# Therapeutic effect of chlorpheniramine in treatingupper airway cough syndrome (UACS) and chronic rhinitis/sinusitis

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**Abstract**: This paper aims to analyze the specific effect of chlorpheniramine on upper airway cough syndrome is related to its treatment of chronic rhinitis and sinusitis. A total of 218 patients admitted to hospital between March 2014 and June 2016 were treated with chlorpheniramine. The patients were divided into two groups based on treatment effect in follow-up visits (all were effective): effective group (114 cases, 52.29%) and ineffective group (104 cases, 47.71%). The proportion of complicated rhinitis or sinusitis of the two groups were compared, and improvement effect on clinical symptoms of chronic rhinitis and sinusitis after treatment was compared. The probability of rhinitis / sinusitis was 65.79% (75/114) in the effective group and 69.23% (72/104) in the ineffective group. There was no statistical difference between the two groups (P>0.05). In both effective and ineffective group, the symptoms such as chest tightness and shortness of breath and pharyngeal discomfort were improved to a certain extent, and the effective group had better improvement effect, but there was no statistical difference between the two groups (P>0.05). In addition, there was no correlation between improvement of cough and improvement of symptoms in the effective group, 21 cases of cough disappeared completely, while complete disappearance rate of other symptoms was only 57.15% (12/21). Chlorpheniramine is effective to some extent in treatment of upper airway cough syndrome, but chlorpheniramine in treatment of upper airway cough syndrome is not associated with rhinitis/sinusitis treatment.

**Keywords**: Upper airway cough syndrome, chronic rhinitis and sinusitis, chlorpheniramine, correlation.

## INTRODUCTION

In recent years, due to factors such as deterioration of the air environment and poor living habits, workload of respiratory medicine also increases gradually. Among the treated patients, chronic cough is the most common disease, often showing complex pathogenic factors in the diagnosis. Upper airway cough syndrome (UACS) is one of the most common causes (see fig. 1). UACS, also known as PND, is a syndrome of postnasal drip, a syndrome characterized by cough as a result of back flow of nasal secretion into the nose and throat, and even regurgitation into the glottis or trachea due to nasal disease (see fig. 2). For a very long period of time, it can not be made clear in the clinics whether upper respiratory tract-related cough is caused by stimulation of upper respiratory tract cough receptor by postnasal drip or inflammation (Yung, *et al*., 2015; Abousaeidi, Fauzi and Muhamad, 2016). Related clinical staff have carried out large-scale research for this end. Although Ma Qianli, Liang Shan, *et al*. reckon that there is no correlation between the upper airway cough syndrome and rhinitis / sinusitis, the current academic community have no uniform understanding towards rhinitis / sinusitis -PND relationship with chronic cough and its mechanism, which is controversial (Cahill, *et al*., 2015; Liang, 2013; Zhang, *et al*., 2011; Kushwah and Kumar, 2017).

In the current clinical practice, chlorpheniramine is the primary medicine for the treatment of upper airway cough syndrome. Chlorpheniramine is a hydroxyalkylamine-based antihistamine (see fig. 3). It is characterized by strong antihistamines, small usage amount, and moderate sedation and anticholinergic effect, suitable for a variety of allergic diseases (Xu, *et al*., 2008; Elsayed, 2017). But its mechanism of action is not very clear in the clinics, and literature study on it is not very much clear, so there still a big controversy exists in the treatment effect of chlorpheniramine. In order to better treat upper airway cough syndrome, the correlation between curative effect of chlorpheniramine on upper airway cough syndrome and on chronic rhinitis and sinusitis is discussed in detail.

## MATERIALS AND METHODS

The selected subjects were 218 patients with upper airway cough syndrome treated in our hospital from March 2014 to June 2016, including 126 males and 92 females, with mean age at (45.5 ± 6.3) years. This paper has a rigorous structure, and the conclusion has been approved by relevant ethics and relevant departments. The selected patients were in line with the following criteria (Dobson, *et al*., 2015; Kanwal *et al*., 2018): (1) chronic cough for more than 8 weeks; (2) normal chest; (3) with the following two or three conditions: Throat discomfort, itching, foreign body sensation, etc. Pebble-like changes in posterior pharyngeal wall; Complicated with chronic rhinitis or sinusitis. Exclusion criteria (Dobson, *et al*., 2015; Maryam *et al*., 2017): (1) complicated with reflux symptoms, chronic stomach history; (2) chronic cardiopulmonary disease; (3) current smoking; (4) application of angiotensin converting enzyme inhibitor

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(ACEI) drugs; (5) dust exposure history; (6) positive in bronchial provocation test; (7) ratio of forced expiratory volume to forced vital capacity is greater than 0.7 (Khodaii, Ghaderian and Natanzi, 2017).

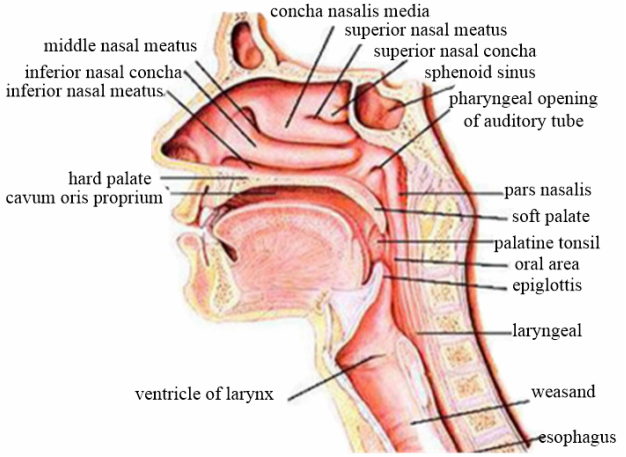


**Fig. 1**: Upper airway cough syndrome

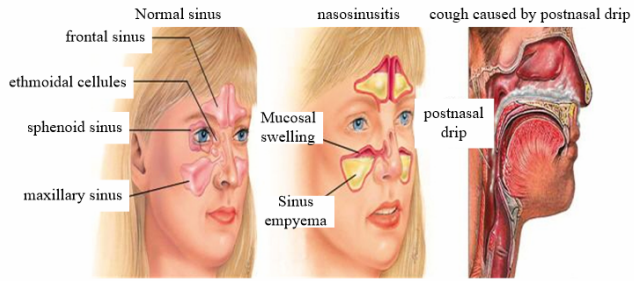


**Fig. 2**: Cough caused by postnasal drip syndrome

***Treatment method***

All patients were treated with chlorpheniramine combined with guaiacol glyceryl ether / dextromethorphan hydrobromide. For chlorpheniramine (manufacturer: Beijing Zhongxin Pharmaceutical Factory; approval number: national medicine permission number H11020961), the dosage was one piece per day, 3 times a day; for guaiacol glycerol ether (production enterprise: STADA Pharmaceutical (Beijing) Co., Ltd.; approval number: national medicine permission number H11022321)/dextromethorphan hydrobromide composite preparation (manufacturer: Shanghai New Asia Pharmaceutical Minhang Co., Ltd.; approval number: national medicine permission number H20030397), 30mg a time, 3 times a day, basic treatment lasts 10 days, and medication days can be controlled as appropriate according to the patient's condition (Ghoneum, *et al*., 2015; Cahill, *et al*., 2015). Patients with obvious symptoms of postnasal drip can further drip the nose with furosemide mixture.

***Clinical observation indicators***

Patients were followed-up for 15 days after discharged, to determine the treatment efficiency. Diagnostic criteria (Hu and Lin, 2011; Yang, *et al*., 2017): (1) Ineffective: cough frequency reduced by less than 1/2 compared with the original, or even cough aggravated, no improvement in nasal performance, no reduction in nasal mucus attachment. (2) Effective: cough frequency reduced by 1/2 compared with the original, nasal-related performance improved, nasal mucus attachment reduced. (3) Markedly: cough frequency reduced by 2/3 or more compared to the original, most of nasal-related performance disappeared, nasal mucus attachment significantly reduced. (4) Cured: cough disappeared, nasal-related performance disappeared, no sense of nasal mucus attachment.

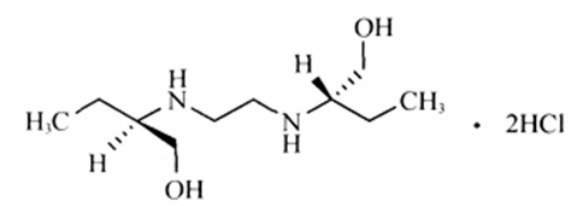


**Fig. 3**: Chlorpheniramine structure

Effective rate= (effective + markedly + cured) / total number of people * 100%

## STATISTICAL ANALYSIS

The study on correlation between curative effect of chlorpheniramine on upper airway cough syndrome and on chronic rhinitis and sinusitis adopted SPSS17.0 statistical software to analyze and deal with the data. The count data were indicated by (n, %), and tested by chi-square; the measurement data were indicated by ($x \pm s$), and tested by t. Only when $P<0.05$, difference can be considered as statistically significant (Aroune, 2017).

## RESULTS

The selected 218 patients were successfully followed up. According to the diagnostic criteria, 114 cases were effectively treated, the effective rate was 114 cases (52.29%), and 104 cases were ineffectively treated with probability of 47.71%. The patients were classified as effective and ineffective group. There was no statistical difference in comparison between the groups ($P> 0.05$) (table 1).

The probability of rhinitis and sinusitis was 65.79% (75/114) in the effective group and 69.23% (72/104) in the ineffective group. There was no significant difference between the two groups ($P>0.05$). In both the effective and ineffective group, the symptoms of chest tightness, shortness of breath and pharyngeal discomfort were improved to a certain extent. However, improvement of cough was not related to improvement of the disease in the effective treatment group. The 36 cases of cough disappeared completely, while complete disappearance rate was only 55.56% (20/36) for other symptoms. See table 2.

**Table 1**: Comparison of two groups' general information

| Group | Male-female ratio /n | Average age /Year | Chronic cough course /month |
|---|---|---|---|
| Observation group (114) | 67:47 | (46.8±5.7) | (7.3±1.4) |
| Control group (104) | 59:45 | (47.2±6.1) | (7.6±1.2) |
| $X^2$/t | 0.092 | 0.500 | 1.691 |
| P | 0.761 | 0.617 | 0.092 |

**Table 2**: Treatment effect and improvement of accompanying symptoms

| Curative effect | Case (%) | Improvement of accompanying symptoms (n, %) | | | |
|---|---|---|---|---|---|
| | | Cured | Markedly | Effective | Ineffective |
| Effective group | | | | | |
| Cough healed | 36(16.51) | 20 | 11 | 5 | 0 |
| Markedly | 41(18.81) | 0 | 28 | 13 | 0 |
| Effective | 37(16.97) | 0 | 0 | 37 | 0 |
| Ineffective group | | | | | |
| Ineffective | 104(47.71) | 0 | 0 | 12 | 92 |

**Table 3**: Comparison of clinical characteristics between the effective and ineffective groups (n, %)

| Group | Rhinitis / sinusitis | Clear throat | Pharyngeal discomfort | Chest tightness, shortness of breath | Cough at night |
|---|---|---|---|---|---|
| Effective (114) | 75(65.79) | 59(51.75) | 113(99.12) | 19(16.67) | 54(47.37) |
| Ineffective (104) | 72(69.23) | 51(49.04) | 102(98.08) | 21(20.17) | 46(44.23) |
| P | >0.05 | >0.05 | >0.05 | >0.05 | >0.05 |

To observe whether the treatment effect of chlorpheniramine is related to rhinitis / sinusitis, the clinical characteristics of the effective and ineffective groups were analyzed. It was not difficult to find that there was no significant difference (P> 0.05) in proportion of accompanying rhinitis / sinusitis and proportion of postnasal drip symptoms (table 3).

## DISCUSSION

Chlorpheniramine is the primary representative of the first generation of histamine, and its combination is widely used to treat upper respiratory tract infections and cough. The evidence for efficacy of first-generation histamine in treatment of upper airway cough syndrome was mainly derived from uncontrolled empirical treatment studies in which agnogenic chronic cough was selected as the object (Jamil, 2017; Raza *et al*., 2017). However, there was no clinical report on effectiveness of the first generation of histamine for cough treatment, so the topic was analyzed as the core here.

The results of this study showed that among the 218 patients receiving chlorpheniramine treatment, the effective rate was only 52.29% (114/218). The result has clear similarity as similar studies by Ma Qianli, Zhang Qiao, *et al*. (Ma, *et al*., 2011; Abbas *et al*., 2017). In this study, 147 out of 218 patients had rhinitis / sinusitis, the proportion was only (67.43%), but it was evenly distributed between the effective and ineffective groups. Although comparatively, symptoms of the effective group improved relatively better, there was no statistically significant difference shown in the study, and improvement in cough of patients with rhinitis / sinusitis was not proportionally to that in other symptoms, indicating that there is no significant correlation between curative effect of chlorpheniramine on airway cough syndrome and on chronic rhinitis and sinusitis.

## CONCLUSION

In conclusion, it is not difficult to find from the results of this study that chlorpheniramine has a certain therapeutic efficiency in treatment of upper airway cough syndrome, but overall treatment efficiency is not high, which can not fully meet the contemporary level and requirement for clinical medical treatment. In addition, no significant correlation between curative effect of chlorpheniramine on airway cough syndrome and on chronic rhinitis and sinusitis was found in this study, which proved that the treatment mechanism had nothing to do with rhinitis / sinusitis.

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