

Research Progress in TCM Treatment of Retinitis Pigmentosa

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Abstract: Retinitis pigmentosa (RP) is a genetic eye disease characterized by primary dystrophic degenerative lesions of photoreceptor cells and retinal pigment epithelium. Although there are many treatment methods, there is still a lack of effective methods to restore visual acuity and visual field. Traditional Chinese medicine ophthalmologists have been conducting extensive clinical research on retinitis pigmentosa for a long time and have achieved significant progress. The paper is a summary of the progress of traditional Chinese medicine in the treatment of retinitis pigmentosa in the last five years.

Keywords: Retinitis pigmentosa; Traditional Chinese medicine; Research progress

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1. Introduction

Retinitis pigmentosa is a primary degeneration of retinal photoreceptor cells and pigment epithelium. The main symptoms are night blindness and centripetal reduction of visual field ^[1]. There is evident night blindness even with minimal changes in the fundus. RP tends to progress slowly; it usually begins in early childhood (6-12 years old), and worsens in adolescence, with the blind stage occurring in mid-age or old age. Although modern medical treatment is becoming more sophisticated and traditional drug treatment is developing continuously, these treatment methods do not have broad and practical curative effect, and they are unable to restore visual function and visual field in the later stages. RP has long been recorded in ancient books of traditional Chinese medicine as “Gaofeng Neizhang” ^[2]. Traditional Chinese medicine first emphasizes on the overall concept, followed by syndrome differentiation, and finally treatment, which may improve visual function and delay the course of certain diseases. Traditional Chinese medicine ophthalmologists have deeply excavated the classic analysis of etiology and pathogenesis, as well as the prescription compatibility of predecessors. This paper analyzes and summarizes the treatment methods of traditional Chinese medicine for retinitis pigmentosa in the recent five years, in order to provide information about the latest trends and development of traditional Chinese medicine in the treatment of RP.

TCM treatment includes etiology and pathogenesis, TCM prescription, acupuncture, combination of acupuncture and medication, integrated traditional Chinese and western treatment, and so on. In recent years, doctors from all sides have made practical and innovative achievements in experiments and clinical practice through a better understanding of ancient books and classics. The progress of traditional Chinese medicine in the treatment of retinitis pigmentosa in the recent five years will be discussed in the following sections.

2. Etiology and pathogenesis

RP in traditional Chinese medicine is attributed to the “high wind finch order.” Its clinical characteristics in ancient books of traditional Chinese medicine recorded during the Sui Dynasty, including Chao Yuan Fang’s “Treatise on the Origin and Symptoms of Diseases,” are as follows: “Some people have impaired vision at night or when they are in the dark, and normal vision when it is daytime or in the light, which is called finches.” In the Ming Dynasty, its etiology is thought to be human qi imbalance of yin and yang. In the Qing Dynasty, according to “Za Bing Yuan Liu Xi Zhu,” this disease is caused by congenital deficiency or parental inheritance, thus pointing out that this disease is a hereditary disease. According to “Mu Jing Da Cheng,” it is attributed to insufficient yuan yang, in which the endowment is not as effective as the depletion of Yuan. According to “Ophthalmology of Traditional Chinese Medicine,” in yin and yang imbalance, the decline in yang does not control yin; if yin and yang are not in harmony, yang qi cannot be used. In short, yin and yang imbalance is the pathological form of the disease, while yang failure is the basic cause of the disease. Its pathogenesis can be summarized as insufficient endowment, the fire failure of the life door, the loss of the spleen’s vital movement, or the deficiency in the source of energy and blood.

3. Traditional Chinese medication

Yao Zhen and other researchers treated 40 RP patients with Ziyin Mingmu pill ^[3]. Based on the pathogenesis of the disease, tonic and unclog worked together to treat the syndrome of deficiency and excess, with a noticeable clinical effect. Fan Mingfeng, Wang Kenian, and other researchers used Zhujing pill to treat RP and found that it helped improve visual acuity ^[4,5]. Luo Xiaoqin and other researchers treated 28 RP patients with Mingmu Dihuang decoction ^[6] and found that it had good effect on improving vision and visual field in comparison with those who were treated with western medicine. Another study investigated the efficacy of Ginkgo Mingmu prescription in 40 RP patients and found that the symptoms experienced by these patients improved significantly upon taking the prescription ^[7]. Jiang Pengfei and other researchers used Yiqi Mingmu pill to explore the electroretinogram and hemodynamics of 70 patients with RP ^[8], proving that it can improve the blood supply to the eyes and improve vision.

4. Acupuncture

In a study ^[9], 30 patients with RP were treated with the “two dragons playing with pearls” method, which effectively improved the vision and visual field of these patients. Zhang Yanju and other researchers treated 13 RP patients by using the Wentong needle method (fire needling) on the Fengchi point, in which the patients had remarkable therapeutic outcomes ^[10]. Tian Qingmei and other researchers found that acupuncture can treat eye diseases by improving the brain visual system ^[11] and that RP can be treated in various ways in the process of analyzing its mechanism of action.

5. Combination of acupuncture and medication

In another study ^[12], Xinming No. 1, Qiuhou, and Shangjianming were selected in combination with Xinming No. 2 and Yiming for skin acupuncture and auricular plaster, while compound anisodine acupoint injection was performed near the superficial temporal artery to treat 26 cases of RP; the intervention delayed the progression of RP. Yu Zhao-an and several other researchers treated 20 RP cases with acupuncture combined with compound anserine acupoint injection near the superficial temporal artery ^[13], proving that its efficacy is superior to acupoint injection alone. Liu Jingxia used Yishiyin combined with acupuncture and binocular ion introduction to treat RP ^[14], and the effect was remarkable. In a study ^[15], Siwu Wuzi decoction and acupuncture were used together to alleviate the symptoms experienced by 24 RP patients with liver-kidney insufficiency, so as to improve visual acuity, expand visual field, and improve the electroretinogram amplitude. Wuzi Mingmu prescription was combined with acupuncture in the treatment

of 27 RP cases ^[16]; compared with the control group that received vitamin A and Vitamin E alone, the study found that acupuncture combined with medication had better clinical efficacy. Wu Danlei and other researchers treated 24 RP cases with Jianpi Yishen Tongluo decoction combined with acupuncture ^[17], and the efficacy of the treatment was significantly higher than that of pure oral nutritional western medicine. Guo Jiyuan treated 18 patients with RP by using acupuncture combined with Yishiyin decoction and found that the patients' visual acuity, ERG-B wave, and visual field improved after treatment, with a high total effective rate ^[18]. Another study used acupuncture combined with Mingmu Dihuang decoction to treat 24 RP cases (liver-kidney yin deficiency syndrome); the patients' visual acuity and visual field improved over a short period, and the accompanying symptoms of dryness and discomfort in the eye, dizziness and tinnitus, dry mouth, as well as other symptoms were alleviated ^[19]. Xiao Xiangyan observed the use of triple therapy (Yishiziyin combined with Xuesaitong ion introduction, and acupuncture) in the treatment of 30 RP cases and found that it has good clinical efficacy in terms of improving patients' visual acuity, average visual field, retinal circulation, optic nerve conduction, and retinal metabolism ^[20].

6. Integrated traditional Chinese and western medicine treatment

Several researchers used Qiju Dihuang pill combined with intravenous Shengmai injection and acupuncture to treat 16 RP patients, and the effect was better than the control group ^[21]. In a study, superior rectus bypass surgery was performed in conjunction with Astragalus injection and Salvia miltiorrhiza injection, along with Buyang Huanwu decoction to treat 25 RP patients of qi deficiency and blood stasis type ^[22]; the injection and decoction effectively made up for the deficiency of the surgery alone, which could not improve the visual function of patients. Li Dujun and other researchers treated 37 RP patients with electroacupuncture, external Chinese medicine by sticking on acupoints around the eye, intravenous infusion of salvia miltiorrhiza and ligustrazine, Guhong injection, cerebroprotein hydrolysate injection, intravenous nutritional support, as well as oral Chinese medicine ^[23]; patients who received the integrated treatment had significantly better results than the western medicine control group.

7. Experimental studies

Jiang Pengfei and other researchers detected apoptosis-related targets in retinal tissue and found that Lycium-Salvia miltiorrhiza can inhibit the apoptosis of retinal photoreceptor cells in rd10 mice by decreasing the expression of apoptotic protease and increasing the expression of lens protein, thus retaining the normal structure of retina and protecting visual function ^[24]. It was found that Lycium-Salvia miltiorrhiza can inhibit the apoptosis of photoreceptors by inhibiting the oxidative stress response in rd10 mice, which may also improve visual function of RP patients ^[25]. Several researchers observed the use of Yiqi Mingmu pill in RP mice and found that the retinal thickness and number of photoreceptor cell nucleus were significantly higher than the model group, along with a clearer retinal layer structure ^[26-28]. Yiqi Mingmu pill regulates apoptosis-related genes, membrane surface molecules, protease, and so on for the protection of retinal ultrastructure. Several studies have examined the apoptosis of photosensitive cells in RCS rats with congenital retinitis pigmentosa and found that Bushen Yijing recipe can promote the aggregation of peripheral blood stem cells on the retina and the expression of ciliary neurotrophic factor, thus inhibiting the apoptosis of photosensitive cells in RCS rats ^[29,30].

8. Conclusion and prospects

In recent years, the clinical research and treatment of retinitis pigmentosa have been carried out in a multidimensional and multilevel direction. While traditional Chinese medicine and western medicine are making steady progress in their respective fields, the integrated application of traditional Chinese medicine, acupuncture, western medicine, and surgery is attempting to improve. Traditional Chinese medicine

treatment makes up for the irreversible defect of visual function in western medicine treatment to a certain extent, and its advantage is also fully reflected in its curative effect. However, large sample randomized controlled trial and evidence-based medicine data are still lacking, the efficacy evaluation standard and clinical trial design have not been standardized, and the supporting evidence is insufficient, hindering the completion of substantive changes in the treatment of RP in traditional Chinese medicine. The basic research work on the mechanism of action of traditional Chinese medicine in the treatment of RP is blooming everywhere, which brings hope to clinical practice, but there is little advancement in terms of research direction and methods. In order to improve the overall research level of traditional Chinese medicine in the treatment of retinitis pigmentosa, it is necessary to combine basic research and clinical research as well as conduct them in a multi-level setting. However, numerous obstacles remain on the path from experimental research to clinical application, such as the highly individualized genes of RP itself, the clinical validity period preserved by one-time administration, and other dose-related issues that remain unclear. As a result, the exploration of RP treatment in traditional Chinese medicine is still facing layers of hurdles.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Yang P, Fan X, (eds) 2018, *Ophthalmology*, Version 9, People's Health Publishing House, Beijing.
- [2] Peng Q, 2019, *Ophthalmology of Traditional Chinese Medicine*, Shanghai Science and Technology Press, Shanghai.
- [3] Yao Z, Peng J, Wang Y, et al., 2020, Clinical Study on Ziyin Mingmu Pill in the treatment of Retinitis Pigmentosa. *Asia Pacific Traditional Medicine*, 16(04): 105-107.
- [4] Fan M, Zhang X, 2018, Clinical Effective Rate of Modified Zhujing Pill in the Treatment of Primary Retinitis Pigmentosa and Its Effect on Patients' Visual Acuity. *Electronic Journal of Clinical Medical Literature*, 5(98): 164-165.
- [5] Wang K, 2018, Effect of Zhujing Pill on Primary Retinitis Pigmentosa. *China People's Health Medicine*, 30(05): 87, 90.
- [6] Luo X, Zhou Z, Duan J, 2017, Effect of Mingmu Dihuang Decoction on Primary Retinitis Pigmentosa in 28 Cases. *Hunan Journal of Traditional Chinese Medicine*, 33(05): 75-76.
- [7] Liu Y, Zhang YZ, Zhang Q, 2017, Treatment of Primary Retinitis Pigmentosa by Ginkgo Mingmufang. *Journal of Changchun University of Traditional Chinese Medicine*, 33(01): 115-117.
- [8] Jiang P, Peng J, Zeng, et al., 2020, Effect of Yiqi Mingmu Pill on Ocular Hemodynamics in Patients with Retinitis Pigmentosa. *Journal of Nanjing University of Traditional Chinese Medicine*, 36(01): 24-27.
- [9] Zhao Y, Han D, 2015, Observation on the Therapeutic Effect of "Erlong Xizhu" Acupuncture on Retinitis Pigmentosa. *China Acupuncture and Moxibustion*, 35(07): 681-684.
- [10] Zhang YJ, Fang XL, 2015, Clinical Observation of Warm Acupuncture in the Treatment of Primary Retinitis Pigmentosa. *Chinese Journal of Ophthalmology*, 25(04): 259-262.
- [11] Tian QM, Qian JC, Bi AL, et al., 2020, Research Progress on the Mechanism of Acupuncture to Improve Vision in Functional Eye Disease. *Liaoning Journal of Traditional Chinese Medicine*, 47(04): 203-206.

- [12] Xu H, Min Z, Lv T, et al., 2016, Clinical Observation on Acupuncture Treatment of Primary Retinitis Pigmentosa. *Shanghai Journal of Acupuncture and Moxibustion*, 35(04): 395-398.
- [13] Yu Z, Ye X, Peng J, et al., 2019, Clinical Observation of Acupuncture Combined with Acupoint Injection in Primary Retinitis Pigmentosa Patients. *Liaoning Journal of Traditional Chinese Medicine*, 46(04): 816-818.
- [14] Huang L, Liu J, 2020, Liu Jingxia Differentiation and Treatment of Retinitis Pigmentosa and Its Clinical Significance. *China Journal of Traditional Chinese Medicine Ophthalmology*, 30(11): 788-792.
- [15] Fang S, 2020, The Clinical Effect of Siwu Wuzi Decoction Combined with Acupuncture in the Treatment of Retinitis Pigmentosa, Jiangxi University of Chinese Medicine.
- [16] Zhou XL, Kong L, 2018, Clinical Observation of Wuzi Mingmu Prescription Combined with Acupuncture in the Treatment of Retinitis Pigmentosa. *Hebei Med*, 24(09): 1564-1568.
- [17] Wu D, Wu L, 2018, Clinical Observation of Strengthening Spleen, Tonifying Kidney and Clearing Collaterals Combined with Acupuncture in Treatment of Primary Retinitis Pigmentosa. *Beijing Journal of Traditional Chinese Medicine*, 37(09): 882-884.
- [18] Guo JY, 2015, Effect of Acupuncture Differentiation on 18 Cases of Retinitis Pigmentosa. *Contemporary Medicine*, 21(23): 152-153.
- [19] Jiang C, 2020, Effect of Acupuncture Combined with Mingmu Dihuang Decoction on Retinitis Pigmentosa, Hunan Great Learning of Chinese Medicine.
- [20] Xiao XY, 2019, Clinical Observation of Traditional Chinese Medicine Triple Therapy for Primary Retinitis Pigmentosa, Heilongjiang Big Study of Traditional Chinese Medicine.
- [21] Chen F, 2016, Effect of Integrated Traditional Chinese and Western Medicine on Retinitis Pigmentosa. *Shanxi Traditional Chinese Medicine*, 32(03): 26, 29.
- [22] Liu H, Li Z, Ji J, et al., 2016, Therapeutic Effect of Supplementing Qi and Activating Blood Circulation Combined with Superior Rectus bypass in the Treatment of Primary Retinitis Pigmentosa. *New Traditional Chinese Medicine*, 48(10): 148-149.
- [23] Li D, Luo J, Mo G, et al., 2017, Clinical Analysis of 61 Cases of Retinitis Pigmentosa Treated by Impact Therapy of Traditional Chinese and Western Medicine. *World Update Medical Information Digest*, 17(33): 137, 140.
- [24] Jiang P, Ou C, Peng J, et al., 2021, Effect of Lycium and Miltiorrhiza on the Expression of Caspase-8, Caspase-12, Caspase-3 and α B-crystallin in Retina of rd10 Mice. *Chinese Journal of Traditional Chinese Medicine Information*, 2022(2): 48-54. <https://doi.org/10.19879/j.cnki.1005-5304.202105502>
- [25] Ou C, Peng J, Jiang P, et al., 2020, Effects of Lycium and Miltiorrhiza on Photoreceptor Apoptosis and Oxidative Stress in rd10 Mice. *Shi Zhen, Guo Yi Guo Yao*, 31(11): 2580-2582
- [26] Wang Y, Jiang P, Pan K, et al., 2018, Effects of Yiqi Mingmu Pill on the Expression of Bax and Caspase-3 in Retina of Retinitis Pigmentosa Rats. *Advances in Ophthalmology*, 38(11): 1019-1023.
- [27] Jiang P, Wang Y, Pan K, et al., 2018, Effects of Yiqi Mingmu Pill on the Expression of Bax mRNA and Caspase-3 mRNA in Retina of Retinitis Pigmentosa Rats. *World Science and Technology – Modernization of Traditional Chinese Medicine*, 20(10): 1834-1839.
- [28] Jiang P, Wang Y, Pan K, et al., 2019, Effect of Yiqi Mingmu Pill on the Expression of Fas and FasL Protein in Retina of Rats with Retinitis Pigmentosa. *Journal of Traditional Chinese Medicine*, 60(04): 327-332.

- [29] Li X, Tang Y, Xu K, et al., 2018, Effects of Bushen Yijing Recipe on the Recruitment of Peripheral Blood Stem Cells in the Retina of RCS Rats and the Expression of Ciliary Neurotrophic Factor. *Chinese Journal of Ophthalmic Optics and Visual Science*, 20(08): 475-483.
- [30] Liang L, Li X, Xu K, et al., 2018, Inhibitory Effect of Bushen Yijing Recipe on Photoreceptor Cell Apoptosis in RCS Rats with Congenital Retinitis Pigmentosa. *New Progress in Ophthalmology*, 38(07): 611-615.

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