

Research Progress on the Study of Chinese Medicine Evidence of Diabetes Mellitus

Xie Lei^{1,a}, Wu Yun^{1,b}, Ding Yanlin^{1,c}, Xu Jianqin^{2,d,*}

¹Shaanxi University of Chinese Medicine, Xi'an, Shaanxi, 712046, China

²Shaanxi Provincial Hospital of Chinese Medicine, Xi'an, Shaanxi, 710003, China

^a1018711076@qq.com, ^b1357544245@qq.com, ^c1961902408@qq.com, ^dxjq0516@163.com

*Corresponding author

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Abstract: China is one of the countries with the largest number of diabetes patients. In recent years, the prevalence rate has increased year by year, and there is a younger trend. The diagnosis and treatment of diabetes in traditional Chinese medicine has a history of thousands of years. This article summarizes the clinical classification, etiology and pathogenesis of diabetes treated by traditional Chinese medicine, and the treatment methods, so as to enrich the treatment of diabetes and provide more ideas for the clinical treatment of diabetes in traditional Chinese medicine.

1. Introduction

Table 1: Incidence of diabetes in China

Diagnostic criteria	Size of survey	Age range	Morbidity (%)
Lanzhou Conference Standards in 1979	300,000	All age group	0.67
WHO-1985	100,000	25-64	1.04
WHO-1985	210,000	25-64	2.51
WHO-1999	100,000	≥18	4.5
WHO-1999	46,000	≥20	9.7
WHO-1999	100,000	≥18	9.7
WHO-1999	170,000	≥18	10.4
WHO-1999	76,000	≥18	11.2

Diabetes mellitus is a multi-causal endocrine metabolic disease manifested by chronic blood glucose increase, with high prevalence, disability and mortality rates, and a huge degree of health hazards as well as socio-economic burdens on human beings. Over the past 30 years, the prevalence of diabetes mellitus in China has increased significantly. The results of the monitoring of chronic diseases and their risk factors in China in 2013 showed that the prevalence of diabetes mellitus among people aged 18 years and older was 10.4%, and the prevalence increased to 11.2% in 2017, as shown in Table 1 and Figure 1. Type 2 diabetes mellitus accounted for more than 90% of the diabetes mellitus population, and the number of patients with DM ranked the first in the world [1]. The prevention and treatment of diabetes mellitus is still a major problem in the world, in recent years,

the advantages of traditional Chinese medicine in the treatment of diabetes mellitus have gradually appeared, with a long history, focusing on individual diagnosis and treatment and macroscopic diagnosis and treatment of the disease, and improving the symptoms and reducing the blood glucose level at the same time. In this paper, we summarize the research progress of TCM in the treatment of diabetes mellitus in recent years.

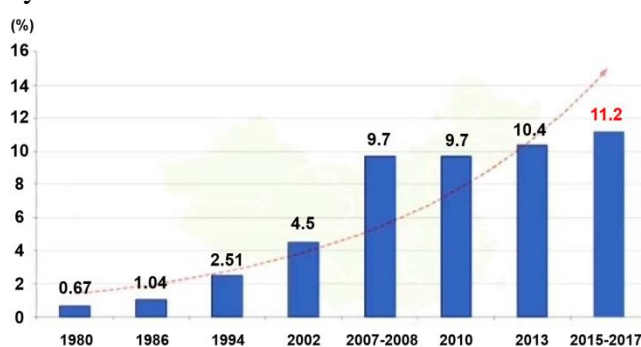


Figure 1: Incidence of diabetes in China

2. Chinese medicine's understanding of diabetes

2.1. Innate deficiency

In ancient Chinese medical literature, there is only "thirst" but no record of "diabetes". "Thirst" was first seen in "Huangjingnei". According to the similarity of its symptoms, there are similarities of its symptoms, including "Xiaodan", "Xiaoke", "Feixiao", "Xiaozhong", "Lixiao", "Pidan", "Kidney Fever", "Fengxiao", etc. "Lingshu ·Five Changes" said that "If all the five organs are soft and weak, they are good for diseases and illnesses." It pointed out that the five visceral endowment is insufficient, the body is weak, which is an important reason for the occurrence of thirst. Later generations of doctors believed that kidney deficiency was the main mechanism of diseases, and that kidney yin and yang deficiency, spleen and kidney deficiency were the main mechanisms. Yin deficiency was internal heat, consuming yin and fluids, and easily causing thirst.

2.2. Dietary indiscretion

"Suwen - the theory of strange diseases": "This overflow of five qi is also known as the Pidan". If the five flavors are imported and hidden in the stomach, the spleen will perform its essence and fluid in the spleen, thus making the population sweet. It's the cause of human obesity. This kind of patient must eat a lot of sweet food and gain a lot of weight. Obese patients can cause internal heat, and some sweet foods can make people feel full. So their qi overflows and turns into xiaoke. "The ancients believed that congenital deficiency, combined with a hasty diet and excessive consumption of sorghum, which had a strong taste of fat, sweet, thick, and greasy. It resulted in internal dampness and heat. The spleen and stomach were in a central focus, and the internal heat was abundant, which was caused by spleen and stomach diseases. Ma Shi said: "Heat in the stomach, fluid depletion, water and grains are all eliminated, which is called elimination". It was also pointed out that people with obesity, phlegm-dampness obstruction, poor qi, depression and heat, depletion of yin and injury to the essence, are more likely to occur in the spleen (disease of the spleen). Tong Xiaolin believes that the core mechanism of spleen disease is "fullness" and "internal heat", and the development of spleen disease to thirst is in line with the progression of pre-diabetes to diabetes in modern medicine [2].

2.3. Emotional internal injuries

"Lingshu · Five Changes" said: "Anger is the gas on the reverse, the chest animal accumulation, blood and gas inverse retention, hip skin full of muscle, blood turned into heat. Heat is eliminating the skin, so it is elimination and disease". "Lingshu Benzang Chapter" has "liver vein tiny for the elimination of disease". Ancient medical practitioners believe that the occurrence of this disease and the liver is closely related to the liver, the liver likes to organize and evil depression, long-term mental stress or emotional upset will affect the liver's excretion is not normal, resulting in the reversal of qi disorder, blood and gas against the retention of the chest will be poor qi, aggravate the stimulation of the mind. And the liver qi stagnates for a long time and transforms into fire, which can damage the yin of the lungs and stomach. The middle-jiao is in a state of liver depression for a long time, causing the liver to damage the spleen. It can lead to liver depression and spleen deficiency, and consume the yin of the liver and kidney.

2.4. Phlegm and blood stasis interconnections

Many medical doctors believe that the pathogenesis of thirst-quenching disease is based on yin deficiency, and have put forward the "theory of yin deficiency", "theory of fire deficiency", "theory of fluid deficiency and dryness and heat theory", and so on, "Theory of Yin Deficiency and Excessive Heat" and so on. Initially, deficiency of both qi and yin can be the main manifestation, but if not intervened and controlled, with the development of the disease, the formation of new pathological products, such as phlegm-dampness, blood stasis, turbid toxin, dampness-heat and so on, further aggravate thirst. For example, "Yi Guan · Xiaoke Lun" said "long illness is not cured, either phlegm or stasis, water can be sick blood, blood can be sick water." When water stops, blood stasis occurs, and phlegm and blood stasis accumulate for a long time, resulting in phlegm and blood stasis interconjugation.

3. Chinese medicine dialectical treatment

3.1. Traditional Chinese medicine treatment ideas

Zhang Jingyue Yun: "All such people, all thirst and so on ... Diabetes, the general name of the three diseases, that is, internal heat and skin wasting also." Later generations of doctors generally used the traditional theory of the three diseases to diagnose and treat the disease of thirst, and the dialectical typing was based on "deficiency of qi and yin," "deficiency of yin and fire," "deficiency of yin and yang," and "deficiency of spleen and kidney, "deficiency of the spleen and kidney" and "gastric fire", and the treatment is based on nourishing, reducing fire and tonifying the deficiency.

3.2. New ideas for diagnosis and treatment of thirst-quenching disease in Chinese medicine

"Su Wen - The Treatise on Meridians and Vessels" said: "drink in the stomach, swim overflow essence, up to the spleen, the spleen disperses the essence, up to the lungs, adjusting the waterway, down to the bladder, the water four cloth, the five meridians in parallel, and in the four seasons of the five viscera yin and yang, the premise of the normal." Based on the basic theory of "spleen qi disperses essence", Xu Jianqin firstly linked the two pathological phenomena of Chinese medicine "spleen does not disperses essence" and modern medicine "insulin resistance" to elaborate the pathogenesis of thirst. The pathogenesis of thirst [3]. In recent years, clinicians have found that the traditional Chinese medicine theory of "three elimination" and the modern medical diagnosis of "three more and one less" symptoms are not completely consistent, and the differences between the various types of evidence are even greater differences in clinical manifestations, and the typical symptoms that

gradually appear through the progression of type 2 diabetes mellitus cannot meet the theoretical guidance for diagnosis and treatment. Based on this, there are many new theories, such as Xu Jianqin, through the San Jiao dialectic, believes that dampness and heat is the cause of thirst, "fat and sweet" means "Preference for sweet and greasy foods and obese appearance", "Preference for sweet and greasy foods" leads to appetite and cannot be restrained, "And can not control, "obese appearance" is nourishing and greasy difficult to melt and block the gas, gas is fire, so brewing dampness and heat, and even "its gas overflow, turned into thirst. Proposed "dampness and heat to eliminate" [4], and the treatment advocates "Xuanhua Sanjiao dampness and heat" [5]. There are also "turbid poison causing elimination theory" [6], "phlegm-dampness causing elimination", etc. broke through the traditional upper, middle and lower thirst theory limitations, and the treatment also correspondingly put forward "turbid detoxification method" [7], "Clearing heat and removing phlegm" and other innovative treatments that focus on clearing are different from the traditional method of nourishing Yin and clearing heat.

3.3. Dialectical typing Diabetes

Mellitus in Chinese medicine is known as xiaoke disease, which is divided into two major types: splenic (obese) and wasting (emaciated). Splenic (over-eating of fat and sweet foods and sedentary lifestyle) is the initiating factor for wasting diabetes mellitus, and the core mechanism is internal heat in the middle of fullness of the body, which includes most of type 2 diabetes mellitus, while wasting (wasting) is the initiating factor for tenderness of the internal organs and weak internal organs, friability of the will, or depression of the guards, and the core mechanism is heatiness of the qi division, which includes type 1 diabetes mellitus and some of the type 2 diabetes mellitus who have turned into wasting diabetes mellitus [8]. This includes type 1 diabetes mellitus and some type 2 diabetes mellitus turning into thirst. "Su Wen - Yu Ji Zhen Organ Theory" says: "The spleen is a solitary organ, and the central earth is used to irrigate the four sides. If the spleen does not give up its essence and the essence of the lungs and stomach in the upper jiao is insufficient, resulting in a deficiency of both qi and yin in the lungs and stomach, then upper elimination will occur. If the spleen yin and earth are insufficient to restrain the fire of yang-ming in the stomach, and heat accumulates in the spleen and stomach, then there will be evidence of blazing fire in the stomach. If there is deficiency of spleen and kidney, deficiency of kidney essence, and imbalance of yin and yang, there is deficiency of yin and internal heat, which consumes yin fluid and turns into lower elimination. Longterm deficiency of yin and yang, generate dampness and phlegm, and heat from depression, or prolonged illness with qi deficiency and blood stasis, injuring the essence into the complex. Based on the basic pathogenesis of deficiency as the root, Yin deficiency and internal heat, nowadays the dialectical typing of Chinese medicine for thirst is commonly found in Qi and Yin deficiency, stomach fire blazing, spleen and kidney deficiency, Yin deficiency and fire, Yin and Yang deficiency, and based on the new theoretical breakthroughs in the etiology of pathogenesis in recent years, new dialectical typing such as phlegm and stagnation, dampness-heat internalization, and phlegm-dampness internal obstruction have also appeared.

3.4. Treatment

The earliest documented treatment for thirst was found in the Neijing. Tracing back to the original source, the Suwen-Qi Disease Theory firstly proposed that for "spleen disease", "treating it with orchids to get rid of the stale qi also". Lan is orchid soup, pointed out that the use of Perilla and other aromatic dampness to wake up the spleen of traditional Chinese medicine to treat the spleen and disease, this theory of treatment ideas for later generations of the treatment of spleen and disease provides an important value.

3.4.1. Single-flavored Chinese medicines

The Materia Medica Compendium first recorded the efficacy of mulberry leaves in the treatment of thirst-quenching disease, mulberry leaves are sweet, bitter, cold in nature, attributed to the lung and liver meridians; not only can it improve the clinical symptoms of thirst-quenching disease patients with lung heat and fluid injuries, but also a large number of clinical trials have shown that mulberry leaves can significantly lower the blood glucose of patients with diabetes mellitus, improve insulin resistance, improve the symptoms of the patients, improve the quality of life of the patients, etc, and have a certain preventive effect on diabetes mellitus. Studies have shown that mulberry leaf treats type 2 diabetes by regulating protein expression, anti-islet cell apoptosis over improving inflammatory response, regulating mitochondrial metabolism and other mechanisms [9]. Ghost arrow feather, also known as weiqiao, research found that its hypoglycemic effect may be related to the protection of pancreatic β -cell function, stimulate insulin secretion, improve insulin resistance, improve glucose-lipid metabolism disorders and inhibit the activity of α -glucosidase and other effects [10]. The earliest book that recorded Huanglian as a treatment for thirst-quenching disease is Famous Physicians' Other Records: "Huanglian quenches thirst-quenching." Modern pharmacological research has found that the active alkaloid extracted from medicinal plants such as Huanglian and Berberis, Huanglianin, also known as Berberine, has a variety of antiinflammatory and antibacterial effects in clinical practice, and in recent years it has been found to be able to increase insulin sensitivity to treat diabetes mellitus. Berberine can increase cellular uptake of glucose without promoting insulin secretion, and it can also activate the insulin signaling pathway, increase insulin receptor sensitivity, and improve insulin resistance in type 2 diabetes [11]. The Divine Husbandman's Classic of the Materia Medica records that Pueraria Mirifica: "Sweet and flat in flavor, raw in the Sichuan Valley, treating thirst, body heat, vomiting paralysis, raising the yin qi, and detoxifying all toxins." Pueraria Mirifica is sweet, pungent and cool in nature, and enters the spleen, stomach and lung meridians, and is good at raising the yang, generating fluids and quenching thirst. Since ancient times, it has been a good medicine for the treatment of thirst. Modern pharmacology has also found that Puerarin has the effect of lowering blood glucose, lowering blood lipids, improving insulin resistance, anti-oxidative stress, reducing inflammatory reactions, etc [12].

3.4.2. Traditional Chinese Medicine Compound Soup

Ancient medical doctors believed that the pathogenesis of thirst disease was mainly characterized by deficiency, yin deficiency, and dryness and heat. And its treatment method was based on the theory of "San Xiao" in accordance with the lung, stomach and kidney. For lung and stomach yin deficiency in upper-jiao, the treatment is to nourish yin and moisten dryness. Its prescription medicine is Yuquan Pill or Yuyi Decoction with modifications. And for significant heat symptoms, we can adopt Baihu Jiashen Decoction. For liver and stomach heat, the prescription is modified Da Chai Hu Decoction. For stomach fire in the middle-jiao, the prescription is modified with Yu Nv Decoction. For spleen and stomach qi deficiency, the prescription is modified with Qiwei Baizhu powder. For liver and kidney yin deficiency, the prescription is modified with Liuwei Dihuang Decoction. For yin deficiency and excessive fire, the prescription is modified with Zhibai Dihuang Decoction. For deficiency of yin and yang, the prescription is modified with Jingui Shenqi Pill or Jisheng Shenqi Pill. If the patient has a lot of phlegm and dampness, Erchen Tang can be added. And if blood stasis is severe, Taohong Siwu Tang can be added.

Some doctors believe that this disease is related to six depressions at the beginning of the disease, and the causative factors are internal injuries of emotions, phlegm, dampness, Qi, stasis and heat, but accumulation of Six Stagnation Stagnances can turn fire, and the manifestation of which is dominated by heat, and the treatment is to open up the depressions, clear away the heat, dissolve the phlegm, eliminate dampness, and invigorate the blood. Academician Tong Xiaolin believes that the occurrence of thirst can be divided into four stages: depression, heat, weakness and damage [13].

Depression, heat, weakness is the diabetes stage, and damage is the complication stage. If the thirst disease depression evidence is divided into spleen and stomach congestion evidence, liver depression and stagnation of Qi evidence, the treatment to move the Qi stagnation, liver relief for the method, give thick Park three things soup, Chaihu Shugan San plus subtractions. In recent years, clinicians of traditional Chinese medicine have also advocated the treatment of diabetes mellitus by clearing away dampness and heat, clearing away heat and resolving phlegm, and prescribing Ge Ge Schengen Baicalin and Lian Lian Tang, Huang Lian Wen Gallbladder Tang, and Xiaofang Thoracic Tang with additions and subtractions.

3.4.3. Proprietary Chinese medicines

The Chinese Diabetes Prevention and Control Guidelines suggest that the use of proprietary Chinese medicines (pCms), which correspond to the type of diabetes, can effectively improve clinical symptoms with the help of lifestyle interventions or glucose-lowering drugs. Proprietary Chinese medicines are one of the most important ways of treating diabetes and its complications in Chinese medicine, and it is clinically recommended to use sugar-free granules, capsules, concentrated pills or tablets. For example, Jinlida granules are used in patients whose blood glucose is still not up to the standard even after taking a stabilized dose of metformin. The drug can bring down blood glucose further, improve the beta-cell function index and insulin sensitivity, and improve the symptoms of thirst, fatigue, constipation and so on. Recommended drugs also include Ginseng Astragali Glucose-lowering Granules and Tianqi Glucose-lowering Capsules can effectively reduce the occurrence of diabetes mellitus. For the complications of diabetes, there are also recommended traditional Chinese patent medicines and simple preparations to treat with, such as Huangkui capsule, which can effectively reduce serum creatinine and urinary microalbumin. Mudan Granule has a good effect on improving diabetes peripheral neuropathy, such as numbness of hands and feet, pain of limbs and abnormal skin sensation [14]. There are many other proprietary Chinese medicines such as those mentioned above, including many in-hospital preparations, which need to be used symptomatically after diagnosis and typing.

3.4.4. Traditional Chinese Medicine External Treatment

External treatments of Chinese medicine mainly include acupuncture, auricular acupuncture, moxibustion, warm acupuncture, herbal fumigation, tuina, and patch therapy.

With the advantages of non-toxicity and slight adverse reactions, acupuncture is widely used in the clinic, and its advantages of helping to lower blood glucose, control and improve various complications have been recognized by more and more patients and medical workers. Acupuncture treatment can significantly reduce the pain, numbness, stiffness and other symptoms of diabetic peripheral neuropathy patients through local acupuncture, with electroacupuncture, auricular acupuncture and other methods of better efficacy. Acupuncture prescription points were first seen in "A-B classic of acupuncture and moxibustion", "Thousand-Golden-Prescriptions" proposed acupuncture acupoints for the treatment of xerostomia, such as Taichong, Yinbai, Chengzhi, Quchi, Sanyinjiao, and so on. Yang Can [15] retrieved 605 articles from China Knowledge Network, 509 articles from Wanfang, 994 articles from China Biomedical Literature Library, and 186 articles from Pubmed through modern complex network technology to study the pattern of acupoints used in the treatment of diabetes mellitus, and found that the top 15 acupoints were: Sanyinjiao, Ashigarashiri, Spleen Yu, Kidney Yu, Gastric Yu, Lung Yu, Middle Epigastric, Gastric Yu, Taixi, Qihai, Guanyuan, Hedu, Fenglong, Quchi, Tianchi, and other acupoints used for treating diabetes mellitus. , Fenglong, Quchi, and Tianshu. Warm acupuncture applied to T2DM patients was able to reduce the patients' blood glucose level, improve the therapeutic efficacy, and improve the index of oxidative stress. Zhou Hongtao [16] et al. randomly divided 82 cases of T2DM patients into control group and observation group, and gave them conventional treatment and warm acupuncture treatment on the basis of conventional treatment, respectively; FPG, 2 hPG, HbA1c levels of the two groups decreased

significantly after treatment, and the decrease was more obvious in the observation group. In addition, SOD (superoxide dismutase) levels increased significantly and MDA (malondialdehyde) levels decreased significantly in both groups.

4. Summary and outlook

Since ancient times, Chinese medicine has played an irreplaceable role in the treatment of diabetes. Today, the development direction of modern Chinese medicine has appeared the combination of modern emerging technologies, which can make Chinese medicine develop in a broader field. However, there are still many problems in this process, such as insufficient innovation, inconsistent standards and irrationality. To further improve the theoretical system of traditional Chinese medicine, obtain more clinical evidence of traditional Chinese medicine, and study the pathogenesis of diabetes in combination with traditional Chinese medicine are the necessary research directions of the majority of Chinese medicine workers.

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