

Research Progress of Diabetic Kidney Disease with Traditional Chinese Medicine

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Abstract: *Diabetic kidney disease is not only a common microvascular complication of diabetes, but also diabetes-specific renal damage. With the progress of the disease, it gradually develops into end-stage renal disease (ESRD). DKD showed podocyte loss, glomerular hypertrophy, Mesangial matrix dilation and glomerular basement membrane thickening in the early stage, and nodular glomerulosclerosis, Mesangial vasolysis, inflammation and interstitial fibrosis in the late stage [1-2]. at present, there is no specific treatment plan in western medicine. Clinical practice shows that traditional Chinese medicine has a significant and definite effect on delaying the progression of diabetic renal diseases. This article will summarize from three aspects: etiology and pathogenesis, syndrome differentiation and treatment.*

Keywords: Diabetic kidney disease, Category of wasting and thirst disease, Traditional Chinese medicine, Summarize.

1. Introduction

Diabetic kidney disease (DKD) is a kind of chronic kidney disease (CKD) caused by various types of diabetes. Its pathogenesis is complex, which can involve the whole kidney (including glomerulus, renal tubule, renal interstitium, etc.) [3]. It is characterized by persistent increase in albumin excretion and / or progressive decrease in glomerular filtration rate (GFR). It eventually developed into end-stage renal disease (ESRD). DKD is the main cause of ESRD, about 30% ~ 50% of global ESRD is caused by DKD [4]. DKD has become the primary cause of ESRD in the middle-aged and elderly in China [5]. DKD is a serious threat to the health of Chinese residents, so it can be seen that early diagnosis and treatment of DKD is very necessary. In recent years, the research on the mechanism of traditional Chinese medicine in the treatment of DKD has been gradually deepened, and some progress has been made. This paper is summarized as follows.

2. Etiology and Pathogenesis

Diabetic kidney disease is classified as "category of wasting and thirst disease" in traditional Chinese medicine, and also classified as "category of disease with edema, turbid urine, obstruction and rejection" and so on. Professor Lu Renhe combined with the clinical symptoms, lesion location, etiology and pathogenesis of diabetic nephropathy, put forward that the TCM disease of diabetic nephropathy is called "Xiaohe nephropathy" [6]. Song Dynasty·Zhao Ji Sheng Ji Zonglu shows "thirst for a long time, kidney qi injury, kidney water, kidney qi deficiency decline, abnormal gasification, opening and closing is unfavorable, water valley is not hidden, subtle non-solid and cause urine to sweet, there is ointment, can be edema." Wai tai mi yao: Thirsty and can not drink much water, but swollen legs, feet first thin, impotence weak, a few urinals, this is also kidney disease. Medical Recipes and Formulas: "the kidney dissipates, the thirst deepens, the chronic disease affects the kidney, and the water grain essence is mixed with dampness and turbid. The treatment should distinguish the turbid discharge, tonify the kidney and consolidate the essence." The nephropathy of eliminating thirst is yin deficiency of the body, diabetes is prolonged for a long time, consumption of qi and yin,

deficiency of five internal organs, turbid phlegm, blood stasis and so on. The initial stage of the disease is mostly deficiency of both qi and yin, gradually to yin deficiency of liver and kidney; extension of the disease, yin damage and yang, injury to spleen and kidney; late disease, kidney yang decline, turbid toxin internal stop; finally lead to deficiency of the five internal organs. Professor Tong Xiaolin [7] believes that deficiency, blood stasis and turbidity are the basic pathogenesis of kidney disease, deficiency is mainly qi deficiency, and there are differences in deficiency of qi, blood, yin and yang, as well as differences in stagnation of collaterals, stasis of collaterals and blockage of collaterals. blood stasis is kidney disease with deficiency of qi and inability to promote blood circulation, and cannot absorb blood vessels, resulting in blood stasis and blood coagulation in kidney collaterals. Turbidity is the internal accumulation of turbid toxin, and there are three different manifestations of dampness, turbidity and poison, all of which are caused by the inability of kidney damage to resolve and expel endogenous turbid toxin. It can be seen that the three influence each other and cause disease, which is summarized as blood stasis as the core pathogenesis, deficiency is the basic condition, and turbidity is the final outcome.

3. Treatment based on Pattern Differentiation

Xiaohe nephropathy is characterized by this deficiency, the main lesion organs are lungs, stomach and kidneys, in which the kidneys as the fundamental. In the early stage of the disease, there is a deficiency of qi and yin, which gradually leads to a deficiency of yin in the liver and kidneys, stagnation of the kidney channels, and leakage of essence. The kidney is the master of water, the Secretary for opening and closing, thirst disease for a long time. Kidney yin loss, yin loss of gas, resulting in kidney qi deficiency, no power to regulate, open and close the division, then see frequent urination, or oliguria and swelling; or liver and kidney yin deficiency. Or liver and kidney yin deficiency, essence and blood can't be carried up to the eyes, resulting in dry eyes and blurred vision. In the stage of disease progression, the spleen and kidney are deficient in yang, and water-dampness is retained, resulting in overflow of water. When water-dampness is retained and overflows into the skin, the face and feet become edematous, or even

hydrothorax and ascites; and when yang deficiency fails to warm the four extremities, the cold limbs become cold. Coldness of the limbs. In the advanced stage of the disease, the kidneys are weakened by labor, the kidneys are out of order, the toxins stop inside, the five organs are damaged, and the qi, blood, yin and yang are weakened. Kidney yang is weakened, water-dampness floods. Water-dampness flooding, turbid toxin stopping inside, heavy up and down the grid refusal, change of the evidence bee up. When the turbid toxin floods upwards and the stomach is out of harmony, nausea and vomiting, poor appetite will occur. The water-drinking overrides the heart and shoots the lungs, then palpitations and shortness of breath, chest tightness and shortness of breath can't lie down; drowning poison people's brain, then trance, consciousness, unclear, or even coma. If the brain is poisoned by drowning, then the mind will be in a trance, consciousness will be unclear, or even coma will not be awakened; if the kidney yin fails, the turbid evil will congest the triple jiao, and the kidney will not be open, then there will be little or no urine, and there will be vomiting. The patient will have to be treated with a combination of diagnosis and treatment of diabetic nephropathy. Guidelines for Diagnosis and Treatment of Diabetic Nephropathy with Combinations of Diseases and Syndromes [8]: On the basis of early, middle and late stage of DKD, it can be divided into liver-kidney yin deficiency syndrome, spleen-kidney qi deficiency syndrome, qi-yin deficiency syndrome, spleen-kidney yang deficiency syndrome, yin-yang deficiency syndrome, kidney yang deficiency syndrome, turbid toxin stasis syndrome.

4. Traditional Chinese Medicine Treatment

4.1 Single Drug Treatment

Astragalus membranaceus has the function of invigorating the spleen and tonifying qi, rising yang, promoting water and detumescence, replenishing qi to help blood, blood stasis, yang prosperity, yin and cold, and blood circulation [9]. *Astragalus membranaceus* can "expel the evil blood of the five internal organs". Modern pharmacological studies have shown that *Astragalus membranaceus* has the functions of reducing blood pressure, regulating lipids, promoting blood circulation, reducing proteinuria, improving glomerular metabolic disorders and so on [10]. *Radix Rehmanniae*, clearing away heat and cooling blood, nourishing yin and promoting fluid [11] is often used to treat the syndrome of dryness-heat due to deficiency of yin and fluid. Zhang Xuan et al. [12] found that *Radix Rehmanniae* can reduce blood glucose, blood lipid, improve insulin resistance, improve microinflammatory state, delay microangiopathy, improve microcirculation disorders, and has a preventive and therapeutic effect on DKD. *Salvia miltiorrhiza* cooling blood circulation, menstruation and pain relief, related studies have shown that the effective components of *Salvia miltiorrhiza* can regulate blood glucose, blood fat, renal blood flow, oxidative stress, inhibit inflammation and renal fibrosis [13]. *Poria cocos*, diuresis, dampness and spleen, replenish qi but not evil, diuresis but not harm. Modern pharmacological studies show that *Poria cocos* can be diuretic, lipid-lowering, inhibit urinary protein, and improve renal function [14].

4.2 Classical Prescription Treatment

4.2.1 Gegen Qinlian decoction

Gegen Qinlian decoction is composed of *Pueraria*, *Scutellaria baicalensis*, *Coptis chinensis* and licorice. Fan Yaofu et al. [15] found that intravenous infusion of Gegen Qinlian decoction can significantly reduce albuminuria, improve renal function, reduce high blood viscosity and inhibit platelet aggregation in patients with diabetic nephropathy. Guo Zhibo et al. [16] found that Gegen Qinlian decoction can improve renal injury, enhance renal function and inhibit the release of serum inflammatory factors in rats with diabetic nephropathy.

4.2.2 Danggui Buxue decoction

Danggui Buxue decoction comes from Li Dongyuan's *Neiwaishangbianhuolun*, which has the effect of tonifying qi and promoting blood circulation and removing blood stasis. In the prescription, *Astragalus membranaceus* invigorates qi and solidifies the surface, warming yang and promoting diuresis, *Angelica sinensis* tonifying blood and activating blood without injuring blood circulation, can tonify deficiency and cure the root cause. *Astragalus membranaceus* and *Angelica sinensis* are combined at 5:1 to play the function of tonifying qi and promoting blood circulation, removing blood stasis and dredging collaterals. Gu Yue et al. [17] showed that Danggui Buxue decoction can inhibit podocyte mitochondrial division and apoptosis by regulating AKAP1/Drp1 pathway, reduce albuminuria, and delay the progression of DKD.

4.2.3 Shenqi Dihuang decoction

This prescription is composed of ginseng, astragalus, cooked *Rehmannia*, moutan, yam, *Poria cocos* and *Cornus officinalis*. In the prescription, *Rehmannia glutinosa* nourishes yin and tonifies kidney, tonifies essence and fills marrow; *Cornus officinalis* flesh converges and removes, tonifying liver and kidney; Chinese yam strengthens spleen and kidney, tonifies deficiency and astringent essence; these three medicines are mainly to tonify kidney yin. Moutan Cortex moutan clearing heat and cooling blood, activating blood circulation and removing blood stasis; *Radix Astragali*, tonifying qi and solid surface, collecting sweat and solid removal; ginseng greatly tonifying vital energy, tonifying spleen and promoting fluid; *Poria cocos* invigorating spleen and heart, promoting water infiltration and dampness. This prescription has the effect of tonifying qi and invigorating spleen, nourishing kidney and nourishing yin. Wu Ruixuan et al. [18] 66 patients with IV-V stage of diabetic nephropathy were randomly divided into control group and treatment group. It was found that Shenqi Dihuang decoction combined with basic treatment could significantly improve the score of TCM syndrome, protect renal function, improve nutritional status and inhibit the level of microinflammation.

4.3 Treatment with Proprietary Chinese Medicine

Kidney tablets are composed of *Polygonum multiflorum*, dodder, *Radix Pseudostellariae*, fried *Atractylodes macrocephala*, Chinese wolfberry, *Achyranthes bidentata*, *Achyranthes bidentata*, red peony, *Poria*, *Alisma*, plantain and ripe rhubarb, which has the effect of tonifying kidney and spleen, promoting blood circulation and promoting dampness. It is suitable for non-dialysis patients with chronic renal

failure with syndrome of deficiency of both qi and yin and dampness and turbidity, such as nausea, vomiting, lack of food, dry mouth and dry stool. Wang Huiling [19] found that Shuiluanhuang capsule based on Shenqi Dihuang decoction (raw astragalus, cooked Rehmannia, yam, cornus meat, Poria, alisma, Cornus officinalis, Salvia miltiorrhiza, Rosa chinensis, Euryale seed) enhanced podocyte autophagy activity by activating LKB1/AMPK/Sirt1 signal pathway, reduced blood glucose, improved creatinine and urea nitrogen, reduced urinary protein, and protected kidney.

5. Summary

With the gradual deepening of traditional Chinese medicine's understanding of diabetic nephropathy and the in-depth study of traditional Chinese medicine components in modern pharmacology, the mechanism of Chinese medicine on diabetic nephropathy has become increasingly clear, and according to the current clinical experience, traditional Chinese medicine has fewer side effects than western medicine. More acceptable to patients. However, due to the doctors' personal understanding of diabetic nephropathy, there is no clear unity, therefore, we need to improve and unify the traditional Chinese medicine treatment system of diabetic nephropathy.

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