International Journal of Biology and Life Sciences
ISSN: 2957-9511 | Vol. 1, No. 1, 2022

Study on the therapeutic effect of immunotherapy on patients with allergic rhinitis

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Abstract: Objective: To investigate the therapeutic effect of Antigen specific immunity (SIT) on patients with Allergic rhinitis (AR). Methods: 100 patients with allergic rhinitis were divided into matched group and test group according to different treatment methods, with 50 patients in each group. The matched group was treated with conventional Kairuitan and Neishuna, and the test group was treated with SIT on this basis. Results: After treatment, the scores of rhinitis symptoms and drug use in the test group were (2.74 ± 0.93) and (0.45 ± 0.28) respectively, which were significantly lower than those in the matched group (3.46 ± 1.18) and (0.96 ± 0.42) (P<0.05); There were no serious adverse reactions in both groups during treatment. Conclusion: SIT treatment for AR patients can alleviate clinical symptoms, reduce their demand for drugs, and improve immune function. And the method is effective, which is more conducive to the early recovery of patients and getting rid of the problem of allergic rhinitis.

Keywords: Specific immunity; Allergic rhinitis; Treatment effect.

1. Introduction

With the rapid development of industrialization in China and the aggravation of air pollution, AR has become an important health problem in modern society, and its incidence is increasing year by year [1]. AR is a chronic inflammatory disease of nasal mucosa, which is mediated by immunoglobulin E(IgE) and starts with the release of inflammatory mediators, and is jointly involved by immune active cells, pro-inflammatory cells and cytokines [2]. Clinical manifestations are frequent nasal congestion, nasal itching, sneezing and excessive nasal secretions, etc. If we do not intervene in treatment, it is easy to induce other systemic diseases, and in severe cases, we will lose labor force [3]. Drug therapy can only temporarily control and relieve symptoms, but relapse and adverse drug reactions are common [4]. Immunotherapy can significantly reduce the severity of AR, prevent the occurrence of new allergic reactions, and block or delay the progress of its development into asthma, thus improving the quality of life of patients [5].

Immunotherapy is a kind of treatment that is worthy of recognition and recommendation. It can achieve the therapeutic effect by interfering the immune response of the body and changing the course of allergic diseases. It is worth noting that in immunotherapy, standardized allergen vaccine must be used for SIT [6]. SIT is the only clinical treatment that can change the natural course of allergic diseases through immunomodulatory mechanism, especially for some unavoidable allergens [7]. It is tolerated by giving standardized allergen vaccine to patients and gradually increasing the dose to stimulate the immune system, even if a new immune balance is formed in patients [8]. When exposed to allergens in the environment again, patients do not show or rarely show AR-related clinical symptoms. This study observed the therapeutic effect of SIT on AR patients.

2. Materials and Methods

2.1. Materials

100 patients with AR from June 2020 to June 2021 were selected. Inclusion criteria: ① Conforming to the relevant diagnostic criteria in the Guide for Diagnosis and Treatment of Allergic Rhinitis; ② Skin prick test (SPT) showed that dust mites were at least (++) or (++) above; ③ It has the indication of immunotherapy. Exclusion criteria: ① Patients with bronchial asthma and other allergens (pollen, feathers, animal hair, cockroaches, etc.) positive (++) or above; ② those who use hormones, antihistamines and nasal decongestants within 2 weeks; ③ Those who can't complete the follow-up. All patients were randomly divided into two groups. There were 50 cases in the test group, 26 males and 24 females. 7 ~ 71 (31.66 2.37) years old; The course of disease is 1 ~ 13 (6.45 2.32) years. 50 cases in the matched group, 22 males and 28 females; Ranging from 6 to 74 (33.04 2.15) years old; The course of disease is 1 ~ 15 (6.51 2.22) years.

2.2. Therapeutic method

The test group was treated with SIT, while the matched group was treated with drug therapy. According to the data, the symptoms and signs of the test group and the matched group before and after treatment were compared and scored. Before treatment, all patients were tested for allergen skin, and all patients were tested for dust mites++. According to the results of skin test, allergen vaccine with obvious positive reaction was selected for desensitization treatment. Patients in the matched group were treated with antihistamines or intranasal inhaled surface hormone. Patients in the test group were given hypodermic injection of house dust mite allergen preparation under sterile conditions, which was divided into two stages, namely, the initial stage and the maintenance stage, in which the initial stage was injected for 15 weeks, once a week, the initial dose was set at 20SQ-U/ml, and then it was gradually accumulated until 100,000sq-u/ml every week and then maintained. Maintenance stage: ensure that the injection dose of house dust mite allergen preparation is 100,000 sq-u/ml, and the injection time is once every 7 weeks until the end of treatment. Both groups need to complete the treatment for one year.

2.3. Observation index

2.3.1. AR symptom score before and after treatment

Symptoms are divided into three categories: sneezing, runny nose and itchy nose, each of which is 1-3 points according to its degree. Among them: sneezing 3~5 times, runny nose ≤3 times /d, nasal congestion symptoms when inhaling hard, occasional nasal itching as 1 point. 6~10 sneezes per time, runny nose 4~8 times a day, intermittent nasal congestion, tolerable nasal itching is 2 points. 11 sneezes or more each time, 9 runny noses or more every day, frequent oral breathing, and unbearable nasal itching is 3 points.

2.3.2. Score of drug application before and after treatment

Budesonide nasal spray once a day was counted as 1.5 points, and loratadine tablets oral one tablet a day was counted as 1 point. The average daily medication scores before and after treatment were calculated.

2.3.3. Adverse reactions

During the treatment, hematuria routine, liver and kidney function and other indicators were monitored, and the occurrence of drug-related adverse reactions was recorded.

2.4. Statistical method

SPSS22.0 statistical software was used for data analysis. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± s). The mean of the two samples was compared by t-test.

3. Result Analysis

3.1. Comparison of AR symptom scores between two groups before and after treatment

Before treatment, there was no significant difference in AR symptom scores between the two groups (P>0.05). After treatment, the scores of symptoms and signs of rhinitis in the two groups decreased significantly, and the scores of the test group were significantly lower than those of the matched group, with statistical significance (P<0.05). See table 1.

Table 1. Comparison of AR symptom scores between the two groups before and after treatment

Group	Number of cases	Before treatment	After treatment	t value	P value
Test group	50	8.59± 3.31	2.78± 0.94	10.256	<0.05
Matched group	0	8.17± 3.21	3.51± 1.21	7.187	<0.05

3.2. Comparison of drug use scores between the two groups before and after treatment

Before treatment, there was no significant difference in drug use scores between the two groups (P>0.05). After treatment, the drug application scores of the two groups were significantly lower, and the test group was significantly lower than the matched group, with statistically significant differences (P<0.05), as shown in Table 2.

Through subcutaneous or sublingual administration, patients are repeatedly exposed to allergens at long intervals or in small doses, and desensitization treatment is carried out. This kind of treatment greatly reduces patients' demand for drugs, and at the same time, it can alleviate patients' clinical symptoms and change or control the development of symptoms.

Table 2. Comparison of drug application scores between the two groups before and after treatment

Group	Number of cases	Before treatment	After treatment	t value	P value
Test group	50	1.71± 0.32	0.46± 0.31	24.336	<0.05
matched group	50	1.61± 0.65	0.97± 0.43	6.156	<0.05

3.3. Comparison of adverse reactions between the two groups

No serious complications such as liver and kidney dysfunction were found in the two groups during treatment, and no obvious adverse reactions occurred in the matched group. Only 2 cases of mild itching in the eyes and mouth occurred in the test group, and the symptoms were relieved after 3 ~ 5 days. The main pathophysiological changes of AR are chronic inflammatory diseases of nasal mucosa involving immune active cells, pro-inflammatory cytokines, inflammatory cytokines, etc. Clinically, antihistamines and glucocorticoid inhalation are mainly targeted for local anti-inflammatory treatment.

4. Discussion

AR, also known as allergic rhinitis, is one of the most common diseases in otolaryngology. IAt present, the treatment methods of AR mainly include avoiding contact with allergens, drug therapy and immunotherapy. Avoiding contact with allergens is the most effective way to prevent and treat AR, but it can't be completely avoided for airborne allergens. In addition, drug treatment can only control the clinical symptoms of patients, but cannot fundamentally regulate the immune status of patients. With the in-depth understanding of the pathogenesis of AR and the extensive development of immunotherapy, it is gradually realized clinically that immunotherapy can achieve the purpose of clinically curing the disease by regulating the immune response of patients [9]. Allergen is the main cause of AR, and avoiding contact with allergen in clinical treatment is the main means of prevention and treatment. However, for allergens in the air, patients can't completely avoid it, and drug treatment can only relieve patients' clinical symptoms, but it can't fundamentally improve patients' immune status and enhance their ability to resist allergens. Allergic rhinitis is a common clinical ear, nose and throat disease. Compared with other acute and chronic rhinitis, the incidence of this disease is regular and periodic, and it is an allergic disease, which is related to the regulation of patients' autoimmune function. The disease usually occurs in young children, especially children around 7 years old. The immune function of children in this age group is not fully mature, and they are seriously affected by external stimuli, so they are prone to abnormal immune regulation, which leads to allergic reactions.

Patients with AR often have symptoms such as itchy nose, swelling of nasal mucosa, sneezing and hypersecretion of nose, and some patients can also show obstructive sleep apnea.

Although AR doesn't threaten patients' lives, its repeated attacks and persistent delays seriously affect patients' work efficiency and quality of life, and increase the economic burden of individuals and society. On the other hand, some studies have found that AR is also an important inducing factor of asthma, which can further develop into adult allergic asthma. SIT is a method to solve the problem from the etiology, especially for allergens that have been identified but can't be completely avoided in real life. It is mainly treated by subcutaneous, sublingual and other routes of administration, with small dose, long interval and repeated contact with allergens. Its advantages are that it can obviously relieve clinical symptoms, reduce patients' demand for drugs, and specifically interfere with immune response and change the natural process of allergic diseases.

Histamine, as an inflammatory transmitter, plays a key role in the pathogenesis of AR. It can stimulate smooth muscle contraction and gland secretion by combining with H1 receptor, and then dilate blood vessels, enhance permeability and cause allergic reaction. Therefore, in the past, antihistamines were mainly used to treat AR in clinic, which formed competitive combination with H1 receptor, blocked the combination of histamine, prevented it from playing a biological role, weakened allergic reaction activity, and played a good role in relieving symptoms. With the development of medical technology, the clinical application of SIT therapy has solved the problem of unavoidable contact with allergens in life. Through subcutaneous or sublingual administration, patients are repeatedly exposed to allergens at long intervals or in small doses, and desensitization treatment is carried out. This kind of treatment greatly reduces patients' demand for drugs, and at the same time, it can alleviate patients' clinical symptoms and change or control the development of symptoms.

The main pathophysiological changes of AR are chronic inflammatory diseases of nasal mucosa involving immune active cells, pro-inflammatory cytokines, inflammatory cytokines, etc. Clinically, antihistamines and glucocorticoid inhalation are mainly targeted for local anti-inflammatory treatment. Although these drugs have obvious effect on controlling rhinitis symptoms, they are drug dependent and easy to relapse after drug withdrawal, and the side effects of long-term drug use, especially glucocorticoid drugs, may affect patients' health. The mechanism of SIT is complex, including regulating inflammatory response pathway, regulating specific T cells and B cells, inducing immune deviation or tolerance, etc. The clinical mechanism of SIT mainly includes antibody reaction, effector cell reaction and T cell reaction.

In this study, the patients in the test group were treated with dermatophagoides farinae drops on the basis of routine antihistamines and topical glucocorticoid. It shows that SITAR under tongue has exact curative effect. SIT can be divided into subcutaneous injection and sublingual administration. Subcutaneous injection requires multiple injections into the local skin, which is easy to cause discomfort to patients and reduce compliance. Although sublingual administration is convenient and has few adverse reactions, it is easy to cause serious gastrointestinal symptoms due to its large dosage, and it can also cause adverse reactions to respiratory system and respiratory tract, especially for young children, which is poor in drug compatibility and easily affects the therapeutic effect. Therefore, how to choose the appropriate treatment method is a controversial issue in SIT at present, and it is also the direction that needs to be further discussed clinically.

To sum up, SIT therapy for AR can better relieve the clinical symptoms of patients, improve the immune function of patients, and control the disease, which is worth popularizing in clinical application.

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