

ROLE OF ISOTONIC SALINE NASAL IRRIGATION IN SEASONAL ALLERGIC RHINITIS

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ABSTRACT**BACKGROUND**

Allergic rhinitis is IgE-mediated nasal mucosal hypersensitivity reaction after exposure to the offending allergen. Treatment options for allergic rhinitis includes allergen avoidance, immunotherapy, local/systemic antihistamines and steroids. Nasal saline irrigation is a possible potential treatment or adjunct to pharmacological treatment. It produces improvement in nasal symptoms, reduction in medicine consumption, by acceleration of mucociliary clearance time and thus improvement in quality of life.

MATERIALS AND METHODS

Our prospective study was performed with 52 patients in between the ages of 20-60 years who presented with recurrent (more than 1 year) symptoms of seasonal allergic rhinitis. Isotonic saline nasal irrigation was added for a period of 8 weeks along with other measures of allergic rhinitis treatment such as allergen avoidance and pharmacotherapy and quality of life was assessed by the severity of symptoms.

RESULTS

This study was designed to evaluate the reduction in symptom score with the use of isotonic saline nasal irrigation given twice daily for 8 weeks in seasonal allergic rhinitis along with the standard treatment i.e. antihistamines and intranasal corticosteroid spray. Total of 52 patients were studied. The usage of isotonic saline nasal irrigation improved the quality of life in terms of reduction in the severity, frequency and duration of symptoms compared to the relief he had in the previous years when he used only intranasal steroids.

CONCLUSION

Nasal irrigation with isotonic saline is a safe, inexpensive, easy to use and effective adjunctive therapy in patients with seasonal allergic rhinitis to alleviate the symptoms of allergic rhinitis. It resulted in significant improvement in the quality of life.

KEYWORDS

Saline Nasal Irrigation, Allergic Rhinitis, Mucociliary Clearance Time, Isotonic Saline.

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BACKGROUND

Allergic rhinitis is a common condition, affecting about 10 to 40% of the population globally. According to guidelines of

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Allergic Rhinitis and its Impact on Asthma (ARIA) 2008, allergic rhinitis is defined clinically by nasal hypersensitivity symptoms induced by immunologically mediated inflammation of nasal mucous membrane after exposure to offending allergen.¹ Common allergens which causes the allergic rhinitis are house dust mites, pollens, animal dander and fungi, vegetable proteins, enzymes and chemicals.²

Symptoms of allergic rhinitis are nasal obstruction, sneezing, rhinorrhoea which may be anterior as nasal discharge and posterior as postnasal drip, nasal itching. The primary non-pharmacological treatment for allergic rhinitis includes avoidance of the offending allergens in the patients which plays a vital role along with pharmacotherapy and

immunotherapy. Pharmacotherapy includes antihistamines, intranasal corticosteroid sprays and anti-leukotrienes.¹ Intranasal corticosteroids are effective medications for the management of allergic rhinitis and are able to deliver high concentrations of drugs to the target organ (Kaszuba 2001; Weiner 1998; Wilson 2004; Yáñez 2002). They are, however, associated with side effects such as crusting and bleeding, and cannot target multiple organs in patients with comorbid diseases such as asthma or the ocular symptoms that may accompany allergic rhinitis (Bousquet 2008). Other medication options, such as antihistamines, are also a mainstay of treatment and have been shown to significantly decrease histamine-driven symptoms (sneezing, nasal itching, ocular symptoms), but are less effective in improving nasal congestion (Jacobs 2009). Additionally, first-generation oral antihistamines are associated with significant sedative side effects and have not been shown to be as cost-effective as second-generation antihistamines. Lastly, leukotriene receptor antagonists are also commonly used; they have efficacy equal to that of oral antihistamines, but are more expensive and remain inferior to intranasal glucocorticoids (Rodrigo 2006). In light of this, non-pharmacologic therapy approaches are of great importance. One such approach is nasal irrigation using saline solutions, which in international guidelines and reviews is recommended as complementary treatment of AR without its efficacy ever having been established conclusively.³ Nasal saline irrigation is a natural remedy and recent Cochrane reviews evaluated its efficacy as a potential treatment or adjunct to pharmacological treatment.^{4,5} Saline nasal irrigation can be used for variety of conditions. They have been used in the management of acute & chronic rhinosinusitis, allergic and non-allergic rhinitis, septal perforations, nonspecific nasal symptoms (including post-nasal drip) and in postoperative care of nasal surgical patients. The use of a simple and inexpensive non-pharmacologic form of therapy, saline nasal irrigation in the management not only reduces the symptomology but also reduces the frequency of using medications.

The Hermelingmeier-nasal irrigation as an adjunct treatment in allergic rhinitis⁶ study conducted prospective, randomised, controlled trials that assessed the effects of SNI (saline nasal irrigation) on 4 different outcome parameters were included. SNI performed regularly over a period of 7 weeks was observed to have positive effect on all investigated outcome parameters. Saline nasal irrigation showed improvement in nasal symptoms, reduction in medicine usage, acceleration of mucociliary clearance time and improvement in quality of life.

Chusakul conducted a double blind, randomised study- Comparison of buffered and non-buffered nasal saline irrigations in treating allergic rhinitis.⁷ 36 subjects were taken and given three kinds of isotonic SNI non-buffered (pH 6.2-6.4), buffered with mild alkalinity (pH 7.2-7.4) and buffered with alkalinity (pH 8.2-8.4). Overall nasal symptoms significantly improved with buffered solution with mild alkalinity.

Chong 2016 conducted a randomised controlled study to evaluate the effect of saline irrigation in patients with chronic rhinosinusitis⁴ which included two randomised controlled trials; one compared large volume (150 mL) hypertonic saline irrigation with usual treatment over a 6-month period; the other compared 5 mL nebulised saline twice a day with intranasal corticosteroids, for three months and evaluating them. The evidence suggests no benefit of 5 mL nebulised saline spray over intranasal steroids, and there is some benefit with large volume saline irrigation with hypertonic solution when compared with placebo.

AIMS AND OBJECTIVES

To evaluate the effect of isotonic saline nasal irrigation in seasonal allergic rhinitis.

To evaluate the quality of life in patients with seasonal allergic rhinitis by assessing the severity of symptoms.

MATERIALS AND METHODS

Present study is a prospective study carried out for a period of 8 months from August 2015 to March 2016 in the peak seasons of seasonal allergic rhinitis. The patients attending to OPD of Chalmeda Anand Rao Medical College hospital with symptoms of seasonal allergic rhinitis were enrolled for study. Informed consent was obtained from the patients. The study was approved by the Ethical Committee of Chalmeda Anand Rao institute of medical sciences.

Study consists of series of 52 patients.

Complaints and duration of symptoms were taken.

Complete ENT examination done.

Patients fulfilling the inclusion criteria are subjected to prospective study.

The patients were followed for a period of at least 2 months once in fifteen days after treating with standard medical treatment that is antihistaminics, intranasal steroidal sprays and leukotriene antagonists along with isotonic saline nasal irrigation as an adjunctive treatment to assess the decrease in severity of symptoms.⁸

Inclusion Criteria

Patients with clinical symptoms characteristic of seasonal allergic rhinitis.

Age of 20-60 years.

Patients already on standard treatment (antihistamines and intranasal corticosteroids) for more than 1 year.

Exclusion Criteria

Age <20 and >60 years.

Non-allergic rhinitis patients.

Acute and chronic rhinosinusitis.

Patients with cystic fibrosis.

Patients on immunotherapy started within the prior year.

Previous surgery for turbinate reduction.

Patients with nasal polyposis.

RESULTS

A total of 52 patients participated in study. Females constituted 27 (52%) while males constituted 25 (48%) of

total patients (Table 1). Isotonic saline nasal irrigation twice daily for a period of 8 weeks along with intranasal corticosteroid spray and antihistamines reduced the severity of symptoms like rhinorrhoea, post-nasal drip, episodes of sneezing, itching of nose in about 46 patients. All the patients completed the study without any adverse effects.

Gender	Number of Patients	Percentage
Male	25	48%
Female	27	52%
Total	52	100

Table 1. Gender Distribution of Patients

Age (Years)	Number of Patients	Percentage
20-30	15	28.8%
31-40	16	30.8%
41-50	13	25%
51-60	08	15.4%
Total	52	100

Table 2. Age Distribution of Patients

The above table shows that 15 (28.8%) patients were in the age group of 20-30 years, 16 (30.8%) patients were in the age group of 31-40 years, 13 (25%) patients were in the age group of 41-50 years and 8 (19.2%) patients were in the age group of 51-60 years. Maximum percentage of patients were constituted in the age group of 20-40 years. It is constituting around 60%. (Table 2).

Symptoms	Number of Cases	Percentage
Improvement	46	88.5%
No improvement	06	11.5%
Total	52	100

Table 3. Results of the Study

The above table shows that in 46 (88.5%) patients symptoms of allergic rhinitis are improved in terms of severity, duration and frequency of attacks as compared with their previous attacks and in 6 (11.5%) patients there is no significant improvement in symptoms. (Table 3).

DISCUSSION

Allergic rhinitis is a common condition which is prevalent in 10 to 20% of population globally with a large impact on patients and high health care costs; both direct, from the cost of repeated consultations and of chronic medical therapy and indirectly by absenteeism and decreased productivity.⁹

Antihistamines with intranasal corticosteroid sprays are first-line treatment for allergic rhinitis.¹ In addition to that isotonic saline nasal irrigation helps in reducing the severity of symptoms within 8 weeks. Nasal saline potentially represents a safe and inexpensive adjuvant therapy for allergic rhinitis. The use of saline nasal irrigation not only improves the symptoms but also reduces the use of frequent usage of antibiotics and quality of life of patients. Previous Cochrane reviews have demonstrated some possible

benefits of saline in patients with chronic rhinosinusitis⁴ and upper respiratory tract infections.⁵ Saline nasal irrigation may enhance nasal mucosa’s ability to resist the effect of infection agents, inflammatory mediators and irritants by following mechanisms:

Increasing mucociliary clearance function¹⁰ demonstrated by increased ciliary beat frequency.^{11,12}

Decreasing the nasal mucosal oedema.¹³

Decreasing inflammatory mediators.¹⁴

Clearing inspissated mucus plugs and exogenous inflammatory triggers.¹⁵

Saline can be deposited in nasal cavity in various forms including sprays, drops, nebulisers and irrigation. The volume of nasal saline from sprays and nebulisers can vary greatly. These can be very low volume devices (<5 mL per nostril) and high volume devices (> 60 mL per nostril). Nasal saline sprays reach the nasal cavity adequately, and there is some evidence that high pressure and volume saline is more effective in penetrating the adjacent sinus cavities.¹⁵

The saline solutions available are hypotonic (<0.9% NaCl), isotonic (0.9% NaCl) and hypertonic (>0.9% NaCl). Isotonic saline (0.9% NaCl) is used for irrigation twice daily for a period of 8 weeks in this study.

Numerous clinical studies have used various tonicities of sodium chloride. Shoseyov et al discovered that hypertonic saline 3 times a day led to inflamed mucosa due to local irritation.¹⁶

Baraniuk et al showed that hypertonic saline irrigation leads to release of substance P and glandular secretion by means of stimulation of nociceptive nerves, causes pain in patients.¹⁷ Side effects of isotonic saline nasal irrigation are rare. Sometimes minor complications like aural fullness, epistaxis and stinging of the nasal mucosa may occur. Unlike hypertonic or hypotonic saline, isotonic saline will not cause any local irritation and pain so it is safe to use in nasal irrigation.

Saline nasal irrigation can also be used in patients suffering from chronic rhinitis, viral upper respiratory tract infection and have been tried in patients with mild-to-moderate rhinitis of pregnancy and acute rhinosinusitis.¹⁸

Chronic rhinosinusitis which is greater than 12 weeks is the most common indication for saline nasal irrigation according to a recent survey.¹⁹ Based on positive results in clinical and functional outcomes, the Cochrane Collaboration concluded that SNI is appropriate adjunctive therapy for the symptoms of chronic rhinosinusitis.²⁰ The users of liquid saline nasal irrigation have reported significantly decreased antibiotic and nasal spray use.²¹ Two studies evaluated the effect of liquid SNI on chronic rhinosinusitis in the context of workplace-related airborne irritants. Woodworkers (N=45), exposed to varying levels of wood dust, performed daily SNI and demonstrated significantly improved sinus symptoms, mucociliary clearance and expiratory nasal flow.²²

In case of viral upper respiratory tract infections, liquid and spray saline nasal irrigation has been evaluated for the treatment and prevention of viral URI. An RCT of 200 adults with viral URI showed that subjects treated with micronised saline, compared to liquid SNI, had improved rhinometric

resistance, nasal volume, mucociliary transit time and symptom severity scores.²³ Compliance rates with each therapy were not reported, limiting the conclusion of superiority of micronised over liquid SNI for URI. The outcome measures in each study were different, limiting comparability.

One RCT of 60 adults evaluated spray saline nasal irrigation as preventive therapy for viral URI.²⁴ In this study, those receiving a preventive daily spray SNI reported significantly fewer episodes of URIs, shorter symptom duration and fewer days with nasal symptoms compared to those without a preventive SNI care.

Effects of daily saline nasal irrigation for acute URI were evaluated in a methodologically strong two-phase RCT of 390 children.²⁵ Children with URIs were randomised to receive either routine care plus isotonic SNI with either liquid or fine spray or routine care only (control), and followed for 3 weeks (treatment phase) and then an additional 9 weeks (prevention phase). In both phases, both saline nasal irrigation delivery groups equally and statistically outperformed controls on nasal secretion, obstruction and medication use assessments.

In postoperative use, nasal irrigation is essential for cleansing the crusts and secretions inherent to any sinonasal surgery. It significantly reduces nasal secretion and shows a tendency to reduce postsurgical oedema.

Some of the studies which have focused on postoperative irrigation with seawater lacked a comparative control groups and without postoperative care. Pigret and Jankowski found no significant difference in the results of pressurised seawater and saline along with the usage of antiseptics and mucolytic agents. Keerl et al, in another observational study of 121 patients, saline nasal irrigation was very well tolerated, and some of the patients continued nasal saline irrigation in their daily life as a routine. Pinto et al reported no symptomatic benefit of irrigation, whether iso- or hypertonic and recommended not implementing postoperative irrigation, their study, however, involved certain defects like no inclusion criteria, and no details of surgical technique, numerous revision surgeries and application of an endonasal haemostasis substance. Moreover, the symptom scores used were not validated, and the final nasal cavity status was not documented.²⁶

Today, however, no comparative controlled studies and no clear data are available in the literature that define the optimal method of nasal irrigation (spraying or nasal douching), the preferred type of saline solution (sodium chloride, Emser salt, or seawater salt; buffered or non-buffered; isotonic or hypertonic), and the best frequency for the individual indication (AR, acute rhinosinusitis, chronic rhinosinusitis, dry nose, or after endonasal sinus surgery). The question as to the most advantageous form of application therefore remains unanswered.

CONCLUSION

Isotonic saline nasal irrigation is a quite easy and effective method with no side effects. In this study, the addition of isotonic saline for nasal irrigation in seasonal allergic rhinitis

patients along with the intranasal corticosteroid sprays, antihistaminics with leukotriene antagonists resulted in improvement of quality of life compared to the previous episodes by reduction in the severity, frequency and duration of symptoms without any adverse effects.

REFERENCES

- [1] Bousquet J, Khaltaev N, Cruz AA, et al. Allergic rhinitis and its impact on asthma (ARIA) 2008 update (in collaboration with the World Health Organization, GA(2)LEN and AllerGen). *Allergy* 2008;63(Suppl 86):8-160.
- [2] Scadding GK, Durham SR, Mirakian R, et al. BSACI guidelines for management of allergic and non-allergic rhinitis. *Clin Exp Allergy* 2008;38(1):19-42.
- [3] Bauchau V, Durham SR. Prevalence and rate of diagnosis of allergic rhinitis in Europe. *Eur Respir J* 2004;24(5):758-764.
- [4] Chong LY, Head K, Hopkins C, et al. Saline irrigation for chronic rhinosinusitis. *Cochrane Database of Systematic Reviews* 2016;(4):CD01199.
- [5] King D, Mitchell B, Williams CP, et al. Saline nasal irrigation for acute upper respiratory tract infections. *Cochrane Database of Systematic Reviews* 2015;(4):CD00682.
- [6] Hermelingmeier KE, Weber RK, Hellmich M, et al. Nasal irrigation as an adjunctive treatment in allergic rhinitis: a systematic review and meta-analysis. *Am J Rhinology Allergy* 2012;26(5):19-25.
- [7] Chusakul S, Warathanasin S, Suksangpanya N, et al. Comparison of buffered and nonbuffered nasal saline irrigations in treating allergic rhinitis. *Laryngoscope* 2013;123(1):53-56.
- [8] Head K, Snidvongs K, Glew S, et al. Saline nasal irrigation for allergic rhinitis. *Cochrane Database of Systematic Reviews* 2017;(3):CD012597.
- [9] Schoenwetter WF, Dupclay L, Appajosyula S, et al. Economic impact and quality of life burden of allergic rhinitis. *Curr Med Res Opin* 2004;20(3):305-317.
- [10] Talbot AR, Herr TM, Parsons DS. Mucociliary clearance and buffered hypertonic saline solution. *Laryngoscope* 1997;107(4):500-503.
- [11] Boek WM, Graamans K, Natzijl H, et al. Nasal mucociliary transport: new evidence for a key role of ciliary beat frequency. *Laryngoscope* 2002;112(3):570-573.
- [12] Kim CH, Hyun Song M, Eun Ahn Y, et al. Effect of hypo, iso, and hypertonic saline irrigation on secretory mucins and morphology of cultured human nasal epithelial cells. *Acta Otolaryngol* 2005;125(12):1296-1300.
- [13] Georgitis JW. Nasal hyperthermia and simple irrigation for perennial rhinitis. Changes in inflammatory mediators. *Chest* 1994;106(5):1487-1492.
- [14] Zeiger R, Shatz M. Chronic rhinitis: a practical approach to diagnosis and treatment II. *Treatment Immunol Allergy Pract* 1982;4:26-36.

- [15] Wormald PJ, Cain T, Oates L, et al. A comparative study of three methods of nasal irrigation. *Laryngoscope* 2004;114(12):2224-2227.
- [16] Shoseyov D, Bibi H, Shai P, et al. Treatment with hypertonic saline versus normal saline nasal wash of pediatric chronic sinusitis. *J Allergy Clinical Immunology* 1998;101(5):602-605.
- [17] Baraniuk JN, Ali M, Yuta A, et al. Hypertonic saline nasal provocation stimulates nociceptive nerves, substance P release and glandular mucous exocytosis in normal humans. *Am J Respir Crit Care Med* 1999;160(2):655-662.
- [18] DeGuzman DA, Bettcher CM, VanHarrison R, et al. Allergic rhinitis: guidelines for clinical care. University of Michigan Health Systems. <http://cme.med.umich.edu/pdf/guideline/allergic07.pdf>
- [19] Rabago D, Zgierska A, Bamber A, et al. The use of nasal saline irrigation among family medicine physicians in Wisconsin. *Wisconsin Medical Journal* 2009 In Press.
- [20] Harvey R, Hannan SA, Badia L, et al. Nasal saline irrigations for the symptoms of chronic rhinosinusitis. *Cochrane Database Syst Rev* 2007;18(3):CD006394.
- [21] Rabago D, Zgierska A, Mundt M, et al. Efficacy of daily hypertonic saline nasal irrigation among patients with sinusitis: a randomized controlled trial. *J Fam Pract* 2002;51(12):1049-1055.
- [22] Holmstrom M, Rosen G, Wahlander L. Effect of nasal lavage on nasal symptoms and physiology in wood industry workers. *Rhinology* 1997;35(3):108-112.
- [23] Passali D, Damiani V, Passali FM, et al. Atomized nasal douche vs nasal lavage in acute viral rhinitis. *Arch Otolaryngol Head Neck Surg* 2005;131(9):788-790.
- [24] Tano L, Tano K. A daily nasal spray with saline prevents symptoms of rhinitis. *Acta Otolaryngol* 2004;124(9):1059-1062.
- [25] Slapak I, Skoupa J, Strnad P, et al. Efficacy of isotonic nasal wash (seawater) in the treatment and prevention of rhinitis in children. *Arch Otolaryngol Head Neck Surg* 2008;134(1):67-74.
- [26] Pinto JM, Elwany S, Baroody FM, et al. Effects of saline sprays on symptoms after endoscopic sinus surgery. *Am J Rhinol* 2006;20(2):191-196.