Value of serum Fractalkine and Vaspin contents for the diagnosis of coronary heart disease and the correlation with cardiac function and myocardial injury

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ABSTRACT

Objective: To study the value of serum Fractalkine and Vaspin contents for the diagnosis of coronary heart disease and the correlation with cardiac function and myocardial injury.

Methods: A total of 80 patients with coronary heart disease were divided into stable angina pectoris group (n=45) and unstable angina pectoris group (n=35) according to the clinical seizure characteristics and signs. 50 subjects with normal cardiac function who received physical examination in the hospital over the same period were selected as the normal control group. The serum Fractalkine and Vaspin contents, cardiac function parameter levels under ultrasonic cardiogram and serum myocardial enzyme spectrum contents of each group were detected. Pearson test was used to further assess the inner link of serum Fractalkine and Vaspin contents with disease severity in patients with coronary heart disease.

Results: Serum Fractalkine contents of stable angina pectoris group and unstable angina pectoris group were higher than that of normal control group while Vaspin contents were lower than that of normal control group, and serum Fractalkine content increased while Vaspin content decreased with the aggravation of angina pectoris. Cardiac function parameters LVEDD, LVEDV, LVESD and LVESV levels of stable angina pectoris group and unstable angina pectoris group were higher than those of normal control group, serum myocardial enzyme spectrum indexes CK, CK-MB, LDH, AST and ALT contents were higher than those of normal control group, and the levels of above indexes increased with the aggravation of angina pectoris. Serum Fractalkine content in patients with coronary heart disease was positively correlated with the decrease of cardiac function and the degree of myocardial injury while Vaspin content was negatively correlated with the decrease of cardiac function and the degree of myocardial injury.

Conclusion: Serum Fractalkine and Vaspin contents are abnormal in patients with coronary heart disease, and the abnormal degree is directly related to the cardiac function and myocardial injury.

1. Introduction

Coronary atherosclerotic heart disease (coronary heart disease) is the most common clinical cardiovascular disease, and early screening and confirming the disease is the basis for formulating reasonable treatment, and also helps improve the prognosis of disease[1]. Coronary angiography is the “gold standard” to determine coronary disease, but the operation is relatively complex, and requires the contrast injection, it is traumatic, has the risk of allergies, and it is not the conventional means for condition detection, so looking for more convenient and reliable detection indexes is becoming a hot spot of clinical research. Fractalkine is a new chemotactic factor, and many studies have shown that the changes in its serum content are closely related to the inflammatory immune response of atherosclerosis[2]; Vaspin is a new type of adipokine, which can inhibit the production of inflammatory factors and improve insulin sensitivity, and is the negative regulatory factor of atherosclerosis[3]. In this study, serum Fractalkine and Vaspin levels in patients with coronary heart disease were detected, and the inner link between their levels and coronary heart disease condition was further analyzed in order to clarify their value for coronary heart disease condition detection, now reported as follows.
2. Information and methods

2.1 Diagnostic criteria for coronary heart disease

(1) With typical clinical manifestations such as chest distress after fatigue and precordial pain; (2) typical myocardial ischemia expression in ECG; (3) coronary artery occlusion in echocardiography.

2.2 Case information

A total of 80 patients with coronary heart disease who were treated in the hospital between September 2015 and September 2016 were selected as the research subjects and divided into stable angina pectoris group (n=45) and unstable angina pectoris group (n=35) according to the clinical seizure characteristics and signs. 50 subjects with normal cardiac function who received physical examination in the hospital over the same period were selected as the normal control group. Stable angina pectoris group included 25 men and 20 women that were 48-71 years old; unstable angina pectoris group included 19 men and 16 women that were 49-73 years old; normal control group included 27 men and 23 women that were 45-72 years old. There was no statistically significant difference in the general data among the three groups (P>0.05).

2.3 Serum Fractalkine and Vaspin content detecting

After admission, 2.0-3.0 mL of fasting cubital venous blood was extracted from each group and centrifuged at low speed to separate serum, and enzyme-linked immunosorbent assay (ELISA) was used to determine Fractalkine and Vaspin contents in it. The enzyme-linked immunosorbent assay kit was purchased from Nanjing Jin Yibai Biological Technology Co., Ltd., and the article Numbers were MD891 and BD732 respectively.

2.4 Cardiac function parameters

After admission, color Doppler diasonograph was used to measure the cardiac function parameters, including left ventricular end-diastolic diameter (LVEDD), left ventricular end-diastolic volume (LVEDV), left ventricular end-systolic diameter (LVESD) and left ventricular end-systolic volume (LVESV).

2.5 Myocardial injury indexes

Fasting serum samples were taken, and RIA method was used to detect the levels of myocardial enzyme spectrum indexes in them, including creatine phosphokinase (CK), creatine kinase isoenzyme (CK-MB), lactate dehydrogenase (LDH), aspartate aminotransferase (AST) and alanine aminotransferase (ALT).

2.6 Statistical methods

Statistical software was SPSS 21.0, measurement data in the study were in terms, and the comparison between groups was by paired t test; correlation analysis was by Pearson test. P<0.05 indicated statistical significance in differences.

3. Results

3.1 Serum Fractalkine and Vaspin contents

Comparison of serum Fractalkine (ng/L) and Vaspin (ng/mL) contents among three groups of subjects was as follows: differences in serum Fractalkine and Vaspin levels were statistically significant among the three groups of subjects (P<0.05). Serum Fractalkine contents of stable angina pectoris group and unstable angina pectoris group were higher than that of normal control group while Vaspin contents were lower than that of normal control group, and differences were statistically significant (P<0.05). Serum Fractalkine content of unstable angina pectoris group was higher than that of stable angina pectoris group while Vaspin content was lower than that of stable angina pectoris group (P<0.05), shown in Table 1.

3.2 Cardiac function parameters

Comparison of cardiac function parameters LVEDD (mm), LVEDV (mL/m²), LVESD (mm) and LVESV (mL/m²) levels among three groups of subjects was as follows: the differences in LVEDD, LVEDV, LVESD and LVESV levels were statistically significant

| Table 1. Comparison of serum Fractalkine and Vaspin contents among groups. |
|-----------------------------|---|---|
| Groups                      | n  | Fractalkine | Vaspin      |
| Control group               | 50 | 412.8±59.73 | 1.82±0.24   |
| Stable angina pectoris group| 45 | 552.19±88.43 | 1.16±0.21   |
| Unstable angina pectoris group | 35 | 721.63±89.55 | 0.59±0.07   |
| P                           |    | 14.382      | 8.293       |
| P                           |    | <0.05       | <0.05       |

Note: compared with control group, *P<0.05; compared with stable angina pectoris group, *P<0.05.
Comparison of serum CK, CK-MB, LDH, AST and ALT contents (IU/L).

Table 3.

<table>
<thead>
<tr>
<th>Groups</th>
<th>n</th>
<th>LVEDD</th>
<th>LVEDV</th>
<th>LVESD</th>
<th>LVESV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>50</td>
<td>42.18±5.93</td>
<td>7.23±0.98</td>
<td>143.28±17.19</td>
<td>13.28±2.04</td>
</tr>
<tr>
<td>Stable angina pectoris group</td>
<td>45</td>
<td>71.28±8.94</td>
<td>14.19±2.45</td>
<td>192.36±25.48</td>
<td>20.17±2.54</td>
</tr>
<tr>
<td>Unstable angina pectoris group</td>
<td>35</td>
<td>110.84±15.49</td>
<td>23.84±4.51</td>
<td>285.38±41.29</td>
<td>35.66±5.18</td>
</tr>
</tbody>
</table>

Note: compared with control group, \(^*P<0.05\); compared with unstable angina pectoris group, \(^{a}P<0.05\).

3.3 Myocardial injury indexes

Comparison of serum myocardial injury indexes CK, CK-MB, LDH, AST and ALT contents among three groups was as follows: differences in serum CK, CK-MB, LDH, AST and ALT contents were statistically significant among the three groups of subjects \((P<0.05)\). Serum CK, CK-MB, LDH, AST and ALT contents of stable angina pectoris group and unstable angina pectoris group were higher than those of normal control group \((P<0.05)\). Serum CK, CK-MB, LDH, AST and ALT contents of unstable angina pectoris group were higher than those of stable angina pectoris group \((P<0.05)\), shown in Table 3.

4. Discussion

Fractalkine belongs to the chemokine superfamily, which can be expressed and released by various inflammatory factors, and not only exerts chemotactic function, but also has functions such as mediating cell adhesion and immune injury. Foreign study has shown that the content of Fractalkine increases in peripheral blood of patients with acute coronary syndrome, and the content of Fractalkine is closely related to the number of involved coronary arteries. Vaspin is a newly discovered cytokine that plays an important role in glycolipid metabolism and also participates in the development of cardiovascular disease. WANG Luo-qing has pointed out that the low level of Vaspin is an independent risk factor for coronary heart disease, which further clarifies its anti-atherosclerosis effect. In this study, serum Fractalkine and Vaspin contents in patients with coronary heart disease in the hospital were detected, and it was found that serum Fractalkine contents of patients with coronary heart disease were higher than that of normal control group while Vaspin contents were lower than that of normal control group, and serum Fractalkine content of unstable angina pectoris group was higher while Vaspin content was lower, indicating that the changes of Fractalkine and Vaspin contents indeed participate in the occurrence and development of coronary heart disease, and the changes of serum Fractalkine and Vaspin contents increase with the aggravation of coronary heart disease. The above results indicate that the specific contents of Fractalkine and Vaspin in serum of patients with coronary heart disease are closely related to the severity of the disease, which is further discussed in this paper.

The first inspection method for the severity of coronary heart disease is echocardiography, its dynamic and noninvasive characteristics are welcomed by clinical physicians and patients, and the changes of left cardiac systolic and diastolic function are the main indicators to reflect the cardiac function of patients with coronary heart disease. When coronary pathological change is aggravating and myocardial blood supply decreases, normal left ventricular systolic and diastolic function change, the main expression is that the left cardiac contractility declines and end-systolic heart cavity hemorrhage increases, and the quantitative indicator expression in echocardiography is the elevation of LVEDD and LVEDV levels. Excessive end-systolic heart cavity hemorrhage can later cause the left cardiac diastolic dysfunction,
which is characterized by the increase of end-diastolic heart cavity volume, i.e. the elevation of LVESD and LVESV levels[12,13]. In the study, analysis of the differences in echocardiography parameters among groups indicated that LVEDD, LVEDV, LVESD and LVESV levels of patients with coronary heart disease were higher than those of normal control group, and LVEDD, LVEDV, LVESD and LVESV levels of unstable angina pectoris group were higher than those of stable angina pectoris group. This indicates that the echocardiography parameters can quantitatively reflect the degree of cardiac dysfunction of coronary heart disease patients. Pearson test showed that serum Fractalkine content was positively correlated with LVEDD, LVEDV, LVESD and LVESV levels while Vaspin content was negatively correlated with their levels, confirming that serum Fractalkine and Vaspin contents in patients with coronary heart disease are directly correlated with the degree of cardiac dysfunction. When coronary atherosclerosis plaque volume increases and the stability declines, the myocardial ischemia increases, and the myocardial cell ischemia hypoxia injury and even necrosis can occur in the later stage[14]. There are many specific factors in myocardial cells, AKA "myocardial enzyme spectrum index", their contents in peripheral blood are little in physiological state, but after myocardial injury, they enter into the circulating blood through the damaged cell membrane, and therefore, high levels of myocardial enzyme spectrum indexes mostly indicate the occurrence of myocardial injury[15,16]. CK, CK-MB, LDH, AST and ALT are most common myocardial function-related parameters in clinical research, serum contents of these indexes in each group were detected in this study, and it was found that serum CK, CK-MB, LDH, AST and ALT contents of patients with coronary heart disease were higher than those of normal control group, and the contents were higher in unstable angina pectoris group, indicating that myocardial enzyme spectrum index contents can directly reflect the degree of myocardial injury in patients with coronary heart disease. Further Pearson test showed that serum Fractalkine content in patients with coronary heart disease was positively correlated with CK, CK-MB, LDH, AST and ALT contents while Vaspin content was negatively correlated with them, confirming that serum Fractalkine and Vaspin contents in patients with coronary heart disease are directly correlated with the degree of myocardial injury. Serum Fractalkine content increases while Vaspin content decreases in patients with coronary heart disease, and their specific contents are directly correlated with the degree of cardiac dysfunction and myocardial injury. Detection of serum Fractalkine and Vaspin contents is expected to be a convenient, sensitive and efficient means for the disease detection, efficacy assessment and prognosis judgment for patients with coronary heart disease.

References