

ORIGINAL RESEARCH

Comparative Evaluation of Hypertonic Saline Nasal Douching Versus Normal Saline Nasal Douching in Post Operative Endoscopic Sinus Surgery Patients: An Institutional Based Study

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ABSTRACT

Background: To study and compare the hypertonic nasal douching with normal saline nasal douching in post operative endoscopic sinus surgery.

Materials & Methods: A total of 200 subject were enrolled. The age group was 30 to 60 years who underwent surgery were selected. Post operative evaluation was done. All subjects were given antibiotic-soaked nasal pack for around 48 hrs after surgery. All patients were given the same antibiotic in the post operative period till 10 days and then evaluated on 10th and 20th postoperative day. 200 patients were divided into 2 groups as 100 patients each. Group I patients used hypertonic saline for douching while group II patients used isotonic saline for nasal douching. The appearance of nasal mucosa was listed as either normal and edematous. Crusting was described as nil, mild or severe in nature.

Results: On 10th post operative day, there were no patients with normal mucosa and percentage was similar in both hypertonic as well as normal saline. On 20th day, there were 24% of patients of hypertonic saline and 10% of patients of normal saline with normal mucosa. There were 33% of patients with no crusting with use of hypertonic saline on 20th day. Similarly, there were 22% of individuals who used normal saline on 20th day had no crusting. Severe crusting cases with hypertonic saline were 36% and with normal saline were 41% of patients on 20th day.

Conclusion: Patients who used hypertonic saline for douching in the post operative period were found to have lesser severe crusting as compared to those who used isotonic saline for douching.

Keywords: Functional Endoscopic Sinus Surgery, Nasal Douching, Hypertonic Saline.

INTRODUCTION

The concept of Functional endoscopic sinus surgery (FESS) is the removal of tissue obstructing the Osteo Metal Complex (OMC) and the facilitation of drainage while conserving the normal non-obstructing anatomy and mucous membrane. The rigid fiberoptic nasal telescope provides superb intra-operative visualization of the OMC, allowing the surgery to be focused precisely on the key areas.¹

Patients who have had such operations invariably will develop mucosal swelling, crusting and nasal discharge in the post operative period. These symptoms can last from few days to several weeks following the operation. To counter these problems patients are advised

various forms of treatments. These could be in the form of nasal alkaline douches, nasal decongestants and or both. Nasal alkaline douches have been a longstanding treatment for sinonasal disease. It has been practised in India for centuries as part of the purification routines performed in preparation for yoga.² Nasal irrigation with saline seems to reduce nasal and rhinosinusal dryness, facilitating the clearing of thick mucus and crusts in patient's affected by rhino sinusitis.³ In addition to these properties, because of their effects of moisturisation, humidification and reduction of swelling, they have been tried after surgery for rhino sinusitis.⁴ Nasal saline douches have been recommended in the immediate post operative period to clear the blood clots and crusts.⁵

Recently, hypertonic saline (HS) administration is recognized as the regent taking full advantage of the patients' own total body water by drawing interstitial "third space", so it could be posited as a means of maximizing intravascular volume.⁶ In the perioperative period, HS administration could reduce the intravenous fluid required to sustain tissue perfusion. A recent Cochrane review found that HS reduced the overall volume of intravenous fluid, resulting in a statistically significant reduction in complications.⁷ Hence, this study was conducted to compare the hypertonic nasal douching with normal saline nasal douching in post operative endoscopic sinus surgery.

MATERIALS & METHODS

The present study was conducted for evaluating and comparing the hypertonic nasal douching with normal saline nasal douching in post operative endoscopic sinus surgery. A total of 200 subject were enrolled. The age group was 30 to 60 years who underwent FESS were selected. Post operative evaluation was done. All subjects were given antibiotic-soaked nasal pack for around 48 hrs after surgery. All patients were given the same antibiotic in the post operative period till 10 days and then evaluated on 10th and 20th postoperative day. 200 patients were divided into 2 groups as 100 patients each. Group I patients used hypertonic saline for douching while group II patients used isotonic saline for nasal douching. The appearance of nasal mucosa was listed as either normal and edematous. Crusting was described as nil, mild or severe in nature. All the results were recorded and analysed using SPSS software.

RESULTS

A total of 200 patients with age group of 30 to 60 years was selected. Mean age was 45.36 years. On 10th post operative day, there were no patients with normal mucosa and percentage was similar in both hypertonic as well as normal saline. On 20th day, there were 24% of patients of hypertonic saline and 10% of patients of normal saline with normal mucosa. There were 33% of patients with no crusting with use of hypertonic saline on 20th day. Similarly, there were 22% of individuals who used normal saline on 20th day had no crusting. Severe crusting cases with hypertonic saline were 36% and with normal saline were 41% of patients on 20th day.

Table1: Endoscopic appearance of nasal mucosa in post operative period.

Days of assessment	Endoscopic nasal mucosa	Hypertonic saline %	Isotonic saline %	P- value
10th day	Normal mucosa	0	0	1
	Edematous	100	100	
20th day	Normal mucosa	24	10	0.01 (Significant)
	Edematous	76	90	

Table2: Endoscopic scores for crusting inside the nose in post operative period.

Days of assessment	Crusting inside nose	Hypertonic saline %	Isotonic saline %	P- value
10th day	No crusting	5	6	0.42
	Mild crusting	38	34	
	Severe crusting	57	60	
20th day	No crusting	33	22	0.02 (Significant)
	Mild crusting	31	37	
	Severe crusting	36	41	

DISCUSSION

Nasal irrigation (NI) is an old practice of upper respiratory tract care that likely originated in the Ayurvedic medical tradition.⁸ It was adopted by Western medicine in the late 19th century, and since then, it has continued to gain popularity worldwide.⁹ It is used alone or in association with other therapies in several conditions, including chronic rhinosinusitis (CRS) and allergic rhinitis (AR). Moreover, particularly in children, it has been prescribed to treat and prevent upper respiratory tract infections (URTIs).¹⁰

During FESS an intact muco-periosteum lined cavity should be preserved in the areas of the medial orbital wall, skull base and the frontal recess to avoid orbital complications. Use of powered instruments during FESS requires great care and a wide knowledge of the anatomy related to the orbit.¹¹ Hence, this study was conducted to compare the hypertonic nasal douching with normal saline nasal douching in post operative endoscopic sinus surgery.

In the present study, A total of 200 patients with age group of 30 to 60 years was selected. Mean age was 45.36 years. On 10th post operative day, there were no patients with normal mucosa and percentage was similar in both hypertonic as well as normal saline. On 20th day, there were 24% of patients of hypertonic saline and 10% of patients of normal saline with normal mucosa. Our results were in concordance with the results obtained by previous authors who also reported similar findings. In a study conducted by Low TH et al, authors investigated the clinical effects of normal saline, lactated Ringer's, and hypertonic saline nasal douching solutions after ESS. All groups showed an improvement with treatment in Sino-Nasal Outcome Test (SNOT-20) scores and VAS scores, as well as endoscopic evaluation of mucosa appearance over time. There was no improvement of mucociliary clearance (MCC) during the treatment period. Irrigation with lactated Ringer's solution resulted in better symptom scores in SNOT-20 ($p < 0.05$) and VAS ($p < 0.05$), compared with irrigation with normal saline or hypertonic saline solutions. Patients receiving hypertonic saline solutions had less polypoidal mucosa at week 6. Douching with lactated Ringer's solution after ESS results in better improvement in sinonasal symptoms, compared with normal saline or hypertonic saline solutions.¹²

In the present study, there were 33% of patients with no crusting with use of hypertonic saline on 20th day. Similarly, there were 22% of individuals who used normal saline on 20th day had no crusting. Severe crusting cases with hypertonic saline were 36% and with normal saline were 41% of patients on 20th day. In another similar study conducted by Farag et al, authors randomised forty adult candidates for endoscopic endonasal surgery with chronic rhinosinusitis (CRS). The surfactant (S) and hypertonic saline (HS) irrigation groups both showed significant decreases in scores for the SNOT-22 over time (both $p < 0.0001$), but no difference was seen between the 2 groups ($p = 0.09$, $p = 0.5$). The S group reported significantly more side effects (52% vs 6%, $p = 0.002$) and had more patients stop the solution (20% vs 0%) and fewer S patients finished the study compared to the HS group. There were no significant differences in overall subjective symptoms related to sinonasal disease between S and HS irrigation, but tolerability appeared to be an issue.¹³ Rabago D et al, in another study, assessed the degree to which subjects using nasal irrigation for chronic

sinus symptoms also reported improvements in symptoms related to allergy, asthma or nasal polyposis. Transcripts of interviews were systematically examined. Twelve of 21 subjects with allergic rhinitis spontaneously reported that HSNI improved symptoms. Two of seven subjects with asthma and one of two subjects with nasal polyposis reported a positive association between HSNI use and asthma or nasal polyposis symptoms. Transcript content was organized into themes which included: 1) HSNI resulted in improvement of allergic rhinitis and asthma symptoms, and 2) HSNI should be used for symptoms of allergic rhinitis.¹⁴

CONCLUSION

Patients who used hypertonic saline for douching in the post operative period were found to have lesser severe crusting as compared to those who used isotonic saline for douching.

REFERENCES

1. Setliff RC, Parsons DS. The "Hummer"; new instrumentation for functional endoscopic sinus surgery. *Am J Rhinol* 1994;8:275-78. 10.2500/105065894781874232.
2. Rabago D, Zgierska A, Mundt M. Efficacy of daily hypertonic saline nasal irrigation among patients with sinusitis: a randomized controlled trial. *J Fam Pract*. 2002;51:1049–55.
3. Nuutinen J, Holopainen E, Haaletela T. Balanced physiologic saline in the treatment of chronic rhinosinusitis. *Rhinology*. 1986;24:265–69.
4. Ryan RM, Whittet HB, Norval C. Minimal follow up after functional endoscopic sinus surgery: does it affect the outcome? *Rhinology*. 1996;34:44–45.
5. Williams RA. Submucous resection of the septum. In: Dudley H, Carter D, editors. *Rob and Smith's operative surgery*. 4. London: Butterworths; 1986
6. Radhakrishnan RS, Xue H, Weisbrodt N, et al. Resuscitation-induced intestinal edema decreases the stiffness and residual stress of the intestine. *Shock* 2005;24:165–70.
7. Lavu H, Sell NM, Carter TI, et al. The HYSLAR trial: a prospective randomized controlled trial of the use of a restrictive fluid regimen with 3% hypertonic saline versus lactated Ringers in patients undergoing pancreaticoduodenectomy. *Ann Surg* 2014;260:445–53.
8. Rama S., Ballentine R., Hymes A. *Science of Breath: A Practical Guide*. Himalayan Institute Press; Honesdale, PA, USA: 1998.
9. Burns J.L. Nasal lavage. *J. Otolaryngol*. 1992;21:83.
10. Sur D.K., Plesa M.L. Treatment of allergic rhinitis. *Am. Fam. Physician*. 2015;92:985–92.
11. Gross CW, Becker DG. Instrumentation in endoscopic sinus surgery. *Curr Opin Otolaryngol Head Neck Surg* 1996;4:20 . 10.1097/00020840-199602000-00006
12. Low TH, Woods CM, Ullah S, Carney AS. A double-blind randomized controlled trial of normal saline, lactated Ringer's, and hypertonic saline nasal irrigation solution after endoscopic sinus surgery. *Am J Rhinol Allergy*. 2014 May-Jun;28(3):225-31
13. Farag AA, Deal AM, McKinney KA, Thorp BD, Senior BA, Ebert CS Jr, Zanation AM. Single-blind randomized controlled trial of surfactant vs hypertonic saline irrigation following endoscopic endonasal surgery. *Int Forum Allergy Rhinol*. 2013 Apr;3(4):276-80.
14. Rabago D, Guerard E, Bukstein D. Nasal irrigation for chronic sinus symptoms in patients with allergic rhinitis, asthma, and nasal polyposis: a hypothesis generating study. *WMJ*. 2008 Apr;107(2):69-75.