Changes of cysteine-rich protein 61 expression in patients with atherosclerosis and its clinical significance

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Abstract: Objective To explore the level of plasma cysteine-rich protein (Cyr61) in patients with arteriosclerosis and its clinical significance. Methods Atherosclerosis is the main pathological mechanism of coronary atherosclerotic heart disease and arterial stenosis and occlusion. The adhesion, proliferation and migration of endothelial cells and smooth muscle cells are all involved in the formation and development of atherosclerosis. . The inflammatory response theory of atherosclerosis In view of the role of Cyr61 in cell function and inflammatory response, this study aimed to explore the role of Cyr61 in atherosclerosis. In this study, plasma Cyr61 levels were compared in patients with coronary heart disease (patients with acute coronary syndrome and stable angina pectoris) and controls (with no obvious stenosis on coronary artery angiography), and their correlation with the severity of arteriosclerosis and other factors of arteriosclerosis was evaluated. Correlation of laboratory indicators. Results The level of Cyr61 in patients with coronary heart disease was significantly higher than that in the control group (P<0.01), the level of plasma Cyr61 in the acute coronary syndrome group was significantly higher than that in the stable angina group, and the level of plasma Cyr61 was positively correlated with the Gensini score (P<0.01). 01), plasma Cyr61 levels were independently correlated with coronary heart disease. Conclusion Plasma Cyr61 level is highly correlated with coronary heart disease, and is related to the type and severity of coronary heart disease.

Keywords: cysteine-rich protein 61; atherosclerosis; coronary atherosclerotic heart disease

Cysteine-rich protein 61 (Cyr61), also known as CCN1, is an extracellular matrix protein in the CCN protein family. Cyr61 is involved in cell adhesion, proliferation, migration and other physiological activities [1], and is also closely related to angiogenesis [2], wound repair [3], and tumorigenesis [4] in vivo. Recent studies have shown that Cyr61 is also involved in pro-inflammatory effects in the process of atherosclerosis [5].

1 Materials and methods

1.1 Research object.

This study included 99 patients with coronary heart disease diagnosed as inpatients in the First Hospital of Jilin University, including 48 patients with acute coronary syndrome, 51 patients with stable angina pectoris, and 50 asymptomatic controls (coronary Arteriography showed no significant stenosis). All subjects signed informed consent, and this study was approved by the Ethics Committee of the First Hospital of Jilin University.

1.2 Research methods

Patient information (sex, age, history of hypertension, smoking history, family history of premature coronary heart disease, body mass index, total cholesterol, triglycerides, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, and plasma Cyr61 levels) were collected. History of hypertension was defined as the use of antihypertensive drugs in the medical history record or clearly informed by the patient, or systolic blood

pressure ≥ 140 mmHg or (and) diastolic blood pressure ≥ 90 mmHg on admission; smoking history was defined as at least one cigarette per day, and continuous smoking for at least one year; family history of premature coronary heart disease is defined as coronary heart disease before the age of 55 for women and before the age of 65 for men; body mass index is defined as the weight in kilograms divided by the square of the height. The figure is an international public indicator for measuring human body fat and thin. Blood samples were collected from all subjects and sent to the laboratory for blood lipid analysis(total cholesterol, triglycerides, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol) detection; enzyme-linked immunosorbent assay to detect the concentration of Cyr61 in plasma, strict installation of kits (human cysteine-rich protein 61 ELISA kit, Cloud-Clone Corporation) manual operation.

1.3 Statistical analysis

All data were tested for normality and conformed to the normal distribution. Quantitative data were expressed as mean ± standard deviation (x ± s), quantitative data with non-normal distribution were expressed as median (interquartile range), and qualitative data were expressed as percentage. Quantitative data with normal distribution used independent sample mean t test for comparison between groups, and quantitative data with non-normal distribution. Data were tested using nonparametric tests. The enumeration data were analyzed by the chi-square test. Multiple linear regression analysis was used to analyze the correlation between CYR61 and Gensini integral and the influencing factors of Gensini integral. All statistical processing used SPSS 19.0 software.

2 Results

2.1 Comparison of clinical characteristics and Cyr61 level between CHD group and control group. Compared with the control group, the levels of total cholesterol, triglyceride, low density lipoprotein cholesterol and high density lipoprotein cholesterol were significantly higher in the CHD group (P <0.01). The level of Cyr61 in plasma of coronary heart disease group was significantly higher than that of contrast group (P < 0.01), as shown in Table 1.

Table 1 Comparison of Clinical Characteristics and Cyr61 Levels between Coronary Heart Disease Group and Control Group

Grouping	Male (%)	Age (year)	Hypertension (%)	Smoking history (%)	Early onset coronary heart disease. Family history (%)	Body mass index (kg/m²)
acute coronary syndrome	26(54.2)	59.5 soil 3.5	33(68.8)	22(45.8)	15(31.3)	25.5 3.5
(n = 48). stable angina (n =	28(54.9)	58.3 3.9	35(68.6)	21(41.2)	14(27.5)	24.2 3.6
51). Control group (n = 50)	25(50)	58.9 4.3	34(68)	20(40)	11(22)	24.6 3.7

Grouping	Total cholesterol (mmol/L)	Triglyceride (mmol/L)	Low density lipoprotein Cholesterol (mmol/L)	High density lipoprotein Cholesterol (mmol/L)	CYR61(μg/L)
acute coronary syndrome	4.33 0.46	1.25 0.42	2.28 0.21 * *	0.9±0.29***	15.25±3.33***
(n = 48). stable angina (n =	4.2 0.49	1.26±0.41	2.16±0.19***	0.98±0.22***	9.35±2.67***
51). Control group (n = 50)	4.22±0.52	1.27±0.45	2.1 0.18 * *	1.15±0.21***	4.53±1.65***

* * compared with control group p <0.001

2.2 Comparison of clinical characteristics and CYR61 level between ACS group and SAP group. Low density lipoprotein cholesterol in ASC group was higher than that in SAP group <0.05). The plasma CYR61 level in ACS group was significantly higher than that in S A P group (P < 0.01), as shown in Table 2.

Table 2 Comparison of Clinical Characteristics and CYR61 Levels between ACS Group and SAP Group

Grouping	Male (%)	Age (year)	Hypertension (%)	Smoking history (%)	Early onset coronary heart disease. Family history (%)	Body mass index (kg/m²)
acute coronary syndrome (n = 48). Stable angina (n = 51)	26(54.2)	59.5±3.5	33(68.8)	22(45.8)	15(31.3)	25.5 3.5
	28(54.9)	59.5 3.5	35(68.6)	21(41.2)	14(27.5)	24.2 3.6

Grouping	Total cholesterol (mmol/L)	Triglyceride (mmol/L)	Low density lipoprotein Cholesterol (mmol/L)	High density lipoprotein Cholesterol (mmol/L)	CYR61(μg/L)
Acute coronary syndrome (n = 48)	4.33 0.46	1.25±0.42	2.28±0.21***	0.9 0.29**	15.25±3.33***
Stable angina (n = 51)	4.2±0.49	1.26±0.41	2.16±0.19***	0.98±0.22***	9.35±2.67***

** compared with control group p <0.001

2.3 Correlation between Cyr61 and coronary heart disease Plasma Cyr61 level was positively correlated with coronary heart disease score, as shown in Table 3.

Table 3 Correlation Analysis between Cyr61 and Coronary Heart Disease [chi-square analysis table

Project	χ^2/F
CYR61	203.65
Gender. High blood pressure. Smoking history. Family history of premature coronary heart disease	0.28
	0.007
	0.38
	1.08
Age. Body mass index	1.15
	1.67
Total cholesterol	0.99
Triglycerides. Low density lipoprotein cholesterol	0.02
	10.95
High density lipoprotein cholesterol	13.74

3 Discussion

Although people's living habits are more health-conscious than before, and there are effective pharmacological methods for lowering cholesterol, atherosclerosis is still an important risk factor in human diseases. Although the onset of atherosclerosis is slow and can be latent for several years or even decades, when it occurs, it will cause a variety of fatal diseases such as myocardial infarction, angina pectoris, etc., which can quickly endanger life. Atherosclerosis is the most important and common cardiovascular disease caused by chronic inflammation. At the same time, atherosclerosis is also an important cause of many other cardiovascular and cerebrovascular diseases, such as ischemic heart disease, stroke, Angina pectoris, myocardial infarction or heart failure, etc. [6]. Atherosclerosis is the pathological basis of coronary atherosclerotic heart disease in cardiovascular disease, and it is also the main target of prevention and treatment of

coronary heart disease. Atherosclerosis is a chronic disease that requires life-long prevention and treatment. Therefore, research on anti-atherosclerotic drugs has high requirements in terms of efficacy, safety, price, and drug compliance.
In the process of chemical development, there are many molecules that can be used as therapeutic targets, including the control of LDL uptake and its oxidation process, the aggregation and adsorption of monocytes, and the expression level of “scavenger receptors” [7-8]. Based on the research on the formation mechanism of atherosclerosis, the role of Cyr61 in the formation of atherosclerosis has attracted attention year by year. Cyr61 is an immediate early gene produced by the mouse fibroblast cell line 3T3 induced by serum or platelet-derived growth factor[9]. Extracellular matrix protein, which can participate in cell adhesion, proliferation,

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