Mechanism of Bupleurum-Huangqi Medicine and the Treatment of Type 2 Diabetes Based on Network Pharmacology

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Abstract. To explore the mechanism of action based on network pharmacology of Bupleurum-Huangqi on the treatment of type 2 diabetes. METHODS: A total of 124 patients with type 2 diabetes mellitus admitted to our hospital from November 20 2019 and were enrolled in the study. They were randomly divided into control group and observation group (62 cases). The control group received metformin treatment, while the observation group received Dachaihu soup treatment, blood glucose levels and inflammatory factors levels before and after treatment were compared between the two groups. RESULTS: There were no significant differences in the levels of FPG, 2hPG, HbA1c, Hcy and HS-CRP between the two groups before treatment ($P>0.05$). The levels of the patients after treatment were lower than those of the control group ($P<0.05$). . Conclusion: Bupleurum-Huangqi medicine has a mechanism of reducing the levels of blood sugar and inflammatory factors in patients with type 2 diabetes, and can achieve a good therapeutic effect.

The use of Bupleurum-Huangqi medicine has been used for a long time. Dachaihu soup comes from "Golden Dragonfly", and Bupleurum and Radix Astragali are the main agents for solving the problem, which can relieve the yang and diarrhea. Type 2 diabetes patients are mostly caused by diet, emotional disorders leading to yin deficiency and heat, etc., suitable for Bupleurum-Huangqi reconciliation table, Shugan Jieyu, clearing heat and dampness, purging fire detoxification and other effects [1]. Therefore, in this study, patients with type 2 diabetes were studied, and the mechanism of action based on network pharmacology of Bupleurum-Huangqi on the treatment of type 2 diabetes was discussed.

Information and methods

1.1 Clinical data

A total of 124 patients with type 2 diabetes admitted to our hospital from November 20 to 2019 were enrolled in the study. They were randomly divided into the control group and the observation group. There were 38 males and 24 females in the control group, aged 36-61 years, with an average age of 45.52±1.37 years. There were 36 males and 26 females in the observation group, aged 35-63 years, with an average age of 46.78±1.41 years. The gender and age of the two groups were not statistically significant ($P>0.05$). Patients and their families were voluntarily involved in understanding the content of this study.

1.2 Methods

Control group: received metformin (Chinese medicine Zhunzi H20023370, Sino-US Shanghai Squibb Pharmaceutical Co., Ltd.) treatment, 0.5g / time, 2 times / d, continued treatment for 3 months.

Observation group: Received Dachaihu Tang treatment. The prescriptions are 20g of Bupleurum and Astragalus membranaceus, 15g of medlar and turmeric, 10g of Radix Paeoniae Alba, Radix Paeoniae Alba and Rhubarb, 6g of licorice tablets, warm water, 1 day, and 3 months of continuous treatment.

1.3 Observation level

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(1) Comparison of blood glucose levels before and after treatment in the two groups of patients. FCG (fasting blood glucose), 2hPG (2 h postprandial blood glucose) and HbA1c (glycated hemoglobin) were compared before and after treatment in two groups of patients using a blood glucose meter.
(2) Comparison of inflammatory factors levels before and after treatment in the two groups of patients. The fasting venous blood of the two groups was taken 5 ml before and after treatment. The levels of HS-CRP (supersensitive C-reactive protein) were detected by fluorescence polarization immunoassay for Hcy (Homocysteine) and immunoturbidimetry.

1.4 Statistical analysis

The data were processed by SPSS18.0 software, and the t-test of the measurement data was performed by (). The difference of $P<0.05$ was statistically significant.

2 Results

2.1 Comparison of blood glucose levels before and after treatment in the two groups of patients

There were no significant differences in the levels of FPG, 2hPG and HbA1c between the two groups before treatment ($P>0.05$). The level of patients after treatment was lower than that of the control group ($P<0.05$), as shown in Table 1.

Table 1 Comparison of blood glucose levels before and after treatment in two groups of patients ()

Group	No	FPG(mmol/L)		2hPG(mmol/L)		HbA1c(%)	
		Before treatment	After treament	Before treatment	After treatment	Before treatment	After treatment
Watch group	44	11.59±1.38	6.16±0.72	16.18±1.65	7.73±0.75	8.26±0.86	6.72±0.71
Control group	44	11.61±1.43	7.69±0.68	16.29±1.74	9.07±0.83	8.31±8.82	7.35±0.69
t	/	0.026	5.243	0.037	7.921	0.041	5.627
P	/	>0.05	<0.05	>0.05	<0.05	>0.05	<0.05

2.2 Comparison of inflammatory factors levels before and after treatment in two groups of patients

The levels of Hcy and HS-CRP in the two groups were not statistically significant ($P>0.05$). The level of the patients in the observation group was lower than that in the control group ($P<0.05$). See Table 2.

Table 2 Comparison of inflammatory factor levels before and after treatment in two groups of patients ()

Group	No	Hcy (μmol/L)		HS-CRP(mg/L)	
		Before treatment	After treatment	Before treatment	After treatment
Watch group	44	22.78±1.86	18.73±1.82	9.19±1.72	6.38±1.16
Control group	44	27.89±1.95	21.68±2.75	9.34±1.75	8.35±1.34
t	/	0.057	7.912	0.021	6.715
P	/	>0.05	<0.05	>0.05	<0.05

3 Discussion

Diabetes belongs to the category of "thirst quenching" in TCM theory. It is characterized by emotional disorders and unhealthy diet, leading to excessive labor, lung, stomach and kidney yin. Patients often show symptoms such as yin deficiency, heat and thirst [2]. In the treatment of

traditional Chinese medicine, the prescription is the treatment of the main medicine. Through the theoretical structure of the syndrome differentiation, the corresponding drug combination formula is used according to the patient's condition, the combination of prescriptions pays attention to the synergistic effect of the drug effect. The drug pair is composed of two drugs with synergistic effects, so in the prescription, the drug pair is a fixed companion unit. The drug can not only exert synergistic effects, but also exert the efficacy of different drugs alone through the comprehensive and catalytic mechanism of drug [3]. Bupleurum and Astragalus membranaceus are commonly used medicine pairs. They first appeared in Xiaochaihu Tang of "Break the Lun", and then experienced many years of syndrome differentiation and treatment research, in "The Golden Essentials", "Six Colds", "Introduction to Medicine", " The Practical Chinese Medicine Handbook is documented in all the classics and has a good therapeutic effect on various disease certificates. In the present study, there were no significant differences in the levels of FPG, 2hPG, HbA1c, Hcy, and HS-CRP between the two groups before treatment (P>0.05). The levels of patients observed after treatment were lower than those of the control group (P> <0.05), indicating that Dachaihu Tang can effectively reduce the blood sugar and inflammatory factors levels of patients. Bupleurum is bitter and slightly cold, and it is a yang medicine in the yin. It has the effects of lifting yang, relieving fever, soothing the liver and replenishing qi. Bupleurum has various chemical components such as saponins, flavonoids and polysaccharides. Saikosaponin a can effectively inhibit the content of peroxides and triglycerides in the liver; saikosaponin b can regulate zinc in serum, Calcium level; stimulating effect on adrenal gland and glucocorticoid, antipyretic effect; activation of immune cells, enhancing patient's specific immune response, regulating immune function; central nervous system, depression, Tumors, etc., have inhibitory effects [4]. Astragalus membranaceus is a bitter cold, which is a kind of yin-inducing medicine, which has the effects of clearing heat and dampness, purging fire and detoxification, and removing fever and removing trouble. Astragalus membranaceus contains various chemical substances such as flavonoids, volatile oils, and terpenoids. Baicalein and baicalin can scavenge various free radicals such as superoxide anion, hydroxyl radical and hydroperoxidase; inhibit arachidonic acid , cytokine activity, etc., play a role in antipyretic and anti-inflammatory; inhibit the activity of a variety of apoptotic proteins, can inhibit cell apoptosis, play an antiviral effect; regulate progesterone levels, protect against ischemia and reperfusion Hippocampal neurons synapse, protect nerve function; accelerate sugar transport, increase glycogen synthesis, regulate glucose metabolism, regulate insulin resistance, and play a role in lowering blood sugar [5]. The treatment of patients with type 2 diabetes is complicated, and the development of the disease will also affect the patient's operation mechanism. Therefore, it is necessary to have a comprehensive therapeutic effect on various pathogenic factors and damage effects. The application of Bupleurum-Huangqi can exert the pharmacodynamic characteristics of the two drugs, and through coordination and catalysis, it can regulate the blood sugar and inflammatory factors of patients, and protect the liver and center of patients. The nervous system improves the patient's own immune function and relieves the patient's depression [6]. In summary, Bupleurum-Huangqi medicine has a mechanism of reducing blood glucose and inflammatory factors in patients with type 2 diabetes, and can achieve a good therapeutic effect.

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