

Research Progress on Acupuncture Combined with Traditional Chinese Medicine in the Treatment of Diabetic Retinopathy

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Abstract: Diabetic retinopathy (DR) stands as one of the most prevalent and severe microvascular complications of diabetes mellitus, and it is a primary contributor to vision impairment and blindness among the working - age population globally. Although contemporary therapies such as intravitreal anti - VEGF injections and laser photocoagulation have proven effective, they are frequently constrained by high costs, repeated injections, and potential adverse effects. Traditional Chinese Medicine (TCM), encompassing both herbal prescriptions and acupuncture, has been increasingly employed as complementary and alternative interventions for DR. In recent years, the combination of acupuncture and Chinese herbal medicine has exhibited promising synergistic effects in enhancing visual acuity, alleviating macular edema, and retarding disease progression. This paper conducts a review of the recent research advancements regarding the combined therapy of acupuncture and TCM for DR, encompassing the TCM etiology of DR, clinical evidence, potential mechanisms, and existing challenges, with the aim of offering a reference for future clinical and experimental investigations.

Keywords: diabetic retinopathy; acupuncture; traditional Chinese medicine; combined therapy; research progress

1. Introduction

Diabetes mellitus has emerged as a global public - health concern, with its incidence rising precipitously in both developed and developing nations. As per the International Diabetes Federation, around 537 million adults were afflicted with diabetes in 2021, and this figure is projected to reach 783 million by 2045 [1]. Among diverse diabetic complications, diabetic retinopathy (DR) stands as the most prevalent microvascular complication. A systematic review and meta - analysis conducted by Teo et al. (2021) indicated that among diabetic individuals, the global prevalence of any DR was 22.27% (95% confidence interval, 19.73%–25.03%). The prevalence was highest in Africa (35.90%) and North America and the Caribbean (33.30%) [2]. DR is the principal cause of blindness among the working - age population and the sole factor contributing to the increase in age - standardized blindness over the past three decades [4].

In Traditional Chinese Medicine (TCM) theory, DR is frequently classified as “Xiaoke Mubing” (diabetic eye disease), and its pathogenesis is commonly ascribed to Qi deficiency, Yin deficiency, blood stasis, and phlegm turbidity. Both acupuncture and Chinese herbal medicine have been independently employed in the management of DR. However, mounting evidence suggests that their combination may yield superior results by concurrently addressing multiple pathological links. This paper reviews the recent research advancements regarding the combination of acupuncture and Chinese herbal medicine in the treatment of DR, encompassing the theoretical foundation, clinical investigations, mechanisms of action, and future prospects.

2. Pathogenesis of Diabetic Retinopathy and TCM Understanding

2.1 Modern Medical Perspective

Diabetic retinopathy (DR) is primarily driven by chronic hyperglycemia, which triggers a series of metabolic abnormalities, such as increased polyol pathway flux, accumulation of advanced glycation end - products (AGEs), activation of protein kinase C (PKC), oxidative stress, and inflammatory responses. According to the article on DR in Nature Reviews Disease Primers (Wong et al., 2016), the development of DR is supported by complex and interrelated pathophysiological mechanisms initiated by hyperglycemia, including genetic and epigenetic factors, increased production of free radicals, advanced glycosylation end products, inflammatory factors, and vascular endothelial growth factor (VEGF)[3]. These phenomena lead to pericyte loss, thickening of the capillary basement membrane, formation of microaneurysms, increased vascular permeability, and ultimately retinal ischemia. In response to hypoxia, the up - regulation of VEGF promotes pathological neovascularization, which is prone to hemorrhage and fibrosis[3].

2.2 TCM Etiology and Pathogenesis

In Traditional Chinese Medicine (TCM), diabetes (Xiaoke) is mainly associated with Yin deficiency and internal heat. Prolonged illness often impairs Qi and Yin, resulting in Qi - Yin deficiency. The eyes are nourished by the essence of the liver and kidneys; therefore, chronic diabetes may cause deficiency of the liver and kidneys, leading to blurred vision. Moreover, Qi deficiency fails to promote blood circulation, resulting in blood stasis[5]; and Yin deficiency generates internal heat, which forces blood out of the vessels, causing retinal hemorrhage. Phlegm and dampness further obstruct the meridians, forming hard exudates and macular edema. According to the evidence mapping study by Ling et al. (2024), which evaluated 51 systematic reviews and meta - analyses on TCM intervention for DR, the treatment methods mainly included tonifying deficiency, activating blood, and resolving stasis. The core TCM syndromes of DR are typically Qi - Yin deficiency, blood stasis, and phlegm turbidity. The combination of acupuncture and herbal medicine aims to replenish Qi and Yin, activate blood circulation, remove stasis, and resolve phlegm.

3. Acupuncture Therapy for Diabetic Retinopathy

Acupuncture, a crucial element of Traditional Chinese Medicine (TCM), entails the insertion of fine needles into specific acupoints to regulate the flow of Qi and blood. In the case of Diabetic Retinopathy (DR), commonly chosen acupoints encompass Jingming (BL1), Cuanzhu (BL2), Taiyang (EX - HN5), Sizhukong (SJ23), and Tongziliao (GB1) in the periorbital region, along with distal points such as Zusanli (ST36), Sanyinjiao (SP6), Guangming (GB37), Taixi (KI3), and Hegu (LI4). The underlying principles involve nourishing the liver and kidneys, clearing heat, promoting blood circulation, and eliminating stasis.

Several systematic reviews have documented the positive impacts of acupuncture on DR. A systematic review and meta - analysis conducted by Ang et al. (2020), which searched 14 databases (5 English, 4 Chinese, and 5 Korean) and incorporated 6 randomized controlled trials (RCTs), revealed that acupuncture, either in combination with standard medication or used alone, might be more effective in treating DR than standard medication alone [6]. More recently, a network meta - analysis by Che et al. (2025) included 28 studies published from 2012 to 2023, involving 2801 patients, and compared interventions such as acupuncture, TCM, electroacupuncture, acupoint injections, and calcium dobesilate. The study concluded that the combination of electroacupuncture, acupuncture, and TCM may be the most efficacious treatment for DR, and that acupuncture and related therapies exhibit significant efficacy in treating DR, enhancing vision, and reducing macular edema, with relatively few adverse effects [4].

4. Traditional Chinese Medicine (Herbal Therapy) for Diabetic Retinopathy

Traditional Chinese herbal medicine has been extensively employed in the syndrome - differentiated treatment of diabetic retinopathy (DR). Commonly utilized formulas include Qi Ju Di Huang Wan (Lycium, Chrysanthemum, and Rehmannia Pill) for liver - kidney Yin deficiency, Sheng Mai San combined with Xue Fu Zhu Yu Tang for Qi - Yin deficiency complicated by blood stasis, and Er Zhi Wan for nourishing Yin and cooling blood. Individual herbs such as Astragalus membranaceus (Huangqi), Salvia miltiorrhiza (Danshen), and Panax notoginseng (Sanqi) have been demonstrated to possess antioxidant, anti - inflammatory, and microcirculation - improving characteristics.

A network meta - analysis conducted by Li et al. (2023) incorporated 107 studies involving 9710 patients (4767 cases in the experimental group and 4973 in the control group) and evaluated nine distinct oral Chinese medicines for DR. The study offered evidence indicating that the combination of oral Chinese medicines with conventional treatment yields superior outcomes across all aspects of DR compared to the sole use of conventional treatment [7]. An evidence mapping study by Ling et al. (2024) further verified that traditional Chinese medicine (TCM) exhibited definite efficacy in the treatment of diabetic retinopathy, although the evidence was of moderate to low quality [5].

5. Clinical Investigations on the Combination of Acupuncture and Chinese Herbal Medicine

The integration of acupuncture and Chinese herbal medicine is theoretically more efficacious than either modality used in isolation, as they exert a synergistic effect. Chinese herbs offer systemic pharmacological impacts, while acupuncture unblocks meridians and promotes local circulation. A number of clinical trials have been carried out to verify this hypothesis.

A prospective randomized controlled trial conducted by Yang et al. (2025) explored the application of acupuncture combined with Tongluo Mingmu decoction subsequent to laser surgery for diabetic retinopathy. A total of 172 patients who had undergone laser surgery for diabetic retinopathy were divided into four groups. The findings indicated that after two weeks of treatment, the scores of main symptoms, secondary symptoms, the leakage area of retinal neovascularization,

and the central macular thickness in the combination group (acupuncture plus Tongluo Mingmu decoction) were lower than those in the acupuncture - only and herb - only groups ($p < 0.05$)[8]. Another clinical study published in the Chinese Journal of Traditional Chinese Medicine (2026) by researchers from Jinan Second People's Hospital investigated the effect of modified Liuwei Dihuang decoction combined with acupuncture on non - proliferative diabetic retinopathy patients with liver - kidney Yin deficiency syndrome. A total of 86 patients were randomly allocated into two groups. After treatment, the combination group exhibited significantly lower traditional Chinese medicine symptom scores and LogMAR visual acuity values ($p < 0.05$), as well as higher peripapillary capillary vessel density in multiple directions compared to the acupuncture - only group. The total effective rate was also significantly higher in the combination group, without an increase in adverse reactions[9].

6. Conclusions

In conclusion, diabetic retinopathy persists as a primary cause of visual impairment, and existing Western medical treatments exhibit certain limitations. Traditional Chinese Medicine, especially the combination of acupuncture and Chinese herbal medicine, presents a promising complementary therapeutic approach. Clinical evidence derived from systematic reviews, network meta - analyses, and randomized controlled trials indicates that the combined therapy can enhance visual acuity, mitigate macular edema, facilitate hemorrhage absorption, and impede the progression of diabetic retinopathy, while maintaining a favorable safety profile. The underlying mechanisms encompass synergistic anti - oxidative, anti - inflammatory, anti - VEGF, and microcirculation - improving effects. Nevertheless, more rigorous research is requisite to validate these benefits and optimize treatment protocols. The integration of Traditional Chinese Medicine with modern ophthalmology may pave the way for novel approaches in the comprehensive management of diabetic retinopathy.

References

- [1] Sun H, Saeedi P, Karuranga S, Pinkepank M, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045[J]. *Diabetes Res Clin Pract*, 2022, 183:109119-109131. doi: 10.1016/j.diabres.2021.109119. Link
- [2] Teo ZL, Tham YC, Yu M, et al. Global Prevalence of Diabetic Retinopathy and Projection of Burden through 2045: Systematic Review and Meta-analysis[J]. *Ophthalmology*, 2021, 128(11):1580-1591. doi: 10.1016/j.ophtha.2021.04.027. PMID: 33940045
- [3] Wong TY, Cheung CMG, Larsen M, Sharma S, Simó R. Diabetic retinopathy[J]. *Nat Rev Dis Primers*, 2016, 2:16012. doi: 10.1038/nrdp.2016.12. Link
- [4] Che SJ, Zhang ZY, Wang SA, et al. Acupuncture and related therapies for diabetic retinopathy: A systematic review and network meta-analysis[J]. *Medicine (Baltimore)*, 2025, 104(20):e42431.
- [5] Ling J, Hu M, Wang Y, Zhou J, Xie ZL, Deng HY, Luo XX. [Evidence mapping of traditional Chinese medicine intervention in diabetic retinopathy]. *Zhongguo Zhong Yao Za Zhi*. 2024 Jul;49(13):3676-3683. Chinese.
- [6] Ang L, Song E, Jun JH, Choi TY, Lee MS. Acupuncture for treating diabetic retinopathy: A systematic review and meta-analysis of randomized controlled trials. *Complement Ther Med*. 2020 Aug;52:102490.
- [7] Li HD, Li MX, Zhang WH, Zhang SW, Gong YB. Effectiveness and safety of traditional Chinese medicine for diabetic retinopathy: A systematic review and network meta-analysis of randomized clinical trials. *World J Diabetes*. 2023 Sep 15;14(9):1422-1449.
- [8] Yang Y, Wang L, Huang H, Xu LH. Application of acupuncture combined with Tongluo Mingmu decoction after laser surgery for diabetes retinopathy[J]. *International Medicine and Health Guidance News*, 2025, 31(11):1869-1874.
- [9] Effect of Modified Liuwei Dihuang Decoction Combined with Acupuncture on Blood Flow and Visual Function of Optic Disc in Liver-Kidney Yin Deficiency Syndrome of Non-Proliferative Diabetic Retinopathy[J]. *Chinese Journal of Traditional Chinese Medicine*, 2026(2):70-74.