



The effectiveness of nasal saline irrigation (seawater) in treatment of allergic rhinitis in children



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ABSTRACT

Objective: To evaluate the effect of nasal saline irrigation in the treatment of allergic rhinitis (AR) in children and to assess whether nasal saline irrigation could be used as a complementary therapy for AR in children in combination with the intranasal corticosteroids (INS).

Method: In total, 61 children with AR were divided into three groups: the nasal irrigation, intranasal corticosteroid, and combined treatment groups. Symptoms and signs of AR and eosinophils (EOS) in the nasal secretions were evaluated after 4 weeks, 8 weeks, and 12 weeks of treatment.

Results: In AR children treated with nasal irrigation and a decreased the INS dose, a significant improvement in symptoms and signs and a significant decrease in the mean EOS count in nasal secretions were observed at week 12.

Conclusion: Nasal saline irrigation with physiological seawater is well tolerated and benefits the patients with AR, and can thus be considered a good adjunctive treatment option to maintain the effectiveness of the INS at a lower dose, thus resulting in reduced side effects and a decreased economic burden.

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Introduction

Allergic rhinitis is a disease characterized by the classic symptoms of rhinorrhea: obstruction of the nasal passage, sneezing, and itching. At present, this common atopic disease is a global health concern because it affects 25–35% of the population and its prevalence is increasing [1,2].

Several different therapeutic strategies exist for the allergic rhinitis. Currently, the treatment includes allergen avoidance, pharmacotherapy, and immunotherapy. Antihistamines and topical corticosteroids are the most frequently used medical options. Intranasal corticosteroid sprays are recommended as the first-line therapy for the patients, but they must be used on a daily basis to control the disease and do not provide sustained relief after the course of medical treatment is completed.

Recent studies have documented interesting results regarding the use of nasal irrigation as an adjunctive treatment modality in many sinonasal diseases, including allergic rhinitis [3–5]. Garavello et al. [6] found that the mean daily rhinitis score was reduced and also observed reduced consumption of oral antihistamines in children with seasonal AR after they were treated with the nasal irrigation.

This study was designed to assess the efficacy and safety of nasal saline irrigation as an adjunctive treatment in children with AR, particularly with regard to enhancing the effectiveness of intranasal corticosteroid spray therapy for resolution of nasal symptoms and signs while reducing the topical corticosteroid dose required.

Methods

Between November 2012 and June 2013, 61 children (38 boys and 23 girls) with allergic rhinitis were treated in the Department of Otolaryngology, Head and Neck Surgery, of the Shanghai Children Hospital and were enrolled in the study. Their mean age was 6 years (range from 2 to 15 years). All the patients were diagnosed with AR (moderate to severe) caused by house dust mites and mold. The diagnosis of AR was confirmed by history, physical examination, and skin prick tests for a battery of common allergens. All the patients presented with nasal edema and viscous secretions. The patients with marked septum deviation, prior nasal surgery, nasal polyposis, and symptoms of infection were excluded.

This study was approved by the local institutional review board, and an informed consent form was signed by the parents of the children.

We performed open-label trial with the patients who were randomly assigned to three groups: the intranasal corticosteroid

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Table 1
The scores for evaluating symptoms of AR (adopted from Mion et al. [7]).

Score	Itching	Rhinorrhea	Nasal congestion	Sneezing
0	Absent	Absent	Absent	Absent
1	3–5/day	Cleaning the nose 1–4 times a day	Little, does not cause disturbance	Occasional pruritus
2	6–10/day	Cleaning the nose 5–10 times a day	Oral breathing most of the day	Sporadic, sufferable
3	≥11/day or interferes with sleep or concentration	Constant cleaning	Does not breathe through the nose	Insufferable

group ($n=17$), the seawater group ($n=18$), and the seawater + corticosteroid group ($n=26$). In the corticosteroid groups, the patients were instructed to use a 200 μg fluticasone propionate nasal spray (Flonase, GlaxoSmithKline UK) daily for 4 weeks, followed by administration of 100 μg daily for 4 weeks and 50 μg daily for another 4 weeks. For nasal saline irrigation (seawater), 4–6 sprays of seawater were used twice a day for nasal irrigation from a commercial positive-pressure nasal irrigation applicator (Nasal Cleaner; physiological seawater, Nantong Apon Medical Appliance Co., China).

All the patients were asked to visit the clinic at weeks 4, 8, and 12. Nasal symptoms, signs and nasal secretions of the EOS were evaluated. All data were recorded, and nasal secretions were collected for further analysis. The patients and their parents were instructed to record their nasal symptoms and signs. Nasal symptoms included the following: (1) nasal itching, (2) rhinorrhea, (3) nasal obstruction, and (4) sneezing. The intensity of these four symptoms was rated on a 4-grade scale: 0 = no symptoms, 1 = slight symptoms, 2 = mild symptoms, and 3 = severe symptoms. Total scores ranged from 0 to 12 and represented the sums of scores for the four symptoms (Table 1). The score for nasal signs were as follows: 1 = turbinate hypertrophy with little nasal blockage, 2 = nasal congestion with nasal blockage, and 3 = nasal congestion with total nasal blockage limiting nasal breathing.

The eosinophilia (EOS) of nasal secretions was studied using nasal smears. The smears were sampled from the naris using a sterile cotton-tipped wooden swabs. Each swab was placed 2 cm into the anterior nares and rolled across the mucosa for 5 s with moderate constant pressure. None of the samples were visibly tinged with blood; therefore excessive trauma did not occur. Immediately after the collection, each specimen was smeared over the entire surface of 2 glass slides to prohibit the uneven distribution of cells. The slides were then dried by air, stained

with hematoxylin–eosin, and examined in a blind manner by two separate pathologists. The samples were then evaluated for the presence or absence of eosinophils by examining 10 high-power fields with a light microscope and recording the number of eosinophils.

The data were analyzed using SPSS (PC version 11.5) software. Data were expressed as the mean \pm standard error of the mean. The one-way analysis of variance was used to compare these populations. $P < 0.05$ was considered significant.

Results

Nasal irrigation with seawater was well tolerated by all the patients, and no adverse effects were reported. A significant improvement of symptoms and signs was reported in all the patients after 3 months of administration (Figs. 1 and 2). Compared with the patients treated with the corticosteroid alone or saline alone, significant differences in the total scores of symptoms and signs were observed in corticosteroid + saline patients at weeks 4, 8, and 12 ($P < 0.05$).

The mean eosinophil count in the nasal secretions decreased in all the patients after treatment (Fig. 3). Significant differences were observed between the patients treated with the corticosteroid alone and those treated with the corticosteroid + saline and also between the patients treated with saline alone and those treated with the corticosteroid + saline at weeks 8 and 12 when the topical corticosteroid dose had been reduced from 100 μg to 50 μg ($P < 0.05$).

Discussion

This study investigated the relationship between the use of nasal irrigation and symptoms of AR in children. Daily nasal irrigation with seawater significantly improved the symptoms of the AR in this study, proving effective in controlling allergic rhinitis in combination with a reduced dose of a nasal corticosteroid. The INS is recommended as a first-line therapy, especially when the symptoms of AR are severe. The major advantage of INS administration is that high concentrations of the drug, which has a rapid onset of action, can be delivered directly to the target organ, thus avoiding or minimizing systemic effects. This report addresses the combined use of nasal saline irrigation and intranasal corticosteroids to potentially provide a safe and economically viable therapeutic approach for children with AR.

In the present study, fluticasone propionate showed a similar symptomatic efficacy to that found in the literature [8–10]. Seawater nasal irrigation, as used in this study, is a simple procedure that is easily reproducible and performed. The procedure was readily explained to our study group, and the patients had

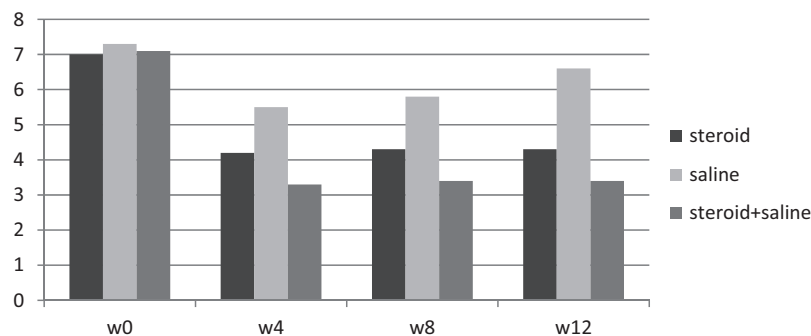


Fig. 1. Average symptom scores of AR patients demonstrate that steroid + saline treatment improves the efficacy of treating AR in children. Data are expressed as mean \pm SE. * $P < 0.05$, compared with steroid alone patients and saline alone patients.

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