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Nasal saline or intranasal corticosteroids to treat allergic rhinitis in children

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Abstract

Clinical Question—In pediatric populations, is nasal saline irrigation as effective as intranasal corticosteroids at relieving allergic rhinitis symptoms?

Answer—No. Intranasal steroids are more effective than nasal saline alone to reduce symptoms of allergic rhinitis (AR) in children. Combination therapy further improves symptom reduction.

Level of Evidence for the Answer—B

Search Terms—Allergic Rhinitis, Nasal Saline, Nasal corticosteroids, children younger than age 18.

Date Search Was Conducted—August and September 2014, October 2015.

Inclusion Criteria—Meta-analyses, randomized controlled trials, systematic reviews, cohort studies, nasal spray, hypertonic saline solution, nasal lavage, rhinitis, intranasal administration, nasal saline, human, English language.

Exclusion Criteria—Antihistamines, Adults, Articles older than 2008

Summary of the Issues

Allergic Rhinitis (AR) is one of the most common diseases in pediatric patients, with a worldwide prevalence ranging from 2.2% to 45.5% in children between the ages of 6 and 14.^{1,2} Symptoms include nasal obstruction, rhinorrhea, nasal itching and sneezing, which can be disruptive to sleep and lead to negative impacts on daily function and performance.³ Avoidance of allergens is the first-line treatment but often is not feasible. Appropriate pharmacotherapy often includes intranasal corticosteroid sprays (INS), which is not without drawbacks.^{1,4} INS must be used daily to relieve symptoms effectively and do not provide long-term relief of symptoms once the course of therapy is completed.

Nasal saline has been investigated as an alternative to INS therapy. Nasal saline is a solution of 0.9% sodium chloride and sterile water that can be administered in a variety of delivery

vehicles, including nasal mist or spray bottles, neti pots (to rinse nasal passages) and nasal saline irrigation machines, which use pulse action or suction to clear sinuses. Saline irrigation has been shown to assist with clearing potential allergens and mucus, improve the mucociliary transport function of the nasal mucosa and open nasal passages.⁴ Studies indicate that nasal saline is useful as an adjuvant treatment in children with AR,^{1,5} but can nasal saline be effective in treating AR when used alone? A study by Hong et al. on the compliance and efficacy of saline irrigation in pediatric patients with chronic rhinosinusitis found this to be an effective choice, with reported compliance as high as 60%.⁶ Therefore, it is reasonable to consider whether or not nasal saline irrigation could be effective in this population as an alternative treatment for AR symptoms in those who do not wish to use intranasal corticosteroids.

Summary of the Evidence

A prospective study by de Souza Fernandes et al. studied the usefulness of Peak Nasal Inspiratory Flow (PNIF) curves to assess treatment outcomes for children with AR.² Forty eligible patients ages 8 to 15 with AR symptoms, diagnosed using the guidelines established in the Allergic Rhinitis and its Impact on Asthma (ARIA) study and confirmed by allergy testing, were monitored for 10 weeks. Classification of AR severity was based on PNIF. A clinical score was calculated based on a previously established set of six signs and symptoms of AR: nasal obstruction, rhinorrhea, sneezing, nasal itching, oropharyngeal itching and ocular itching. Each item was rated from 0 to 3, with 0=no symptoms and 3=intense, almost debilitating symptoms.

The participants were divided into two groups. The treatment group received fluticasone propionate corticosteroid nasal spray, 100 mg per day, and the placebo control group was treated with nasal sodium chloride, 0.9% once daily. Statistical analyses considered variation of clinical scores and PNIF between the two study groups. Overall results showed statistically significant reduction in the clinical symptoms score for the treatment group ($p<0.001$) compared with little change in the nasal saline placebo group ($p<0.001$) (Table). The INS treatment group also demonstrated increased PNIF percentages compared to the saline placebo group. The power of the study was limited by the small number of participants.

The results of a study by Chen et al. concurred with the de Souza study. This 2014 three-arm, randomized control study evaluated nasal saline compared with nasal steroids and with a combination of nasal saline and steroids. Sixty-one children aged 2 to 15 years with confirmed diagnosis of moderate to severe AR were divided into three groups: nasal saline irrigation, INS, and a combination of nasal saline irrigation and INS.¹ The patients in the corticosteroid groups were prescribed 200µg for weeks 1 through 4, 100µg for weeks 5 through 8, and 50µg for weeks 9 through 12. The nasal saline irrigation groups were instructed to use 4 to 6 sprays twice daily for 12 weeks.¹ Patients and parents recorded nasal signs and symptoms as instructed. Nasal signs were scored as: 1=turbinate hypertrophy with little nasal blockage, 2=congestion with nasal blockage or 3=congestion with total nasal blockage limiting nasal breathing. Four nasal symptoms — nasal itching, rhinorrhea, nasal

obstruction, sneezing — were rated on a 0 to 3 scale based on intensity with 0=no symptoms and 3=severe symptoms. Eosinophils were quantified for each patient via nasal smear.

Patients were evaluated at 4, 8 and 12 weeks of treatment. The signs and symptoms were recorded and eosinophil smears were reexamined at each follow-up visit. The study demonstrated that combination therapy with both intranasal steroids and saline nasal irrigation resulted in significant improvement in signs and symptoms ($p<0.05$) compared to those treated with saline irrigation alone or steroids alone. Clinical significance was demonstrated by decreased eosinophils in nasal secretions in the combination group when compared to saline alone or intranasal steroids alone ($p<0.05$) by 8 and 12 weeks of use. We were unable to compare statistical data from this report with other published reports due to the lack of numerical data accompanying the charts and figures. Visual review of the figures, however, supported their conclusion that daily nasal irrigation is an effective adjuvant treatment for allergic rhinitis “in combination with a reduced dose of a nasal corticosteroid.”¹

In 2013, the European Academy of Allergy and Clinical Immunology (EAACI) published recommendations for treatment of AR based on the highest level of evidence retrieved from a systematic review of the literature.³ The Group supported the use of multiple treatment modalities including intranasal corticosteroids and nasal saline irrigation. The EAACI also concluded that nasal saline irrigation is an effective adjuvant to intranasal corticosteroids therapy and indicated that nasal saline was effective at reducing the amount of INS required for symptom relief.³

Conclusion

The studies reviewed herein concluded that intranasal steroids are more effective at reducing symptoms of AR when compared to nasal saline irrigation alone. Combination therapy with INS and nasal saline irrigation improves AR symptoms and maximizes the efficacy of intranasal corticosteroids. Concomitant use of intranasal corticosteroids and nasal saline irrigation is an effective treatment option that is well tolerated in a pediatric population. Based on clinical experience and patient preference, INS and adjuvant nasal saline irrigation appear to be a good option for improving symptoms and quality of life for children suffering from AR.

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Table

Mean Score and Percent Reduction in Clinical Symptoms of AR with INS Compared with Saline Over 8 Weeks.²

Week	Steroid Group		Saline Group	
	Mean Clinical Symptom Score *	Percent Reduction	Mean Clinical Symptom Score *	Percent Reduction
Week 0	11.2	--	10.5	--
Week 2	3.9	65%	9.3	11%
Week 4	3.5	10%	9.4	-1%
Week 6	3.5	0%	8.7	7%
Week 8	3.4	3%	8.9	-2%
Net Percent Reduction		70%		18%

* Mean Clinical Symptom Score calculated for 6 symptoms on a 0-3 scale with 0 = no symptoms and 3 = intense symptoms. Total possible clinical score = 18.

Adapted from de Souza Campos Fernandes et al., 2014.²