

## Original Research Article

# The management of postoperative airway after nasal endoscopic sinus surgery

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### ABSTRACT

**Background:** Nasal surgery followed by nasal packing can be vulnerable due to airway complications like, respiratory blockage and dyspnea. Thus the present study aimed to compare the nasal packing with nasal airway after the nasal surgery for the airway management.

**Methods:** A total of 120 patients for fiberoptic endoscopic sinus surgery were included in this study. All subjects were equally divided in to 3 groups; group 1, 40 patients with traditional bilateral nasal packing; group 2, 40 patients with 5 mm internal diameter uncuffed ETT in to one of the nostrils and bilaterally in group 3 40 patients. During postoperative period all data were recorded and analyzed by using statistical analysis software 20.0.

**Results:** In case of group 1 patients cardio-respiratory parameters reported significant variation. Pain and bleeding during removal of nasal airway and discomfort showed significant results among group 1 patients than in group 2 and group 3 patients.

**Conclusions:** This study showed that the new intervention to manage the airway obstruction has benefits as compared to traditional nasal packing with ease of suctioning, oxygen supplementation.

**Keywords:** Fiberoptic endoscopic sinus surgery, Airway blockage, Nasal packing, Endoscopy

### INTRODUCTION

In head and neck surgery postoperative airway obstruction is most common type of complication. In case of different nasal sinuses, fiberoptic endoscopic sinus surgery (FESS) is widely used intervention to widen the drainage pathway.<sup>1,2</sup> The concept of FESS has been designed by Messerklinger and focuses at easy mucociliary clearance and postoperative normal ventilation.<sup>3,4</sup> Other than common postoperative complications like, orbital trauma, intracranial injury, bleeding; various other problems arises such as, embolism, nausea, aspiration, vomiting, myocardial infarction can also happen.<sup>5-11</sup> The mechanism of breathing is usually very complex phenomenon, which is

quite perceived in daily life.<sup>12,13</sup> Any situation leading to a small blockage in breathing including nasal packing can leads to a sense of discomfort.<sup>14</sup> If any case the obstruction is not removed immediately, it can progress to dyspnea, retention of carbon dioxide and rapid hypoxemia. Therefore it usually very difficult to assess the recovery profile during postoperative period as all these characteristics can alter the sedation levels.<sup>15,16</sup> Although the preoperative counselling of breathing through mouth is given but it is problematic to maintain due to patients in anaesthetic stage. In resource limited areas it is quite difficult to use costly nasal airway. Therefore, the present study aimed to compare the new interventions to maintain the nasal airway during postoperative period in patients undergoing FESS. The

newer intervention included low cost sterilized uncuffed endotracheal tube cut in to appropriate size and placed in the nasal cavity unilaterally or bilaterally to prevent the airway obstruction and breathing discomfort.

### METHODS

This study was an interventional study conducted in MNR medical college and hospital, ENT department during the period from August 2019 to February 2020. A total of 120 patients undergone FESS surgery were involved in this study. This study was approved by Institutional Human ethical committee. Equal number of patients (40) was divided in three different groups such as group 1, group 2 and group 3. All the patients mean age ranges between 17-59 years. The patients with diabetes, heart disease and central nervous system disorders were excluded from this study. Before the surgery, written consent form and counselling was provided to all the patients. During the operative procedure, mean arterial pressure, oxygen saturation, electrocardiograph were observed and recorded at an interval of 10 minutes. At the end of surgery and before nasal packing a 5 mm internal diameter uncuffed ETT was inserted in one nostril in group 2 patients and in both nostrils in group 3 patients. Traditional nasal packing was done in group 1 type patients. All data were recorded and analyzed by SPSS software 20.0 statistical analysis software.

### RESULTS

A total of 120 patients were under gone FESS during the study period. The age group ranged between 17-59 years. There was no significant difference found in between various variables such as, age, sex, weight, height, and mean surgery period (Table 1). Postoperative variables were recorded during recovery period (Table 2). There was no pain and discomfort found in most of the patients belongs to group 2 and group 3. There was significant difference found in overall satisfaction rate in doctors to the results of new intervention in group 2 and 3 with traditional nasal packing in group 1 patients ( $p < 0.0002$ ) (Table 2).

**Table 1: Demographic data of patients under gone FESS.**

Demographic data	Group 1 (n=40)	Group 2 (n=40)	Group 3 (n=40)
Age	31	29	28.2
Sex (male/female)	22/18	19/21	28/12
Weight	62	57	65
Height	165.3	165.2	167.8
Duration of surgery in minutes	107.53	114.43	119.27

**Table 2: Postoperative parameters and variables related with nasal packing in 3 different groups.**

Post-operative parameters	Group 1 %	Group 2 %	Group 3 %	P value
Respiratory rate	19	15.45	14.4	0.015
Pain/discomfort	Pain-25.4 Discomfort-55.3 No pain/discomfort-17.6	Pain-11 Discomfort-22.3 No pain/discomfort-68.4	Pain-12 Discomfort-26.3 No pain/discomfort-62.1	<0.0001
Discomfort during nasal packing	No discomfort-10 Mild discomfort-27.5 Moderate discomfort-57.3 Extreme discomfort-5.6	No discomfort-37.4 Mild discomfort-24.6 Moderate discomfort-57.3 Extreme discomfort-3.2	No discomfort-24.5 Mild discomfort- 0.4 Moderate discomfort-14.6 Extreme discomfort-5.2	<0.03
Bleeding from nostril during removal of packing	No bleeding-67.8 Mild bleeding-29 Moderate bleeding-2.7 Heavy bleeding-0	No bleeding-92 Mild bleeding-9 Moderate bleeding-1 Heavy bleeding-0	No bleeding-84 Mild bleeding-12 Moderate bleeding-4 Heavy bleeding-0	<0.0001
Overall satisfaction of the surgeon	Satisfied-35 Neutral- 46.3 Negative-30.4	Satisfied-72 Neutral-28 Negative-0	Satisfied-85 Neutral-15 Negative-0	<0.0001
Overall satisfaction of anaesthesiologist	Satisfied-33 Neutral-47 Negative-20	Satisfied-65 Neutral-30 Negative-5	Satisfied-75 Neutral-22 Negative-3	<0.0001

### DISCUSSION

Several methods are available for the prevention of any airway obstruction and breathing problem after head, neck and nose surgery with different level of success.<sup>13-19</sup> However, the important matter to use such interventions

in developing nations like India includes the cost and availability of necessary equipment. Although there are interventions like laryngeal mask airway or nasopharyngeal airway as a excellent method to prevent airway obstruction, but due to its high cost, it is limited for use in India.<sup>20</sup> In this present study we evaluated the

potential use of low cost sterilized uncuffed ETT in patients undergoing FESS. In most of the patients, apart from preoperative counselling, it is difficult to manage the normal breathing through mouth during the immediate postoperative period after bilateral nasal packing.<sup>14</sup> In this study all patients were studied for 4 hours during immediate postoperative period for any complications like, respiratory rate, pulse oximetry (SpO<sub>2</sub>) and haemodynamic variables such as, mean MAP and HR, which is significantly higher while oxygen saturation was lower in group 1 patients. This study made the useful benefits of nasal conduits in not only manage the normal breathing and oxygen saturation; it can also maintain the cardiac parameters. However, apart from managing nasal airway, other potential benefits of these interventions such as, haemostatic effect of ETT, comfortable of suctioning through nasal ETT, easy oxygen supplementation, prevent oedema and fibrosis in operative site. The discomfort and pain because of placement of nasal airway during post-operative period is one of the most critical factor which makes us to design and conducting this study. The response for newer interventions among patients was excellent as only 9% and 21.4% in group 3 and 12% and 25.3% in group 2 suffered from mild discomfort and pain as compared to 26.2% and 54.6% in group 1 patients. Our findings showed clinically and statistically significant which establishes the potential benefits of designing the present study. Similar result showed by Holden et al. which supported our study of newer interventions in nasal packing with ETT.<sup>21</sup> The complications such as, COPD, obstructive sleep apnea and cardiac diseases increases the difficulty to manage patients due to deep sedation and anaesthesia level.<sup>22-24</sup> The post operative period in these patients can be difficult to manage if they fail to breathe through mouth.<sup>2,25,26</sup> In the present study we did not phase such complications in group 2 and 3 patients. The bronchospasm, laryngospasm, uvular edema and bleeding are the major complications of nasal packing and failure to breathe through mouth.<sup>27</sup> Due to these reasons the nasal pack swell like tampon and create pressure on the soft tissues of the pharynx, hence causing venous stasis and edema.<sup>28</sup> Approximately 6% of patients develops Samster's triad in whom FESS for removal of nasal polyps can leads to bronchospasm in response to drugs such as, aspirin and non-steroidal anti-inflammatory drugs.<sup>29</sup> The subjective assessment of the present procedure was recorded by the surgeons and anaesthesiologist depend on the post-operative variables. These records showed that the present airway procedure satisfied 65% and 76% of surgeons and 75% and 84% of anaesthesiologists in both group 2 and 3. Sukhminder et al study reported also the similar type of findings regarding satisfaction level in surgeons and anaesthesiologists.<sup>30</sup> In this study dexmedetomidine was used before induction of anaesthesia which can decreases the anaesthetic and analgesic requirements besides reducing the incidence of shivering and maintain haemodynamic variables in pre-operative and post-operative period. Similar interventions were used by

Sukhminder et al and Bajwa et al which showed similar result as compared to our findings.<sup>30,31</sup> The hypopharyngeal packing can reduces the nasal bleeding during surgery on nasal sinuses. Basha et al and Piltcher et al study also reported the reduction of bleeding during nasal surgery.<sup>15,31</sup> The distal end of the pack was knotted and kept inferior to the ETT and the other portion placed in compact manner so it can prevent bleeding in the aerodigestive tract.

## CONCLUSION

The present study showed that there was excellent outcome to use these newer interventions. The other benefits such as, comfortable suctioning, oxygen supplementation and possible haemostatic effect. The most important part in these newer interventions are low cost and easy to use instead of traditional nasal packing.

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## REFERENCES

1. Ramachandran R, Singh PM, Batra M, Pahwa D. Anaesthesia for endoscopic endonasal surgery. *Trends Anaesthesia Critical Care.* 2011;1:79-83.
2. Danielsen A, Gravningsbråten R, Olofsson J. Anaesthesia in endoscopic sinus surgery. *Eur Arch Otorhinolaryngol.* 2003;260:481-6.
3. Kennedy OW, Zinreich SJ, Rosenbaum A. Functional endoscopic sinus surgery: Theory and diagnosis. *Arch Otolaryngol.* 1985;111:576-82.
4. Kennedy OW, Zinreich SJ. The functional endoscopic approach to inflammatory sinus disease: Current perspectives and technique modifications. *Am J Rhinol.* 1988;2:89-96.
5. Ikeda K, Tanno N, Tamura G, Suzuki H, Oshima T, Shimomura A, et al. Endoscopic sinus surgery improves pulmonary function in patients with asthma associated with chronic sinusitis. *Ann Otol Rhinol Laryngol.* 1999;108:355-9.
6. Saito T, Ikeda T, Kono Y, Ohtsubo T, Noda I, Saito H. Implications of endoscopic endonasal surgery for the treatment of postoperative maxillary mucoceles. *ORL J Otorhinolaryngol Relat Spec.* 2000;62:43-8.
7. Weber R, Keerl R, Hosemann W, Schauss F, Leuwer R, Draf W. Complications with permanent damage in endonasal paranasal sinus operations-more frequent in experienced surgeons?. *Laryngorhinootologie.* 1998;77:398-401.
8. Berenholz L, Kessler A, Sarfaty S, Segal S. Subarachnoid hemorrhage: A complication of

- endoscopic sinus surgery using powered instrumentation. *Otolaryngol Head Neck Surg.* 1999;121:665-7.
9. Korkut AY, Erkalp K, Erden V, Teker AM, Demirel A, Gedikli O, et al. Effect of pharyngeal packing during nasal surgery on postoperative nausea and vomiting. *Otolaryngol Head Neck Surg.* 2010;143: 831-6.
  10. Westreich R, Sampson I, Shaari CM, Lawson W. Negative pressure pulmonary oedema after routine septorhinoplasty: Discussion of pathophysiology, treatment and prevention. *Arch Facial Plast Surg.* 2006;8:8-15.
  11. Celebi N, Artukoglu F, Celiker V, Aypar U. Repeated attacks of venous air embolism during endoscopic sinus tumour surgery: A case report. *Int J Pediatr Otorhinolaryngol.* 2005;69:1437-40.
  12. Cummings CW, Fredrickson JM, Harker LA, Krause CJ, Schuller DE, Richardson MA. *Otolaryngology head and neck surgery.* 3rd ed. St Louis: Mosby; 1998.
  13. Mehta VM, Har-El G, Goldstein NA. Post obstructive Pulmonary oedema after laryngospasm in the otolaryngology patient. *Laryngoscope.* 2006; 116:1693-6.
  14. Orlandi RR, Lanza DC. Is nasal packing necessary following endoscopic sinus surgery?. *Laryngoscope.* 2004;114:1541-4.
  15. Basha SI, McCoy E, Ullah R, Kinsella JB. The efficacy of pharyngeal packing during routine nasal surgery-A prospective randomised controlled study. *Anaesthesia.* 2006;61:1161-5.
  16. Baker AR, Baker AB. Anaesthesia for endoscopic sinus surgery. *Acta Anaesthesiol Scand.* 2010;54: 795-803.
  17. Wormald PJ, Athanasiadis T, Rees G, Robinson S. An evaluation of effect of pterygopalatine fossa injection with local anesthetic and adrenalin in the control of nasal bleeding during endoscopic sinus surgery. *Am J Rhinol.* 2005;19:288-92.
  18. Banhiran W, Casiano RR. Endoscopic sinus surgery for benign and malignant nasal and sinus neoplasm. *Curr Opin Otolaryngol Head Neck Surg.* 2005;13:50-4.
  19. Bolger WE, Brown CL, Church CA, Goldberg AN, Karanfilov B, Kuhn FA, et al. Safety and outcome of balloon catheter sinusotomy: A multicenter 24-week analysis in 115 patients. *Otolaryngol Head Neck Surg.* 2007;137:10-20.
  20. Kaplan A, Crosby GJ, Bhattacharyya N. Airway protection and the laryngeal mask airway in sinus and nasal surgery. *Laryngoscope.* 2004;114:652-5.
  21. Holden JP, Vaughan WC, Brock-Utne JG. Airway complication following functional endoscopic endoscopic sinus surgery. *J clinical Anesthesia.* 2002;14:154-7.
  22. Hamans EP, Van Marck EA, DeBacker WA, Creten W, Van de Heyning PH. Morphometric analysis of the uvula in patients with sleep-related breathing disorders. *Eur Arch Otorhinolaryngol.* 2000;257: 232-6.
  23. Sandler NA, Hodges J, Sabino M. Assessment of recovery in patients undergoing intravenous conscious sedation using bispectral analysis. *J Oral Maxillofac Surg.* 2001;59:603-11.
  24. Religa ZC, Wilson S, Ganzberg SI, Casamassimo PS. Association between bispectral analysis and level of conscious sedation of pediatric dental patients. *Pediatr Dent.* 2002;24:221-6.
  25. Tewfik MA, Frenkiel S, Gasparrini R, Zeitouni A, Daniel SJ, Dolev Y, et al. Factors affecting unanticipated hospital admission following otolaryngologic day surgery. *J Otolaryngol.* 2006;35: 235-41.
  26. Liu T, Wang BQ, Yang PC. A possible link between sinusitis and lower airway hypersensitivity: The role of Staphylococcal enterotoxin B. *Clin Mol Allergy.* 2006;4:7.
  27. Tabboush ZS. Airway obstruction from uvular edema after traumatic adenoidectomy. *Anesth Analg.* 2000;91:494.
  28. Jeffrey PH, Winston CV, John GB. Airway complication following functional endoscopic sinus surgery. *J Clin Anesth.* 2002;14:154-7.
  29. Kim JE, Kountakis SE. The prevalence of Samter's triad in patients undergoing functional endoscopic sinus surgery. *Ear Nose Throat J.* 2007;86:396-9.
  30. Bajwa SJS, Kaur J, Singh A, Parmar SS, Singh S. Postoperative airway management after nasal endoscopic sinus surgery: A comparison of traditional nasal packing with nasal airway. *Anesth Essays Res.* 2013;7(1):116-22.
  31. Bajwa SJ, Gupta S, Kaur J, Singh A, Parmar SS. Reduction in the incidence of shivering with perioperative dexmedetomidine: A randomized prospective study. *J Anaesthesiol Clin Pharmacol.* 2012;28:86-91.
  32. Piltcher O, Lavinsky M, Lavinsky J. Effectiveness of hypopharyngeal packing during nasal and sinus surgery in the prevention of PONV. *Otolaryngol Head Neck Surg.* 2007;137:552-4.

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