■ ORIGINAL ARTICLE

Endoscopic Sinonasal Surgery: Study of 110 Patients With Nasal Polyposis and Chronic Rhinosinusitis

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Introduction and objectives: Nasal polyposis with chronic rhinosinusitis is classified as a subset of chronic rhinosinusitis. The goal of this study is to assess the results of endoscopic sinonasal surgery at our hospital for nasal polyposis with chronic rhinosinusitis.
Patients and method: In this review of 110 patients affected by chronic rhinosinusitis and nasal polyps treated with endoscopic sinus surgery, we focus on symptoms, degree of involvement, sinus opacity (Lund-Mackay grading system), complications, rate of improvements, and recurrences.
Results: Major complications did not occur. Minor complications occurred in 21 patients (19%) with the most frequent being adhesion. Patients who suffered from asthma, aspirin intolerance, or both were related to a greater rate of recurrences. The endoscopic surgery of recurrences was not linked to a greater rate of failures. In our study, the complications rate was not related to revision surgery. The severity grading used in nasal endoscopy correlated well to the grading assigned by computerized tomography.
Conclusions: The presence of asthma, aspirin intolerance, or both adversely affect endoscopic sinus surgery outcome. In this review, the rate of complications is not related to revision surgery. The staging used relates well the degree of occupation shown by the nasal endoscopy to that given by computerized tomography.

Key words: Endoscopic sinonasal surgery. Chronic rhinosinusitis. Polyposis. Recurrences. Complications.

Cirugía endoscópica nasosinusal: estudio de 110 pacientes con rinosinusitis crónica con pólipos
Introducción y objetivos: La rinosinusitis crónica con pólipos es una entidad considerada como un subgrupo dentro de la rinosinusitis crónica. El objetivo de este estudio es valorar los resultados de la cirugía endoscópica nasosinusal de la rinosinusitis crónica con pólipos en nuestro hospital.
Pacientes y método: Exponemos una revisión de 110 pacientes con rinosinusitis crónica con pólipos, operados mediante cirugía endoscópica. Se estudia los síntomas, el grado de afección, la ocupación de los senos (estadificación de Lund-Mackay), las complicaciones y el porcentaje de curaciones y recidivas.
Resultados: En esta serie no hay complicaciones mayores. Se describen 21 (19 %) menores, de las que la sinequia es la más frecuente. Los pacientes con asma, intolerancia al ácido acetilsalicílico o ambos trastornos presentan un mayor porcentaje de recidivas. Cuando se trata de cirugía endoscópica de revisiones quirúrgicas, no observamos que tengan mayor probabilidad de recidivar. En la serie que estudiamos, las complicaciones no están relacionadas con las revisiones quirúrgicas. La gradación de la gravedad de la afección que utilizamos en la endoscopia nasal se corresponde bien con la estadificación obtenida en la tomografía computarizada.
Conclusiones: El asma, la intolerancia al ácido acetilsalicílico o ambas se manifiestan como factores de mal pronóstico. En la serie revisada, no hay una clara relación entre la cirugía primaria o de revisión con las complicaciones. En la estadificación utilizada se correlacionan bien el grado de ocupación de la endoscopia nasal y la tomografía computarizada.

Palabras clave: Cirugía endoscópica nasosinusal. Rinosinusitis crónica. Poliposis. Recidivas. Complicaciones.

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INTRODUCTION

Nasal polyposis (NP) is a serious health issue suffered by around 4% of the general population.[1] During the last few years doctors have been reviewing the disease again in an attempt to unify the criteria used to define it. Until now

chronic sinus problems were a mixed group of illnesses that were hard to classify.

The European Position paper on Rhinosinusitis and Nasal Polyposis (EPOS document)[2] defines it as a subgroup within what is considered to be chronic rhinosinusitis.

NP is a disease where there is chronic inflammation of the upper airways. Histology of the disease shows oedema and infiltration of a number of inflammatory cells (predominantly eosinophils, mastocytes, lymphocytes, and plasma cells). The pathogenesis of NP is still unknown.

There are different hypotheses to explain why some forms of chronic rhinosinusitis (CRS) develop into NP and others do not. A different local allergic mechanism from systemic allergy mediated by immunoglobulin E (IgE) has been described, in which the IgE has a specific role against Staphylococcus or superantigen.[4]

Functional surgical treatment by endoscopic sinonasal surgery (ESS) is based on the hypothesis that diseased mucosa can get well if ventilation is made easier through natural orifices, thus restoring mucociliary clearance.

There is very little published[5-7] on ESS results in CRS with polyps that exclude other CRS categories, and, generally speaking, there are no unanimous criteria regarding pre-surgical staging and review of the complications.

We have attempted to show a series describing the results of 110 ESS on CRS with polyps, detailing the criteria for inclusion and reviewing clinical results, relapse, prognosis factors, and complications.

PATIENTS AND METHOD

A review was carried out on 110 patients who had been treated at our hospital by ESS for chronic rhinosinusitis with polyps (CRSP) between 1999 and 2004.

All of the patients, who present a bilateral condition, were operated on by the same surgeon and were monitored for at least 2 years.

Related factors were taken into account, such as asthma, acetylsalicylic acid (ASA) intolerance, allergies (specifying those patients who had positive prick tests), previous surgeries (ESS or Caldwell-Luc), and symptoms.

Patients were evaluated before and after endoscopic nasal surgery. The exam was done at the doctor's office, without topical anaesthesia, and without vasoconstrictors. Classification was done according to a variation of the staging system devised by Lund et al.[8]

Patients are evaluated by a CT scan before surgery; the invasion of the sinus area is classified by the Lund staging system,[9] in which the highest degree of the condition is 24 points (12 on each side). If the patients underwent treatment with topical steroids (budesonide or fluticasone, 200 µg/day) and systemic steroids (deflazacort, with starting dose at 1 mg/kg of weight per day, and then decreasing for 14 days) and no improvement was seen for at least 3 months, then surgery was performed.

Surgery consisted of endoscopic surgery whose area depended on the compromised sinuses evaluated during the pre-surgical CT scan. All of the surgeries performed involved at least uncinectomy, anterior ethmoidectomy, or bilateral antrostomy. If a posterior ethmoid condition was found, then the surgery included posterior ethmoidectomy. If, while examining the fronto-ethmoidal recess, mucosa inflammation was visible, the recess was enlarged and the same treatment was performed within the sphenoid ostium. If the nasal septum was significantly deviated, it was corrected by septoplasty or endoscopic resection of the deviation.

After surgery patients were put on topical steroids (fluticasone or budesonide, 200 µg/day) for at least 2 years.

Minor complications were as follows: haemorrhaging that was a problem during surgery, but did not require special measures such as transfusion or surgical reintervention, synechia, ecchymosis, spontaneously resolving epiphora, and asymptomatic posterior septal perforation. Major complications were: orbital haematoma, mucolele/mucopyocele, fistulas of cerebrospinal fluid (CSF), and haemorrhaging that required post-surgical measures.

In revision cases, the same types of questions are asked as in primary surgery. Relapses are considered to be reinterventions during the series under study. Operations for relapses at other centres are considered to be primary.

Whether or not to use reintervention due to recurrence was based on nasal obstruction symptoms and a grade III endoscopic exam in both nasal passages, anterior and posterior, in spite of continuous treatment with topical steroids and 1 or 2 orally administered systemic steroid regimens (deflazacort).

Statistical Processing

Descriptive statistics were drawn up on the data; the mean was found along with the standard variation for quantitative variables and the percentage for qualitative variables. The degree of association between qualitative variables is calculated by using the relative risk (RR) with a corresponding confidence interval (CI) of 95%. Correlation of the endoscopic staging and the CT classification was done using Spearman's coefficient.

The application used was SPSS version 11.5.

RESULTS

There were 81 males and 29 females among the 110 patients. The average age was 45 (15.2) (range, 9-93). In the clinical history, 38 patients (34%) had allergy symptoms, with 11.8% having positive prick tests.

Twenty-seven cases (24.5%) had been operated on previously for nasal polyposis. Of these exams, some were non-endoscopic polypectomies, some were Caldwell-Luc procedures, and others were previous ESS. These primary surgeries were performed at other centres.

The symptom that led them to visit the doctor was nasal obstruction, found in 95% of cases (Table 1), or olfactory alterations, found 72% of the time. A little under half of the patients complained of rhinorrhea, while facial pain was not a symptom seen frequently (17%).

Table 1. Symptoms by Frequency*

Symptoms	*n*	*%*
Nasal obstruction/NRI	100	95
Hyposmia	33	30
Anosmia	46	42
Rhinorrhea	52	47
Facial algia/cephalea	19	17

*NRI indicates nasal respiratory insufficiency.

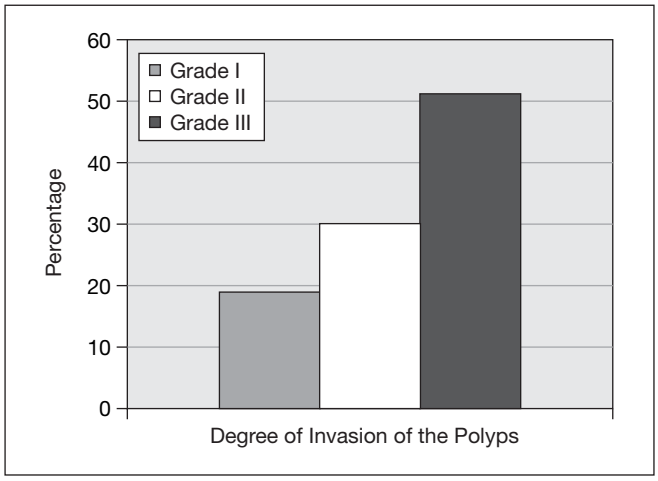

Figure 1. Pre-surgical nasal endoscopy results according to the extent of invasion. Grade I (extending to the middle meatus): 19%. Grade II (extending to areas beyond the middle conchae without reaching the floor of the nasal passage): 30%. Grade III (extending through the entire nasal passage): 51%.

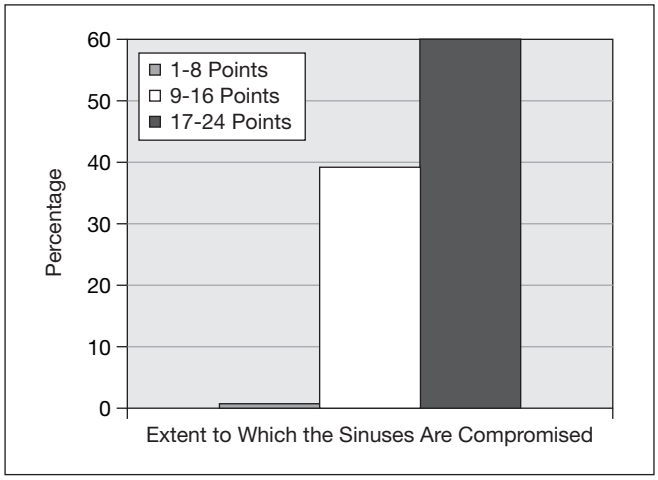

Figure 2. Results of the CT staging. Grade III (extension within sinuses according to a Lund-Mackay staging score of between 17 and 24): 60% Grade II (a score between 9 and 16): 39.1% Grade I (a score between 1 and 8): 0.9%.

Nasal endoscopy exams showed a higher percentage of massive polyposis (Figure 1). The pre-surgical CT imaging test also showed a higher percentage of massive polyposis (Figure 2).

Table 2. Minor Complications

	Patients, n	*%*
Synechia	10	9.1
Ecchymosis	7	6.4
Haemorrhage	5	4.5
Complications (all causes)	21	19

Table 3. Relapse Risk in Asthmatic Patients

	With Revision	*Without Revision*
With asthma	6 (21.4%)	22 (78.6%)
Without asthma	6 (7.4%)	75 (92.6%)

A posterior ethmoidectomy was done 70% of the time; sphenoidotomy was done 37% of the time; in 13% of the cases the frontal recess was enlarged and a septoplasty had to be performed in 7 patients (6.4%).

There were no major complications in the series under study.

Twenty-one patients (19%) had minor complications (Table 2). Synechia can be singled out as the most common complication (9.1%), followed by ecchymosis (6.4%), and haemorrhage (4.5%).

Twelve patients (10.9%) needed revision surgery due to symptomatic relapse that did not respond to steroids. These relapses, when the subgroup of patients with asthma was included, were seen 25.7% of the time. Of the patients, 16.4% had ASA intolerance. If the patients had asthma and ASA intolerance (Widal's triad), 11% had to be operated on again.

The risk of relapse was studied in the subgroup of patients with asthma (Table 3). The probability was almost triple (RR=2.8; 95% CI, 1.02-8.2; odds ratio (OR), 3.4; $P<.05$).

When the risk of relapse was calculated for the subgroup of patients with ASA intolerance, the probability was more than triple (RR, 3.6; 95% CI, 1.3-10.2).

Patients who had both previous symptoms, Widal's triad, had over 3 times the risk of relapse (RR, 4.04; 95% CI, 1.4-11.4).

A study was made to see whether or not previous ESS meant there was a higher chance of revision surgery (RR, 0.6; 95% CI, 0.1-2.6). If the patient had had previous endoscopic surgery, this did not represent a higher probability of relapse.

Patients operated on because of recurrence had a complication rate of 22.2% (6 patients). If they had had no prior operations, the rate of complications was 19.3% (15 patients). The difference was not statistically significant.

Lastly, one of the aims was to see if the endoscopic grading of the polyposis area correlated with the staging through CT imaging tests. This correlation was positive, although only discretely (Rho, 0.48; $P<.001$).

DISCUSSION

This series looked at 100 ESS that were performed exclusively due to CRS with polyps. The descriptive results

show an incidence of gender, the age at which the patient started suffering from the condition and the percentage of allergies, in line with what has been published elsewhere.[5-7]

Patients visit their physician complaining of nasal obstruction as a symptom that requires further attention and they almost always have olfactory alterations.

A condition due to rhinosinusal polyps associated with asthma and ASA intolerance, known as the ASA triad or Widal's syndrome, is a factor that implies a higher chance of relapse, as seen in this study. We have found that the probability of relapse is affected if asthma or ASA intolerance is added to polyposis or the entire triad.[10,11]

Our review shows a relapse incidence of 11%. This is lower than what has been published in the last few years.[10-12] We see this difference as being linked to the different criteria taken into account, such as surgical revision of subsidiary relapses. Surgical revision occurs in this series if nasal obstruction and grade III endoscopy is sustained for 3 months after the patient has been treated once or twice with oral steroids (14 days) and continuous topical steroids; other series do not use this criterion or else the medical treatments include other drugs (antibiotics, nasal constrictors, etc) whose efficacy is currently heavily questioned.[2,10-15]

Regarding patients who had been operated on previously, we did not see any difference in the relapse percentage from the primary surgery group. There is no convincing reason for this fact. It seems that endoscopic surgery is successful in certain patients and that there are inherent factors to the pathogenesis that determine, more or less, the rate of success, independently of the surgical steps taken.[3,6,14-19]

Regarding analysis of the complications, our series does not have major complications, even though the series analyzed is too small to come to any conclusions. The number of minor complications is higher than in other series.[5,10-16]

Minor complications differ from one series to another; the various case reports do not clearly follow unanimous criteria regarding minor complications and their analysis; occasionally, they are questionnaires sent to the professionals involved; CRSP and CRS without polyps (unilateral and bilateral) are evaluated all together or they include a surgeons' learning curve. The series that we present does not include a learning curve and we have only reviewed bilateral CRSP.

Synechia was the complication that we saw most; occasionally it is asymptomatic (when it is posterior, i.e. it does not obstruct the infundibulum) and was taken into account in our series independently of the symptoms giving rise to it.

Considering haemorrhage as a complication would require more homogenous inclusion criteria; it would be necessary to determine whether it was something that was just a bother during surgery, if it called for reintervention, if it required coagulation of the anterior ethmoidal artery or the sphenopalatine artery and whether or not a blood transfusion was necessary.

The staging system devised by Lund et al[8,9] or Kennedy[19] is widely used as a CT evaluation of the invasion. It does not make things any more complexes and is useful for comparing different series. In our study we have evaluated the degree of correlation with nasal endoscopy staging and we have seen that a correlation does exist. This should not, however, be considered as an isolated trial, but instead one that was done within the context of examination and clinical practice.

Asthma, ASA intolerance, or both, are clear factors for poor prognosis when it comes to evaluating relapses of ESS for CRS with polyps. If a relapse needs to be operated on this does not imply a worse prognosis when it comes to the possibility of recurrence or possible complications during surgery. A change is underway in the manner in which CRS with polyps is treated due to a greater knowledge of its pathogeny.[2,6,14,15,20] However, this is still not enough to achieve the results that are always to be expected. Endoscopic surgery has gone from being the best therapeutic option[21-23] to being just one weapon in the currently accepted arsenal.[24]

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