

Current Trends In Pre And Postoperative Management Of Functional Endoscopic Sinus Surgery

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Abstract

Careful pre and postoperative management of patients undergoing functional endoscopic sinus surgery (FESS) is a factor in determining good functional outcome. This study reviews current evidence for pre and postoperative medical management of patients who undergo FESS and assesses current protocols used by a cross-sectional survey by postal questionnaire of United Kingdom otorhinolaryngologists.

320 surgeons replied. 94% of surgeons have a protocol for pre or postoperative medical management of patients who undergo FESS, using a wide range of topical and oral medication. Oral steroids are used significantly more in patients with polyp than non-polyp disease. Antibiotic use does not differ between protocols. Postoperative nasal douching should be encouraged as evidence suggests they improve outcome following FESS, which may avoid the need for frequent office debridement. Although the use of both antibiotics and oral steroids is increasing, there is no conclusive evidence to support their use.

INTRODUCTION

Functional endoscopic sinus surgery (FESS) offers surgery tailored to the disease of each individual in order to restore sinus function through preservation of normal sinus anatomy.¹ Good functional outcome is determined not just by surgical technique, but by medical measures in the immediate pre and postoperative periods.

Preoperative steroids and antibiotics are used both in FESS for nasal polyposis and chronic rhinosinusitis (CRS). Postoperative management is varied and aims to prevent postoperative infection, synechia formation and aid mucosal healing to return to normal function.^{2,3} Combinations of antibiotics, steroids, nasal douches, steam inhalations, antihistamines, antifungals and nasal decongestants are used, without a significant evidence base.

There are no clinical trials of immediate preoperative medication. Some trials have examined postoperative medical management.^{2,4,5,6,7,8,9} No studies have analysed patients with polyp and non-polyp disease who undergo FESS as separate groups. Opinions also vary widely as to when patients should be first followed up after FESS.^{6,10,11,12}

Despite the lack of good evidence for perioperative medical

management of FESS, most surgeons do use some form of treatment.^{13,14} This study evaluates current evidence for pre and postoperative management of FESS and analyses the protocols currently used by United Kingdom (UK) consultant otorhinolaryngologists through a cross-sectional survey by postal questionnaire.

MATERIALS AND METHODS

A cross-sectional survey by postal questionnaire regarding pre and postoperative management of FESS was sent only to UK consultant otorhinolaryngologists who were full members of the British Association of Otorhinolaryngologists - Head and Neck Surgeons (BAO-HNS) in January 2005 (Figure 1). 535 confidential questionnaires were sent with a prepaid, self-addressed reply envelope. A three month delay was allowed for return of the questionnaires. Only fully completed questionnaires were included in the study. The questionnaire was devised to ascertain the frequency of FESS amongst UK otorhinolaryngologists, the medications used in pre and postoperative management of patients with both polyp and non-polyp disease (mostly CRS) and the timing of first follow-up.

Figure 1

Figure 1: FESS Questionnaire

Please tick the boxes of all statements that are true for your practice

I perform functional endoscopic sinus surgery Yes No

If you do not perform FESS, please still return the questionnaire in the envelope provided and thank you very much for your time.

I perform approximately the following number of FESS procedures each year:

1-10 11-20 21-30 31-40 41-50 >50

For patients who are to undergo FESS, I have a protocol for:

immediate pre-operative management

immediate post-operative management

In my immediate pre-operative protocol I use: Please complete the table below

Intervention	POLYP DISEASE					NON-POLYP DISEASE				
	Yes	Drug	Dose	Freq	Usd/ day	Yes	Drug	Dose	Freq	Usd/ day
Alkaline nasal douches	<input type="checkbox"/>	N/A				<input type="checkbox"/>	N/A			
Steam inhalations	<input type="checkbox"/>	N/A	N/A			<input type="checkbox"/>	N/A	N/A		
Oral steroids	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal steroid spray	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal steroid drops	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal decongestants	<input type="checkbox"/>					<input type="checkbox"/>				
Antibiotics	<input type="checkbox"/>					<input type="checkbox"/>				
Antifungals	<input type="checkbox"/>					<input type="checkbox"/>				
Antihistamines	<input type="checkbox"/>					<input type="checkbox"/>				
Other	<input type="checkbox"/>					<input type="checkbox"/>				

In my immediate post-operative protocol I use: Please complete the table below

Intervention	POLYP DISEASE					NON-POLYP DISEASE				
	Yes	Drug	Dose	Freq	Usd/ day	Yes	Drug	Dose	Freq	Usd/ day
Alkaline nasal douches	<input type="checkbox"/>	N/A				<input type="checkbox"/>	N/A			
Steam inhalations	<input type="checkbox"/>	N/A	N/A			<input type="checkbox"/>	N/A	N/A		
Oral steroids	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal steroid spray	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal steroid drops	<input type="checkbox"/>					<input type="checkbox"/>				
Nasal decongestants	<input type="checkbox"/>					<input type="checkbox"/>				
Antibiotics	<input type="checkbox"/>					<input type="checkbox"/>				
Antifungals	<input type="checkbox"/>					<input type="checkbox"/>				
Antihistamines	<input type="checkbox"/>					<input type="checkbox"/>				
Other	<input type="checkbox"/>					<input type="checkbox"/>				

I follow up patients following FESS for the first time after surgery at:

<1 week 1 week 2 weeks 3 weeks 4 weeks >4 weeks

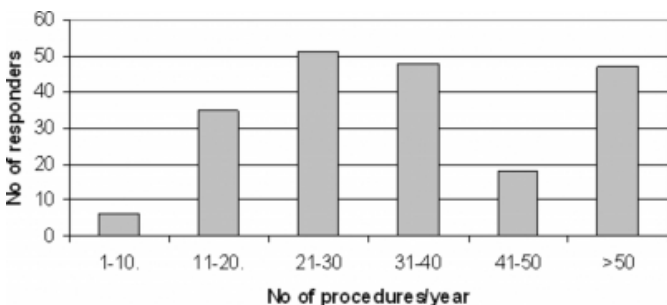
RESULTS AND ANALYSIS

RESPONSE RATE AND FREQUENCY OF FESS

320 questionnaires were returned fully completed giving a response rate of 60%. FESS was performed by 64% of responders, who form the basis of subsequent analysis. The number of procedures performed each year showed a bimodal distribution with 25% performing 21-30 and 23% performing over 50 procedures each year (Figure 2).

Figure 2

Figure 2: Frequency of FESS amongst UK surgeons



PRE AND POST OPERATIVE PROTOCOLS

Of those who perform FESS, 94% of responders have a protocol for pre and/or postoperative management of FESS.

The distribution of pre and postoperative protocols is shown in table I. Of surgeons with a FESS protocol, 35% only had a protocol for postoperative management and 64% a protocol for both pre and postoperative management.

Figure 3

Table 1: FESS Protocol distribution

	Polyp disease	Non-polyp disease
Preoperative protocol no. of surgeons with protocol (%)	122 (65)	99 (53)
Postoperative protocol no. of surgeons with protocol (%)	187 (99.5)	179 (95)

POLYP AND NON-POLYP DISEASE

11% had a protocol for polyp disease only, the remainder for both polyp and non-polyp disease. 34 of 99 (34%) preoperative and 69 of 179 (39%) of postoperative protocols were the same regardless of disease type.

FESS PROTOCOLS AND STATISTICAL COMPARISON

The use of oral and topical nasal treatments pre and post FESS are shown in table 2. Chi squared tests were performed in order to determine whether there was any significant difference in use of medication when comparing pre to postoperative protocols and polyp to non-polyp disease. Any groups of 5 or less were excluded from analysis to retain test validity.

Figure 4

Table 2: Pre and postoperative medication in FESS

Intervention	PREOP	POSTOP	POLYP DISEASE NON-POLYP DISEASE			
	% of protocols	% of protocols	Drug	Dose	Freq	Use/ days
Alkaline nasal douches	12	14	N/A			
Steam inhalations	7	4	N/A	N/A		
Oral steroids	42	3	Prednisolone	20-50mg	od	3-14
Nasal steroid spray	50	38	Nasonex/ fluticasone/ mometasone	i-ii	od-bd	28-long term
Nasal steroid drops	57	44	Betnesol	ii-iii	bd-tds	7-42
Nasal decongestants	19	22	Flixonase Xylometazoline	i-ii	od-bd bd-tds	14-90 1-21
Antibiotics	27	35	Augmentin	375-625mg0-500mg	tds	7-14
			Flucloxacillin	500mg	od-tds	7-10
			Erythromycin	250-500mg	bd	7-14
			Clarithromycin	500mg	od	10
			Azithromycin	100mg	od-bd	6-14
			Doxycycline			
Antifungals	1	0				
Antihistamines	5	1				
Other	3	3	Sterimar® Naseptin®			

COMPARISON POLYPS V NON-POLYP DISEASE

Oral steroids are used significantly more preoperatively in patients with polyps when compared to non-polyp disease (Chi sq=44.9, dof=1, p<0.001) (Figure 3). Both oral steroids and nasal steroid drops were used significantly more postoperatively in patients with polyps when compared to non-polyp disease (Oral: Chi sq=37.58, dof=1, p<0.001, Drops: Chi sq=7.12, dof=1, p<0.01) (Figure 4).

Figure 5

Figure 3: Preoperative protocols

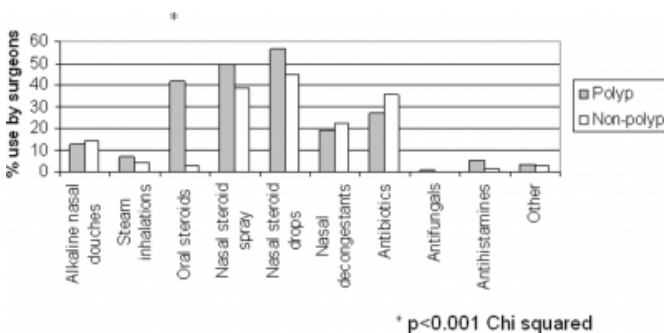
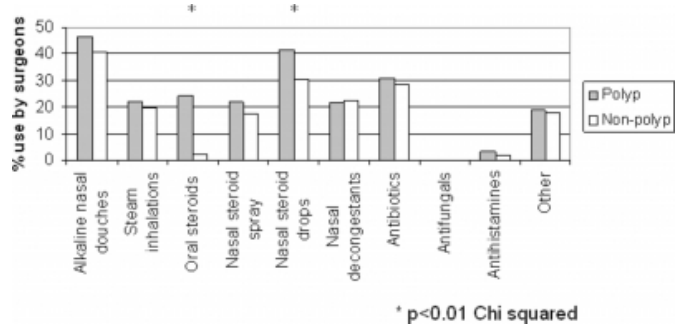


Figure 6

Figure 4: Postoperative protocols



COMPARISON PREOPERATIVE V POSTOPERATIVE

The use of alkaline nasal douches and steam inhalations was significantly greater postoperative when compared to preoperative in patients with both polyp (Douches: Chi sq=39.12, dof=1, p<0.01, steam: Chi sq=13.07, dof=1, p<0.01) and non-polyp disease (Douches: Chi sq=21.04, dof=1, steam: p<0.001 Chi sq=12.72, dof=1, p<0.001) (Figures 5 and 6).

Figure 7

Figure 5: Polyp disease protocols

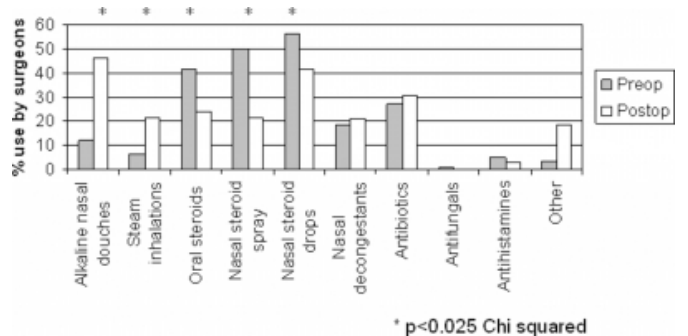
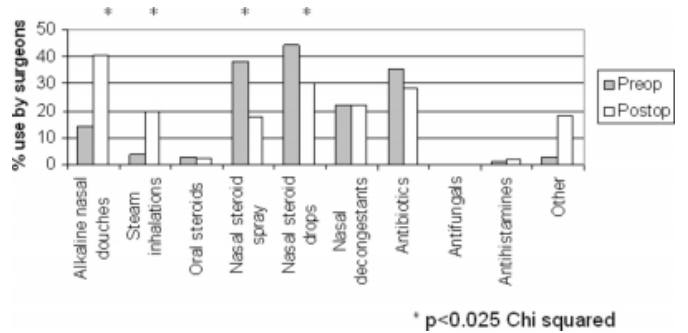


Figure 8

Figure 6: Non-polyp disease protocols



Topical steroid drops and spray were used significantly more preoperatively when compared to postoperative in patients with both polyp (Drops: Chi sq=26.3, dof=1, p<0.01, spray:

Chi sq=6.52, dof=1, p<0.025) and non-polyp disease (Drops: Chi sq=15.16, dof=1, p<0.001, spray: Chi sq=5.69, dof=1, p<0.025) (Figures 5 and 6). Oral steroids were used significantly more preoperatively than postoperatively in patients with polyp disease only (Chi sq=10.85, dof=1, p<0.001) (Figure 5).

FIRST FOLLOW-UP

2 weeks was the mode for first follow-up (Table 3).

Figure 9

Table 3: First follow-up visit after FESS

First Follow-up (weeks)	<1	1	2	3	4	>4
N	8	20	82	19	30	46
(%)	(4)	(10)	(40)	(9)	(14)	(22)

DISCUSSION

Functional outcome following FESS is determined by preoperative, intraoperative and postoperative management. Surgical technique has developed with improvements in instrumentation, optics and mucosal preservation technique.^{1,15} Pre and postoperative management of FESS facilitates mucosal healing, minimises scar tissue and ensures rapid return to normal function. This study finds that FESS is performed by a large percentage of UK otorhinolaryngology consultants. Nearly all these surgeons have a protocol for pre and postoperative management. Many have different protocols for patients with polyps and those without. Although postoperative protocols are more common than preoperative, most have a protocol for both.

This cross-sectional study does have limitations as the response rate was 60%, the minimum reported to be ideal for meaningful inferences to be made.¹⁶ However, the questionnaire was confidential, targeted only experienced clinicians and was quick and easy to complete. Stamped addressed envelopes were used to increase response rate. As such, these results should be considered worthy of discussion.^{17,18} It is recognised that a significant percentage of the BAO-HNS membership are in non-surgical allied professions or retired from clinical practice. Therefore, the true percentage of ENT surgeons who practise FESS is probably greater than we report. The predominant finding from our survey is that there is a large variation in types of medication, their dosage and length of use in the pre and postoperative management of FESS.

Oral and topical steroids are the most commonly used medications both before and after FESS. The anti-

inflammatory effect of oral steroids in the preoperative period can reduce mucosal oedema and dramatically decreases the size of nasal polyps. This may improve the extent of safe surgical access of polyp clearance without excessive bleeding obscuring endoscopic visualisation. Postoperative steroids may improve healing and sense of smell.²

The benefits of long term steroid use after FESS in preventing recurrent disease are not clear. Some studies have found fewer cases of recurrence of nasal polyps with topical steroid use following FESS.^{19,20,21,22,23} However, the only double-blind prospective randomised controlled trial of nasal steroid spray versus placebo found no influence of recurrence rate of CRS or nasal polyps one year after FESS.⁵ There are no trials of steroid use in the immediate preoperative period and their effect on outcome. We found that oral steroids are used significantly more both pre and postoperatively in patients with polyps than those without. Topical steroid sprays or drops are also used significantly more postoperatively in patients with polyps. This study found that many surgeons use both topical and systemic steroids in their protocols. We were not able to ascertain from our questionnaire whether surgeons are using different steroid preparations at different times or in different patient subgroups.

Antibiotics are widely used by surgeons both before and after FESS. In the preoperative period antibiotics may decrease inflammation by minimising infection and so improve the operative field. Used following FESS, they may facilitate healing by preventing infection.⁷ Although the authors expected antibiotics to be used more often in patients with non-polyp disease (mainly CRS) when compared to patients with polyps, this was not the case. The use of antibiotics may be guided by endoscopic swabs taken both before and after surgery,²⁴ however problems with increasing antibiotic resistance in sinusitis dictate that they should be used with caution.²⁵ The only double-blind prospective randomised controlled trial of antibiotic (cefuroxime axetil) versus placebo after FESS in 202 patients found no difference in terms of symptom and endoscopic scores or incidence of postoperative infection.⁸ A retrospective study of 57 patients receiving erythromycin for 3-6 months after FESS did show a significant improvement in symptom and endoscopic outcome compared to 92 patients who received no antibiotic.⁷ No significant side effects of either antibiotic were reported.

Postoperative fibrin clot debridement and granulation removal are thought by some to be necessary to prevent scar tissue formation.³ This is achieved by postoperative office debridement and nasal douching. However, the value of removing healing tissue, causing further requirement for healing by secondary intention, is not proven. Several visits for office debridement take time, cause discomfort to the patient and are not an appropriate use of resources within the constraints of the UK National Health Service.

Nasal douching can take the form of vigorous mechanical self-debridement by the patient using high volume intranasal saline irrigations, or simply humidification to avoid crusting using an intranasal saline spray (Sterimar®). The mechanism of action may be by mechanical clearance of crusts and inspissated mucus and improvement in actual ciliary function, although these studies were not in use following FESS.^{26,27} Nasal douching has been shown to significantly improve nasal symptoms in patients with sinonasal disease.⁹ Postoperative use of nasal douching with hypertonic saline alone has shown comparable outcomes in terms of symptom scores and synechiae with published series.^{4,6} Office debridement may therefore be unnecessary. A randomised controlled trial found significantly less nasal obstruction and oedema following the use of postoperative high volume and low pressure nasal douching when compared to low volume and high pressure douching (Sterimar®).² We found that the use of nasal douches is widespread with nearly half of UK surgeons using them in their postoperative protocol. Sterimar® use is not as common. Current evidence supports the increased use of nasal douching, which is a simple postoperative intervention without significant side effects.

Steam inhalations and nasal decongestants are included in approximately 20% of postoperative FESS protocols. Steam inhalations are used following FESS in order to humidify the nasal cavity and to avoid crusting. They do risk mucosal heat damage. Nasal decongestants are used to decrease mucosal oedema immediately following FESS (range 1-21 days, table 2). Despite the widespread use of steam inhalations and nasal decongestants, there is no available evidence as to their efficacy in improving outcome after FESS. There is no evidence to support the use of antihistamines and antifungals after FESS and their routine use is rare amongst UK surgeons.^{2,28}

Molony and Ah-See performed a cross-sectional survey by postal questionnaire of FESS practice of UK consultant members of the same organization (BAO-HNS) in

1998.¹³ They found that a similar proportion of surgeons perform FESS. They questioned consultants regarding their postoperative management, but did not distinguish between polyp and non-polyp disease. Comparison of their findings with our study shows that antibiotics and oral steroids are now used more frequently and nasal decongestants less frequently (Table 4). Nasal douches and steam inhalations are used by a similar proportion.

Figure 10

Table 4: Comparison of postoperative medication use with Molony and Ah-See, Clinical Otolaryngology 1998

	% of FESS surgeons using medication		
	Polyp disease	Non-polyp disease	Moloney and Ah-See
Alkaline nasal douches	47	41	46
Steam inhalations	22	20	25
Oral steroids	24	2	2
Nasal steroid spray	22	17	52
Nasal steroid drops	42	30	Not separated in study
Nasal decongestants	21	22	32
Antibiotics	31	29	12
Antifungals	0	0	Not included
Antihistamines	3	2	Not included

Frequent follow-up in the immediate postoperative period has been recommended by many, the purpose of which is to assess and debride the nasal cavity.^{10,11,12} We found that 40% of respondents first see patients after FESS at 2 weeks and 22% at more than 4 weeks (Table 3). A comparison of our findings with a survey in 1998 shows a trend of later first follow-up appointment (Table 5).¹ This is in line with more recent studies which question the value of regular follow-up.^{4,6} Ryan et al performed cavity toilet at 2 weeks and then one final follow-up at 3 months in most cases, showing good functional outcomes.⁶ Fernandes used postoperative nasal douching alone and found comparable outcomes in terms of symptom scores and rates of synechiae with published series.⁴

Figure 11

Table 5: Comparison of first follow-up visit after FESS with Molony and Ah-See, Clinical Otolaryngology 1998

First follow-up (weeks)	% of surgeons Tysome and Sharp, 2005	% of surgeons Moloney and Ah-See, 1998
<1	4	18
1-4	74	71
>4	22	11

CONCLUSIONS

We have found that FESS is performed by approximately two thirds of UK otolaryngologists, a similar proportion as found in 1998.¹³ FESS is performed by most surgeons once

every one to two weeks. This distribution is bimodal indicating the emergence of rhinology as a subspecialty. Nearly all surgeons who perform FESS have a management protocol, of which approximately two thirds have a protocol for pre and postoperative management and one third for postoperative management alone. Two weeks is the most common first follow-up time, although more surgeons first see patients following FESS later than four weeks when compared to 1998 (Table 5).

Steroids are the most common medication used in FESS protocols. Oral steroids are used significantly more in patients with polyp than non-polyp disease and significantly more postoperatively than preoperatively only in patients with polyps. Antibiotic use is widespread and varied and does not differ significantly between protocols. The use of both antibiotics and oral steroids has increased when compared to 1998. Current studies do not provide conclusive evidence to support their use. Postoperative nasal douching is common and evidence supports their efficacy in improving outcome following FESS, which may avoid the need for frequent office debridement. This suggests that their use should be increased amongst surgeons. More prospective clinical trials of topical and systemic medication, especially prior to FESS, are required to make further recommendations.

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