SPECIAL REPORT

Rhinology, 43, 246-254, 2004

Nasal surgery: evidence of efficacy*

Symposium: European Rhinologic Society meeting, Ulm, Germany, 2002

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INTRODUCTION Valerie J. Lund

Considerable emphasis is now placed, quite rightly, on evidenced based treatment. This is optimally provided by good quality randomised placebo controlled trials, ideally in sufficient numbers to allow meta-analysis. Medical therapy lends itself very well to this approach. However in surgery there are intrinsic problems in the provision of a placebo group and both surgeons and patients have to some extent conspired to avoid randomisation. Consequently the majority of the surgical literature offers at best level 3 and more often level 4 evidence. It was therefore extremely appropriate that certain aspects of nasal surgery should be scrutinised for evidence of efficacy by the four following experts.

NASAL SURGERY FOR CHRONIC RHINOSINUSITIS - EVIDENCE OF EFFICACY?

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***Definitions*: Evidence based medicine** is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research (Sacket et al., 1996). **Efficacy** (interchangeble with **effectiveness**) is the effect of a particular medical action in altering the natural history of a particular disease for the better (Library of Congress Catalogue Card Number 78 – 600, 117; 1978).

There has been a continuous progress in surgery for chronic rhinosinusitis during the last two decades (Hosemann et al., 2000). We have also faced an increase in the economic burden of sinus surgery paralleled by a significant number of surgical side effects, resulting in an understandable interest in analyzing the **efficacy** by use of **evidence based medicine**.
There are three important obstacles in evaluation of evidence in sinus surgery:

1. We lack sufficient knowledge about the different clinical subtypes of rhinosinusitis due to an incomplete definition of the pathoaetiologic factors.

2. There is no universally accepted, valid and comprehensive classification system of the different surgical procedures for chronic rhinosinusitis.

3. For some time we have known that there is no correlation between objective findings and subjective outcome following surgery for chronic rhinosinusitis (Hosemann et al., 1988).

The topic of this presentation is surgery for chronic rhinosinusitis excluding the special aspects of polypoid rhinosinusitis - it is generally agreed that insufficient drainage and ventilation represents the major pathogenetic factor in non-polypoid chronic rhinosinusitis. Experimental validation of sinus - reventilation procedures has been successfully undertaken. (Forsgren et al., 1998, 1999). On the other hand, there is a long list of other pathogenetic factors in chronic rhinosinusitis in addition to inadequate drainage and ventilation (e.g. primary mucociliary insufficiency, immunodeficiency, non-allergic reaction to fungi and/or bacteria, cystic fibrosis, aspirin and NSAID intolerance, asthma, non-allergic-rhinitis-with-eosinophilia–syndrome = NARES, smoking, gastroesophageal reflux, etc).

*Received for publication: March 22, 2004; accepted: June 12, 2004

Table 1. Surgery for chronic rhinosinusitis – subjective "success rate".

Author	Rate of "success"	
Reusch (1912)	84 %	No optical aids!
Wigand (1981)	83 %	endoscope
Schaefer et al. (1989)	83 %	endoscope
Kennedy (1992)	85 %	endoscope
Draf, Weber (1992)	89 %	microscope + endoscope
Kerrebijn et al. (1996)	82 %	radical surgery (Denker)!

Table 2. General health status questionnaire. (Hosemann et al., 2002).

General health status questionnaire.
short form 36 : pre- and postoperative indices

Domains	Pansinusitis	Ant. Ethmoid	
	83 → 85	82 → 83	85
	70 → 73	71 → 80	84
	56 → 79	60 → 81	79
	57 → 60	61 → 62	68
	→	53 → 58	63
	74 → 79	74 → 81	89
	80 → 82	81 → 87	90
	66 → 71	69 → 70	74
	→	→	-

Table 3. Outcome of the health status questionnaire: % restriction in patients suffering from chronic rhinosinusitis. (Hosemann et al., 2002).

Literature on the efficacy of surgery for chronic rhinosinusitis is mostly confined to individual case series or a review of case series. For nearly a century a success rate of about 80 % has been reported irrespective of the type of surgical procedure on the paranasal sinuses. The results of minimally invasive, optically aided procedures have not given the dramatic additional improvement that was expected (Table 1). In order to evaluate the special efficacy of the latter, reference to the 'hierarchy of research' may be needed (ranging from level 1 "systematic reviews of randomized controlled clinical trials" to level 5 "expert opinion"). Randomized controlled studies on sinus surgery, however, are hardly feasible and raise ethical problems. Prospective studies have been done on less relevant minor aspects only and have shown puzzling results. According to these there is a questionable effect of postoperative wound care on definitive healing (Nilssen et al., 2002). A special benefit of cutting instruments has not been proven (Vauterin et al., 2000) and controlled hypotension had no effect on the surgical conditions (Jacobi et al., 2000).

There is an enormous amount of information on 'evidence based medicine' on the internet (204 000 items). The same holds true for 'evidence and chronic sinusitis' (17 900 items) and 'evidence based medicine and chronic sinusitis' (8 900 items) but if we look for 'randomized controlled trials and chronic sinusitis' in Medline, we get 3 citations only between 1966 and May 2002. Looking for 'efficacy or effectiveness and surgery and chronic sinusitis', during the same period 37 citations are present in Medline (Tables 2 and 3). The most important articles represent lower level information according to the hierarchy of research, but confirm the positive experience of the individual case series (Terris and Davidson, 1994; Hebert and Bent, 1998; Lund, 2001).

Subtle changes in treatment success may be detected by examining the quality of life (Testa and Simonson, 1996). A series of special 'quality of life – instruments' have been developed (General health status questionnaire, short form 36; Rhinoconjunctivitis Questionnaire - RQLQ; Rhinosinusitis Outcome Measurement - RSOM-31; Sinonasal Outcome Test - 20; Chronic Sinusitis Survey - CSS; Rhinosinusitis Disability Index - RSDI). We have also done an extended study on our own patients. (Hosemann et al., 2002) which suggests that the special benefit of extended outcome studies in sinus surgery is questionable: Significant changes of indices pre- vs. post-operatively almost exclusively reflect local symptoms like pain, sleep disturbance and vitality. Any changes of different indices are equidirectional in all items and different subpopulations (pansinusitis / anterior ethmoiditis). The many changes of indices are concordant with traditional global self-assessment of operative success by the patient.

In summary, nasal surgery for chronic rhinosinusitis has shown overwhelming though low level evidence of efficacy in the literature. The evidence is based on clinical experience (case series), scientific observations and animal experiments. However, the persistent lack of knowledge regarding classification, definition and pathophysiology obviate improvements in outcome studies. Moreover, the missing classification of diseases, interventions and outcome make it difficult to define quality management in sinus surgery.

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SEPTAL AND TURBINATE SURGERY

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When considering the evidence of efficacy for septal and inferior turbinate surgery one must look to published research to determine set standards. The individual surgeon can then audit his own results against these set standards. The set standards are also available for health care politicians.

When we as surgeons assess the results of our surgical procedures and aim to understand them we must consider whether we originally made a correct analysis and diagnosis, whether we chose the correct surgical procedure, and whether we executed the procedure correctly. A good result may also require an element of luck! When assessing the literature and comparing published results with our own it is important therefore that we determine whether the authors stated the diagnosis and described the surgical procedure. Unfortunately, in the field of septoplasty, there is no single recognised system for classifying septal deformity (Guyuron et al., 1999). It is also important to determine whether any other confounding variables were present that would influence nasal function such as rhinosinusitis or polyposis. We should also be clear as to what surgical procedures are being described when considering efficacy of septoplasty. Septoplasty is not a single operation. Different techniques apply to different septal deformities, ranging for example from a closed “swing-door” procedure to an open approach, extra-corporeal total septal reconstruction (Gubisch and Constantinescu, 1999).

There is also no single widely accepted series of outcome measures although recently the American Academy of Otolaryngology - Head and Neck Surgery has proposed a validated, disease specific quality of life score for septoplasty (Stewart et al., 2004). Furthermore outcome data collection should avoid bias. Ideally patients should be questioned about symptom change independent of the operating surgeon. As well as symptoms of nasal obstruction being studied nasal aesthetics may also be important (Vuyk and Langenhuijsen, 1997). We have proposed a surgeon based score to assess nasal aesthetics (Sharp and Rowe-Jones, 2003) which can be utilised with patient quality of life scores related to appearance. No standard, widely accepted objective test for assessing outcome of septoplasty exists. Whilst acoustic rhinometry changes correlate with symptom changes they do not always correlate with pre-operative symptoms and therefore cannot be considered diagnostic for determining the cause of the patient’s symptoms (Grymer et al., 1989; Marais et al., 1994). Acoustic rhinometry may be helpful as a measure of technical success or otherwise but this does not imply success in symptom relief (Pirila et al., 2001). When assessing results of septoplasty one is also compromised by the difficulties of control groups for surgeon intervention. The results that are reported in the literature are generally observational, providing level three evidence. Most series present 70-85% of patients being improved in relation to

nasal symptoms including long-term follow-up (Jessen et al., 1989; Bohlin and Dahlquist, 1994; Siegel et al., 2000; Dinis and Haider, 2002). In Bohlin and Dahlquist's study of 63 septoplasties performed by junior ENT surgeons a significant reduction in postoperative nasal resistance was present at 3 months and was maintained at up to 10 years post operation. These objective measurements were accompanied by subjective satisfaction in 84% of the patients seen at 10 years. Septoplasty with attention to the area adjacent to the nasal valve has a high success rate with a straight septum achieved in 82% of patients (Urquhart and Bersalona, 1997). In a group of 127 patients undergoing septoplasty for a deviated nasal septum, accompanied by a reduction in nasal resistance, 85% were satisfied or very satisfied with the operation (Sipila and Suonpaa, 1997). A further study of 24 patients also demonstrated a significant reduction of nasal resistance and significant increase in nasal volume following submucous resection of the septum and turbinectomy. All patients reported subjective improvement in nasal patency (Shemen and Hamburg, 1997). No attention to quality of life scores were made in these studies. Most recently the nasal obstruction and septoplasty effectiveness scale (NOSE) has been used as a validated, disease specific quality of life outcome tool. A prospective observational outcomes multicenter study with 14 sites used the NOSE on 59 patients undergoing septoplasty with or without partial turbinectomy. Significant improvements in scores were recorded at 3 and 6 months postoperatively (Stewart et al., 2004).

When asking why some patients fail to improve following septoplasty one has also to address the difficulty of diagnosing the cause of a patient's complaint of nasal obstruction. It is difficult to always accurately determine the contribution of a deviated septum to patients' symptoms particularly as septal deviation has been reported as having a prevalence of 1-80% in the general population (Jessen and Janzon, 1989).

Similar difficulties apply to assessing surgical outcome for inferior turbinate hypertrophy. We have no clear indicators, subjective or objective, for determining what is the normal size for an inferior turbinate. As with septoplasty studies many reported series also do not define the pathology of the inferior turbinates and there is no standardised reporting system for assessing other nasal pathology that may contribute to a sensation of nasal blockage. This highlights the difficulty of reaching a diagnosis for symptoms of nasal obstruction. Reported series also do not clearly state the indications for surgery and associated pre-operative or post-operative medical therapy. A wide range of surgical techniques are also available for reducing the size of the inferior turbinate making it very difficult to provide a single figure of outcome for what is a basket of different procedures. As with septoplasty there is also no clearly defined system for subjective or objective outcome measurement. As with septoplasty most evidence is level three based with symptom scores reportedly improving in 41-93% of patients. A retrospective study of 307 patients who had undergone submucosal diathermy (SMD), SMD with outfracture, partial turbinectomy or linear cautery revealed that up to 71% of patients were satisfied with the results 3 months and 1 year after surgery, falling to a maximum of 52% of patients after 2 years. No statistical difference was demonstrated between the different techniques (Warwick-Brown and Marks, 1987). Other authors have prospectively confirmed subjective improvement in the sensation of nasal obstruction 2 months after SMD, accompanied by an objective fall in nasal resistance measurements. In patients who do not have concurrent medical treatment however the benefits of surgery are lost within 15 months (Jones and Lancer, 1987). Cryotherapy may be as effective as SMD (Wengraf et al., 1986). A prospective, randomized study comparing laser cautery to SMD found the results to be equivalent at 6 weeks with respect to nasal patency improvement, but the laser was associated with less morbidity in terms of nasal obstruction in the early post-operative period. At 1 year the reduction in subjective nasal airway obstruction was maintained only in the laser group (Cook et al., 1993). This was not accompanied by an objective improvement in peak nasal inspiratory flow rate. Other authors have shown a significant reduction in nasal obstruction symptom grade and nasal resistance values 6 months after contact laser turbinate reduction (Min et al., 1996).

Submucosal outfracture of the inferior turbinate has been demonstrated to produce a significant in objective mean cross-sectional nasal area 3 months after surgery. Ninety percent of patients reported improvement in nasal obstruction (Marquez et al., 1996). Similar results have been reported following turbinoplasty (Grymer et al., 1996).

Radical trimming of the inferior turbinate produces a dramatic reduction in symptom scores for nasal obstruction and halves objective nasal resistance measurements. Only 20% of patients develop recurrent nasal obstruction within 2 years (Martinez et al., 1983; Moore et al., 1985; Ophir et al., 1985; Wight et al., 1990). At mean follow-up time of 7 years 3 months, nasal resistance was still significantly lower than pre-operatively (Carrie et al., 1996). Studies on the effect of anterior turbinectomy have shown similar results (Fanous, 1986). Antroconchopexy has been demonstrated to produce significant postoperative improvements in symptom scores for nasal obstruction and significant reduction in nasal resistance measurements (Lannigan and Gleeson, 1992). The procedure may be associated with less long-term dryness than total inferior turbinectomy (Salam amd Wengraf, 1993). However in a study reporting that 28 out of 29 patients gained improvement in nasal breathing up to 5 years following total inferior turbinectomy, only 1 patient complained of excessive nasal dryness (Martinez et al., 1983). No additional benefit has been demonstrated from surgical reduction of the hypertrophied compensatory turbinate associated with septal deviation (Illum, 1997).

In conclusion the existing evidence for the efficacy of septal and inferior turbinate surgery is level three and four. A standard system of describing septal deformity and inferior turbinate enlargement is required that ideally can be associated with an objective and diagnostic measure that can be repeated for outcome analysis. This measurement must correlate with patient symptoms so helping lead to accurate diagnosis. Randomised control trials are needed for surgery of the inferior turbinate.

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THE PATIENT'S VIEW ON OUTCOMES OF SEPTAL SURGERY

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BACKGROUND

A survey on the outcome of septal surgery was done in cooperation with a German sickness fund in 1994 whilst analysing routine hospital claims data. One of the results of this analysis was the identification of several ICD-coded diagnoses with a surprisingly high frequency. Notably in 1992, surgery for septal deviation was among the 'Top Ten' hospital diagnoses in the male insured population constituting 15 procedures per 10,000 insured and an average length of stay of 8 days (Dörning et al., 1995). In 1994 there was only weak evidence for the effectiveness of nasal surgery and there were only a few studies that included patient's view on outcomes. For this reason it was decided to undertake a post-operative patient survey. We wanted to assess the patient-perceived functional outcomes of surgery, to find out about the level of

patient satisfaction and to identify the main determinants of patient satisfaction after they had been discharged from the hospital.

MATERIAL AND METHODS

Survey Characteristics

A written survey was conducted of all employed members of a German sickness fund (n = 392), who had been hospitalised for surgical correction of a deviated nasal septum (ICD9 – 470) on average 7.7 months previously. A response rate of 85.2% was achieved (334 valid questionnaires) which form the basis for the following results.

Survey instrument

The survey instrument focused amongst other things on:

- the reasons for undergoing surgery
- pre- & post-operative subjective symptom assessment
- post-operative complications
- patient satisfaction with the outcome of surgery

The reasons for surgery constitute why patients thought they had decided to undergo an operation on the nasal septum.

To assess the functional outcomes we developed and pre-tested the Nasal Symptom Checklist (NSCL). The NSCL consists of 18 symptoms which are related to a deviated nasal septum (i.e. nasal obstruction, headache, snoring). Symptom distress is rated by 4 answer categories (strong, moderate, rare, and not at all). A global nasal distress score is computed by summing up the 18 items and transforming the score into percentages. Higher scores represent higher distress. The Nasal Symptom Checklist is a one-dimensional score with good reliability (Cronbach's alpha: pre-operative 0.80; postoperative 0.78). The pre-operative level of symptoms was assessed as recalled by the patients.

Asking for post-operative complications we obviously focused on those complications of which patients were aware.

Patient satisfaction was assessed by three items: satisfaction with the result of surgery, willingness to undergo the operation again and their attitude towards recommending nasal surgery to others. Four answer categories were proposed (very satisfied, rather satisfied, rather dissatisfied, very dissatisfied).

Patient characteristics

Eighty nine per cent of the respondents were of male gender with an average age of 35.2 years (20-69). The length of stay on this occasion had decreased compared to 1992 to an average of 6.5 days (and might be even shorter today). Ninety four per cent of the patients had had nasal packing post-operatively.

RESULTS

Reasons for surgery

Not surprisingly almost all patients (98%) suffered from nasal obstruction and cited this symptom as one of the reasons for undergoing surgery. Almost half of the patients underwent surgery because of snoring (48%), and a third cited dryness of mouth and headache as one reason (34% and 31%, respectively).

Alleviation of symptoms

The average pre-operative NSCL reached 29.6% (from a possible 100 %) and decreased to an average of 12.4%. The absolute symptom alleviation was 17.4 percent points (a decrease that was highly significant, $p<0.0001$). Relative to the (recalled) pre-operative level, this represents nearly 60 % relative symptom alleviation. However, complete relief was reported in only 10.9 %, only, whereas 7.9% report no alleviation at all (or even sometimes worsening of symptoms).

Major surgical complications

The majority of patients reported no post-operative complications (70.1%). Twenty nine per cent reported at least one complication. Serious complications like adhesions (5.7%), perforation of the septum (2.1%) or an abscess in the surgical field (1.8%) occurred less frequently, but were of significance.

Patient satisfaction with the outcomes of surgery

The questionnaire showed 45.2% of the respondents were very satisfied, 35.6% rather satisfied and 19.2% rather or very dissatisfied. In patient satisfaction research, the question always arises "Where does dissatisfaction start?" In other words, how should the "rather satisfied" be interpreted? In this study and in several other treatment satisfaction studies which we have conducted, consistently, we have found that people who say they are "rather satisfied" exhibit the same answering behaviour as the group of "dissatisfied" patients. Therefore, we recommend that one only takes the "very satisfied" as the "successes", if one is interested in an honest assessment.

Determinants of patient satisfaction

Figure 1 shows a graphical display of a multivariate model (a categorical regression for non-metrical data) of the main determinants of patient satisfaction.

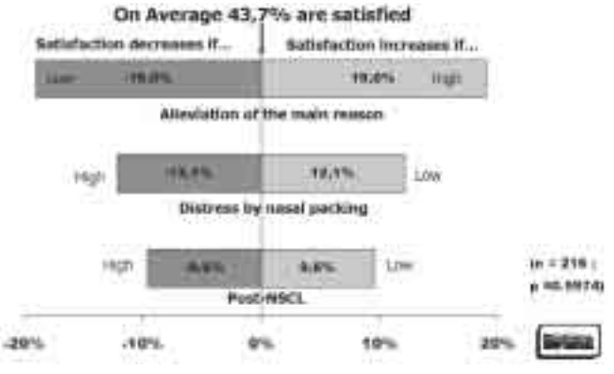

Figure 1. Determinants of patient satisfaction.

The model tells us that there are three main variables which determine the level of patient satisfaction: (1) the alleviation of that symptom, which was cited as the main reason for undergoing surgery, (2) the distress caused by nasal packing and (3) the actual level of nasal symptoms as measured by the NSCL at the time of the survey.

The model estimates the average percentage of satisfied patients 43.7% (which is quite close to the level actually observed). The percentage of satisfied patients decreases to 24.7% (43.7 – 19.0), if the distress caused by the symptom, that was cited as the main reason for undergoing surgery, is still high. It further decreases to 12.6% (43.7-19.0-12.1) if the distress caused by nasal packing was perceived as high. Satisfaction is lowest among the group of patients, whose overall symptom level at the time of the survey is still high: only 3% of the patients in this group consider themselves as satisfied (43.7-19.0-12.1-9.6).
On the other hand in the group where almost everybody is satisfied and who are the ones, where the reason for undergoing surgery has been cured, nasal packings caused low distress and the overall symptom level at the time of the survey is low: 43.7+19.0+12.1+9.6 = 83.8% satisfied patients.
The model fit is non-significant (p=0.5947), indicating that the model reflects the empirical data well.

DISCUSSION

Generalisation of results

Compared to many other studies on outcomes of nasal surgery, our study population is quite large and not biased by single institution characteristics. However, because the sickness fund is prone to blue collar workers, the results may not be applicable to Germany as a whole.

Recalled pre-OP symptom assessment

One would certainly have preferred to assess the pre-operative symptom level prospectively. However, a German sickness fund only knows about a patient undergoing surgery when the patient is actually in the hospital, so for logistic and technical reasons a preoperative assessment is impossible.

Recalled symptoms may deviate from the actual symptom level immediately before the operation in two ways: they may be either exaggerated or understated. Exaggeration leads to an overestimation of the treatment effect, whereas understatement leads to an underestimation.

From studies comparing retrospective and prospective assessments it is known, that retrospective assessment in general leads to a slight overestimation of treatment effects (Aseltine et al., 1995; Kohlmann et al., 1998; Dawson et al., 2000). So if any bias occurred from the recalled assessment in our study, it is in the direction towards “better results”.

Effectiveness

This study would not be considered ideal from the perspective of evidence based medicine, since it is an observational study with no control group or randomisation. On the other hand, the study demonstrated something about “real world” conditions and the results that are achieved under everyday routine conditions. Consequently it considers effectiveness rather than efficacy. The alleviation of symptoms is comparable to the results of other researchers (Arunchalam et al., 2001; Pirilä and Tikato, 2001). In addition the post-operative complication rates are considerably higher than the ones reported in the literature and patient satisfaction is not that high.

CONCLUSION

- Patient criteria for (dis-)satisfaction are plausible and rational.
- The patient’s view of outcomes gives immediate and direct insights into the effectiveness of septal surgery.
- From the patient’s perspective in 1994 there was room for improvement.

EPILOGUE

The results of this study were originally published in 1996 (Bitzer et al., Laryngo-Rhino-Otologie 1996; Dörning et al., Gesundheitswesen 1996) and caused considerable discussion among the German ENT-community at that time.

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EVIDENCE ON EFFICACY IN NASAL SURGERY. SURGICAL MANAGEMENT OF NASAL POLYPOSIS

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Nasal polyposis is a chronic disease with a clinical course over at least 20 years (Vento et al., 2000). A variety of strategies have been used, both medical and surgical and it is often a combination of treatments which offers the best long term management (Blonquist et al., 2001). In this study, 32 consecutive patients with nasal polyposis were treated with 10 days of oral prednisolone 40mg per day for 3 days reduced to 5mg per day and for one month (400mg per day) with topical budesonide bilaterally. Then randomised surgery on the right or left side was performed, the extent of surgery being determined by the disease. This was followed by one year of budesonide bilaterally (400mg per day). Visual analogue scores were used for symptom evaluation (before treatment and at 1, 3, and 12 months post treatment). Olfactory thresholds were recorded using a butanol test and polyp size was assessed on endoscopy (0-3) [0 no polyps, 1 polyps confined to the middle meatus, 2 polyps outside the middle meatus and 3 polyps completely occluding the middle meatus] (Lund et al., 1995). The results are shown in Figures 1, 2 and 3. From the study it was concluded that (1) medical treatment seems to be sufficient to treat most symptoms and nasal polyposis, (2) when hyposmia is the primary symptom no additional benefit seems to be gained from surgical treatment, (3) if nasal obstruction is the main problem after steroid treatment surgical treatment is indicated, and (4) selection of those who will benefit from surgery should be based on the patient and not on the examiner's polyp score.

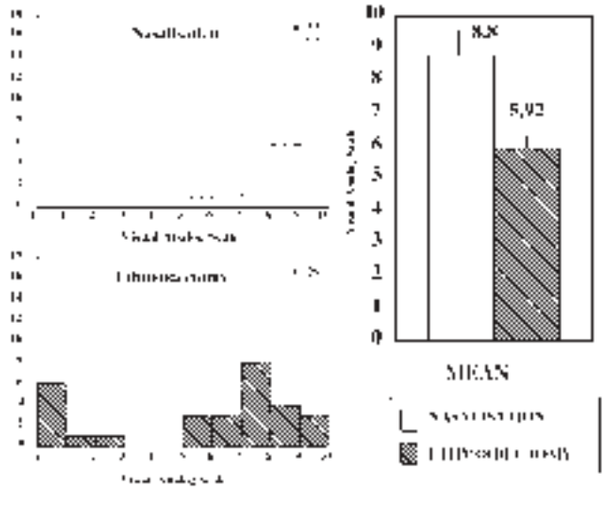

Figure 1*. Improvement in the nasal discomfort 24 months after surgery.
0 same discomfort as before surgery
+10 normal functioning nose

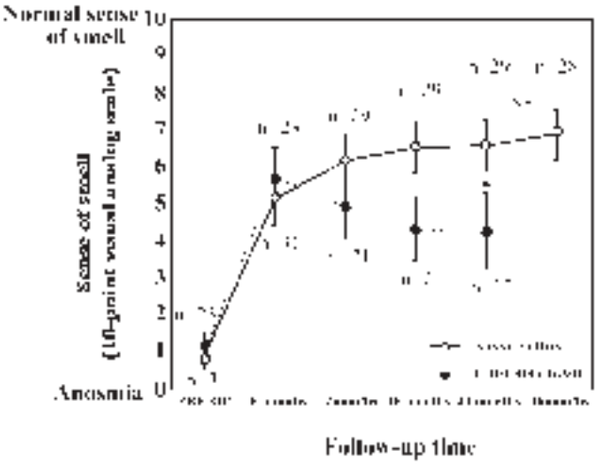

Figure 2*. Sense of smell after surgery.

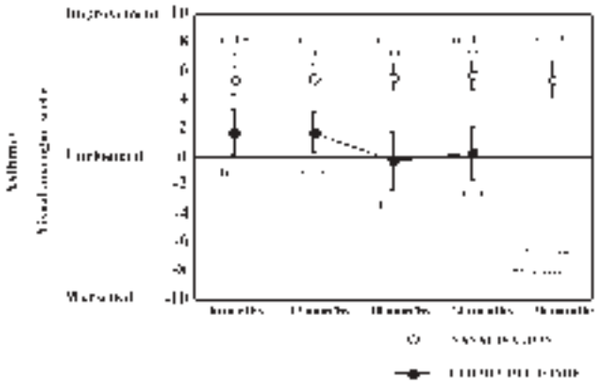

Figure 3*. Improvement asthma after nasalisation and ethmoidectomy.

*These 3 figures have been reproduced from:
Jankowski R, Pigret D, Decroocq F (1997) Surgery: polypectomy vs functional ethmoidectomy vs radical ethmoidectomy. Acta Otolaryngol (Stockh) 117: 601-608.

Two questions arose from this study. (1) Is it easy to evaluate separately the symptoms of each nostril with visual analogue score? And, (2) should a third arm evaluating radical ethmoidectomy have been added to this study?

More recently a comparison of functional results after 6 days of systemic steroids and after 'nasalisation' (complete fronto-ethmo-sphenoecomy) for nasal polyposis has been conducted (Bodino et al., manuscript in preparation). This work has shown that functional results of nasalisation are equivalent to those obtained using systemic steroids but remain stable in the longer term. It further added support that nasalisation is a radical but functional procedure for nasal polyposis.

In an earlier study comparing the functional results after more limited ethmoidectomy and nasalisation for diffuse and severe nasal polyposis (Jankowski et al., 1997), two demographically similar groups were compared sequentially (Table 1) (see paper for precise differences between the two techniques). Nasalisation showed a significant improvement over less radical surgery at 24 months when visual analogue scores for nasal discomfort were compared (Figure 1) and/or sense of smell (Figure 2). Although the numbers in the more limited ethmoidectomy group are small, asthma was less improved in these patients than in those undergoing nasalisation (Figure 3). At five years there was a significant number in the recurrence rate with nasalisation patients having fewer re-operations (4) and a recurrence rate of 23% as compared to 40 revision procedures in the limited ethmoidectomy group and a recurrence rate of 58%. In conclusion, medical treatment of nasal polyposis is effective, where possible using topical steroids with the addition of systemic steroids where appropriate. In addition, surgery is an effective treatment when medical therapy fails and on balance the more thorough the clearance of the sinuses, the longer the benefit.

CONCLUSION

Radical ethmoidectomy or nasalisation gave the same functional results as six days of systemic steroids but the nasal improvement after the 'medical' polypectomy significantly decreased two months after treatment whereas patient improvement was maintained up to one year post-operatively.

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