

Postoperative Care in Functional Endoscopic Sinus Surgery: A Brief Study on Expert Opinions

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Article Info

Article Note:

Received: October 2023

Accepted: October 2023

Publish Online: November 2023

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Keywords:

Nasal polyps;

Endoscopic surgery;

Long-term;

Care.

Abstract

Background: An operation called functional endoscopic sinus surgery (FESS) can improve symptoms with success rates ranging from 67% to 98%. However, post-FESS management is still uncertain, and this expert opinion provides guidelines for managing patients after the surgery.

Aim: This study aimed to evaluate postoperative care in functional endoscopic sinus surgery.

Methods: In the current descriptive cross-sectional study, a questionnaire consisting of 25 questions about pre- and post-FESS considerations in terms of medications, imaging and the follow-up period was designed and 40 expert rhinologists in this field responded to the questions.

Results: Post-operative antibiotics, pre-and post-operative corticosteroids especially in the form of nasal spray, corticosteroid-soaked Gelfoam, saline irrigation in large volumes, and nasal debridement after surgery were recommended by the majority of the surveyed experts. Post-operative imaging was suggested if any adverse event is suspected. Furthermore, oral corticosteroids are suggested for exacerbations. Most of the experts recommend long-term follow-ups.

Conclusion: Based on the findings of the current survey, the experts' practice not only is remarkably variable over each other but also differs from the current guidelines. Further investigations and practical workshops are strongly recommended to improve the experts' performance in FESS.

Conflicts of Interest: The Authors declare no conflicts of interest.

Please cite this article as: Rastegar Z, Safavi Naini A. Postoperative Care in Functional Endoscopic Sinus Surgery: A Brief Study on Expert Opinions. J Otorhinolaryngol Facial Plast Surg 2023;9(1):1-10.

<https://doi.org/10.22037/orlfps.v9i1.43859>

Introduction

Nasal polyps are noncancerous growths that occur in the nasal cavities and sinuses. These growths are commonly associated with chronic rhinosinusitis with nasal polyps, which affect approximately 25-30% of patients with chronic rhinosinusitis. While benign, nasal polyps can cause significant discomfort and decreased quality of life, necessitating prompt evaluation and treatment (1, 2).

In the mid-1980s, functional endoscopic sinus surgery (FESS) was introduced as a treatment for chronic rhinosinusitis (CRS) and chronic

rhinosinusitis with nasal polyps that did not respond to medical therapy. Since then, FESS turned to a choice approach and was accompanied by significantly improved symptoms and quality of life in both short- and long-term (3, 4).

From a clinical perspective, the management after FESS is still questionable. Besides, numerous considerations in pre- and post-operative settings remained unresponded. On the other hand, the applied approaches in different regions considerably vary. Moreover,

the practice of the otorhinolaryngologists in a single region might differ, as well. Therefore, the current expert opinion aims to investigate the pre- and post-FESS considerations of expert rhinologists in Iran. This expert opinion aims to provide guidelines or recommendations for management after FESS.

Methods

The Experts

The current descriptive cross-sectional study has been designed as an expert opinion aiming at the investigation of long-term post-FESS considerations.

Given that, 40 otorhinolaryngologist specialists with fellowships of rhinology who were experts in this field shared their opinions on potential post-FESS management and preferences using a particular questionnaire designed for this aim. The study has been proposed to the Ethics Committee of Shahid Beheshti University of Medical Sciences and approved via code number "IR.SBMU.NRITLD.REC.1402.087".

The Survey

Due to the significance of the issues in this field, a thorough literature review of published papers in peer-reviewed and high-impact factor journals about FESS and post-FESS management was done to extract the most challenging and unresponded matters. Given that, a questionnaire consisting of 25 questions was designed to address the critical decisions about post-endoscopic sinus surgery management.

This questionnaire asked about pre-operative antibiotic and corticosteroid administration, packing after surgery, the first debridement post-operation, use of gel foam, post-operative use of corticosteroids and its form, the initiation, and duration of treatment with corticosteroids, saline irrigation, post-operative and topical antibiotic use, antihistamines and decongestants, post-operative imaging, requirements for refers to immunologists, the drug administered in exacerbations, and duration of the follow-ups.

Statistical analysis

The Rstudio program analyzed the gathered data. The categorical data were presented in frequencies and percentages. Mean and standard deviation were applied to calculate the continuous variables.

Results

Survey Response

The questionnaire was sent to 40 fellowships of rhinology who were experts at FESS and working in academic clinical and research settings. All the respondents spent many years researching chronic rhinosinusitis, chronic rhinosinusitis with polyps, nasal polyps, and endoscopic sinus surgery.

1. Antibiotic

A. Prophylactic Antibiotic

The responses to the questions in terms of prophylactic antibiotic use revealed that 22 (55%) preferred not to administer these agents in advance of the intervention (Table 1).

B. Post-operative Antibiotic

Nearly all of the attendees (95 % or 38) used postoperative systemic antibiotics. The post-operative antibiotic injection was initiated immediately by the end of the procedure and continued for an average period of 8.76+/-4.29 days.

C. Topical Antibiotic

Postoperative topical antibiotic agents were not favored by any of the participants.

2. Corticosteroids

A. Pre-operative Corticosteroid

Sixty percent of the participants presented a positive insight regarding the use of pre-operative corticosteroids; while 12.5% responded to use it seldomly and 12.5% in case of severe polyposis. Detailed information is demonstrated in Table 1.

B. Post-operative Corticosteroids

Thirty-nine (97.5%) of the responders were willing to use corticosteroids in postoperative settings among whom 56.4%, 10.3% and 33.3% favored local corticosteroids, systemic corticosteroids and their combination,

respectively (Table 2). Moreover, those who agreed on the necessity of local corticosteroids to be administered predominantly applied nasal sprays (60%). More information in this regard is presented in Table 2.

The mean interval between the operation and post-operative corticosteroid initiation was 5.6+/- 6.0 6 days. Besides, the mean recommended time to use corticosteroids was 45.38+/-83.69 days.

Table 1. Preoperative considerations

Preoperative considerations	Frequency	Percentage
Do you use preoperative antibiotics?		
○ Yes	18	45
○ No	22	55
Do you use preoperative corticosteroids for your patients?		
○ Yes	24	60
○ No	6	15
○ Seldom	5	12.5
○ Only in case of severe polyposis	5	12.5
If yes, which form of steroids do you prefer to use?		
○ Local	22	56.4
○ Systemic	4	10.3
○ Local and systemic	13	33.3

3. Antihistamines

The majority of the attendees (57.5%) preferred not to prescribe the antihistamines in post-operative settings; while 9 (22.5%) presented that their decision to prescribe these agents might differ from case by case.

Systemic antihistamines are more favored among those representing their willingness to prescribe antibiotics in postoperative settings (15 individuals out of 17).

4. Decongestant

Decongestant agent prescription was recommended by only 3 (7.5%) of the rhinologists.

5. Corticosteroid-soaked Gelfoam

Nearly 50 percent of members used Corticosteroid-soaked Gelfoam. Thirteen cases (33%) mentioned that they do not use Corticosteroid-soaked Gelfoam.

6. Saline

All the participants declared that they recommend postoperative saline irrigation among whom 80% preferred hypertonic saline and 20% prescribed isotonic solutions.

7. Packing and Debridement

Three-four of the survey responders presented that they perform nasal packing after the endoscopic sinus surgery; while ten reported

that they do not pack the nasal cavity after the endoscopic sinonasal operations.

Besides, the mean interval between the surgery and the first debridement was 17.3+/-8.98 days (ranging from 5 to 30 days after the operation).

8. Endoscopic Interval

The intervals between postoperative endoscopic reevaluation of the patients variably differed among the rhinologists. The most common response was bimonthly (25.7%) followed by initially every month then every 3 months (11.4%) and initially every month then every 3, and finally every 6 months (11.4%). Further data are shown in Table 2.

9. Immunologist Consult

Eighty per cent of the responders presented that they refer their patients to an immunologist.

10. Post-operative Imaging

Postoperative imaging was routinely done by 30 responders (75%) who variably presented to perform imaging in case of postoperative complications (40%), in case of symptoms persistence (30%), within 2 (3%), 3 (6%), 4 (3%) months and one year (6%) postoperatively.

11. Exacerbations

In case of symptoms recurrence or exacerbation, 22 individuals (55%) of the

rhinologists represented that they prescribed oral corticosteroids, while the rest used a combination of oral corticosteroids and antibiotics.

12. Follow-ups

Generally, 65% of the respondents presented that long-term follow-ups are required for the

patients among whom 10 (38.5%) recommended lifelong visits and 16 (61.5%) represented the least period of a year for the patients' routine follow-up. Nevertheless, the duration of following the patients undergoing FESS remained unclear.

Table 2. Postoperative considerations

Postoperative considerations	Frequency	Percentage
Do you consider postoperative systemic antibiotics?		
○ Yes	38	95
Do you apply any topical antibiotics in the postoperative setting?		
○ No	0	0
Do you apply postoperative corticosteroids?		
○ Yes	39	97.5
If yes, which type of corticosteroids do you prefer?		
○ Local	23	56.4
○ Systemic	4	10.3
○ Both	13	33.3
If you prefer local steroids, which form of administration do you recommend?		
○ Nasal spray	21	60
○ Nasal drop	5	14
○ Irrigation	5	14
○ Nasal spray and irrigation	1	3
○ Nasal drop and spray	1	3
○ Nasal irrigation and spray	1	3
○ All three forms	1	3
Do you apply postoperative antihistamines?		
○ Yes	8	20
○ No	23	57.5
○ It differs based on the case	9	22.5
In the case of prescribing antihistamines, which form of administration do you prefer more?		
○ Systemic	15	88
○ Local sprays	2	12
Do you apply postoperative decongestants?		
○ Yes	3	7.5
Do you recommend saline solution irrigation to your patients in the postoperative setting?		
○ Yes	40	100
If yes, which tone of saline do you prefer?		
○ Isotonic	18	20
○ Hypertonic	32	80
Do you perform postoperative packing?		
○ Yes	30	75
Do you use corticosteroid-soaked gel foams?		
○ Yes	27	
At what intervals do you perform endoscopic reassessments for your patients?		
○ Initially every month then every 3 months	4	11.4

○ Initially every month then every 2, then 4, and finally every 6 months	2	5.7
○ Every two months	9	25.7
○ Initially every month then every 3, and finally every 6 months	4	11.4
○ Initially every month then every 3, then every 6 months, and annually	3	8.6
○ Every month	3	8.6
○ Every 3 months	3	8.6
○ Every 4-6 months	2	5.7
○ Every month until three months, then every 3 months	1	2.9
○ First week, first month, then every 2 months until a year	3	8.6
○ Every 2 weeks in first three months after surgery, every 2 months in second trimester, and then every three months in next 6 months	1	2.9
Do you request immunologist consultant for your patients with chronic rhinosinusitis in postoperative setting?		
○ Yes	24	80
Do you perform any postoperative imaging for your patients?		
○ Yes	30	75
If yes, in which conditions?		
○ In case of postoperative complications	12	40
○ In case of persistent symptoms	9	30
○ Routinely within a year after the surgery	2	6
○ Routinely within two months after the surgery	1	3
○ Routinely within three months after the surgery	2	6
○ Routinely within four months after the surgery	1	3
○ No information	3	10
What do you do in case of symptoms exacerbations in postoperative settings? I prescribe ...		
○ Systemic corticosteroids only	22	55
○ Systemic antibiotics only	0	0
○ Both	18	45
Do you recommend long-term follow-up of the patients after functional endoscopic sinus surgery?		
○ Yes	26	65
How long do you follow your patients after functional endoscopic sinus surgery?		
○ The least period of a year	10	38.5
○ Lifelong follow-up	16	61.5

Discussion

Endoscopic sinus surgery (ESS) has significantly advanced since it first emerged. The concept behind sinus surgery stems from Messerklinger's studies on mucociliary clearance and its role in the pathogenesis of sinusitis. The goals of functional endoscopic sinus surgery (FESS) in treating sinusitis are to enlarge sinus ostia, restore adequate aeration of sinuses, improve mucociliary transport, and provide a better route for topical therapies. The notion behind FESS may seem straightforward,

but the anatomical variability and the broad range and severity of diseases addressed in every FESS remain challenges for the surgeon in every case (5).

Despite all the advances in ESS and FESS, several controversies in terms of pre-and post-operative management and the duration of follow-ups remained unresponded. The matters that are tried to be assessed in the current expert opinion study.

Functional endoscopic sinus surgery (FESS) is categorized as one of the clean-contaminated

surgical procedures considering the bacterial colonization of the sinonasal cavity (6). Given that, it seems logical to apply preoperative prophylactic antibiotics as recommended for clean-contaminated and contaminated surgeries (7). In this regard, forty-nine members of the American Rhinologic Society were surveyed among whom more than half (57%) used prophylactic antibiotics before FESS (8). Other studies are agreeing on the utility of preoperative prophylactic antibiotics for FESS (9, 10). This outcome is in contrast to our survey in which the majority of the responders recommended not to use prophylactic antibiotics. Similarly, an old survey by Portela et al. in 2012 showed that the majority of otorhinolaryngologists preferred not to apply preoperative antibiotics for patients undergoing FESS (11). Nevertheless, data in this regard are significantly controversial; even those who recommend using prophylactic antibiotics are debating about the use of intravenous versus oral agents, the duration of prophylaxis and the types of applied antibiotics to cover anaerobic bacteria, use the wide-spectrum agents such as amoxicillin-clavulanic acid or amoxicillin alone suffices (9).

Postoperative antibiotic administration was recommended by nearly all the participants in the current study. It has been estimated that post-FESS infection occurs in 15% of the patients (12). Accordingly, the necessity for postoperative antibiotic use turned into an arguing issue in these patients who have probably applied antibiotics several times in their lives because of chronic rhinosinusitis, which has predisposed them to significant antibiotic resistance (13). However, postoperative antibiotic prescription seems routine the general outcomes of postoperative antibiotic use are controversial; some represented favorable outcomes and others opposed. On the other hand, some of them presented short-term benefits but long-term adversities. In a 2012 survey, 86% of otolaryngologists declared that they prescribe

systemic antibiotics postoperatively (14). The logic for recommendations of postoperative antibiotic use in FESS refers to its clean-contaminated nature.

One of the findings regarding antibiotic use for FESS was the reluctance of the surgeons to use topical agents, which potentially can minimize the probability of biofilm formation if applied in combination with debridement and saline irrigation (15, 16). However, topical antibiotics historically had no significant benefit in FESS (17, 18). On the other hand, Verma et al. in a recent investigation represented favorable outcomes in 30-day follow-up of patients undergone FESS(16).

The majority of responders in our investigation represented routine use of corticosteroids in pre-operative settings, while 25% of them stated to use it seldomly or in some cases. The European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) has indicated that preoperative systemic or local corticosteroids could efficiently decrease the amount of blood loss during the surgical procedure as well as the duration of the surgery; however, data in terms of the superiority of local administration over systemic route are inconclusive (19).

Moreover, postoperative corticosteroids in both local and systemic forms were remarkably recommended by approximately all of the authorities who responded to our questionnaire. Surfing the literature emphasizes that both topical and systemic corticosteroids are amongst the initial therapies for chronic rhinosinusitis with and without nasal polyps. The logic for this includes the properties of corticosteroids in reducing inflammation of the nasal mucosa and cavity, facilitating drainage of the secretions and aiding in the healing process (20). A meta-analysis was conducted to evaluate the role of pre-operative corticosteroids in 1309 patients revealed that pre-operative use of corticosteroids in FESS could lead to significantly reduced blood loss, shorter time of operation and improved surgical field quality (20). Besides, corticosteroids

improve postoperative endoscopic scores in chronic rhinosinusitis. Furthermore, both systemic and local agents can significantly decrease the rate of recurrence, particularly in chronic rhinosinusitis. The significance of long-term postoperative corticosteroid use has been implicated in the study of Calus and colleagues who followed their patients for 12 years and represented considerably better responses among those who underwent long-term corticosteroid treatment. They insisted on their outcomes because of factors in the patients who underwent revision surgeries, as well (21). Furthermore, more recent investigations have exaggerated the value of postoperative corticosteroid use to the extent that they suggest applying steroid-releasing implants after FESS with promising data in terms of reducing polyp formation, requirement for revision surgeries and necessity of using systemic corticosteroids; however, the data show short-term benefits, but not long-term ones (22, 23).

The majority of the responders in the current investigation represented their unwillingness to apply antihistamine and decongestant agents in the postoperative management of chronic rhinosinusitis. Data regarding the use of antihistamines and decongestants are limited; in agreement with our findings the major body of evidence did not support their routine use; however, the theories are controversial and most of the authorities represent decision-making might be different case by case (24-26). Consistently, EPOS has presented no conclusive data on decongestant use as they claimed that the main scope of use of these agents is to reduce mucosal oedema by inducing vasoconstriction which might lead to rebound swelling. Accordingly, although the short outcomes might be reasonable, long-term use is not recommended (19).

However, our responders represented vague and inconsistent information regarding the use of corticosteroid-soaked gelfoams in their patients; two randomized clinical trials represented favorable outcomes following

applying gelfoams smeared with corticosteroids in terms of less postoperative complications and better response to treatment (27, 28). Presented data in EPOS does not firmly enforce the utility of corticosteroid-soaked gelfoams, but generally favoured these agents assessing the limited trials on this issue; however, we found no meta-analysis in this term (19).

Postoperative saline irrigation is one of the means that approximately all of the approaches are unanimous about its utility for the patients. In agreement, all of the rhinologists in the current study recommended it. Nevertheless, the debates focus on the volume and tonicity of the irrigation solutions. The authorities of the current investigation mostly preferred isotonic saline solutions in high volumes; a treatment that was recommended by Chitsuthipakorn et al. in their systematic review, as well (28). Similar recommendations were published by Verma and colleagues (16); while Chong et al. recommended high-volume (150 ml) hypertonic solutions (29). Those who prefer isotonic solutions indicate the adversities of hypertonicity including sensations of pain, blockage, rhinorrhea, the irritation of nasal mucosa and the sensation of burning when using a hypertonic agent (16, 30). There are some hypotheses regarding the use of ringer lactate with promising outcomes including better improvements in sinonasal symptoms, compared with normal or hypertonic saline solutions (31). Besides, data regarding the volume of the irrigation revealed superior outcomes regarding high-volume solutions with both low- and high-pressure strategies compared to low-volume approaches (16, 32). EPOS reports insight regarding postoperative irrigation is positive; however, limited studies have presented neutral outcomes. Besides, it has been mentioned that isotonic saline is superior over hypertonic agents (19); however, there is only a study assessing ringer lactate which presented its superiority over iso- and hypertonic saline regarding its better

tolerability than saline solutions (31). The necessity of routine debridement is a challenging issue in sinonasal endoscopic surgery. The mean interval of debridement performance with the index surgery was about 17 days in our investigations. Nevertheless, data in this regard are controversial and inconsistent (33-36). Smith et al. have recommended a debridement procedure with a week interval after the procedure (33). Similarly, three other studies including a meta-analysis (37) and two systematic reviews (36, 38) presented negligible lower SNOT-22 scores at six months in the debridement group but did not recommend it regarding the pain complaint of the patients and insignificant impact on their quality of life. Further questions in the current study included the intervals between endoscopic assessments, the requirement for an immunologist consultant, post-operative imaging and follow-up period. Most of the individuals recommended bimonthly endoscopic revision, they predominantly recommended an immunologist consultant in cases with pathological manifestations of a chronic disease, they applied imaging in case of suspicion for adverse events requiring revision surgery and represented the necessity of long-term follow-ups for the least period of year. Data in this field are significantly limited and dispersed (21, 39-41). Nevertheless, Calus et al. (21) and Gohar et al. (40) insisted on the necessity of the least period of a year to follow the patients with chronic rhinosinusitis undergoing FESS.

Although the expert opinion has advantages, it also has limitations. Experts may need to be corrected and medical research is necessary to validate opinions. Expert opinions can change with new data and may not reflect opinions in other parts of the world or private settings.

Conclusion

Surveys can assist clinicians in weighing expert opinions and considering unique aspects of each case. Based on the findings of the current

survey, the expert's practice not only is remarkably variable over each other but also differs from the current guidelines. Further investigations and practical workshops are strongly recommended to improve the experts' performance in FESS.

Acknowledgements

We would like to thank anyone who contributed to this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Financial Support

The authors declared that there was no funding support for this study.

Ethics

IR.SBMU.NRITLD.REC.1402.087

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