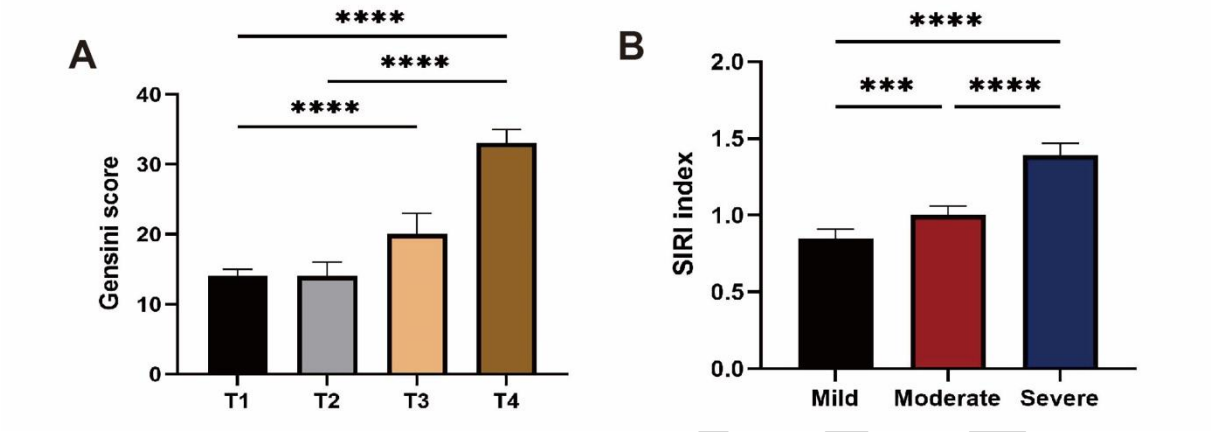

Figure 2. Relationship between Gensini score and the SIRI index in CHD patients. Note: A) the Gensini score by SIRI index quartile; B) the SIRI index by Gensini score tertile. T1 the first SIRI index quartile, T4 the fourth SIRI index quartile. ***P<0.001, ****P<0.0001.

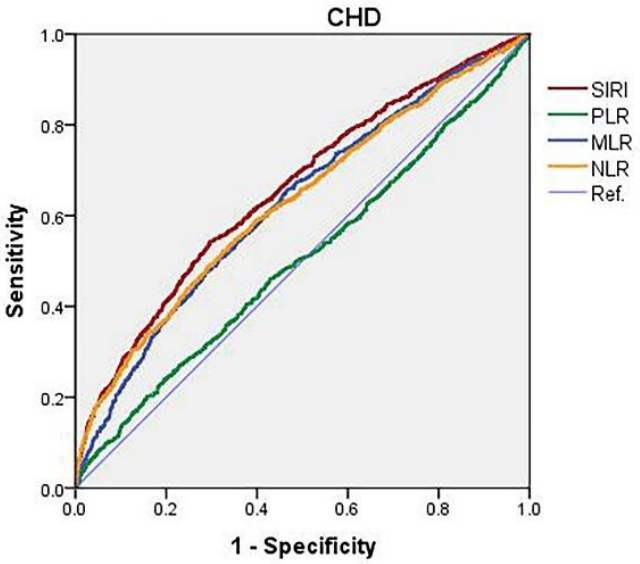

Figure 3. ROC analyses of the SIRI index. Note: CHD coronary heart disease, NLR neutrophil-lymphocyte ratio, PLR platelet-lymphocyte ratio, MLR monocyte-lymphocyte ratio, ROC receiver operating characteristic curve.