Original Article
Effects of Yu-ping-feng granules combined with loratadine tablets on treatment efficacy and immune factor levels in allergic rhinitis patients

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Abstract: Objective: This study was designed to explore the treatment efficacy of Yu-ping-feng combined with loratadine in allergic rhinitis patients. Methods: A total of 88 patients with allergic rhinitis who were admitted to our hospital from July 2017 to September 2018 were collected as research subjects, 43 of whom were enrolled in group A and treated with loratadine, and another 45 cases were enrolled in group B and treated with Yu-ping-feng combined with loratadine. The immune factors and ventilation function of the two groups were observed, as well as the treatment efficacy, adverse reactions and quality of life of the two groups of patients. Results: After treatment, the immune factor level and ventilation function in group B were better than those in group A (P < 0.05). The total adverse reactions and recurrence rate in group B were lower than those in group A (P < 0.05). The total effective rate and quality of life in group B were higher than those in group A (P < 0.05). Conclusion: Yu-ping-feng granules combined with loratadine tablets is effective in treating allergic rhinitis.

Keywords: Loratadine tablets, allergic rhinitis, efficacy, immune factors

Introduction

Allergic rhinitis is a kind of long-term allergic disease [1] characterized by mucosal inflammation driven by activated immune cells [2], with manifestations of nasal congestion, secretions and itching [3]. Allergic rhinitis affects 10% to 40% of the population. It can reduce the quality of life of patients and bring high medical costs [4]. Allergic rhinitis is an IgE mediated inflammation of the nasal mucosa caused by exposure to anaphylactogens. Indoor dust mites and animals are the main causes of perennial symptoms. Exposure to pollen can also give rise to seasonal symptoms [5]. Loratadine is a drug with low water solubility and high permeability [6, 7], which is often used to treat allergic symptoms [8]. It can reduce endothelial inflammation induced by oxidized low density lipoproteins and has protective effects [9]. Loratadine selectively inhibits H1 receptors located primarily on respiratory smooth muscle cells, which do not cross the blood-brain barrier. It can be utilized in a variety of situations to relieve allergic symptoms [10].

Traditional Chinese medicine has become popular all over the world. Yu-ping-feng powder, as a kind of traditional Chinese medicine, it can significantly improve specific and non-specific immune functions. Clinical studies have shown that Yu-ping-feng powder can reduce the risk of recurrent respiratory tract infections by regulating the immune system and inhibiting inflammatory cytokines and their anti-allergic effects in vivo [11]. Moreover, Yu-ping-feng has shown anti-allergic and inflammatory effects and is used to treat allergic rhinitis [12]. This study explored the efficacy of Yu-ping-feng combined with loratadine tablets in allergic rhinitis patients.

Materials and methods

General data

A total of 88 patients with allergic rhinitis in the Tianjin Nankai Hospital from July 2017 to September 2018 were collected and divided into group A and group B. Group A consisted of 43 patients treated with loratadine, including...
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23 males and 20 females. Group B was composed of 45 patients treated with Yu-ping-feng combined with loratadine, including 27 males and 18 females.

Exclusion of inclusion criteria

All patients were diagnosed with allergic rhinitis [13] to be included in this study. Patients and their families were informed and signed an informed consent, and this study was approved by the medical ethics committee of our hospital.

Patients with mental disorders, malignant tumors, severe dysfunction, severe hematological diseases and allergic to therapeutic drugs used in this study were excluded.

Methods

Patients in group A were given oral loratadine tablets (10 mg, SFDA approval number: H20020173, Sinoway Pharmaceutical Co., Ltd., Sanmenixa) once a day, one tablet at a time, for 14 consecutive days. Patients in group B were treated with Yu-ping-feng granules (5 g, SFDA approval number: Z10930036, Sinopharm Guangdong Global Pharmaceutical Co., Ltd.) in addition to treatment given to group A, with one bag at a time, three times a day, for 14 consecutive days. No other therapeutic drugs were used during treatment.

Outcome measures

(1) The ventilation function before and after treatment was detected by a lung function detector, including changes in peak expiratory flow (PEF) and diurnal variation rate of PEF.

(2) In the early morning, five ml of fasting blood of the patient was taken and let stand for 20 minutes. The serum was isolated using a centrifuge (10 xg at 4°C for 15 min, BMH) and rapidly frozen in liquid nitrogen to store at -80°C for later use. IgE and Th1/Th2 levels before and after treatment were detected by enzyme-linked immunosorbent assay (ELISA, Shanghai Yiyan Biological Technology Co., Ltd.).

(3) Treatment efficacy was observed according to symptoms [14]: marked response: symptoms completely disappeared. Effective response: symptoms were greatly alleviated. No response: symptoms did not changed.

(4) Patients in both groups were followed up for the recurrence rate 1 month after treatment.

(5) The physical function, vital function and quality of life of patients in both groups were scored with reference to Short Form 36-item Health Survey (SF-36) [15], with a full score of 100, and the higher the score, the higher the quality of life.

Statistical methods

Statistical analysis was performed using SPSS 21.0 (SPSS, Inc., Chicago, IL, USA). GraphPad Prism 8 (GraphPad Software, San Diego, USA) was used to illustrate the collected data. The measurement data was expressed as (x ± sd), and t test was used for its comparison between groups. The enumeration data was represented by [n (%)], and the chi-square test was used for its comparison between groups. When (P < 0.05), the difference was statistically significant.

Results

General data

The general data of the two groups showed no significant difference in age, gender, basic information, lifestyle, and other aspects between the two groups (P > 0.05). More details were shown in Table 1.

Changes of immune factors before and after treatment

Before treatment, the total IgE levels in group A and group B were (118.39 ± 24.13) KIU/L and (119.58 ± 23.59) KIU/L, respectively. After treatment, they were (68.29 ± 13.69) KIU/L in group A and (53.64 ± 11.54) KIU/L in group B. There was no difference in total IgE levels between the two groups before treatment (P > 0.05), while the level decreased after treatment, and was lower in group B than group A (P < 0.05). Before treatment, Th1/Th2 in group A and group B was (0.75 ± 0.15), (0.77 ± 0.16), respectively. After treatment, Th1/Th2 in group A and group B was (0.93 ± 0.23), (1.24 ± 0.26), respectively. There was no difference in Th1/Th2 between the two groups before treatment (P > 0.05). After treatment, Th1/Th2 increased, and was higher in group B than group A (P < 0.05). More details were shown in Figure 1.
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Comparison of ventilation function between the two groups before and after treatment

The PEF before treatment in group A and group B was (56.69 ± 5.34) L/min and (55.38 ± 5.49) L/min, respectively. The PEF of group A and group B after treatment was (65.28 ± 6.32) L/min and (77.94 ± 7.23) L/min, respectively.

Comparison of time to alleviation of symptoms between the two groups of patients

The time to alleviation of nasal itching, nasal congestion, nasal leakage, and sneezing in group A were (5.28 ± 0.89) d, (4.68 ± 0.79) d, (4.79 ± 0.68) d, and (6.29 ± 0.97) d, respectively. In group B they were (3.28 ± 0.48) d, (2.86 ± 0.53) d, (2.68 ± 0.24) d, and (3.32 ± 0.28) d, respectively. The time to alleviation of symptoms in group B was shorter than that in group A (P < 0.05). More details were shown in Table 2.

Comparison of treatment efficacy between the two groups

After treatment, the total effective rate of group A was 67.44%, which was notably lower than that of group B (93.33%) (P < 0.05). The results suggest that the therapeutic effect of Yu-ping-feng granules combined with loratadine tablets was remarkably better than that of loratadine alone in the treatment of allergic rhinitis. More details were shown in Table 3.
Comparison of adverse reactions between the two groups

We calculated the incidence of adverse reactions in both groups, which was 27.91% in group A and 8.89% in group B. The incidence in group B was considerably lower than that in group A (P < 0.05), indicating that the combination of Yu-ping-feng granules and loratadine tablets causes less adverse reactions than loratadine alone in the treatment of allergic rhinitis. More details were shown in Table 4.

Comparison of recurrence rates between the two groups after 1 month of treatment

The recurrence rate of group A was 37.21% after 1 month of treatment, while that of group B was 15.56%. The recurrence rate of group B was markedly lower than that of group A (P < 0.05). More details were shown in Table 4.
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Table 2. Comparison of time to alleviation of symptoms between the two groups of patients (±sd)

<table>
<thead>
<tr>
<th>Time (d)</th>
<th>Group A (n = 43)</th>
<th>Group B (n = 45)</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal itching</td>
<td>5.28 ± 0.89</td>
<td>3.28 ± 0.48</td>
<td>13.20</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Nasal congestion</td>
<td>4.68 ± 0.79</td>
<td>2.86 ± 0.53</td>
<td>12.74</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Nasal leakage</td>
<td>4.79 ± 0.68</td>
<td>2.68 ± 0.24</td>
<td>19.58</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sneezing</td>
<td>6.29 ± 0.97</td>
<td>3.32 ± 0.28</td>
<td>19.70</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Table 3. Comparison of treatment efficacy between the two groups

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>Group A (n = 43)</th>
<th>Group B (n = 45)</th>
<th>X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markedly effective</td>
<td>9 (20.93)</td>
<td>16 (35.56)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Effective</td>
<td>20 (46.51)</td>
<td>23 (51.11)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ineffective</td>
<td>14 (32.56)</td>
<td>3 (6.67)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total effective rate</td>
<td>29 (67.44)</td>
<td>42 (93.33)</td>
<td>9.457</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Table 4. Comparison of adverse reactions between the two groups

<table>
<thead>
<tr>
<th>Adverse reactions</th>
<th>Group A (n = 43)</th>
<th>Group B (n = 45)</th>
<th>X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>2 (4.65)</td>
<td>1 (2.22)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Thirst</td>
<td>3 (6.98)</td>
<td>1 (2.22)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tongue dryness</td>
<td>2 (4.65)</td>
<td>1 (2.22)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>3 (6.98)</td>
<td>0 (0.00)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dizzy</td>
<td>1 (2.33)</td>
<td>1 (2.22)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Weakness</td>
<td>1 (2.33)</td>
<td>0 (0.00)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total incidence</td>
<td>12 (27.91)</td>
<td>4 (8.89)</td>
<td>5.346</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Table 5. Comparison of recurrence rate between the two groups [n (%)]

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases of follow-up</th>
<th>Recurrence rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>43</td>
<td>16 (37.21)</td>
</tr>
<tr>
<td>Group B</td>
<td>45</td>
<td>7 (15.56)</td>
</tr>
<tr>
<td>X²</td>
<td>-</td>
<td>5.341</td>
</tr>
<tr>
<td>P</td>
<td>-</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Discussion

The existence of circulating self-reactive IgE in patients with autoimmune diseases has long been known [16]. IgE antibody is an important mediator of allergy [17], and its abnormal production can lead to allergic diseases [18]. IgE is an antibody that binds allergen with high affinity that can mediate life-threatening allergic reactions [19]. In addition to allergens acting as classic IgE inducers, viral infection and air pollution may also trigger the IgE pathway [20]. In this experiment, we also observed the secretion of IgE before and after treatment in both groups, and the results showed that the secretion of IgE was reduced in both groups after treatment, and was lower in group B than group A. There is a study showing that abnormal airway reactivity and excessive production of nitric oxide are found in the small airway branches in asthma, and the study provided evidence of peripheral airway dysfunction in patients with allergic rhinitis [21]. It is suggested that allergic rhinitis may affect the patient’s ventilation function, so we tested the ventilation function of the two groups of patients. The results indicated that Yu-ping-feng combined with loratadine reduces the dysfunction of the patient’s ventilation function. It is reported that Yu-ping-feng granules can improve the pathological changes of nasal mucosa tissue through ovalbumin, and can reduce the production and release of immune factors in the immune process of allergic rhinitis, which may be an important cure mechanism for allergic rhinitis [22]. All of the above demonstrates that Yu-ping-feng combined with loratadine can reduce the release of immune factors, alleviate the dysfunction of ventilation, and promote the cure of allergic rhinitis. We also found that patients...
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Table 6. Comparison of quality of life after treatment between the two groups (x ± sd)

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Physical function</th>
<th>Vital function</th>
<th>Mental function</th>
<th>Quality of life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>43</td>
<td>78.28 ± 4.53</td>
<td>82.47 ± 3.68</td>
<td>79.12 ± 4.96</td>
<td>82.47 ± 5.24</td>
</tr>
<tr>
<td>Group B</td>
<td>45</td>
<td>88.39 ± 5.29</td>
<td>90.38 ± 2.59</td>
<td>91.29 ± 4.85</td>
<td>95.27 ± 3.59</td>
</tr>
</tbody>
</table>

| t      | 9.609 | 11.700 | 11.640 | 13.420 |
| p      | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

To sum up, Yu-ping-feng combined with loratadine can exert good treatment efficacy by regulating immune activity, with less recurrence rate and low adverse reactions.

Disclosure of conflict of interest

None.

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