

Outcome for the first 85 patients treated with the functional endoscopic sinus surgery technique*†

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SUMMARY

Out of 85 patients operated on with the functional endoscopic sinus surgery (FESS) technique, 62 patients (73%), representing 105 operated sides, participated in an endoscopic follow-up with concomitant questionnaire concerning symptoms and patient's evaluation of the result. On 61 operative sides were performed polypectomies, 43 sides were operated on because of chronic recurrent sinusitis. Twelve patients (corresponding to 17 sides) were re-operated on. The mean follow-up period was 16 months for the patients with one operation, for those with re-operation it was 10 months. Eighty-two per cent of the patients reported subjectively marked or full improvement, 18% had experienced no change or slight improvement. By endoscopy, 43 operated sides (41.0%) were considered fully normal at follow-up. Residual polyposis was seen in 21 of 61 operated sides (35.9%) with pre-operative polyposis, and purulent discharge was seen in 11 sides (10.5% of all operated sides). The discrepancy between subjective satisfaction and objectively-assessed recurrent or residual pathology indicates a need for further elucidation of the aetiologies for chronic inflammatory sinonasal diseases. Obstruction of the drainage pathways around the ostiomeatal complex cannot explain all cases of sinusitis and is hardly aetiological in polyposis. Nevertheless, FESS is presently an adequate treatment in obtaining immediate relief in most cases of medically resistant sinusitis and polyposis.

Key words: functional endoscopic sinus surgery, sinusitis, polyposis, aetiology, residual pathology

INTRODUCTION

Acknowledging the reports of satisfactory results obtained by the functional endoscopic sinus surgery (FESS) technique, carried out as described in the literature (Levine, 1990; Kennedy, 1992; Stammberger, 1986; Stankiewicz, 1989; Stammberger and Posawetz, 1990; Stammberger, 1991; Vleming et al., 1992), the operation was introduced at the ENT department as a first-choice operation *ultimo* 1991 in cases of chronic sinusitis and nasal polyposis. We intended to evaluate the outcome of the initial FESS procedures, performed in the period November 1991 to August 1993.

MATERIAL AND METHODS

Methods

A follow-up study, based on case records and clinical examination. A standardized follow-up questionnaire was filled in by either of the authors, and the concomitant endoscopic examination was performed by either of the surgeons. We aimed at at least six months' post-operative observation.

Patients

Sixty-two patients (23 women and 39 men) of the 85 patients (73%) accepted participation in the investigation (Table 1). The mean age was 45 years (range 13-77 years). The follow-up group was comparable to the non-attendance group concerning sex and age, indication, and surgeon.

Table 1. Distribution of patients attending follow-up, with respect to age at operation, sex and indication, shown as number of patients. Three patients with polyposis and inverted papillomas are here classified as polyposis.

Distribution of patients (n=62)	females	males	total
age (mean (range) in years)	39 (15-71)	50 (13-77)	45 (13-77)
indication:			
sinusitis (+re-operation)	11 (+2)	15 (+1)	26 (+3)
polyposis (+re-operation)	12 (+4)	23 (+5)	35 (+9)
inverted papilloma	0	1	1
total (+re-operation)	23 (+6)	39 (+6)	62 (+12)

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Indications

All patients underwent pre-operative coronal CT scan of the paranasal sinuses. The decision to operate was based on CT scans, and on symptoms and endoscopic findings. The indications for operation were chronic sinusitis (42% of the patients) and nasal polyposis (56.5%). Sinusitis complaints with polyposis were classified as polyposis. Four patients had inverted papillomas. Three of these were unexpected histological findings in the polypoid tissue and are here grouped as polyposis. Seven patients had bronchial asthma and of these six were medically treated. All asthmatics were having polyposis. Three had known salicylate intolerance (two operated on for sinusitis, one for polyposis), two were allergic to penicillin. Allergy testing was not a routine procedure. Twenty-eight (45.2%) were smokers (10 with sinusitis, 17 with polyposis, 1 with inverted papilloma).

Procedures

All patients were operated on according to the Messerklinger technique. All but two operations were performed under general anaesthesia. The 62 patients at follow-up corresponded to 105 operated sides, comprising 220 primary separate FESS procedures, of which 193 were anterior ethmoidectomies/infundibulectomies. The remaining 27 interventions were resections of the posterior ethmoid or opening of the sphenoid sinus (Table 2). These posterior procedures are mainly performed in the second half of the operative series. Eleven patients were re-operated on once, one patient three times (17 sides). Forty-three of a total of 263 procedures were re-operations. During the primary FESS operations, 61 polypectomies on 35 persons were done (58.1% of the operated sides), and another 14 polypectomies (13.3%) were carried out as re-operations. Forty-three sides (41.0% of the sides operated on) were classified as sinusitis and of these three (2.9%) were re-operated on (Table 3). The mean follow-up period for the primary operation was 16 months (range: 6–29 months) and for the re-operations 10 months (range: 1–18 months). Nine of 12 re-operations were carried out on the first half of the follow-up group. Patients operated on for nasal polyposis were all treated afterwards with either topical or systemic glucocorticosteroids, or both. All patients performed post-operative saline irrigation of the operated sides.

Physical examination and questionnaire

At follow-up, endoscopy was performed in all patients and any presence of polyps, discharge and synechia in the middle meatus, patency of maxillary sinus ostium and nasal air passage were registered. The patients were asked: (1) If they felt worse, no change, slight, marked or full improvement (Q1); (2) Whether the discomfort and inconveniences were in fair relation to the achieved result (Q2); and (3) Whether they with their present experience would accept a second operation, if they developed similar symptoms (Q3).

Surgeons

Two senior surgeons (MF, HA) performed all the FESS operations. The first (MF) introduced the operation without previous experience (apart from participation in an international course

in the method and preceding cadaver dissections) and has operated on 70 out of 85 patients. The latter surgeon (HA) had previous experience from another department concerning 120 operated sides.

Table 2. Distribution of procedures at primary operation as number of sides (number of sides re-operated on).

procedures	unilateral	bilateral	total
infundibulectomy	21 (+4)	78 (+10)	113
anterior ethmoidectomy	18 (+3)	76 (+10)	107
posterior ethmoidectomy	3 (+1)	18 (+6)	28
sphenoidectomy	(+3)	6 (+6)	15
total	42 (+11)	178 (+32)	263

Table 3. Distribution of uni- and bilateral primary operations and re-operations in relation to indication, shown as number of sides.

indication	unilateral	bilateral	total primary	re-operations
sinusitis	9	34	43	3
polyposis	9	52	61	14
inverted papilloma	1	0	1	0
total	19	86	105	17

Statistics

The study was primarily descriptive. The few statistically based comparisons were carried out with the Chi-square test.

Ethics

The study was carried out according to the Helsinki convention.

RESULTS

Physical findings

Forty-three sides (41.0% of the operated sides) were considered fully normal. These sides were equally distributed throughout the series. Various degrees of pathology were seen in 54.3% of the sides. Within the polyposis group some degree of polyposis was seen in 18 (29.5%) out of 61 sides and large polyp masses were seen in three sides (4.9%), in spite of 14 sides re-operated on. In addition, polyposis was seen in one side in a patient primarily classified as sinusitis. Five polyp patients and four patients with sinusitis had purulent discharge in 11 sides (10.5%). In cases without residual polyposis or purulent discharge, a variety of minor pathological changes in the middle meatal mucosa (such as inflammation and mucous secretion) was found in 28 sides (26.7%). In 16 sides (15.2%) minor, functionally inappreciable synechias were seen in the middle meatus. No recurrence of inverted papillomas was seen (Table 4). In patients with asthma, five out of 14 sides were normal. Smoking did not seem to interfere with normalization (Table 5). In three sides the air passage was found to be reduced (all three cases of sinusitis). Out of the 105 operated sides, the middle meatal antrostomies were found patent in 80 sides (76.2%), in one side (1.0%) it was closed, and in the remaining 24 (22.9%) operated sides the ostia were not seen at follow-up, due to insufficient endoscopic access (Table 4).

Table 4. Main results of endoscopic follow-up examination, as number of sides. (Minor pathological changes are not shown, see text.) One patient with ASA intolerance, pre-operatively classified under sinusitis, had minor polyps at follow-up.

pre-operative indication findings	sinusitis (43 sides)	polyposis (61 sides)	insufficient information (of all 105 sides)
polyps	1 (2.3%)	21 (34.4%)	5 (4.8%)
pus	6 (14.0%)	5 (8.2%)	4 (3.8%)
reduced air passage	3 (7.0%)	0	7 (6.7%)
closed sinus ostium	1 (2.3%)	0	24 (22.9%)
fully normal	24 (55.8%)	19 (31.1%)	-

Table 5. Normal endoscopic findings at follow-up. The 43 sides with normal findings are shown in relation to smoking habits and known asthma. Twenty-eight patients are smokers, seven patients have asthma.

indication	smoking		asthma	
	yes	no	yes	no
sinusitis	12	12	0	24
polyposis	11	8	5	14
total	43		43	

No major adverse events occurred during the operation or after. No cases of orbital haematoma, blindness or cerebrospinal rhinorrhoea were encountered. Four cases of small perforations of the papyraceous lamina with ensuing periorbital ecchymosis were recognized. Disturbing bleeding occurred in seven operations, of which one had to be postponed a few days, but no patients required blood transfusion. Temporary epiphora was seen in two cases. One patient complained of protracted unilateral hypaesthesia of the upper incisors (Table 6).

Table 6. Adverse events related to FESS procedures.

major events	number of patients	minor events	number of patients
orbital haematoma	0	periorbital ecchymosis	4
visual loss	0	profuse bleeding	7
meningitis	0	transient epiphora	2
cerebrospinal fluid leak	0	hypaesthesia dentis	1

Patients' evaluation

Of the 50 patients with only one operation, 41 stated marked or full improvement and nine patients reported slight amelioration of their symptoms or none at all. In the re-operated group, with its shorter observation period, 10 out of 12 patients reported marked or full improvement (question Q1; Table 7). Ninety-two percent of the patients reported a positive attitude towards the technique (questions Q2 and Q3; Table 8). Only one of the patients not convinced about the qualities of FESS (questions Q2 and Q3) had a re-operation. The remaining 11 patients with more than one operation confirmed their satisfaction.

Table 7. Patients' evaluation in relation to original indication for surgery, as number of patients, and to findings at follow-up, as number of sides. In brackets is shown the number of patients with re-operation. One patient with solitary inverted papilloma, asymptomatic at follow up, is not shown. Column with totals refers to number of patients (and percentage of total number).

improvement	indication (no. of patients)			findings (no. of sides)	
	sinusitis	polyposis	total	polyposis	pus
none and slight	5 (+2)	4 (+0)	11 (18%)	1	5
marked and full	18 (+1)	22 (+9)	50 (82%)	21	6
total	26	35	61	22	11

Table 8. Patients' evaluation of the FESS procedure (number of patients).

question (see text)	yes	no	do not know
was it worth the trouble? (Q2)	57 (92%)	3 (4.8%)	2 (3.2%)
would you accept a new operation? (Q3)	57 (92%)	1 (1.6%)	4 (6.4%)

DISCUSSION

Recurrent and chronic sinusitis and nasal polyposis constitute the main part of the present beginner's material. Before FESS was introduced, surgical treatment of sinusitis and polyposis consisted of the Caldwell-Luc and Claoué operations, ethmoidectomy and partial removal of nasal polyps. With these surgical techniques we could treat or prevent the more serious complications of sinus disease and we could relieve some of the symptoms. But many patients had to live with symptoms which may not have been dangerous but reduced their quality of life. With the FESS technique, we can now obtain better results for this group of patients. The choice of treatment should be based on an integrated evaluation of all the various information obtained by history, endoscopy and imaging techniques. We consider a pre-operative coronal CT scan necessary for the choice of treatment and surgical procedure and for the safety and efficacy of FESS.

The correlation between symptoms and pathology is far from complete. At final endoscopic examination, Kennedy (1992) found some evidence of residual disease in 44.9% of all patients despite a marked subjective improvement reported in 85.0%. In another study with endoscopic follow-up examination 57% showed some degree of residual pathology despite marked or full improvement in 80-85% (Wildt et al., 1991). This is in accordance with our findings. We found some recurrence of polyposis in 60% of the patients with polyposis (34.4% of the sides) compared to 88.6% of marked or full improvement reported by the same group of patients. Although not statistically significant, due to the size of the groups, the patients with polyposis seem to be easier to satisfy than those with sinusitis in the early post-operative period. Seven out of 11 patients reporting little or no improvement were sinusitis patients, i.e. 63.6% compared to the 43.5% which they constitute of the follow-up group. The

high success rate may be explained by the immediate post-operative amelioration of the nasal stenosis which is the cardinal symptom in the polyposis group (data not shown). The discrepancy between success and endoscopic findings is probably due to the thorough examination during which even minor pathology without clinical significance is detected. In the many cases of subjective satisfaction without objective resolution of disease, the FESS technique seems more functional than radical. A meticulous post-operative endoscopic care in combination with adequate medical therapy seems to be able to keep the majority of patients asymptomatic. Recognizing the limits of our material, we have not proved smoking to be of aetiological importance, which is in accordance with Kennedy (1992). Hypothetically, allergy and asthma might predispose or aggravate an inflammatory state of the sinonasal mucosa, and ASA intolerance has been shown to correlate with liability for polyposis. Kennedy (1992) showed a significantly worse objective outcome for the patients with asthma than for those without asthma. Corrected for the extent of sinonasal disease, however, there was no difference. He concluded, that the most predictive pre-operative parameter of objective outcome is the extent of sinonasal disease. In our series none of the sinusitis patients had asthma and the patients with combined asthma and polyposis did not differ from the follow-up group in general concerning endoscopic findings. Our per-operative data (of retrospective quality) do not allow the extent of disease to be included in the evaluation of post-operative objective morbidity.

Considering aetiology to chronic or recurrent sinonasal infection, it is of interest to note that the group of patients with sinusitis and unsatisfactory results have their symptoms in spite of objective findings of abundant space around the ostiomeatal complex. Residual pathology may to some degree be explained by the cautious reticence necessary in the beginner's hand. The first half of the material is dominated by anterior procedures, but with increasing proficiency the posterior procedures are carried out (data not shown). Nine of the 12 re-operations in the follow-up group have been done on the first half of the patients, but a number of patients may yet develop pathology that will necessitate re-operation. The unsatisfied patients do not belong particularly to the first half of the material. It is satisfying to state that no serious complications have been encountered.

CONCLUSION

Surgery for opening anatomical obstructions of the ethmoid drainage pathway of the paranasal sinuses will most likely keep its place in the primary treatment of chronic sinonasal infections. But even with additional medical therapy, FESS does not appear to be the final solution to polyposis nor to all cases of chronic sinusitis. Frequent findings of residual pathology in satisfied patients, added to the minor group of unsatisfactory results despite sufficient space around the ostiomeatal complex, points towards an increasing role of medical treatment in the future. FESS is an adequate technique for obtaining early post-operative relief from chronic recurrent sinusitis and polyposis symptoms.

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