The effect of Rhodiolae treating chronic myocardial infarction with heart failure on left ventricular remodeling and serum inflammatory factors

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Objective: To explore the effect of rhodiolae treating chronic myocardial infarction with heart failure on left ventricular remodeling and serum inflammatory factors. Methods: A total of 100 cases of chronic myocardial infarction with heart failure were selected and randomly divided into treatment group and control group with 50 cases in each group, the control group was treated with strong heart, dehydration, nutrition myocardium, infection prevention and western comprehensive treatment, the treatment group was given rhodiola treatment based on the western medicine treatment, compared the changes of left ventricular remodeling indexes and serum inflammatory factors of two group patients before treatment (T0), 1 months of treatment (T1), 3 months of treatment (T2). Results: (1) There was statistical significance difference at different time points LVEF, LVEDD, LVESD, LVSTD, LVPWTD. LVEF, LVSTD, LVPWTD: T2 > T1 > T0, LVEDD, LVESD: T2 < T1 < T0; In treatment group LVEF, LVSTD and LVPWTD increased, and the decline rate of LVEDD and LVESD was higher than that of control group; (2) There was statistically significant difference in different time points of IL-6, hs-CRP, and NT-proBNP, serum IL-6, hsCRP and NT-proBNP levels: T2 < T1 < T0; The serum IL-6, hs-CRP and NT-proBNP levels of treatment group decreased more than control group. Conclusion: Rhodiolae is helpful to improve the left ventricular remodeling and serum inflammatory factors in patients with chronic myocardial infarction and heart failure.

1. Introduction

In recent years, due to the aging of society, as well as people's lifestyle and eating habits change, the incidence of myocardial infarction increased significantly, although with the improvement of medical technology, myocardial infarction success rate was significantly higher, but the ventricular remodeling induced by myocardial infarction can easily lead to heart failure, Seriously affecting the quality of patients' life after surgery[1], and studies have confirmed that cardiac function and serum inflammatory factors are related[2]. In recent years, many domestic use of rhodiola in treating coronary heart disease and chronic myocardial infarction shows that it can improve the therapeutic effect, but the effect of rhodiola on left ventricular remodeling and the level of serum inflammatory factors is still very rare, this study investigated the efficacy of rhodiola treatment on chronic heart failure patients with myocardial infarction is exact, the contents of the report is as follows.

2. Clinical data and methods

2.1 General data

A total of 100 cases of chronic myocardial infarction patients with heart failure from January 2015 to June 2016 were selected from the second chinese medicine hospital of Jiangsu Province , according to the set of odd number randomly divided into treatment group and control group with 50 cases in each group, the control group: male 32 cases, female 18 cases, age 59-80 years old, the average years
of age 69, duration of myocardial infarction 1-4 years, the average years 2, the heart function of American New York Heart Association (New York Heart Association, NYHA): grade IV 9 cases, 26 cases of grade III, grade II in 15 cases; the treatment group: 34 cases were male, 16 were female, aged 60-82 years old, the average years old 70 myocardial infarction, duration 0.5-5.0 years, the average years 2, NYHA cardiac functional grading: Grade I 8 cases, 26 cases of grade III, grade II in 16 cases, two groups of gender, age, disease duration and baseline data by statistical analysis showed no significant difference (P>0.05), this study was approved by the Jiangsu Provincial second hospital of traditional Chinese medicine after the implementation of the ethics committee, patients are informed consent.

2.2 Inclusion and exclusion criteria

Inclusion criteria: (1) A history of myocardial infarction and clear history of more than 6 months; (2) The standard of chronic heart failure diagnosis of the cardiovascular branch of Chinese Medical Association prepared "Guidelines for diagnosis and treatment of chronic heart failure"[3]; (3) The NYHA heart function II-IV; (4) The informed consent of patients and their families, good compliance; Exclusion criteria: (1) The other reason leads to heart failure; (2) Cardiomyopathy, hyperthyroid heart disease as a result of myocardial remodeling in the past; (3) Combined infection, liver and kidney dysfunction, malignancy, cerebrovascular, endocrine and other diseases can lead to abnormal serum inflammatory factors; (4) The drug allergy of rhodiola.

2.3 Treatment methods

Two groups of patients were given anti heart failure comprehensive treatment immediately after admitted to the hospital, including low sodium diet, low flow oxygen, strict bed rest, continuous ECG monitoring, treated with digitalis cedilanid intravenous injection according to the degree of heart failure, at the same time gave the angiotensin-converting enzyme inhibitor (ACEI) blood pressure control, aspirin anticoagulation, spironolactone reducing edema, amiodarone arrhythmia, coenzyme A, adenosine triphosphate myocardial nutrition, when necessary to give antibiotics to prevent infection and other comprehensive treatment. Over the same period of the observation group was given Rhodiola injection (Tonghua jade St. Pharmaceutical Co. Ltd., Zunzi Z20060361, 10 mL/10 mL 250 mL specification) adding glucose solution intravenously, 1 D-I continuous treatment of 14 d, use of Rhodiola capsule (Jiangsu Kanion pharmaceutical Limited by Share Ltd production, grain size 0.38 g/, Zunzi Z20040023) oral treatment, 4 tablets/times 1-3 times/d, continuous oral administration for 3 months.

2.4 Observational indexes

Left ventricular remodeling index and serum inflammatory factor were measured before treatment (T0), 1 month (T1) and 3 months (T2). The left ventricular remodeling index including left ventricular ejection fraction (Left Ventricular Ejection Fractions, LVEF), left ventricular end systolic diameter (Left ventricular end systolic dimension, LVESD), left ventricular end diastolic diameter (Left ventricular diastolic diameter, LVEDD), Left ventricular end diastolic ventricular septal thickness (LVSTD) and left ventricular posterior wall thickness (LVPWTD) were measured by Philips HD11XE color Doppler ultrasonography. Serum inflammatory factors including (IL-6), high-sensitivity C-reactive protein (hs-CRP) and N-terminal pro-brain natriuretic peptide (NT-proBNP) were detected by radioimmunoassay.

2.5 Statistical methods

The measurement data represent with (Mean ± SD), t-test was used to compare the groups, and t-test was used to compare the time-series analysis. The statistical analysis software SPSS 17.0 was used to analyze the data. The difference was significant (P<0.05).

3. Results

3.1 Two groups of follow-up situation

Two groups of patients were treated for 3 months, no drug related adverse reactions occurred, no death, loss of access and other off cases. The success rate was 100%.

3.2. Comparison of two groups of left ventricular remodeling index before and after treatment

The LVEF, LVEDD and LVESD levels of the two groups were statistically significant ($F_{group}=26.385$, $F_{group}=23.186$, $F_{group}=19.228$, $F_{group}=19.368$, $F_{group}=17.115$, $P<0.05$). There was statistical significance difference at different time points of LVEF, LVEDD, LVSTD and LVPWTD ($F_{time}=27.162$, $F_{time}=32.664$, $F_{time}=29.875$, $F_{time}=29.144$, $F_{time}=21.387$, $P<0.05$). The LVEF, LVSTD, LVPWTD: T1>T0, LVEDD: LVEDD: T2<T1<T0; The LVEF, LVSTD and LVPWTD of treatment group rise, and LVEDD and LVESD rise decline is higher than that of control group $F_{group}=23.843$, $F_{group}=17.116$, $F_{group}=23.446$, $F_{group}=19.265$, $P<0.05$), see table 1.
Comparison of serum levels of IL-6, hsCRP and NT-proBNP before and after treatment in two groups (n=50).

Table 2.

Note: compared with the control group, \( P<0.05 \).

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>IL-6 (pg/mL)</th>
<th>hs-CRP (ng/L)</th>
<th>NT-proBNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>T0</td>
<td>281.15±42.71</td>
<td>426.38±61.44</td>
<td>1081.26±231.59</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>112.28±24.61</td>
<td>101.38±21.05</td>
<td>609.21±165.51</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>90.53±25.25</td>
<td>52.37±12.38</td>
<td>412.73±120.38</td>
</tr>
<tr>
<td>Control</td>
<td>T0</td>
<td>286.76±49.67</td>
<td>433.59±55.18</td>
<td>1071.25±244.17</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>139.86±55.68</td>
<td>161.28±23.08</td>
<td>752.71±159.73</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>146.33±22.86</td>
<td>71.06±15.26</td>
<td>522.44±101.38</td>
</tr>
</tbody>
</table>

Note: compared with the control group, \( P<0.05 \).

3.3 Comparison of serum hs–CRP, IL–6 and NT–proBNP levels of two groups before and after treatment

The serum IL–6, hs–CRP and NT–proBNP levels of two groups of patients were significantly different \( (F_{Group}=102.375, F_{Group}=132.658, F_{Group}=114.358, P<0.05) \). There was statistical significance difference at different time points of IL–6, hs–CRP, NT–proBNP \( (F_{Time}=115.065, F_{Time}=122.753, F_{Time}=202.385, P<0.05) \). Serum IL–6, hs–CRP and NT–proBNP levels decreased more than control group \( (F_{Interactive}=144.765, F_{Interactive}=185.652, F_{Interactive}=256.378, P<0.05) \), see table 2.

4. Discussion

In recent years, with the constant improvement of medical treatment, the success rate of myocardial infarction was significantly increased, but the long-term prognosis effect is poor, and the incidence of heart failure is higher[4], the myocardial tissue after myocardial infarction, cell necrosis and infarction edema, resulting in ventricular wall thinning, occurred in the role of left ventricular pressure under inflation, in function mainly for ventricular contraction or decreased systolic reverse bulge, which constitute the ventricular remodeling in early stage[5]. The domestic and foreign literature shows that myocardial remodeling is a key factor that leads to heart failure, of which left ventricular remodeling is the most common[6,7]. Ultrasound mainly decreased the level of LVEF, while LVEDD and LVESD increased, and the ventricular wall is thinning due to the heart dilatation. In addition, a large number of clinical studies have shown that serum inflammatory factors such as IL–6, hs–CRP, NT–proBNP and cardiac function was significantly correlated with the poor cardiac function. The worse the heart function, the higher the serum level, in which NT–proBNP in recent years has been widely used as an objective assessment of left ventricular failure indicators[8]. With the rapid development of Chinese medicine, Chinese medicine preparation in the treatment of disease made significant progress, higher, which in recent years has been widely used to evaluate the objective index of left heart failure[8]. With the rapid development of Chinese medicine, Chinese medicine has made significant progress in the treatment of diseases, a large number of studies confirmed that rhodiola in the treatment of cardiovascular and cerebrovascular diseases, anti-fatigue and so has a significant effect[9,10].

The main active ingredient of rhodiola is salidroside, domestic Fu Weiyun and others[11] through animal experiments found that it can help improve myocardial infarction rats’ heart function, promote myocardial infarction myocardial tissue angiogenesis, and has a certain inhibitory effect on cardiac remodeling. The clinical effect of Shi Huirong et al[12] application of rhodiola sachalinensis injection in the treatment of ischemic cardiomyopathy with heart failure in patients, which proved to improve heart function, reduce the level of serum hs-CRP, and promote vascular endothelial growth factor (VEGF) growth. This study found that the treatment of patients with the treatment of 1 months, 3 months, the LVPWTD and LVSTD were significantly increased, while LVEDS and LVESD showed a significant decline in the trend, and its rate was significantly better than that of patients treated with western medicine alone. To observe the levels of serum inflammatory factors found that serum IL–6, hs–CRP and NT–proBNP levels with rhodiola treatment in patients decreased significantly, basically the same with Fu Weiyun, Shi Huirong and other research results, suggesting that rhodiola has a good effect on improving cardiac function in patients with
myocardial infarction and heart failure, inhibiting left ventricular remodeling, reducing serum levels of inflammatory factors and controlling inflammatory immune reaction in patients with chronic myocardial infarction.

Analysis of the reasons that myocardial infarction in the Chinese medicine is "chest pain" category, the main pathogenesis is cardiac blockage. And it has the function of benefiting qi and strengthening the body, promoting blood circulation to remove blood stasis, and promoting blood circulation and removing blood stasis, and activating blood circulation. Huang Deren found that modern pharmacology of salidroside can regulate superoxide dismutase (SOD) and glutathione peroxidase (GSH-Px) activity of myocardial cell, remove excess lipid, reduce blood viscosity, and prevent the formation of atherosclerotic plaque progression, which helps to suppress ventricular remodeling[14]. Domestic Ludian Rong et al[15] found that Rhodiola can inhibit the expression of rat lung tissue endothelin-1 (ET-1) and endothelial nitric oxide synthase mRNA (eNOS-mRNA), and help improve the rat antioxidant, immune function and expansion of large blood vessels. In addition, salidroside significantly improve the antioxidant function, inhibit the myocardial cell apoptosis, at the same time have a good protective effect on myocardial injury, hypoxia/reoxygenation injury and oxidative damage induced by acute myocardial ischemia[16-20]. On the other hand, salidroside and other components such as flavonoids, tyrosol can reduce the level of free radicals in the body, and help reduce the body's inflammatory response[9].

In summary, rhodiola had high safety in the treatment of patients with chronic myocardial infarction with heart failure, the long-term treatment is effective, and can inhibit left ventricular remodeling and improve cardiac function and reduce the effect the serum inflammatory factors levels of, it is worthy of clinical application.

References