

Study on the Functional Recovery of Glucose Channel and Carrier in Diabetes Mellitus by the Promoting Blood Circulation and Removing Blood Stasis Method under High Power Microscope

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Abstract: Diabetes mellitus is a common chronic metabolic disease. It is customary to call it "more than three and less", accompanied by fatigue, weakness and depression. If we can not get the ideal treatment, it is easy to complicate with various chronic diseases and infections, such as cardiovascular, cerebrovascular, kidney, retina, nervous system, and so on. Severe ketoacidosis can occur. In this paper, diabetes mellitus was treated by activating blood circulation and removing blood stasis, and the function recovery of sugar channel and sugar carrier was observed by high power microscopy.

1. Introduction

In the latest study, 382 million people suffered from diabetes in 2013. This figure is expected to increase to 592 million by 2035, which is a major burden for developing countries. The incidence of diabetic angiopathy is also increasing year by year, which is one of the main causes of death and disability in diabetic patients. Recent years, Huoxue Huayu Prescription has made great progress in the treatment of diabetic angiopathy, which plays an increasingly important role. The pathogenesis of diabetes mellitus is as follows. Macromolecular particles in the human body cause a blockage in the formation of barriers, which can cause local thirst. As sugar channels and carriers go wrong, this will cause sugar spillover into sugar channels. Therefore, sugar carriers will not normally transport sugar in the sugar channel, which will form muscle glycogen in human muscles and skeletons. Local thirst will lead to local thirsty necrosis disease and multiple obstetric diseases.

2. History and mechanism of activating blood circulation and removing blood stasis

2.1 History of the activating blood circulation and removing blood stasis method

The promoting blood circulation and removing blood stasis has a long history, which is an important theory and treatment principle of Chinese medicine. The word "blood stasis" was first found in the book "Golden Chamber". But the records of blood stasis originated from the Internal Classic, such as "evil blood" in Lingshu, which is the earliest record of blood stasis. Treatise on Febrile Diseases has made great progress in activating blood circulation and removing blood stasis method. The main pathogenesis of diabetes is deficiency of Yin and Jin, and dryness and heat are more prevalent. Therefore, after a long period of thirst, the disease will enter the collaterals, and Yin deficiency fluid will be less. Blood stickiness can not cause blood stasis, thus forming blood stasis syndrome. Therefore, blood stasis syndrome is a complication of diabetes. Blood stasis has also become one of the important pathogenesis of diabetes. Zhang Zhongjing said in the synopsis of the Golden Chamber: "If the patient is hot, full of irritation, dry and thirsty, his pulse is not hot, this is Yin Fu. This is blood stasis." Zhang Zhongjing put forward the theory that blood stasis can cause diabetes.

2.2 The mechanism of activating blood circulation and removing blood stasis

2.2.1 Improvement of hemorheology and microcirculation

Activating blood circulation and removing blood stasis have the effect of expanding peripheral blood vessels and increasing blood volume of organs. TCM treatment of diabetes mellitus can effectively reduce blood sugar and lipid, which improves the blood hyperviscosity and hemorheology of patients. Therefore, the method of activating blood circulation and removing blood stasis can obviously improve the symptoms of various vascular and neurological complications. It has been proved that *Salvia miltiorrhiza*, *Angelica sinensis*, *Ligusticum chuanxiong*, safflower, *radix paeoniae rubra* and *cortex moutan* have therapeutic effects, such as reducing blood viscosity, dredging microcirculation, relieving erythrocyte and platelet aggregation, expanding blood vessels, etc. According to the hyperviscous state of diabetic patients, western medicine believes that metabolism should be actively regulated. At the same time, we should add persantine, aspirin and other anticoagulant agents, which is consistent with the traditional Chinese medicine treatment of activating blood circulation and removing blood stasis method.

2.2.2 Inhibiting platelet aggregation

Platelet is not only related to hemostasis, but also involved in the pathogenesis of diabetes mellitus and its complications. The results are as follows. *Angelica sinensis* and *Salvia miltiorrhiza* have anti-platelet release and anti-platelet adhesion effects. Safflower, *Angelica sinensis*, *Radix Paeoniae Rubra*, *Ligusticum Chuanxiong*, *Salvia Miltiorrhiza*, *Notoginseng*, *Leonurus heterophylla*, *Typha*, *Earthworm*, *Peilan*, *Astragalus membranaceus*, *Artemisia annua*, *Ginger* and so on have anti-platelet aggregation effects. *Angelica sinensis* and *Ligusticum Chuanxiong* can shorten platelet electrophoresis time. *Angelica sinensis* and *earthworm* have the effect of reducing plasma fibrinogen.

2.3 Improving insulin resistance

Insulin has a remarkable resistance to II diabetes. It is believed that insulin resistance is closely related to blood stasis. Animal experiments showed that *Jiawei Taohe Chengqi Decoction* could reduce the fasting blood glucose concentration of diabetes mellitus and normal rats, which promoted the secretion of endogenous insulin by B cells. Therefore, by inhibiting the secretion of glucagon, it will repair the endocrine cells and increase the secretory granules of islet B cells, which stimulates the synthesis and inhibits the decomposition of hepatic glycogen.

3. Characteristics and viewpoints of treating diabetes mellitus

3.1 The characteristics of treating diabetes mellitus

There are no cases of toxic and side effects in the treatment of pure Chinese medicine, and there is no need for dietary requirements. From the minimum molecular analysis of human dietary structure decomposition, the diet people eat can be divided into two categories: sugar diet and amino acid diet. Sugars are divided into three kinds in nature: polysaccharides (such as starch, cellulose and so on), disaccharides (such as sucrose), and monosaccharides (such as glucose, fructose and so on). Fructose is only found in honey, but it does not exist independently in nature. The dietary structure of human is mainly polysaccharide diet (such as starch, cellulose and so on) and amino acid diet (such as protein, fat and so on). The final breakdown of protein is amino acid.

3.2 The viewpoints of treating diabetes mellitus

In people's diet structure, the polysaccharides, fats and proteins in food will be decomposed as follows under the action of human digestive juice. First, the human body converts polysaccharides (starch, cellulose), fats and proteins into disaccharides or amino acids. Secondly, the human body converts disaccharides (sucrose, maltose) into monosaccharides and stores them in human muscles or bones. Muscle glycogen is stored in human muscle and bone glycogen is stored in human skeleton. The movement of human body is mainly skeletal muscle. When the channel of glycogen conversion is obstructed, the blocked storage will cause the overflow of sugar in human body. This is the root cause of sugar sickness. Therefore, this article boldly proposed that diabetes mellitus is a clinical syndrome of sugar spill caused by the wrong sugar channel.

4. Clinical research

4.1 The therapeutic effect of traditional Chinese medicine and western medicine

We have treated 218 patients with diabetes mellitus with pure Chinese herbal medicine. Now we stop taking drugs and observe 198 cases. The curative effect is shown in Table 1. The blood glucose level was below 6.0 in all cases, and the biochemical index of blood glucose decreased to 4.8 in 6 cases.

Table 1. Statistics of cases without recurrence symptoms

Pure Chinese medicine treatment	Number of cases without recurrence symptoms				
	1 year	2 year	3 year	4 year	5 year
198	169	132	89	56	8

According to the recurrence of diabetic patients treated with Western medicine, the statistics are shown in Table 2.

Table 2. Western medicine in the treatment of recurrent symptoms

Observation on drug stopping of western medicine		Number of cases with recurrent symptoms		
		Within 2 years	2-5 year	5 years or more
Insulin	26	5	11	5
Metformin	36	7	8	11
Hypoglycemia	45	4	20	12

4.2 Cases observed by high power microscope

Patient history: The patient is thirsty, drinkable, dry tongue, frequent urination, hot and sweaty, fearless of cold, fever and other symptoms.

Looking, smelling and cutting: clear mind, yellow face. Language is clear and breathing is even. The tongue is moderate in size, flexible in movement, red in texture and thin yellow and greasy in coating. No tortuosity was found in the veins of the lingual base, and the number of veins slipped.

Prescription: Angelica 12g, Chuanxiong 12g, Rehmannia 12g, safflower 12g, liquorice 6g, Astragalus 15g, gentian 15g, buffalo horn 6g, etc. Add 500 ml of water to the head and fry for 20 minutes. Take 250 ml of juice, decoct twice and add 400 ml of water. Take 200 ml juice, three decoctions and 300 ml water. Take 150 ml of juice and mix it with three decoctions. Take one dose daily, three times orally.

By the high power microscopy, the microcirculatory tissue fluid and its improvement in local tissues of diabetic patients were observed. Such as the follow figure 1 to figure 5.

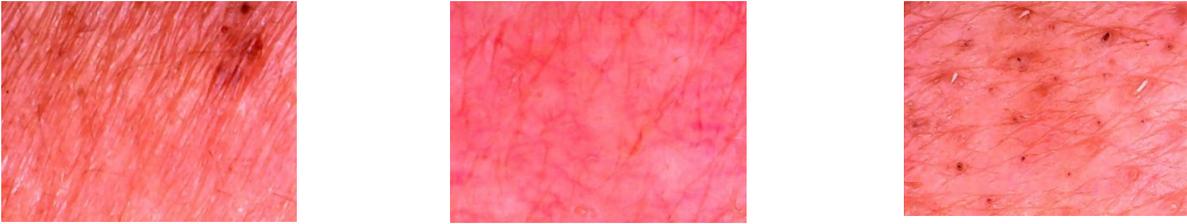


Figure 1: First diagnostic high power imaging (11 May 2019)



Figure 2: Second diagnostic high power imaging (17 May 2019)



Figure 3: Fifth diagnostic high power imaging (11 June 2019)



Figure 4: Sixth diagnostic high power imaging (June 19, 2019)



Figure 5. 7th diagnostic high-power imaging (July 1, 2019)

After 7 courses of treatment with Chinese herbal medicine for activating blood circulation and removing blood stasis method, we can find that the local tissue fluid of the patients has been significantly improved. Therefore, the method of activating blood circulation and removing blood stasis can restore the function of sugar channel and lying carrier for diabetes mellitus.

Conclusions

The symptoms were alleviated compared with the initial diagnosis. Activating blood circulation and removing blood stasis plays an important role in the treatment of diabetes mellitus. In view of the pathogenesis and pathological characteristics of diabetes mellitus, promoting blood circulation and removing blood stasis should be used as the main treatment at this time. In the treatment of diabetes and complications, the method of activating blood circulation and removing blood stasis can be well cured. Promoting blood circulation and removing blood stasis can improve the sensitivity of diabetic peripheral tissue to insulin, which will promote the utilization of glucose.

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