

"Nasal irrigation is a simple, inexpensive treatment that relieves the symptoms of a variety of sinus and nasal conditions, reduces use of medical resources, and could help minimize antibiotic resistance."

Objective

To review clinical evidence on the efficacy of saline nasal irrigation for treatment of sinonasal conditions and to explore its potential benefits.

Quality of Evidence

Clinical trials, reviews, and treatment guidelines discussing nasal irrigation were obtained through a MEDLINE search from January 1980 to December 2001. Most trials were small, and some were not controlled; evidence, therefore, is level II, or fair.

Main Message

Flushing the nasal cavity with saline solution promotes mucociliary clearance by moisturizing the nasal cavity and by removing encrusted material. The procedure has been used safely for both adults and children, and has no documented serious adverse effects. Patients treated with nasal irrigation rely less on other medications and make fewer visits to physicians. Treatment guidelines in both Canada and the United States now advocate use of nasal irrigation for all causes of rhinosinusitis and for postoperative cleaning of the nasal cavity.

Conclusion

Nasal irrigation is a simple, inexpensive treatment that relieves the symptoms of a variety of sinus and nasal conditions, reduces use of medical resources, and could help minimize antibiotic resistance.

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Healthy people's respiratory tracts are protected from airborne contagion and debris by a mucociliary layer^{1,2} that lines the sinonasal cavity. This layer consists of columnar, ciliated epithelial cells and goblet cells bathed in mucus. Foreign particles are trapped in the sticky layer of mucus, and ciliary action propels the entire mucous layer out of the sinuses toward the nasopharynx. When this transport mechanism fails, rhinosinusitis occurs, usually in response to a virus, bacterium, irritant, or allergen.³

Nasal irrigation is a simple, inexpensive procedure that has been used to treat sinus and nasal conditions for many years.⁴ It is still recommended routinely by otolaryngologists.⁵ The procedure involves flushing the nasal cavity with saline solution, which promotes improved mucociliary clearance by moisturizing the nasal cavity and removing encrusted material.⁶ Evidence shows that pulsating saline lavage can remove bacteria also.^{3,7} In the past, recommendations to use nasal lavage were based primarily on strong and long-standing anecdotal evidence.⁸ Treatment guidelines in both Canada and the United States advocate use of nasal irrigation.^{3,9} Multicentre clinical trials have just begun to demonstrate its efficacy for treating several diseases, including rhinosinusitis and allergic rhinitis, and for postoperative care.

Quality of Evidence

References for this article were obtained from a MEDLINE search from January 1980 to December 2001. Key words used were nasal irrigation, nasal lavage, nasal saline, sinusitis, and rhinitis. Because there are as yet relatively few research papers on nasal irrigation, all relevant papers in English and French obtained from the search were reviewed. Most trials were small, however, involving fewer than 100 patients, and several trials were not placebo controlled (**Table 110-17**). Consequently, the quality of evidence is only fair.

STUDY	PATIENTS	DESIGN	COMPARATORS	FINDINGS
Georgitis 1994 ¹⁰	30 allergic rhinitis	Crossover	Nasal hyperthermia (molecular or large- particle water vapour) versus simple irrigation	Histamine levels fell with all treatments; greatest decline seen with irrigation ($P < .05$ and $< .01$) Leukotriene C4 levels significantly reduced by irrigation ($P < .05$)
rayenbuhl and Seppey 1995 ¹¹	104 intranasal surgery	Retrospective	Saline stream versus passive saline instillation	Stream patients required significantly fewer postoperative recovery days ($P < .05$) and visits to physicians ($P < .05$)
Seppey et al 1995 ¹²	151 rhinosinusitis; 58 endonasal surgery	Treatment at physicians' discretion	Medium saline stream versus strong stream	Significant decrease in signs and symptoms in all patients ($P < .0005$)
Seppey et al 1996 ¹³	28 endonasal surgery	Randomized	Saline stream versus passive saline instillation	Stream significantly more effective than drops at 9 days after surgery ($P < .01$) Stream significantly more tolerable at 9, 15, and 30 days after surgery ($P < .02$)

Rhinosinusitis

Rhinosinusitis, an inflammatory disease of the paranasal sinuses, is a substantial source of morbidity and is one of the most common reasons patients visit primary care physicians.⁹ In the United States, rhinosinusitis patients make 16 million visits to physicians each year; the direct medical cost of sinusitis is estimated to be about \$2.4 billion.¹⁸

Signs and symptoms of sinusitis, both acute and chronic, are well known.³ Acute sinusitis is usually accompanied by fever and facial pain near the bridge of the nose and the eyes. Chronic sinusitis is not typically accompanied by fever unless there is acute infection. Both acute and chronic sinusitis share several symptoms, including nasal stuffiness, congestion, postnasal drip, blunted sense of smell and taste, yellow-green nasal drainage, and nausea. Increased quantity or viscosity of sinus secretions can overwhelm the nose's clearing capacity, which can lead to pooled secretions and secondary bacterial infection.

Medical management of rhinosinusitis includes antibiotics, decongestants, corticosteroids, and mucolytics.¹⁹ Therapy is usually directed at alleviating or reducing symptoms, eradicating the underlying cause, or both. Use of irrigating solutions before patients take decongestants or corticosteroids improves these medications' penetration and, presumably, efficacy. Because bacterial infection of the sinuses can be serious, antibiotics are frequently prescribed. Saline nasal lavage has been advocated as adjunct therapy for rhinosinusitis because it promotes ciliary function and decreases edema, which would improve drainage through the sinus ostia.¹⁸ Also, there is evidence that pulsating saline lavage helps flush out bacteria.⁷

Nasal irrigation is well tolerated by rhinosinusitis patients. One open multicentre study of 209 rhinosinusitis patients who irrigated two to six times daily for 20 days with isotonic seawater reported only two adverse events (pain).¹² Other studies have also found adverse events infrequent.^{8,16}

Respiratory infections account for more than 75% of antibiotic prescriptions written annually in physicians' offices,²⁰ and rhinosinusitis is the fifth most common diagnosis for which antibiotics are prescribed.⁹ According to the United States Centers for Disease Control, more than 110 million courses of antibiotics are prescribed each year by office-based physicians in the United States.²¹ A typical course of antibiotic therapy for acute sinusitis lasts 10 days.⁹ In an open, prospective study, 44 adults diagnosed with acute bacterial sinusitis were treated for just 5 days with antibiotic therapy in combination with 12 days of daily nasal irrigation.²² After 5 days, patients' symptoms had abated, and by day 12, the recovery rate was 93%. The authors concluded that frequent nasal lavage can reduce the length of antibiotic therapy and, as a consequence, increase patient compliance and lower costs of medication and other treatment.

Rhinosinusitis is common in children, particularly in those with allergies where impaired drainage increases the likelihood of infection. A randomized controlled, double-blind study of 30 children aged 3 to 16 years (median age 9.5 years) with chronic sinusitis compared use of hypertonic and isotonic saline nasal irrigation.¹⁶ Significant reductions in cough, nasal secretions, and postnasal drip were reported for those using hypertonic saline; those using isotonic saline had significant reductions in nasal secretions. Irrigation was also effective for cleaning the nose and removing intranasal crusts. The authors reported that saline irrigation was simple to use, well tolerated, and inexpensive.

Allergic Rhinitis

Perennial allergic rhinitis is typically treated with antihistamines and, if symptoms are severe, corticosteroids. Nasal irrigation has been recommended as an adjunct therapy to flush out mucus and irritants and improve the flow of air through the nose.²³ A controlled clinical study of 30 subjects with perennial rhinitis compared nasal hyperthermia treatment with saline nasal irrigation. Patients given nasal irrigation through a modified Water Pik® device had lower concentrations of nasal histamine (compared with baseline) immediately following treatment ($P < .001$) and at 2, 4, and 6 hours after treatment ($P < .05$).

Nasal irrigation also substantially decreased the concentration of nasal leukotriene C4 (an inflammatory mediator) at 2, 4, and 6 hours after treatment ($P < .05$). In contrast, nasal hyperthermia treatment produced no demonstrable reduction in leukotriene C4 concentrations, and the reduction in histamine concentration was not sustained to 6 hours after treatment. The investigators concluded that nasal irrigation had a long-term effect on mediator production and was, therefore, a useful therapy for allergic rhinitis.¹⁰

Postoperative Irrigation

The aim of sinus surgery is to open narrow passages and allow more effective airflow and drainage. Performed under general anesthesia, sinus surgery is done through the nostrils using an endoscope with no incision or sutures.²⁴ Surgery is typically done on an outpatient basis, with regular follow-up office visits to monitor healing. Because the nasal cavity quickly becomes encrusted following surgery, frequent cleaning and saline nasal irrigation are needed for 4 to 8 weeks until the lining of the nose and sinuses has regenerated.^{15,24}

Clinical trials of patients undergoing sinus surgery have compared the efficacy of various types of nasal washes. One study of patients undergoing rhinoplasty, septoplasty, and ethmoidectomy compared seawater with an isotonic antiseptic preparation.¹³ Both patients ($P < .002$) and physicians ($P < .001$) expressed a statistically significant preference for seawater lavage based on a global opinion survey of efficacy and tolerability. Also, because seawater lavage was easier to use, patients were more compliant with the regimen and, consequently, less likely to require rescue medication. A randomized, single-blind study comparing pressurized seawater lavage with antiseptic and mucolytic saline irrigation following ethmoidectomy found no statistically significant difference in nasal crust weights or nasal secretions between patients in the two treatment groups.¹⁰

A retrospective study of 104 postoperative patients compared lavage with pressurized jets of fluid from a squeezable plastic bottle to cleansing with a passive, slow infusion of saline drops.¹¹ The number of postoperative recovery days required for each patient was determined by nasal endoscopy. For turbinal resection patients, recovery was defined as a complete absence of encrustations in the nasal fossae. For sinus surgery patients, recovery was complete when risk of synechia had disappeared, when the middle concha healed, or when the meatotomy was permeable and free of encrustation. Results indicated significantly shorter postoperative recovery periods for patients who received pressurized saline compared with patients receiving drops (13.9 days versus 18.2 days for turbinal resection patients [$P = .05$]; 18.9 versus 36.7 days for patients undergoing paranasal procedures [$P = .0005$]). Also, patients receiving

pressurized saline required fewer health care visits than those receiving drops (2.06 visits versus 2.84 visits [P .008] for turbinal resection; 2.44 visits versus 4.23 visits [P .0005] for paranasal procedures).

There are several other areas where saline nasal irrigation has been studied. Tomooka et al⁸ noted the utility of nasal irrigation for treatment of patients with age-related rhinitis, allergic rhinitis, septal perforations, and rhinosinusitis associated with HIV infection. Nuutinen et al²⁵ reported success in treating patients with atrophic rhinitis, rhinitis sicca, and nasal polyposis.²⁵ For patients with cystic fibrosis, irrigation with balanced salt solutions is routinely recommended for restoring the sinonasal mucosa to a normal state.²

Saline Solutions

Several different saline tonicities and pH levels are available. Hypertonic saline has been shown to increase mucociliary transit times,²⁶ but is irritating for nasal membranes.^{10,14,16} Mucociliary clearance was similar after irrigation with a solution buffered to pH 8 or a nonbuffered solution.²⁷

Conclusion

The indications for nasal irrigation are varied and are growing based on an increasing number of large-scale clinical trials. Clinical evidence is mounting that nasal irrigation is an effective, inexpensive adjunct treatment for symptom relief of sinus discomfort and disease. The procedure has been used safely by both adults and children and has no documented serious adverse effects. Clinical trials indicate that patients treated with nasal irrigation are less reliant on other medications and that some postsurgical patients tend to require fewer visits to physicians. Both these effects are likely to have desirable economic consequences for patients and the health care system.

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Editor's Key Points

- Saline nasal irrigation is cheap and simple to use, and it appears to be effective. Recommendations are based mainly on results of small trials (fair-quality evidence).
- Saline nasal lavage is recommended as an adjunct therapy for rhinosinusitis and allergic rhinitis, and postoperatively after nasal surgery. It moisturizes the mucous membrane, reduces crusts, and promotes healing.
- It appears to be safe and generally well tolerated, even for children, and it has been shown to reduce use of antibiotics.
- Pressurized jets of saline appear to be more effective than drops. Hypertonic saline increases mucociliary transit times, but is more irritating. (i.e. [Hydro Pulse Nasal/Sinus Irrigation System](#))

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Haloterapia

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