

Nasal saline irrigation has no effect on normal olfaction: a prospective randomized trial

Jack J. Liu, MD¹, Guy C. Chan, PhD², Avi S. Hecht, MD¹, Dan R. Storm, PhD² and Greg E. Davis, MD, MPH¹

Background: Nasal saline irrigation is a safe treatment for chronic rhinosinusitis; however, its effect on olfaction is unclear. Cyclic adenosine monophosphate (cAMP) is a key second messenger in the mechanism of olfaction and has been shown to be associated with smell function. In animal studies, olfactory cilia may be harvested by simple saline preparations. This study aimed to characterize the effect of nasal saline irrigation on smell function.

Methods: Volunteers with normal olfaction were randomized into a control or irrigation cohort. In the initial appointment, subjects completed a University of Pennsylvania Smell Identification Test (UPSIT) and nasal samples were obtained by 2 methods: the nasal curette and cytobrush. The irrigation cohort performed daily nasal saline irrigations. Both cohorts then returned in 1 week. The UPSIT and nasal cell collection were repeated, and each subject completed a subjective olfactory transition scale. Nasal samples were processed for cAMP levels using a commercial assay.

Results: Thirty-two subjects were enrolled and randomized into each cohort. Control and postirrigation mean UPSIT

scores were 36.8 and 36.7 ($p = 0.48$). No subjects reported a subjective smell loss. Ten pairs of nasal samples were assayed. Using the curette, control and postirrigation cAMP levels were 509 and 490 fmol/(mg/mL), respectively ($p = 0.94$). Using the cytobrush, respective cAMP levels were 424 and 449 fmol/(mg/mL), respectively ($p = 0.94$).

Conclusion: Nasal saline irrigation has no subjective or objective effect on olfaction. It also does not appear to affect cAMP levels, a potential marker of smell function. © 2013 ARS-AAOA, LLC.

Key Words:

cAMP; nasal cell harvesting; nasal curette; nasal cytobrush; olfaction; olfactory cilia; saline irrigation

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Nasal saline irrigation plays an important role in the adjuvant management of chronic rhinosinusitis and allergic rhinitis. Research studies show that nasal saline irrigations can actually improve the symptoms of these two diseases.¹⁻³ Nasal saline irrigations are well tolerated, with

only infrequent mild side effects and extremely rare severe adverse events reported.^{3,4} Despite these infrequent side effects, there are no known clinical studies on the effect of nasal saline irrigation on olfaction. Our interest stemmed from animal studies on olfactory cilia, which are critical to our understanding of human and animal olfactory function. In animal models, cilia may be harvested by hypertonic saline or calcium chloride preparations.^{5,6} This brought into question the potential effects of nasal saline irrigation on human olfactory cilia and hence, olfactory function.

Animal studies examining olfactory cilia show that cyclic adenosine monophosphate (cAMP) is an important second messenger in the mechanism of olfaction.⁷ Clinical studies show that cAMP levels relate to olfactory function and may therefore serve as a potential objective marker of olfaction.⁸

The purpose of this study is to evaluate the effect of nasal saline irrigation on human olfactory function using the University of Pennsylvania Smell Identification Test (UPSIT) and nasal cAMP levels.⁹

¹Department of Otolaryngology, University of Washington, Seattle, WA; ²Department of Pharmacology, University of Washington, Seattle, WA

Correspondence to: Greg E. Davis, MD, MPH, Box 356515, Seattle, WA 98195; e-mail: gedavis@uw.edu

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