

A Comparative Study of Three Methods of Nasal Irrigation

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Objective: To assess the effectiveness of three methods of nasal irrigation on distributing saline to the nasal cavity and paranasal sinuses. **Design:** A prospective, cross-over study. **Materials and Methods:** Twelve subjects (9 patients with chronic sinusitis after functional endoscopic sinus surgery and 3 healthy controls) underwent nasal irrigation with normal saline containing Technetium 99m sulfur colloid. The distribution of radioactivity was assessed on each subject after three different irrigation techniques: metered nasal spray, nebulization with RinoFlow, and nasal douching while kneeling with the head on the floor. **Results:** The nasal cavity was well irrigated by all three techniques. Compared with the other two methods, douching was significantly more effective in penetrating the maxillary sinus ($P = .036$) and frontal recess ($P = .003$). The sphenoid and frontal sinuses were poorly irrigated by all three techniques. **Conclusion:** Nasal douches are more effective in distributing irrigation solution to the maxillary sinus and frontal recess. This should be the method of choice for irrigating these areas. **Key Words:** Nasal irrigation, douche, metered nasal spray, nebulizer, chronic sinusitis, nuclear medicine, Technetium 99m.

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INTRODUCTION

Nasal irrigation is a longstanding treatment for sinonasal disease. It has been practiced in India for centuries as part of the purification routines performed in preparation for yoga.¹ In Western medicine, it has been commonly prescribed since the 19th century.² In 1901, Dr. Wyatt Wingrave,³ a physician and pathologist to the then Central London Throat Nose and Ear Hospital, gave a clinical lecture on "The Nature of Discharges and

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Douches," which was later published in the *Lancet* in 1902. In it, he described the various solvents and instruments that were used for douching in that era. Although most of these agents are no longer used today, the practice of nasal irrigation with saline continued to gain popularity through the 20th century. Saline irrigation has been shown to be effective in improving sinonasal disease, both subjectively and objectively.⁴ It is also a cornerstone in the postoperative care of patients after functional endoscopic sinus surgery.⁵

Various techniques of delivering saline to the nasal cavity and paranasal sinuses have been devised over the years, and these range from simple pots that use gravity to powered machines that generate a pressurized stream. However, despite this diversity, there have been very few studies comparing the effectiveness of these methods in their ability to deliver solution to individual areas within the complex geometry of the nasal cavity and sinuses. The purpose of this study was to compare the distribution of saline achieved by three commonly used methods of nasal irrigation using technetium 99m as a radioactive marker.

MATERIALS AND METHODS

This study was conducted at the Nuclear Medicine Department of the Women's and Children's Hospital, Adelaide, South Australia, between July and September 2001. Approval for the study was granted by the ethics committees of the Royal Adelaide Hospital, The Queen Elizabeth Hospital, and the Women's and Children's Hospital. The ethics committee stated only patients who were not reproductive and above the age of 40 years could be included in the study. Patients with chronic sinusitis who have undergone bilateral endoscopic sinus surgery at either The Queen Elizabeth or Royal Adelaide Hospitals more than 3 months before the study date were invited to participate in the trial. Chronic sinusitis was defined as two or more symptoms of nasal obstruction, rhinorrhea, postnasal drip, facial pain, or headaches that persisted for more than 12 weeks despite medical therapy. Patients with nasal polyposis or gross septal deviations were excluded from the study. Endoscopic sinus surgery performed encompassed a middle meatal antrostomy and anterior and posterior ethmoidectomies, including frontal recess clearance and a sphenoidotomy. Patients with significant musculoskeletal problems preventing them from adapting the nasal douche posture were also excluded from the study. Healthy volunteers without sinonasal disease were recruited as controls. Informed consent was obtained from each subject before they entered the study.