

2024 International Conference on Educational Information Technology,
Scientific Advances and Management (TSAM 2024)

Research and Analysis on the Pathogenesis of Allergic Rhinitis
in Children and Its Treatment by Chinese and Western Medicine

Bo Liu¹

¹ Shaanxi University of Chinese Medicine, No.1 Century Avenue, Qindu District, Xianyang City,
Shaanxi Province, China

Received: May 21, 2024

Accepted: June 22, 2024

Online Published: August 05, 2024

doi:10.22158/mmse.v6n2p150

URL: <http://dx.doi.org/10.22158/mmse.v6n2p150>

Abstract

Allergic rhinitis in children is a common allergic disease, when it recurs, the symptoms are significant, long-lasting, to children's daily life and learning has brought a huge burden. Western medicine has abundant clinical experience in treating this kind of disease, but the unique dialectical thinking and treatment system of traditional Chinese medicine also show undeniable advantages. The purpose of this study was to explore the etiology of allergic rhinitis in children, the relationship between allergic rhinitis and TCM syndrome types, and the advantages and disadvantages of TCM and WM treatment. It is found that allergen, heredity, environmental factors and immune imbalance are the common causes leading to high incidence of diseases. On the whole, TCM can classify different syndrome types and apply corresponding treatment methods, effective relief of the disease, improve the quality of life. We hope this paper can provide a new perspective and guidance for clinical diagnosis and treatment.

Keywords

Childhood Allergic Rhinitis, Pathogenesis, Traditional Chinese and Western Medicine Treatment, Analysis and Discussion

1. Introduction

The incidence of allergic rhinitis in children is on the rise in the world, which has become one of the important problems affecting children's health. Although modern medicine has made great progress in etiology and treatment, the complexity of etiology and individual differences make it difficult to improve the treatment effect and quality of life. There is an urgent need to explore effective treatment

methods for patients with long-term drug therapy or persistent symptoms. Traditional Chinese medicine offers unique advantages in this regard. Traditional Chinese medicine pays attention to holistic conditioning and dialectical treatment, accurately classifies patients of different syndrome types, and combines diet therapy and acupuncture as supplementary therapy, which can not only relieve symptoms, but also improve patients' physique, reduce the recurrence rate. Therefore, it is necessary to explore the etiology of allergic rhinitis in children and its correlation with TCM syndrome types, as well as the advantages and disadvantages of TCM and western medicine treatment methods, so as to provide more comprehensive theoretical basis and clinical practice guidance for clinical treatment.

2. Review of Pathogenic Factors of Allergic Rhinitis in Children

2.1 Mechanisms of Allergen Action

The pathogenesis of allergic rhinitis (AR) in children is complex, in which allergens play a key role in the occurrence and progression of the disease. An allergen is a substance that can induce a specific immune response by entering the respiratory tract of an allergic hapten and triggering a series of immune responses, eventually leads to the emergence of clinical symptoms of anaphylaxis. After the allergen enters the nasal cavity, it is first captured by antigen presenting cells. After antigen processing, antigen presenting cells transmit information to T lymphocytes, especially Th2 helper T cells (Th2). Th2 cells further release cytokines such as IL-4, IL-5 and IL-13, which promote the transformation of B cells into large numbers of plasma cells and IgE antibodies. Once produced in the body, IgE antibodies bind to the surface of mast cells and basophil granulocyte cells, pushing these cells into a state of "Readiness", or sensitization. When the body is re-exposed to the same allergen in subsequent life, the allergen binds to IgE antibodies, triggering a series of intracellular signals that lead to degranulation of mast cells and basophil granulocyte and release of inflammatory mediators, such as histamine, leukotrienes and prostaglandins. The release of these mediators can lead to inflammation of the nasal mucosa and increased vascular permeability, leading to itching, sneezing, water-like runny nose and other typical symptoms, known as the allergic state.

Further research shows that immune response is a complex reaction mechanism, and its influencing factors include some endogenous and exogenous factors. For example, single-nucleotide polymorphism, environmental pollution, microbial infection and other factors can affect the development of allergic rhinitis by disrupting the balance of Th1/Th2. It is worth noting that children's immune systems are not fully mature, which makes them more sensitive to the external environment. Air pollutants, such as PM_{2.5}, may directly or indirectly affect the immune response of the nasal mucosa through oxidative stress pathways, exacerbating symptoms of allergic rhinitis in children. Moreover, exposure to allergens may leave some 'imprint' on the developing immune system of these children, that is, the children are sensitized, thus increasing their risk of developing allergic rhinitis in the future. Therefore, understanding the mechanisms of allergen action is essential for the prevention and treatment of AR and for reducing allergen exposure and optimizing the living environment in early childhood care, has

important implications for reducing the probability of the occurrence of AR (Hansen, Kaiser, Hansen et al., 2024).

2.2 Interaction between Genetic and Environmental Factors

The pathogenesis of allergic rhinitis (AR) in children is relatively complex, and the interaction between genetic and environmental factors plays an important role in the pathogenesis of AR. Children with a family history of allergic rhinitis are at higher risk. Genetic factors are the basis of the development of allergic rhinitis in children. Studies have shown that if one parent has allergic rhinitis, the risk of inheritance in their offspring is between 30% and 50% , whereas if both parents have allergic rhinitis, the risk of inheritance in their offspring may increase to 50% to 80% . This phenomenon reveals that allergic rhinitis is a polygenic trait. However, genetic factors alone are not sufficient to explain all cases. Environmental factors are important factors in inducing and exacerbating allergic rhinitis, environmental Pollution, climate change and secondhand smoke can significantly increase the incidence and severity of allergic rhinitis. Common allergens include pollen, dust mites, pet dander and mold. The allergen enters the body through the respiratory tract, and contact triggers an allergic reaction, resulting in inflammation and swelling of the nasal mucosa. On the other hand, the dynamic interaction between genetic and environmental factors further complicates the problem. Individual sensitivity to environmental allergens depends on genetic predisposition to allergic rhinitis, and long-term environmental stimulation can alter gene expression patterns according to epigenetic mechanisms; Such as DNA methylation and histone modifications can further affect the body's sensitivity to allergens. This process not only plays an important role in the development of the disease, but also affects the course of the disease and the risk of deterioration. Experimental data suggest that children living in urban areas are more vulnerable to air pollution and that particulate matter such as PM2.5 and PM10 synergistically exacerbate the severity of anaphylaxis through oxidative stress and inflammatory pathways. Differences in lifestyle and immune system development also contribute to the relatively low incidence of allergic rhinitis in rural settings, although some allergens, such as pollen and agricultural dust, have higher levels of exposure. In order to effectively reduce the incidence of allergic rhinitis in children, it is necessary to take reasonable preventive measures away from environmental causes, and to make individualized prevention and treatment plans according to individual genetic factors, are key ways to reduce morbidity and improve quality of life. In the future, research on the mechanisms underlying the interactions between genetic and environmental factors should continue to be explored in order to provide a more optimized protocol for clinical prevention and intervention of allergic rhinitis (Li, Zhu,Wei et al., 2024).

2.3 Imbalance of Immune Regulation and Inflammatory Response

Immunomodulatory and inflammatory responses are important components of the pathogenesis of allergic rhinitis in children. The occurrence of allergic rhinitis is closely related to the dysregulation of immune system and inflammatory response. Allergic rhinitis is an immune-mediated inflammatory disease driven by interactions between various cells and molecules in the immune system. When a

child is exposed to allergens such as pollen, dust mites, or pet dander, the immune system is overactivated and produces large amounts of specific IgE antibodies. Normally, the normal function of the immune system is maintained by a relative balance between Th1 and Th2 cells in the body, however, there is often an overactivation of Th2 type immune response in patients with allergic rhinitis, whereas Th1-type immune responses are relatively absent. This immune bias leads to the increased secretion of cytokines such as IL-4, IL-5 and IL-13, which further promotes the proliferation and differentiation of B cells and the production of IgE antibodies and eosinophil granulocyte, this creates a vicious cycle of increased inflammation. (Cui & Zhang, 2024) This imbalance is more obvious especially for the group of children with immature immune system. Inflammatory response is not only a simple overreaction of immune cells, but also a complex reaction mechanism involving the interaction between various cells and molecules. For example, in the process of inflammation, nasal epithelial cells are not only passive victims, but also participants in the inflammatory response. They can release large amounts of chemokines and cytokines, attract more inflammatory cells to infiltrate and release more inflammatory mediators. These findings suggest that allergic rhinitis is not only the result of an overactive immune system, but also a manifestation of complex inflammatory mechanisms following immune dysregulation. Therefore, the treatment and intervention of allergic rhinitis in children should not be limited to the control of symptoms, but should also focus on the recovery of immune regulation and balance of inflammatory response. For example, regulation of Th1/Th2 balance by immunotherapy or drug intervention reduces IGE production and interferes with the release of inflammatory mediators. This approach can fundamentally alleviate the child's condition and improve the child's quality of life.

3. Chinese Medicine's Diagnosis and Treatment of Allergic Rhinitis in Children

3.1 Recognition and Classification of Allergic Rhinitis in Traditional Chinese Medicine (TCM)

Traditional Chinese medicine believes that the internal cause of allergic rhinitis is dysfunction of the zang-fu organs, the external cause is lack of vital energy, striae loose, the surface of the body is not solid, wind, cold, damp, heat and other exogenous invasion. Wind-evil runs through the whole process of allergic rhinitis. When wind-evil invades the lungs of the body while the vital energy is weak, it causes the lungs to lose clearance, the Qi to not absorb fluid, and the body fluid to overflow. The syndrome of latent heat of the lung meridian is that the lung meridian is always depressed with heat, and the spleen is the foundation of the acquired nature, and the spleen qi is weak, then the qi and blood are insufficient, the clear Yang does not rise, the water and dampness do not dissolve, and the nose orifice is not nourished, warm dereliction of duty, striae, nasal orifices in the warm, exogenous pathogenic factors, foreign gas easy invasion, the condition is easy to relapse. In a word, the common syndromes of allergic rhinitis include deficiency of lung-qi, deficiency of spleen-qi, deficiency of kidney-yang and latent heat of lung meridian. The main symptoms of the four syndrome types are nasal obstruction, nasal itching, sneezing, runny nose, color change of nasal mucosa, turbinate enlargement

and so on. Cold syndrome of deficiency of lung-qi is commonly seen in the early stage, and patients may be afraid of wind, cold, sweating and so on. Deficiency of spleen-qi syndrome can be seen eating less, loose stools, abdominal distention, fatigue, head and body weight, pale, and so on. The treatment should be aimed at invigorating qi, invigorating the spleen, promoting Yang and opening orifices, and Zhenwu decoction is usually used to add or subtract. The syndrome of deficiency of kidney-yang is manifested by the symptoms of sore waist and knee, soft urine, clear and long urine, etc. . The syndrome of latent heat of lung meridian is characterized by dry mouth and dry nasal cavity. The dialectical treatment of traditional Chinese medicine (TCM) emphasizes the holistic view and pays attention to individual differences. Providing tailored treatment through diagnostic syndrome types can not only alleviate symptoms, but also modulate the body to enhance immunity, ultimately reducing the frequency and severity of allergic rhinitis attacks. This concept of natural harmony provides parents and children with a safe and effective choice (Zhao, Zhang, Qin et al., 2023).

3.2 Basic Principles and Methods of TCM Treatment

In the treatment of allergic rhinitis in children with traditional Chinese medicine, the concept of the whole and the basic principle of treatment based on syndrome differentiation should be emphasized, and individual differences should be paid attention to in order to achieve the effect of treating root problems and clinical manifestations. For pediatric patients, the treatment of traditional Chinese medicine should start with the lung, taking into account both the spleen and the kidney. During the period of attack, the wind should dissipate and pass through orifices, attack evil to cure its symptoms, and during the interval period, the deficiency should be replenished and the surface should be consolidated, the body should be strengthened to cure its root, and the treatment should be carried out for a longer period. For example, for children with latent lung heat, usually choose heat-clearing drugs qingfei heat, Shengsan Drugs Qingfei Qi, nourishing yin drugs nourishing lung, with Licorice Jianpi and medium. Combined, there are heat clearing lung, the work of nasal orifices. On the other hand, it is more suitable to adopt the method of mild smell, warming lung function, dispersing sex and expelling wind-evil to solve the problem and drive away wind-evil for the children with deficiency of cold syndrome of lung-qi. Many children also have the syndrome of deficiency of lung-qi and spleen-qi. The deficiency of spleen-qi and the deficiency of lung-qi coexist, and the two may affect each other, resulting in wind-evil attaching to the lung, yu Ping Feng San can also be used clinically (Zhang, Liu, Ren et al., 2022). Traditional Chinese medicine also pay special attention to the concept of "Prevention before disease", through regulating the organs, strengthen the physique, reduce the recurrence of allergic rhinitis, improve the overall health of children. The use of traditional Chinese medicine, combined with acupuncture, massage and other external therapies, improve the overall therapeutic effect (Di & Zhu, 2022). Home care commonly used abdominal massage, acupoint massage and other simple and practical methods to alleviate symptoms and improve the quality of life. Despite the rapid development of modern medicine, which provides a variety of treatment methods for allergic rhinitis, but the overall concept of Chinese medicine and the diagnosis and treatment of dialectical thinking,

with its personalized and comprehensive treatment concept, has shown unique advantages in clinical practice. In the prevention and treatment of children's allergic rhinitis, the TCM treatment system not only retains its essence, but also unceasingly combines with modern medicine to provide diversified solutions for improving children's health level.

3.2 Analysis of Typical Cases and Evaluation of Clinical Efficacy

The analysis of typical cases is helpful to understand the application of dialectical treatment of traditional Chinese medicine in children with allergic rhinitis. Taking a 6-year-old boy as an example, the patient often presented with symptoms of nasal itching, frequent sneezing, runny nose and nasal congestion, accompanied by weight loss, fear of wind and cold, eating less and staying in a daze, occasional loose stools and so on. The above symptoms have been going on for two years, seriously affecting the child's quality of study and life. The tongue and pulse of the child presented with tooth marks on the thin side of the tongue, thin white coating and weak pulse. Through the four diagnostic methods and dialectical treatment, the syndrome of deficiency of lung and spleen qi. Yupingfeng powder combined with Guizhi decoction was used in the treatment of the disease. A week later, the child's symptoms significantly reduced. After a month of continuous treatment, the itching and sneezing basically disappeared and the quality of life improved significantly. The curative effect evaluation indicated that the traditional Chinese medicine treats the child allergic rhinitis on the whole is satisfactory, the condition has the obvious improvement. Compared with Western medicine, traditional Chinese medicine can not only effectively relieve symptoms, but also pay attention to overall control, its side effects are small, low recurrence rate. This reflects the advantages of TCM syndrome differentiation and treatment, from the overall point of view, through symptoms, tongue and pulse and other manifestations of dialectical treatment, pay attention to solve the problems of the body zang-fu organs and symptoms. The treatment needs to be individualized, and the prescription of traditional Chinese medicine should be adjusted according to the specific performance of each patient. Clinical experience shows that most of the children's symptoms can be effectively controlled and relieved by accurate dialectical treatment, and have good long-term efficacy. The method of treating allergic rhinitis in children with traditional Chinese medicine has its unique diagnostic and therapeutic ideas, which provides valuable insights for modern medicine. Comparison of integrated traditional Chinese and Western medicine in the treatment of allergic rhinitis in children.

4. Comparison of Chinese Medicine and Western Medicine in the Treatment of Allergic Rhinitis in Children

4.1 Differences in Drug Therapy

In the field of drug therapy, there are obvious differences between Western medicine and traditional Chinese medicine (TCM) in the treatment of allergic rhinitis in children. Western medicine in the treatment of children with allergic rhinitis often use antihistamines, nasal glucocorticoid and other drugs, these drugs can quickly and significantly relieve the symptoms. Antihistamines usually have a

noticeable effect shortly after administration, by inhibiting the release of histamine in the body to relieve symptoms such as sneezing and runny nose, however, long-term use of antihistamines can cause side effects such as lethargy and lack of concentration. In addition, nasal glucocorticoid use reduces nasal congestion and mucosal swelling by suppressing local inflammation, whereas long-term nasal glucocorticoid use also carries some potential risks to growth and development. In contrast, traditional Chinese medicine (TCM) treats drugs from a holistic perspective, emphasizing yin-yang balance and zang-fu functional coordination (Hou, Yang & Dong, 2019). According to the theory of traditional Chinese medicine (TCM), allergic rhinitis in children is usually caused by deficiency of lung-qi, deficiency of spleen-qi, deficiency of kidney-yang and latent heat of lung meridian, by regulating the body's overall environment, thereby enhancing immunity, reduce the frequency and severity of rhinitis attacks. In conclusion, western medicine tends to relieve symptoms rapidly, especially during acute exacerbation of the disease course, while traditional Chinese medicine pays more attention to reducing recurrence by improving the overall state of the body, thus solving the root cause of the disease. It is worth noting that the advantages of traditional Chinese medicine treatment is the side effects of small and the overall regulation of the zang-fu organs, but its slow efficacy, need a long time to adhere to and cooperate. Therefore, it is necessary to evaluate the efficacy, side effects and long-term effects of drugs in clinical application, and to make the most appropriate decision for children's health.

4.2 Comparison of Food Therapy and Acupuncture in Treatment

Although both Chinese and Western medicine have their own advantages in treating allergic rhinitis in children, western medicine relies more on antihistamines and corticosteroid nasal sprays that can effectively and quickly relieve symptoms, long-term use can cause side effects such as drowsiness and loss of appetite. From the point of view of whole treatment and individual treatment, the diet treatment and acupuncture method of TCM have unique advantages. Traditional Chinese medicine has always said that "Medicine and food are of the same origin", diet is an important part of the diet strategy, first of all, should try to avoid eating food that can easily cause allergies; second, children's spleen, stomach function is not yet fully developed, they are susceptible to external factors leading to allergic reactions. This kind of situation may choose the appropriate diet, achieves the enhancement physique effect through the adjustment intestines and stomach function, from inside to outside enhances organism's resistance, thus effectively improves this kind of situation. For example, eating fruits and vegetables rich in vitamin C and antioxidants can help improve the body's internal environment, improve immunity and reduce the incidence of allergic reactions. Dietary therapy has the advantage of being natural, safe and suitable for long-term consumption. The disadvantage is that it takes a long time to stick to it and a relatively long time to get results. Acupuncture is another characteristic treatment of traditional Chinese medicine, through the stimulation of specific meridian points, regulate the balance of yin and yang in the body, promote blood circulation, to treat diseases. For children with allergic rhinitis, acupuncture can be aimed at the points around the nose, such as Ying Xiang Point, Yin Tang point, etc. , to ease the symptoms such as nasal congestion, runny nose (Zhang & Liu, 2021).

Acupuncture is very effective in controlling inflammation and reducing anaphylaxis, and because it does not involve drug treatment and has few side effects, it is especially suitable for children who can not use Western medicine because of drug resistance or allergy. However, acupuncture treatment requires specialized equipment and techniques, and children may have a certain fear of acupuncture, which is less acceptable than diet treatment. Although drug-dependent Western medicine treatment may show a significant effect in the short term, but it is not conducive to long-term treatment and fundamental treatment of the disease. We should take into account the individual differences of children and the degree of acceptance of their guardians when we choose the treatment plan, and make the corresponding plan by combining the advantages of traditional Chinese medicine and Western medicine, in order to achieve the best treatment effect.

4.3 Advantages and Disadvantages of Combination Therapy

The combined therapy of allergic rhinitis in children is a therapeutic scheme made by combining the advantages of traditional Chinese and western medicine. The combined therapy provides a better choice for the treatment of the disease. This method can not only alleviate symptoms, but also improve the overall physical condition and quality of life of children. Traditional Chinese medicine (TCM) believes that the occurrence of allergic rhinitis in children is closely related to the functional deficiency of organs such as lung, spleen and kidney. Traditional Chinese medicine, acupuncture and dietotherapy can regulate the balance of qi, blood, yin and yang in the body, eliminate the source of disease and reduce recurrence. The advantage of traditional Chinese medicine is that its side effects are minimal, suitable for children, and individualized treatment regimen can improve the specificity and effectiveness of treatment (Ding & Li, 2017). But its limitation is that its curative effect is relatively slow and it needs long-term treatment and accurate syndrome differentiation and treatment. Western medicine mainly relies on antihistamine, intranasal glucocorticoid and immunotherapy to rapidly relieve the symptoms of allergic rhinitis, such as nasal itching, nasal obstruction and rhinorrhea, to enable the child to resume normal life in a short period of time. However, the side effects of antihistamines and hormone drugs will also affect children's health, and the underlying causes of allergic rhinitis have not been addressed, and the disease may continue to recur frequently. The combined treatment emphasizes the superiority of integrated traditional Chinese and Western medicine, which can rapidly relieve acute symptoms and pay attention to fundamentally adjust the condition of the disease (He, Ding, Sun et al., 2018). This method is relatively complex, requiring doctors to have a deep understanding of Chinese and Western medicine, and in the whole process of treatment of patients with adequate communication and education to ensure compliance. In the process of implementing the combined therapy, it is necessary to continuously pay attention to and monitor the changes of children's constitution, and adjust the treatment plan according to the progress of the disease, so as to ensure the sustainability and stability of the therapeutic effect.

5. Conclusion

To sum up, the causes of allergic rhinitis in children are complex and varied, including allergen, genetic and environmental factors, immune imbalance, etc. Traditional Chinese medicine pays attention to the accurate dialectical treatment, through drug treatment, diet treatment, acupuncture and other treatment methods in order to achieve the ideal therapeutic effect. Although there are differences in treatment principles and methods between Chinese and Western medicine, both of them aim at the recovery of patients. Compared with single therapy, combined therapy has more advantages in effectiveness and long-term prognosis. Future research should focus on integrated Chinese and Western medicine to optimize treatment regimens and improve clinical outcomes. By combining the advantages of these two methods, we can provide a more scientific, more reasonable and more effective treatment for children with allergic rhinitis, and hope to bring more children health and happiness in their early days.

References

- Cui, Z. B., & Zhang, J. Q. (2024). Progress in the pathogenesis of allergic rhinitis. *Journal of Practical Traditional Chinese Medicine*, 38(04), 91-94.
- Di, G. L., & Zhu, Z. G. (2022). Bear mast, etc. Progress in the treatment of allergic rhinitis with traditional Chinese medicine. *Henan Traditional Chinese Medicine*, 42(02), 314-318.
- Ding, L. F., & Li, Y. J. (2017). Clinical observation of acupuncture and moxibustion in children combined with western medicine. *Journal of Shanghai University of Traditional Chinese Medicine*, 31(03), 48-50.
- Hansen, H. S. E., Kaiser, H., Hansen, T. K. et al. (2024). Association between Apgar scores within normal range and development of asthma, allergic rhinitis and eczema in childhood: A Danish nationwide register study. *Allergy*, 11-14.
- He, S., Ding, L. F., Sun, K. X. et al. (2018). Clinical observation of integrated traditional Chinese and Western medicine in the treatment of allergic rhinitis in children. *Chinese Journal of Integrated Traditional Chinese and Western Medicine*, 38(09), 1054-1057.
- Hou, A. C., Yang, A. J., & Dong, B. C. (2019). Progress in the diagnosis and treatment of allergic rhinitis in children. *Journal of Clinical and Experimental Medicine*, 18(06), 670-673.
- Li, Y., Zhu, L., Wei, J. et al. (2024). Intrauterine and early postnatal exposures to submicron particulate matter and childhood allergic rhinitis: A multicity cross-sectional study in China. *Environmental Research*, 247118165.
- Zhang, X. T., & Liu, Z. Y. (2021). Research progress in the treatment of allergic rhinitis in children. *Modern distance education of Traditional Chinese Medicine in China*, 19(20), 205-208.
- Zhang, Y., Liu, Y., Ren, Q. et al. (2022). Progress in traditional Chinese medicine treatment of allergic rhinitis in children. *Journal of Tianjin University of Traditional Chinese Medicine*, 41(01), 131-136.

Zhao, X., Zhang, J., Qin, Y. H. et al. (2023). Guidelines for the diagnosis and treatment of integrated traditional Chinese and Western medicine in pediatric allergic rhinitis. *Journal of Nanjing University of Traditional Chinese Medicine*, 39(03), 274-284.