

Endoscopic sinus surgery in sinusitis*

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SUMMARY

In terms of functional treatment of sinonasal pathologies, endoscopic surgery represents a spectacular advance, offering excellent illumination, views of areas previously impossible to monitor, and the ability to view the main reference points in the surgical field. Over a five-year period (1988-1993), the authors have performed 278 paranasal sinus operations, using endoscopic techniques. The results obtained in 250 patients, with a minimum follow-up period of one year, have been analyzed. The criteria of assessment used include: self-assessment by the patient and the surgeon's assessment, made on basis of the endoscopic data. The best results were obtained in cases of antrochoanal polyps, polyposis not associated with asthma or acetylsalicylic acid (ASA) sensitivity, circumscribed chronic sinusitis, and aspergillomas. The worst results, with a high rate of recurrence, have been obtained with ASA sensitivity and chronic suppurative pan-sinusitis. It is essential to reach a consensus on the staging of polyposis so that treatment can be monitored adequately, even though, in itself, the pathology is difficult to classify as it can vary in a single patient for no apparent reason. On the other hand, there is a difference between the subjective and objective assessment of the condition, and this makes it even harder to explain the results obtained.

Key words: sinus surgery, ethmoidectomy, paranasal sinuses, sinusitis, nasal polyposis

INTRODUCTION

To discuss the results of endoscopic sinus surgery is dangerous. Earlier observations (Ademà et al., 1991) led us to believe that the results obtained with this new technique were the same as those achieved with conventional techniques, and that what it did have to offer was a different concept in the surgical treatment of a pathology which is, in itself, somewhat complex. Although with certain specific pathologies, such as circumscribed sinusitis, it has been shown to be very effective using a conservative approach, with others the results may depend more on the pathology itself than on the surgical technique employed. Such is the case, for example, with ASA-syndrome polyposis. The difficulty in making an analysis of the results is due to the ignorance of the aetiology in the majority of sinus pathologies and its relationship to the pathology of the respiratory system as well as the possibility that polyposis could be the first step of a full-blown manifestation of the ASA syndrome. The need for an approved classification system of the extent of sinus disease makes it difficult for us to compare our results with those of other authors, as diagnostic and prognostic criteria differ from one to the other (Wigand, 1990; Stammberger,

1991; Lawson, 1991; Moriyama, 1991; Kennedy, 1992). Nonetheless, we wish to publish an analysis of the results obtained in 250 patients, without attempting to attach any statistical significance to them, but merely to describe our observations after several years of practice with the technique.

MATERIAL AND METHODS

The results obtained in 250 patients, all of whom had been operated on between January 1988 and January 1992 and whose cases had then been followed for a minimum of one year, have been analyzed.

The distribution of the different pathologies was: 29 cases of antrochoanal polyps; 62 cases of polyposis with ASA sensitivity; 112 cases of polyposis with non-ASA sensitivity (34 cases of polyposis in asthmatic patients, and 78 cases of polyposis with no asthmatic association); 34 cases of chronic suppurative sinusitis (six pan-sinusitis and 28 circumscribed sinusitis); seven cases of mucocoeles (two in the maxillary sinus, two in the sphenoidal sinus, two in the ethmoidal sinuses, and one in the frontal sinus); one case of schwannoma; and five cases of aspergillomas. Fifty-eight patients had previously been subjected to

surgery using other approaches, and of these 18 had undergone multiple operations.

All of the patients had to fill out a questionnaire, containing the following items:

- (1) *Pre-operative data*: toxic habits; associated conditions; first symptoms; date of first symptom; other related symptoms; endoscopic exploration (extent of lesions, position); axial and coronal CT (description of the lesions and any anatomical variants that may exist); preliminary analysis (IgE, eosinophils); previous treatment (medical and/or surgical).
- (2) *Per-operative data*: type of intervention (unilateral or bilateral); extent of lesions and relationship with CT; pathological anatomy; complications.
- (3) *Post-operative data*: subjective assessment (nasal obstruction, sense of smell, discharge); objective assessment (recurrence, synechia, patency of the middle meatal antrostomy); main treatment; supplementary treatment.

All of the patients were given a pre-operative CT scan. No patients were operated on unless this had been done first.

Those cases showing extensive polyposis were given oral systemic steroid treatment (prednisone) for 15 days prior to surgery (60 mg for 5 days; 30 mg for 5 days; and 15 mg for 5 days) in order to reduce the polyp mass and facilitate the localization of surgical landmarks. If purulent discharge was found, antibiotic treatment was administered.

Thirty patients were given a general anaesthetic without infiltration of a local anaesthetic, while 110 patients were sedated and given a local anaesthesia to the area to be operated on. The remaining 110 patients were given a general anaesthetic and topical application of 2% lidocaine and adrenalin (1:1,000) and an injection of 2% lidocaine and adrenalin (1:100,000) in the area to be operated on.

Septoplasties were performed when it was considered that the septal deviation could, in any way, be responsible for the sinus pathology. If the deviation was not large enough to prevent access to the endoscope and instruments for ethmoidal surgery, the septoplasty was left until the end of the procedure. The surgical technique employed was, basically, the technique described by Messerklinger and Stammberger, with a few small modifications of our own and others, which did not make a substantial difference to the end results. In the first 150 cases an antibiotic cream was instilled and little packing inserted. Cream is virtually no longer used and, instead, a Merocel pack in the middle meatus is used for a 48-h period. Post-operative monitoring was weekly for the first month and less frequent in the following months. The patients were recommended to rinse the cavities with physiological saline and, in summer, to bathe in seawater. After the crusting had disappeared, the patients were treated with beclomethasone or budesonide, two inhalations in each nasal fossa, twice a day. Inspection was performed with rigid and flexible endoscopes. The minimum follow-up period was one year and the maximum was four years. Twenty patients did not return for examination after one year. (Sixteen had shown pathological recurrence, while four had shown a complete improvement at the last examination.)

RESULTS

It is not possible to make a reliable statistical analysis from the data obtained (Table 1), because of the occurrence of errors. Possible sources of such errors include the difficulty in classifying the type of pathology operated on and the distinction between ASA-syndrome polyposis and polyposis not associated with ASA sensitivity, since one is looking at a pathology of the respiratory mucosa, the development of which is impossible to predict.

Table 1. Objective results.

pathology (n=250)	recurrence	no recurrence	
		major	minor
antrochoanal polyps (29)	2 (6.8%)	0	27 (93.1%)
ASA polyps (62)	21 (33.8%)	22 (35.48%)	19 (30.6%)
polyps and asthma (34)	5 (14.7%)	18 (52.9%)	11 (32.35%)
polyps without asthma (78)	2 (2.5%)	14 (17.9%)	62 (79.4%)
pan-sinusitis (6)	6 (100%)	0	0
circumscribed sinusitis (28)	0	0	28 (100%)
mucocoeles (7)	2 (28.5%)	0	5 (71.4%)
schwannoma (1)	1 (100%)	0	0
aspergillomas (5)	0	0	5 (100%)

The fact that some of the patients had previously been operated on casts doubt on the prognosis as, in a large number of cases, it was not necessarily due to the surgical technique employed, but to a recurrence of the original pathology. With those patients who had been operated on by the Cadwell-Luc technique, the presence of fibrous tissue in the sinus cavity made the intervention more complex and probably affected post-operative results. Some of the recurrences could be ascribed to the fact that the authors, despite the training received on cadaver material, acted very conservatively in earlier cases and thus the procedure was not as good as it later became, after a certain amount of experience had been acquired.

On analyzing the medical background of the patients, the illness most commonly associated with polyposis was bronchial asthma and cutaneous atopy or patients testing positive for allergy. In three cases of circumscribed maxillary sinusitis the teeth were also found to be in a poor condition. One patient who had suppurative chronic sinusitis was suffering from Reiter's syndrome and was under treatment with systemic steroid therapy. Another patient had received a heart transplant, and two patients were suffering from hypothyroidism, for which they were being treated.

In the cases of polyposis, the first reference symptoms were nasal obstruction and hyposmia and, to a lesser extent, epistaxis (four cases) and deafness associated with serous otitis (three cases). Headaches, purulent discharge and pharyngeal discomfort were the first symptoms noted in the cases of both limited and diffuse purulent chronic sinusitis. Surprisingly, headache was the predominant symptom for those cases of mucocoeles, probably because, by the time the patients came to us, they were already aware of the fact that they had an intracranial "cyst" or tumour. Diplopia and severe headaches were the most important reference symptoms for the patient who had been diagnosed as having a frontal schwannoma. (Endoscopic surgery was performed on this patient mistakenly, due to a diag-

nostic error. Both the clinical evolution and CT results showed a frontal mucocele. Later, the patient received external approach.) Unilateral, persistent purulent discharge, despite multiple treatment, was the most significant symptom in the five cases of aspergilloma.

Endoscopic exploration revealed several degrees of polyposis in the ASA cases. In the cases of non-ASA polyposis, massive polyposis was confined to the middle meatus. In those cases in which the initial symptoms were deafness and epistaxis, polyposis was found by chance, on performing an exploration of the nasal fossae and nasopharynx. There was no indication of the five cases of aspergilloma on preliminary endoscopic exploration, but they were diagnosed during the course of surgery, for the appearance of the fungal mass. The initial diagnosis was of circumscribed chronic antro-ethmoidal sinusitis, limited to the anterior ethmoidal and maxillary sinuses, and always affecting the ethmoidal infundibulum. Neither CT scans nor surgical exploration revealed that the posterior ethmoids were affected. Eight of the 28 patients were affected by recurrent unilateral sinusitis, and of these four had paradoxically-bent middle turbinates and the other four "conchae bullosa" on the side showing the pathology. In terms of the origin of the polyposis, we noted the frequency with which, on extirpating the uncinat process, larger polyps were attached to it. At times we found polypoid mucosa on the anterior wall of the ethmoidal bulla which, on penetration, showed an apparently healthy mucosa. Polyps originating in the frontal recessus, whether in isolation or within the context of polyposis, were also frequently found. With diffuse polyposis, we found large numbers of polyps in the sphenoethmoidal recessus, the origin of which is hard to determine given the polypoid degeneration of the middle and superior turbinate. In a few cases the polyps were found to originate in the septum.

The only discrepancy between the CT information and surgical findings was in those cases in which a "glue"-type mucus was found in the sinus cavities, which had been identified as being polypoid.

Pre-operative medical treatment was multiple and diverse: patients had received either anti-histamines, topical and systemic steroids, antibiotics, or homeopathic treatment. Fifty-eight patients had undergone partial (simple polypectomy) or Cadwell-Luc procedures.

Seventy-five unilateral operations were performed. Of these, 29 were simple, extensive middle meatal antrostomies to open the part of the sinus in which the antro-choanal polyp was located; 33 were unilateral ethmoidectomies, required for the cases of circumscribed sinusitis and aspergilloma; and seven were marsupializations of mucoceles in the frontal, maxillary or sphenoidal sinuses. Five cases of polyposis were unilaterally treated (two of which were for the presence of unilateral amaurosis and thus simply involved endoscopic ethmoidectomies of the amaurotic side). The histology of the polyps showed inflamed tissue with, in the cases associated with asthma and/or those hypersensitive to acetylsalicylic acid, a notably high number of eosinophilic cells. Subjective assessment of the patient was virtually always found to be better than objective assessment. The feeling of improvement was not found to coincide with the appearance of the mucosa, as minor polyp recurrence were found in patients who

were not experiencing any discomfort. The post-operative recurrence of hyposmia tends to coincide with minor recurrences at the middle meatus. There was a notable difference between the good subjective assessment of a patient with ASA sensitivity and the bad objective development (Tables 1-2). In the short-term, with asthmatic patients, we observed a subjective improvement in pulmonary pathology and were able to reduce the medication and to stabilize the symptoms.

Table 2. Subjective results.

pathology (n=250)	improvement		
	marked	mild	none
antrochoanal polyps (29)	27 (93.1%)	0	2 (6.8%)
ASA polyps (62)	30 (48.3%)	25 (40.3%)	7 (11.2%)
polyps and asthma (34)	22 (64.7%)	9 (26.4%)	3 (8.8%)
polyps without asthma (78)	70 (89.7%)	6 (7.6%)	2 (2.5%)
pan-sinusitis (6)	0	0	6 (100%)
circum. sinusitis (28)	28 (100%)	0	0
mucoceles (7)	4 (57.1%)	1 (14.2%)	2 (28.5%)
schwanomma (1)	0	0	1 (100%)
aspergillomas (5)	5 (100%)	0	0

Nasal obstruction improved 48 h after the operation and then worsened, probably by crusting, only to improve progressively over the following weeks, as long as the appropriate treatment was administered. The improvement of the patients' sense of smell was found to be similar. Posterior nasal discharge is persistent and is the last of the symptoms to disappear. Those patients operated on in the summer season were recommended to bathe in seawater one week after the operation, and recovery of the surgical cavity was found to be markedly better and faster than for those patients who frequently washed and treated the area. Frontal headaches are commonly suffered in the first week after surgery, especially for those patients who have undergone an extensive infundibulotomy. The persistence of the frontal headache, despite treatment, can lead to the need for re-intervention after CT-scan study (two patients).

In all, 14 of the patients had to have further surgical intervention (Table 3). The cases were distributed as follows: two cases of antrochoanal polyps; six cases of ASA sensitivity polyposis; four cases of non-ASA sensitivity polyposis; one case of chronic pansinusitis; and one case of mucocele. Despite the fact that for cases of ASA sensitivity we prefer not to re-operate on unless it is the patient that demands the new operation, and no improvement has been noted with courses of systemic corticoid treatment.

The most notable complications (Table 4) were: six cases of post-operative epistaxis requiring nasal packing (in none of the cases transfusions were necessary); two cases of temporary diplopia, probably secondary to the infiltration of the local anaesthetic; five cases of palpebral haematomas; two cases of asthma attacks directly after operating on patients who had received local anaesthesia; two cases of epiphora several months after the operation, which improved with conservative treatment (antibiotic drops and the insertion of a probe in the lachrymo-nasal duct); one case of CSF leak detected during the

operation and treated with a mucous flap from the middle turbinate; one case of cardiac arrest, coinciding with the external luxation of the inferior turbinate (the patient recovered with no sequelae); and 10 cases of partial closures of the middle meatal antrostomy. Synechiae were frequently found, but rarely had any functional effect on the patient.

Table 3. Revision endoscopic procedures.

antrochoanal polyps	2 (6.8%)
ASA polyps	6 (3.2%)
polyps and asthma	4 (11.7%)
pan-sinusitis	1 (16.6%)
mucocoeles	1 (14.2%)

Table 4. Complications (n=250).

epistaxis	6 (2.4%)
temporary diplopia	2 (0.8%)
palpebral haematoma	5 (2%)
asthma attack immediately after operation	2 (0.8%)
epiphora	2 (0.8%)
partial closure of middle meatotomy	10 (4%)
intra-operative CSF leak	1 (0.4%)
cardiac arrest (recovered)	1 (0.4%)

DISCUSSION

We have intentionally sought to avoid statistical analysis and have only spoken of our observations, given that for the former there is a high risk of error. It is hard to analyse the results of a surgical technique when dealing with a disorder, the aetiology of which is more often than not unknown (Wigand, 1990; Stammberger, 1991; Kennedy, 1992). Due to the heterogeneity of the sample, we have not made the mistake of offering biased data, which would only lead to greater confusion when making comparisons with the results of other authors. It is essential to achieve an international consensus on staging of polyposis. Different proposals have been made by Wigand (1990), Lawson (1991), Levine (1990), Moriyama (1991), Kennedy (1992) and Lund (1993), but none have found acceptance as a definitive classification. Thus, it is impossible to compare results or to draw conclusions on one's own.

In general, our observations do not differ from those of the other authors. None of the patients were heavy smokers. Bronchial asthma as the illness most frequently associated was commonly found by Kennedy (1992), Stammberger (1991), Levine (1990), Vleming (1992) and Gaskins (1992), in varying percentages. The large number of patients with asthma and hypersensitivity to acetylsalicylic acid in our series could be attributed to the fact that the authors work in three different centres, covering, in all, a very large geographical area. In terms of the development of the complaints suffered by these patients, our findings are in agreement with those of Stammberger (1991), in that - although a subjective improvement is to be seen in terms of the seriousness of the asthmatic process, which can be translated into a reduction of medication and the lengthening of the time between asthma attacks - no prognosis can be made with regard to the future development of polyposis, as it is a

secondary respiratory alteration within the general context of the asthma. The improvement of the asthma, in some cases, has been disputed by several authors (Lawson, 1991; Stammberger, 1991; Jankowski et al., 1991; Kennedy, 1992). Despite the lack of more extensive monitoring, it could be said that such intervention for asthma sufferers with sinonasal polyposis does not worsen their condition. The two cases that suffered from asthma attacks immediately after the operation, had received local anaesthetics and the psychosomatic factor could have been more significant than the accidental relationship with the removal of the polyps.

Pre-operative CT scans are essential. Indeed, it is considered so essential that no patient is operated without one. Post-operative CT scans are only performed in those cases with persistent discomfort, especially those suffering from localized headaches, or if another operation is scheduled.

The worst results came from patients with massive polyposis, who had been operated on previously, and who in addition suffered from asthma and ASA sensitivity. The best results were obtained with operations for circumscribed, primary nasosinusal pathology. All this coincides with the findings of other authors (Levine, 1990; Friedman, 1990; Lawson, 1991; Stammberger, 1991; Kennedy, 1992).

The complications to be encountered in ethmoidal surgery (Stanckiewicz, 1989) do not depend so much on the technique employed as on the care and skill of the surgeon, because the anatomical location makes ethmoidal surgery potentially dangerous.

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