

ORIGINAL RESEARCH

Comparative Analysis of Normal Saline, Hypertonic Saline and Diluted Betadine Saline for Allergic Rhinitis Management at a Tertiary Care Hospital

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ABSTRACT

Background: Allergic rhinitis (AR) is a common allergic condition characterized by symptoms such as nasal congestion, clear runny nose, sneezing, postnasal drip, and itching in the nose. The present study was conducted to assess the effectiveness of 3% hypertonic saline, 0.9% normal saline, and 0.5% diluted betadine saline nasal irrigation in managing allergic rhinitis. **Materials and Methods:** A study was conducted on 45 patients diagnosed with allergic rhinitis, aged 20-60 years, who were divided into three groups receiving different nasal irrigation treatments over one month. Data analysis was done using SPSS software. **Results:** 45 patients aged 20-60 years with allergic rhinitis participated, and they were randomly assigned to three different nasal irrigation treatment groups: normal saline (0.9%), hypertonic saline (3%), and diluted betadine saline (0.5%). The distribution of patients varied across the age groups within each treatment group: ages 20-30 represented 31.11% of the total sample, ages 31-40 comprised 37.78%, ages 41-50 accounted for 20%, and ages 51-60 represented 11.11%. Each treatment group consisted of 15 patients, resulting in a total sample size of 45 participants. **Conclusion:** The study revealed significant improvement in quality of life following nasal irrigation across all three treatments, however, no significant differences were observed between the treatment modalities.

Keywords: Congestion, Allergic, Rhinitis.

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INTRODUCTION

Allergic rhinitis (AR) is a common allergic condition characterized by symptoms such as nasal congestion, clear runny nose, sneezing, postnasal drip, and itching in the nose. It affects a significant portion of the population and can lead to reduced productivity and increased healthcare costs.^{1,2} While it was previously considered a condition limited to the nasal airway, the unified airway theory now recognizes it as part of a broader systemic allergic response, often linked with conditions like asthma and atopic dermatitis.^{3,4} AR can be categorized as seasonal (intermittent) or perennial (chronic), or a combination of both. In addition to nasal symptoms, individuals with AR may experience associated allergic conjunctivitis, cough,

Eustachian tube dysfunction, and chronic sinusitis. There are various treatment options available for AR, with intra-nasal glucocorticoids recommended as the first-line therapy.⁵

Non-pharmacologic therapy approaches are crucial in managing allergic rhinitis. One approach involves nasal irrigation using saline solutions, which is recommended in international guidelines and reviews as a complementary treatment for AR, despite the conclusive efficacy of this method not being established.⁶ The objective of the study was to assess the effectiveness of 3% hypertonic saline, 0.9% normal saline, and 0.5% diluted betadine saline nasal irrigation in managing allergic rhinitis.

MATERIALS AND METHODS

A study was conducted on 45 patients diagnosed with allergic rhinitis, aged 20-60 years, who were divided into three groups receiving different nasal irrigation treatments over one month. The study adhered to specific inclusion and exclusion criteria, with patients undergoing thorough evaluations and completing the SNOT-20 questionnaire. Detailed instructions for nasal irrigation were provided, and a follow-up assessment using the same questionnaire was conducted after one month. Data analysis was performed using SPSS software.

RESULTS

45 patients aged 20-60 years with allergic rhinitis participated, and they were randomly assigned to three different nasal irrigation treatment groups: normal saline (0.9%), hypertonic saline (3%), and diluted betadine saline (0.5%). The distribution of patients varied across the age groups within each treatment group: ages 20-30 represented 31.11% of the total sample, ages 31-40 comprised 37.78%, ages 41-50 accounted for 20%, and ages 51-60 represented 11.11%. Each treatment group consisted of 15 patients, resulting in a total sample size of 45 participants. Among the 45 individuals included in the study, 17 patients experienced recurrent sneezing as a symptom of allergic rhinitis.

Table 1: Age distribution of patients with allergic rhinitis

Age group	Normal saline (0.9%)	Hypertonic saline (3%)	Diluted betadine saline (0.5%)	Total(%)
20-30	5	5	4	14(31.11)
31-40	6	4	7	17(37.78)
41-50	3	3	3	9(20)
51-60	1	3	1	5(11.11)
Total	15	15	15	45(100)

Table 2: Complaints of sample population

Complaints	Normal saline (0.9%)	Hypertonic saline (3%)	Diluted betadine saline (0.5%)	Total
Recurrent sneezing	5	6	6	17
Nasal obstruction	2	4	7	13
Nasal discharge	5	2	7	14
Headache	3	2	3	8

DISCUSSION

Allergic rhinitis (AR) is a global health concern characterized by nasal symptoms such as congestion, itching, sneezing, and runny nose, often accompanied by uncomfortable symptoms affecting quality of life.^{7,8} Current treatment methods for AR include desensitization, medication, and surgery. Nasal saline irrigation is a treatment option that can effectively remove mucus, allergens, and air contaminants from the nasal cavity, enhancing mucociliary function and offering safety and convenience. Nasal irrigation can be recommended for the treatment of AR. A simple and inexpensive non-pharmacologic form of therapy, nasal irrigation, can reduce medicine consumption and thereby cut down on costs caused by this disorder for patients and for the health care system.⁹

In our study, 45 patients aged 20-60 years with allergic rhinitis were included, and they were randomly assigned to three different nasal irrigation treatment groups: normal saline (0.9%), hypertonic saline (3%), and diluted betadine saline (0.5%). The distribution of patients varied across the age groups within each treatment group: ages 20-30 represented 31.11% of the total sample, ages 31-40 comprised 37.78%, ages 41-50 accounted for 20%, and ages 51-60 represented 11.11%. A study by J.H. Kim et al.¹⁰ explored the impact of Betadine on ciliated human

respiratory epithelial cells by conducting experiments on cells cultured from human sinonasal mucosa. The cells were exposed to varying solutions, including control solutions, Betadine solutions at different concentrations, and ATP as a positive control. The results showed that undiluted 10% Betadine significantly decreased ciliary function, leading to a reduction in ciliary beat frequency. This ciliotoxic effect was also observed with 5% Betadine. In comparison, our study utilized a 0.5% diluted Betadine saline solution, which was found to carry significantly lower risk to ciliary motility while retaining its antibiotic properties. Li et al explored the efficacy of hypertonic saline nasal irrigation (HSNI) for improving nasal symptoms and quality of life, and for decreasing oral antihistamine consumption in children with allergic rhinitis (AR). They conducted a systematic search of PubMed, Medline, Cumulative Index to Nursing and Allied Health Literature, EMBASE, Chinese Electronic Periodicals Service, and Cochrane Library of Controlled Trials databases for prospective randomized, controlled trials assessing HSNI effects in children with AR and published before December 2017. Two authors independently assessed each trial's quality and extracted data for a meta-analysis. They included four trails comprising 351 patients. HSNI improved patients' nasal symptom scores

(mean difference 1.82 points after treatment; 95% confidence interval (CI), 0.35–3.30; I² = 64%; *p* = 0.02) and a significantly lower rescue antihistamine use rate (risk ratio (RR), 0.68; 95% CI, 0.48–0.95; I² = 28%; *p* = 0.02). HSNI group showed better nasal symptom scores (mean difference, 1.22 points; 95% CI, 1.01–1.44; I² = 0%; *p* < 0.001) in comparison to isotonic saline nasal irrigation (ISNI). Although the antihistamine use (RR, 0.84; 95% CI, 0.64–1.10; I² = 0%; *p* = 0.2) and adverse effect rates were similar between groups. Compared with ISNI, HSNI may be a reasonable adjunctive treatment for children with AR.¹¹

CONCLUSION

The study revealed significant improvement in quality of life following nasal irrigation across all three treatments, however, no significant differences were observed between the treatment modalities.

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