

CLINICAL RESEARCH

Effects of integrated traditional Chinese and Western medicine on inflammatory factors and endothelial function in ACS patients after PCI

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Keywords

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Abstract

Objective To explore the effects of integrated traditional Chinese and Western medicine on inflammatory factors and vascular endothelial function in patients with acute coronary syndrome (ACS) after percutaneous coronary intervention (PCI). **Method** A total of 86 ACS patients treated by PCI in our hospital from Jan. 2017 to Jul. 2018 were selected, and they were divided into the control group (n=43) and observation group (n=43) by random number table method. The patients in the two groups were given conventional treatment, and the control group added atorvastatin treatment on the basis of the conventional treatment, and the observation group added Danshen Chuanxiongqin injection treatment on the basis of the conventional treatment. The levels of high sensitive C-reactive protein (hs-CRP), tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6), von willebrand factor (vWF), endothelin-1 (ET-1) and incidence of adverse cardiac events in the two groups were compared before and after treatment. **Results** After treatment, the levels of hs-CRP, TNF- α and IL-6 in both groups was significantly lower than those before treatment ($P<0.05$), and the levels of hs-CRP, TNF- α and IL-6 in observation group were significantly lower than those in the control group ($P<0.05$); the levels of ET-1 and vWF in both groups were significantly lower than those before treatment, and the levels of ET-1 and vWF in the observation group were significantly lower than those in the control group ($P<0.05$); there was no significant difference in the incidence of adverse cardiac events between the two groups ($P>0.05$). **Conclusion** The

integrated traditional Chinese and Western medicine can improve inflammatory factors in patients with ACS after PCI, improve vascular endothelial function and decrease the occurrence of adverse cardiac events. down-regulate the levels of

Introduction

Acute coronary syndrome (ACS) is a clinical syndrome resulting from the occlusive thrombosis triggered by rupture of coronary atherosclerotic plaque [1]. Previous studies have shown that coronary atherosclerotic unstable plaques are the main cause affecting the occurrence of ACS, while vascular endothelial injury and inflammatory response participate in the process of atherosclerosis and play a certain promoting role [2]. Percutaneous coronary intervention (PCI) is one of the important methods for the treatment of ACS, which is able to effectively dredge the coronary artery lumen, restore coronary blood flow, and improve microcirculation, but the implanted stent will stimulate the vascular endothelium, trigger an inflammatory response, prompt platelet aggregation and activation, and lead to coronary thrombosis and in stent restenosis formation [3]. Therefore, improving vascular endothelial function and reducing inflammatory responses in patients with ACS are the keys to effectively treat ACS and prevent the recurrence of postoperative coronary obstruction. Studies have shown that [4], the administration of integrated traditional Chinese and Western medicine after PCI in patients with ACS can improve the treatment effect, and has a high safety. This study investigated the effects of integrated traditional Chinese and Western medicine on inflammatory factors and vascular endothelial function after PCI in patients with ACS, which is reported as follows.

Materials and methods

Clinical data

General data

86 ACS patients who underwent PCI treatment in our hospital from January 2017 to July 2018 were selected for the study and divided into the control (n = 43) and observation (n = 43) groups according to the random number table method. Control group: 20 males and 23 females, with a mean age of 66.24 ± 9.57 years, and a

mean disease duration of 4.7 ± 1.5 years; observation group: 24 males and 19 females, aging 51-76 years, with a mean age of 64.87 ± 8.24 years, and a mean disease duration of 4.4 ± 1.7 years. The general data of the two groups were not significantly different ($P > 0.05$) and were comparable. This study was performed with the approval of the ethics committee of our hospital, and all patients provided written informed consent.

Inclusion and exclusion criteria

Inclusion criteria: those who met the diagnostic criteria set by the *Guidelines for the diagnosis and treatment of acute myocardial infarction*, *Guidelines for the diagnosis and treatment of unstable angina pectoris* and *Guidelines for the diagnosis and treatment of chronic stable angina pectoris* [3], and were confirmed by pathological diagnosis, CT and MR; those with residual coronary artery stenosis less than 20% after PCI. Exclusion criteria: patients with severe infection, tumor, liver and kidney dysfunction and severe primary hematopoietic system diseases; patients allergic to drugs in this study; pregnant or lactating women; patients with mental diseases.

Treatment

Patients in both groups were given conventional treatment with 100 mg of oral aspirin (100 mg/tablet, Bayer healthcare Co., Ltd., J20080078) and 75 mg of oral clopidogrel (75 mg/tablet, Sanofi Winthrop Industrie, J20130083) once daily. Control group: on the basis of conventional treatment, 20 mg of oral atorvastatin (20 mg/tablet, Rui Pharmaceutical Co., Ltd., J20070061) was added once daily. Observation group: Danshen Chuanxiongqin injection (5 ml/vessel, Guizhou Baite Pharmaceutical Co., Ltd., H52020959) was added on the basis of conventional treatment, 10 ml Danshen Chuanxiongqin injection was added into 250 ml normal saline and infused intravenously once daily. Patients in both groups were treated continuously for 4 weeks.

Outcome measures

Before and after treatment, 5 ml of peripheral venous blood in the fasting state was collected from the two groups of patients, then centrifuged and the supernatant was taken, and various indicators of inflammatory factors and vascular endothelial function were detected in the two groups. ① Measurement of inflammatory factors indicators: levels of hypersensitive C-reactive protein (hs-CRP), tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6) were measured in patients using enzyme-linked immunosorbent assay (ELISA); ② measurement of vascular endothelial function indicators: levels of von willebrand factor (VWF) and endothelin-1 (ET-1) were measured in patients using ELISA; ③ occurrence of adverse cardiac events such as angina pectoris and heart failure in patients were recorded, incidence of adverse cardiac events = adverse cardiac events cases/total cases \times 100%.

Statistical analysis

Statistical analysis was performed using SPSS 20.0, the count data were compared using the χ^2 test, the measurement data were expressed as the mean \pm standard deviation ($\bar{x} \pm s$), and the comparison was performed using the t test, and $P < 0.05$ was considered statistically significant.

Results

Comparison of inflammatory factors levels between the two groups

Before treatment, the levels of hs-CRP, TNF- α and IL-6 were not significantly different between the two groups ($P > 0.05$). After treatment, the levels of hs-CRP, TNF- α and IL-6 in the two groups were significantly lower than those before treatment ($P < 0.05$), and the levels of hs-CRP, TNF- α and IL-6 in the observation group were significantly lower than those in the control group ($P < 0.05$), see Table 1.

Table 1 Comparison of inflammatory factors levels between the two groups

Group	Case s	hs-CRP (mg/L)		TNF- α (ng/L)		IL-6 (ng/L)		t	P	t	P		
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment						
Observation group	43	7.35 \pm 1.14	1.89 \pm 0.37	29.87	0.00	75.46 \pm 13.28	26.54 \pm 7.29	21.17	0.00	14.54 \pm 3.36	5.12 \pm 1.85	16.10	0.00
Control group	43	7.26 \pm 1.23	4.15 \pm 0.74	14.20	0.00	78.15 \pm 14.19	38.68 \pm 8.77	15.51	0.00	15.78 \pm 2.91	9.36 \pm 2.44	11.02	0.00
t		0.352	-17.912			-0.908	-6.980			-1.829	-9.010		
P		0.726	0.000			0.367	0.000			0.071	0.000		

Comparison of vascular endothelial function indicators levels between the two groups

Before treatment, there was no significant difference in the levels of ET-1 and vWF between the two groups ($P > 0.05$); after treatment, the levels of ET-1 and vWF in the two groups were significantly lower than those before treatment ($P < 0.05$), and the levels of ET-1 and vWF in the observation group were significantly lower than those in the control group ($P < 0.05$), as shown in Table 2.

Comparison of adverse cardiac events incidence between the two groups

In the observation group, there was 1 case of recurrent angina pectoris and 1 case of heart failure, and the incidence of adverse cardiac events was 4.65%. In the control group, there were 3 cases of recurrent angina pectoris and 4 cases of heart failure, and the incidence of adverse cardiac events was 16.28%. There was no significant difference in the incidence of adverse cardiac events between the two groups ($P > 0.05$).

Table 2 Comparison of vascular endothelial function indicators levels between the two groups

Group	Cases	ET-1 (ng/L)		<i>t</i>	<i>P</i>	vWF (%)		<i>t</i>	<i>P</i>
		Before treatment	After treatment			Before treatment	After treatment		
Observation group	43	62.45±14.65	33.67±8.65	11.093	0.000	175.24±26.67	115.84±18.65	11.969	0.000
Control group	43	59.27±15.83	48.72±9.38	3.760	0.000	183.65±28.72	142.39±21.47	7.545	0.000
		<i>t</i>							
		0.967	-7.735			-1.407	-6.123		
		<i>P</i>							
		0.336	0.000			0.163	0.000		

Discussion

PCI is the main surgical method in the treatment of ACS, and the therapeutic effect is remarkable, but after PCI, it will trigger body systemic or local inflammatory reactions, leading to stent restenosis and major cardiovascular events. Therefore, it is still necessary to take late intervention measures for ACS patients after PCI, including curbing the inflammatory responses in the body, platelet aggregation and blood lipid levels. The conventional treatment after PCI is dual anti-platelet therapy, namely aspirin combined with a platelet P2Y₁₂ receptor inhibitor [5]. Although dual anti-platelet therapy is able to block platelet aggregation and thrombus formation, it is unable to prevent the stent from stimulating the vascular endothelium and hence the inflammatory responses initiated. Thus, further research is required to develop therapeutic methods that can improve the vascular endothelial cells, curb the inflammatory responses, so as to safeguard the therapeutic effect after stent implantation, and prevent the recurrence of coronary obstruction. Danshen Chuanxiongqin injection is a kind of traditional Chinese medicine preparation, which has the functions of inhibiting platelet agglutination, improving microcirculation and myocardial blood supply. This study used Western medicine combined with Danshen Chuanxiongqin to treat ACS patients after PCI, and explored the effects of the combination of Chinese and Western medicine on the inflammatory factors and vascular endothelial function in patients with ACS after PCI, and achieved good results.

The inflammatory factors of hs-CRP, TNF- α and IL-6 play an important role in the formation of inflammation. Hs-CRP is a typical inflammatory factor, involved in the occurrence and development of ACS, and its level in the body can reflect the severity of ACS lesions; TNF- α can lead to vascular endothelial cell damage, trigger inflammatory responses, can enhance the local inflammatory response by promoting the expression of other inflammatory mediators, promote thrombosis, and accelerate the occurrence and development of ACS. The level of TNF- α can accurately reflect the situation of inflammatory response in the body.; IL-6 can stimulate the synthesis of matrix degrading enzymes and then lead to the rupture of unstable plaques, stimulate the aggregation of platelets, regulate the expression of other inflammatory factors, and then accelerate the progression of arteriosclerosis, the content of IL-6 in the body indirectly reflects the instability of atherosclerotic plaques [7]. The results of this study showed that compared with the control group, the observation group could significantly decreased the hs-CRP, TNF- α and IL-6 levels in patients with ACS after PCI. The main effective ingredients of Danshen Chuanxiongqin injection are Danshensu and ligustrazine hydrochloride, Danshensu can inhibit platelet aggregation and curb chronic inflammatory responses, whereas ligustrazine hydrochloride has the effects of inhibiting platelet aggregation and activation, suppressing vascular inflammation, and is capable of preventing thrombosis. Therefore, conventional treatment combined with

Danshen Chuanxiongqin injection was able to attenuate the inflammatory responses and decrease the levels of hs-CRP, TNF- α and IL-6 in patients with ACS undergoing PCI.

ET-1 and vWF are vasoactive substances related to vascular endothelial function. ET-1 is a systolic factor synthesized by vascular endothelial cells, and vWF is a macromolecular glycoprotein synthesized by vascular endothelial cells. Due to the changes of chemical composition and kinetics in the blood of patients with ACS, the intima of coronary artery is damaged, and the levels of ET-1 and vWF in the body are increased, which leads to the dysfunction of vasodilation and contraction, and aggravates the disease progression [8]. Therefore, the expression levels of ET-1 and vWF can reflect the degree of vascular endothelial injury, and have important clinical significance in predicting thrombosis and disease severity. In this study, compared with the control group, the improvement effect of ET-1 and vWF levels in the observation group was more significant, indicating that conventional treatment combined with Danshen Chuanxiongqin injection can effectively improve vascular endothelial function in ACS patients after PCI, Danshen Chuanxiongqin injection can inhibit the vascular intimal inflammatory responses, improve microcirculation, dilate cerebral vessels to increase blood flow, and then improve vascular endothelial function and decrease the levels of ET-1 and vWF. This study also found that the incidence of postoperative adverse cardiac events was low in the observation group, indicating that administration of integrated traditional Chinese and Western medicine to ACS patients after PCI can play a protective and reparative role on the blood vessels and myocardium of patients, which is related to some aspects of Danshen Chuanxiongqin injection having anti-platelet aggregation and anti-inflammatory effects and improving vascular endothelial function of patients.

In conclusion, the administration of integrated traditional Chinese and Western medicine in patients with ACS after PCI was able to attenuate inflammation in patients, reduce the levels of

inflammatory factors of hs-CRP, TNF- α and IL-6 in the body, improve vascular endothelial function in patients, reduce the levels of ET-1 and vWF, and reduce the incidence of postoperative adverse cardiac events in patients.

Declaration of conflict-of-interest

The authors declare no conflict-of-interest.

References

- [1] Wei Wang. Predictive value of CysC, hs-CRP levels in cardiovascular adverse events in patients with acute coronary syndrome after PCI [J]. Medical Recapitulate, 2016, 22(3):614-617.
- [2] Yuan Yang. Effect of Guizhi Fuling Decoction plus and minus adjuvant therapy for acute coronary syndrome and on serum vWF and ET-1 in patients [J]. Journal of Sichuan of Traditional Chinese Medicine, 2017, 35(8):85-87.
- [3] Guoqiang Huang, Guoyou Du, Xiangming Gu. Significance of high sensitivity troponin I, ischemia modified protein and heart type fatty acid protein in acute coronary syndrome [J]. Guangdong Medical Journal, 2014, 35(1):88-90.
- [4] Hao Sun, Yuan Sun. The research progress of prevention and treatment of restenosis in coronary intervention using traditional Chinese medicine [J]. Shaanxi Journal of Traditional Chinese Medicine, 2014, 35(6):764-765.
- [5] Xun Zhang. Pathophysiological impact of 'dual antibody' therapy in ACS patients undergoing coronary stenting [J]. International Journal of Laboratory Medicine, 2018, 39(9):1087-1090.
- [6] Chunli Li, Xicao Za, Yanhui Sun. Effect of Danshen Chuanxiongqin injection on serum VCAM-1, ICAM-1, ET-1 and NO in elderly patients with acute cerebral infraction [J]. Modern Journal of Integrated Traditional Chinese and Western Medicine, 2016, 25(19):2088-2090.
- [7] Jinping Li, Mingfei Ju, Li Chen. Current knowledge on the relationship between inflammatory factors and acute coronary syndrome [J]. Hebei Medicine, 2015, 21(6):1008-1010.
- [8] Jianfeng Guo, Shengben Wu, Jinping Yang, et al.

Effects of Danhong Injection on endothelial function and inflammatory factor levels in ACS patients undergoing PCI [J]. Chinese Journal of Experimental Traditional Medical Formulae, 2015, 21(12):154-157.