

# Advances in Research on Renal Anemia in Chinese and Western Medicine

Sai Kang<sup>1</sup>, Xiaoyong Yu<sup>2\*</sup>

<sup>1</sup> Shaanxi University of Chinese Medicine, Xianyang, Shaanxi, China

<sup>2</sup> Department of Nephrology II, Shaanxi Provincial Hospital of Traditional Chinese Medicine, Xi'an, Shaanxi, China

**Abstract:** Patients with chronic kidney disease often develop renal anemia as a significant complication, which significantly impacts their quality of life and long-term prognosis. In recent years, with deepening research into the pathogenesis of renal anemia, Western medicine has achieved breakthroughs in erythropoietin analog applications, iron supplementation, and new drug development. Traditional Chinese Medicine (TCM) theory centers on the concept of "kidney deficiency and blood sta-sis." Through TCM compound formulas and acupuncture therapy, a distinctive treatment system has been established. The integrated TCM-Western medicine approach has gradually become a key clinical direction, while personalized precision medical strategies have improved patient outcomes.

**Keywords:** Renal anemia; Chronic kidney disease; Erythropoietin; TCM compound formulas; Integrated TCM-Western medicine

## 1. Introduction

Patients with chronic kidney disease (CKD) often suffer from renal anemia, and its incidence gradually increases as the degree of renal function impairment deepens. Traditional Western medicine's treatment methods for renal anemia mostly rely on erythropoietin (EPO) drugs and iron supplement therapy, although they have achieved good results. However, there are limitations such as the risk of adverse cardiovascular reactions, abnormal iron metabolism, and excessively high medical costs. According to traditional Chinese medicine theory, renal anemia is classified into two types of diseases: "blood deficiency" and "deficiency fatigue". It is believed that the root cause of the disease lies in the blood stasis phenomenon caused by kidney deficiency. Therefore, a systematic clinical intervention plan mainly focusing on tonifying the kidney and benefiting qi, promoting blood circulation and removing blood stasis has been formulated.

## 2. Understanding and Clinical Significance of Renal Anemia

Renal anemia shows significant spatial distribution differences and population heterogeneity in terms of epidemiology. Data from large-scale domestic cohort studies indicate that the prevalence of anemia among patients at various stages of CKD is 25.7%, 53.4%, and 75.8%, respectively. These figures are significantly higher than the corresponding values in Europe and America. This phenomenon may be related to differences in genetic background, dietary structure, environmental factors, and disease spectrum. The probability of anemia in female CKD patients is much higher than that in male patients, largely because they have physiological characteristics such as menstrual blood loss and pregnancy. The severity of this disease far exceeds merely manifested in clinical symptoms. The cardiovascular system is one of the organs most severely damaged. The tissue hypoxia caused by anemia will activate the sympathetic nervous system, thereby triggering a series of compensatory reactions such as accelerated heart rate and increased cardiac output. If this continues for a long time, it is very likely to cause left ventricular hypertrophy and subsequently induce heart failure.

## 3. Research on the Strategies of Integrated Traditional Chinese and Western Medicine in the Treatment of Renal Anemia

### 3.1 Construction and Optimization of the integrated Traditional Chinese and Western Medicine treatment model

The integrated treatment of renal anemia with traditional Chinese and Western medicine has formed a relatively complete theoretical system and clinical operation framework. It has established a comprehensive diagnosis and treatment model of "Western medicine diagnosis, traditional Chinese medicine syndrome differentiation, collaboration between Chinese and Western medicine, and complementary advantages". This model has broken through the limitations of the traditional single drug superposition and achieved a deep integration of the advantages of both Chinese and Western medicine. The key lies in the concept of integrating Chinese and Western medicine based on staging and syndrome differentiation. In the early stage

of chronic kidney disease (CKD) (stage 1-2), the main treatment is traditional Chinese medicine, supplemented by Western medical monitoring. The focus is on preventing anemia and delaying the decline of renal function. It is recommended to use kidney-tonifying and spleen-strengthening prescriptions such as Liuwei Dihuang Pills and Shenling Baizhu Powder, and strictly control blood pressure and blood sugar levels. After entering the middle stage (stage 3-4), a combined therapy of traditional Chinese and Western medicine is adopted. Based on erythropoietin (ESAs) and iron supplements, the prescription and medication should be selected according to the results of TCM syndrome differentiation. For kidney Yin deficiency type, Zhibai Dihuang Pills can be chosen; for kidney Yang deficiency type, You GUI Pills are recommended. For blood stasis syndrome, Xuefu Zhuyu Decoction should be used in combination. In the final stage (stage 5), Western medicine should be the main approach, with traditional Chinese medicine playing an auxiliary and detoxifying role, focusing on alleviating symptoms and improving the quality of life of patients.

### 3.2 Formulation and implementation of individualized and precise treatment plans

Individualized precision medicine is an important direction in modern medical research. It has also shown obvious application value in the integrated treatment of renal anemia with traditional Chinese and Western medicine. After the fusion of multi-dimensional data such as TCM constitution identification, gene polymorphism analysis, and biomarker detection, a more accurate individualized treatment plan can be constructed. TCM constitution identification is the foundation of individualized diagnosis and treatment in this field. By using standardized constitution assessment tools, patients with renal anemia can be classified into various types such as qi deficiency type, Yang deficiency type, Yin deficiency type, and blood stasis type. Patients with different constitution types have significant differences in clinical manifestations and responses to traditional Chinese and Western medical treatments. Patients with Yang deficiency type have a better response to drugs that warm Yang, but their effect on erythropoietin (ESAs) is relatively low. Patients with Yin deficiency type have a relatively significant therapeutic effect on yin-nourishing drugs. However, it is prone to adverse reactions in the digestive system due to the use of iron supplements. The increase in hemoglobin levels in patients with blood stasis type is relatively slow. But after intervention with traditional Chinese medicines for promoting blood circulation and removing blood stasis, the therapeutic effect has significantly improved [1]. Pharmacogenomics holds a significant position in the field of precision medicine. Its importance lies in guiding individualized treatment plans through genetic testing. For gene polymorphisms such as EPOR, VEGF and CYP2D6 related to the therapeutic effect of Erythropoietin-Stimulating Agents (ESAs), genotyping can provide a scientific basis for drug selection and dosage adjustment. The variations of genes related to the metabolism of traditional Chinese medicine (CYP2C19, GST) can affect the metabolic process and clinical efficacy of the active ingredients in traditional Chinese medicine. By using genotyping to create personalized administration regimens, the therapeutic effect can be improved and the risk of adverse reactions can be significantly reduced. With the continuous and in-depth development of biomarker-driven diagnosis and treatment models, novel parameters such as soluble transferrin receptors, hepcidin levels, and reticulocular hemoglobin content have demonstrated higher sensitivity and specificity in evaluating iron metabolism and bone marrow hyperplasia function [2]. The quantitative index system established by traditional Chinese medicine tongue diagnosis and modern objective evaluation techniques (such as digital analysis of tongue images and pulse signal processing) provides a scientific basis for syndrome differentiation and treatment. The treatment response prediction model shaped by machine learning methods not only optimizes the practical significance of precision medicine but also conducts a detailed assessment of the effectiveness and potential risks of various intervention methods. The model integrates multiple information sources such as the patient's clinical materials, laboratory test data, genetic information, and traditional Chinese medicine syndromes. In actual diagnosis and treatment, it can help doctors formulate personalized treatment plans, thereby effectively promoting the development process of individualized medicine [3].

## 4. Conclusion

As a major complication of chronic kidney disease, the treatment strategies for renal anemia have made significant progress in recent years. Western medicine has achieved many breakthroughs through the development of new drugs, the exploration of their mechanisms of action, and the implementation of personalized treatment plans. The emergence of drugs such as hypoxia-inducible factor prolyl hydroxylase inhibitors (HIF-PHI) It has brought new therapeutic approaches to erythropoietin analogues (ESAs). Traditional Chinese medicine, relying on its traditional theoretical framework and integrating modern technological means, has gradually formed a systematic syndrome differentiation and treatment system. It is particularly commendable that the integrated therapy of traditional Chinese and Western medicine has demonstrated particular clinical advantages, improving the therapeutic effect while optimizing the quality of life of patients and controlling medical expenses. However, this disease still encounters many challenges, such as the cardiovascular safety of ESAs, the risks of iron use, and the long-term effectiveness of HIF-PHI.

## References

---

- [1] Chen Xiao, Lu Lina, CAI Yanju. Analysis of Social Regression and Its Influencing Factors in Patients with renal Anemia undergoing Maintenance Hemodialysis [J] Chinese Journal of Modern Pharmaceutical Application, 2020,19(15):41-44.
- [2] Chen LAN, Lu Dongning, Li Tongyu. Discussion on the Etiology, pathogenesis and treatment of renal Anemia Based on the Theory of Toxic Deficiency Pathogenesis in Zhuang Medicine [J]. Chinese Folk Therapy,2025,33(10):38-41.
- [3] He Ming, Yang Chundong, Tong Yu. Analysis of the efficacy and safety of roxadustat in the treatment of renal anemia [J]. Contemporary Medical Review, 25,23(14):67-69.