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Incidence of medico-surgical treatment for nasal polyps on the development of associated asthma

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SUMMARY

The surgical treatment of nasal polyps (in asthmatic patients) is still controversial today because of the contradictory, inconsistent, and unforeseen results reported in the literature. The 50 patients included in this study (mean age 49 years, range 25-67 years) came for a check-up on an average of 18 months (lower limit 12 months, upper limit 40 months) after a radical endoscopic intranasal ethmoidectomy. Thirty patients suffered from polyps and bronchial hyperreactivity; 12 patients in this group also suffered from aspirin intolerance. Twenty patients suffered from nasal polyps alone, and served as a control series. The following parameters were methodically noted relative to the date of ethmoidectomy: 1) the frequency of attacks and possible intervals of respiratory difficulty, pre- and postoperatively; 2) the basic treatment for the asthma, and the difference in size of the therapeutic doses necessary and/or the elimination of one or more therapeutic classes; 3) bronchospasticity, evaluated pre- and postoperatively by auscultation for wheezing and peak flow measurements. A bronchial challenge with carbamyl choline and a four-doses aspirin challenge over two days (10 mg, 50 mg, 100 mg, 400 mg) were carried out pre-and postoperatively in the absence of contra-indications. Ninety-one per cent of the patients have improved and now live in less discomfort. The factors studied show a lower frequency of attacks, a distinct decrease of respiratory difficulty, less need for anti-asthmatic medication and especially less oral corticoids, and a marked improvement in functional respiratory test. The carbamyl choline test confirms these data and even shows the totally reversible nature of nonspecific bronchial hyperreactivity in 30% of these patients. This series is too limited for us to say that intolerance to aspirin is reversible; perhaps only the reactivity threshold changes. In the 20 subjects with nasal polyps alone, no case of asthma have been recorded since the operation. Improvement of the asthmatic condition may be partly dependent upon a global diagnosis and treatment of the

patient by the pneumo-immunoallergologist and the ENT-specialist. However, the nature of the surgical act seems to be of prime importance, and we must insist on the need for a radical marsupialization of the paranasal sinuses.

INTRODUCTION

Nasal polyps (NP) are often associated with the development of asthma (Moloney et al., 1977; Wayoff et al., 1986). The kind of asthma involved is non-allergic, appears late, and may precede, follow or (in some cases) be simultaneous with the appearance of NP. It is a serious illness which may in some cases be fatal; in France the death-rate totals 3.6 per 100,000 inhabitants, and in New Zealand it accounts for 8 deaths per 100,000 (Jacquemin, 1990; Woolcock, 1990).

The increase in morbidity and in death-rate has been observed in all countries, despite progress in therapy. Consequently, it is important to look for any means of improving the way asthma evolves. With this in view, it seems logical to assess the possible incidence of NP surgery on the associated asthma. Few publications mention the results obtained, and they draw opposite conclusions. Van der Veer (1920) was the first to observe that polypectomy could worsen asthma, and this was subsequently confirmed in numerous publications (Francis, 1927; Samter et al., 1958; Samter et al., 1968). Other authors reported contradictory results, observing – in nevertheless extremely variable proportions – an improvement in the asthma after sinus surgery (Weille, 1929; Seigel et al., 1956; Schenck, 1974). Because of the contradictory, inconsistent, and unforeseen results reported in these studies, the surgical treatment of nasal polyps in asthmatic patients is still controversial.

However, a better knowledge of those pathogenic factors which are common to polyps and associated asthma leads us to suppose that the surgical treatment of NP can and must influence the development of asthma. Progress in endonasal surgery, but above all a global and concerted treatment of the patient by the ENT-specialist and the pneumo-allergologist, allows us to state the necessity of treating polyps in order to obtain an optimal balance of the asthma.

This study of 30 patients with NP and asthma confirms, by the use of objective parameters, the undeniably positive effect of marsupialization of the paranasal sinuses on the occurrence of the associated asthma.

PATIENTS AND METHOD

Patients

The 50 patients included in this study (average age 49 years; lower limit 25 years, upper limit 67 years) came for a check-up on an average of 18 months postoperatively (lower limit 12 months, upper limit 40 months). They all had undergone a

detailed initial preoperative examination, including a carbamyl choline (Carbachol®) test and an aspirin challenge.

Our series was made up as follows: Thirty patients (18 men and 12 women) suffered from polyps and bronchial hyperreactivity, as measured by a Carbachol® test; of these, 12 patients (6 men and 6 women) also suffered from aspirin intolerance and corresponded to the definition of the Fernand-Widal Syndrome. Twenty patients suffered from nasal polyps alone (11 men and 9 women), and served as a control series.

Method

A radical, endoscopic intranasal ethmoidectomy was carried out during a period of respiratory and bronchial equilibrium, if necessary after hospitalization for treatment of the asthmatic condition with ß-agonists and corticoids in perfusion, and aerosols four times a day. Preoperatively, a Carbachol® test and a four-dose aspirin challenge over two days (10, 50, 100, 400 mg) were carried out.

The carbamyl choline test, assessing the bronchial responsiveness, was carried out in the absence of contra-indications (attack of asthma or FEV_1 below 1.51, severe respiratory, cardiac or coronary insufficiency, renal insufficiency, patient under treatment with no possibility of interruption) according to the stocked aerosol technique (CARA spirometer). Molar solutions of Carbachol®, in steps of 0.4 mg, were used in the absence of a previous medical history of clinical asthma. The normality of the FEV_1 (i.e. forced expiratory volume in 1 s) at the cumulative dose of 1.6 mg was interpreted as indicating an absence of bronchial hyperreactivity. The test was interrupted before administering this dose, if the FEV_1 dropped by over 20%.

After taking the anamnesis to discover possible accidents upon taking aspirin (attack of asthma, skin rash), the preliminary examination was carried out to make sure of the absence of wheezing upon pulmonary auscultation, nasal permeability, the state of the conjunctiva, and the absence of oedema of the uvula. An initial peak flow measurement (PFM) equal to or over 260 was required. The test started on day 1 with the ingestion of 10 mg aspirin, followed by an additional dose of 50 mg, after an interval of 90 min in the absence of clinical reaction; in other words, a cumulative dose of 60 mg. The criteria for positivity were clinical (conjunctival hyperaemia, oedema of the neck and uvula, nasal obstruction with rhinorrhoea, wheezing cough, wheezing rate upon auscultation) and/or spirometric (at minimum a 20% drop in the PFM, relative to the basic value). The peak flow rate (PFR) was measured every 15 min after ingestion for 2 h, and then every 2 h for 12 h. If the test was negative, the procedure was repeated on the next day with doses of 100 and 400 mg (a cumulative dose of 500 mg).

The course of asthma after therapy for NP and bronchial illness was evaluated eighteen months postoperatively on average. The following parameters were methodically noted relative to the date of ethmoidectomy:

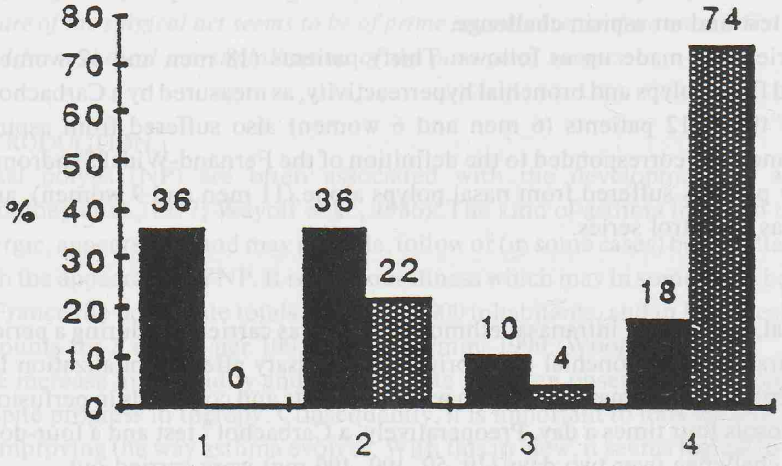

Figure 1. Frequency of attacks: (1) over one attack per week; (2) 1–4 attacks per months; (3) more than 1 attack every 2 months; (4) less than 4 attacks per year. Closed columns: before the operation; open columns: 18 months postoperatively.

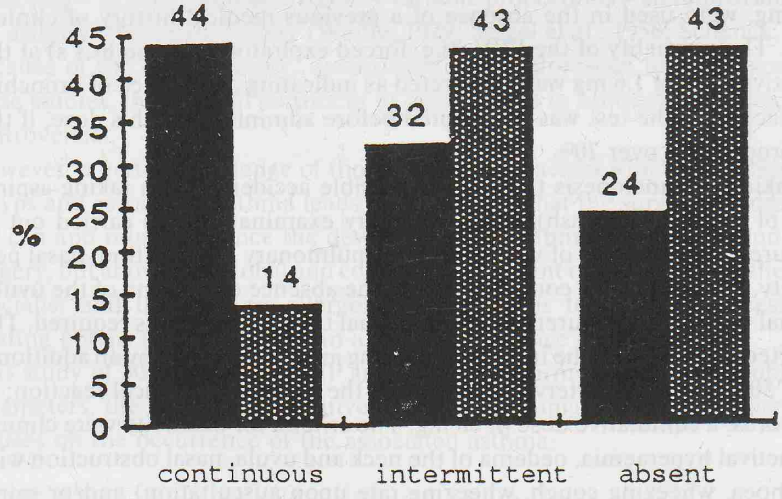

Figure 2. Respiratory difficulty between attacks. Closed columns: before the operation; open columns: 18 months postoperatively.

(1) the frequency of attacks and possible intervals of respiratory difficulty, pre- and postoperatively.
(2) the basic treatment for the asthma, and the difference in size of the therapeutic doses necessary, and/or the elimination of one or more therapeutic classes, i.e. theophylline, ß-agonists, corticoids, either injectable, or per os or by inhalation.
(3) bronchospasticity, evaluated pre- and postoperatively by auscultation for wheezing and peak flow measurements.

RESULTS

In 54% of our patients, nasal symptoms preceded the bronchial signs.

Frequency of attacks and intervals of respiratory difficulty (Figures 1 and 2)

Postoperatively, no patient had more than one attack of asthma per week; almost three-quarters of the patients had fewer than 4 attacks of asthma per year. Continuous respiratory difficulty was present in 44% of the patients at the initial examination; this percentage dropped to 14% after surgery. No patients presented an asthmatic aggravation.

Treatment of the asthma (Figure 3)

Twenty-five per cent of the patients were dependent on oral or injected corticoids preoperatively; 18 months after the operation only 8% of the patients remained corticoid dependent. The rise in the number of patients under corticoids by inhalation or ß-agonists postoperatively was due to the fact that a high number of patients, taken off general corticoid therapy, were stabilized by local treatment after surgery. This had not been possible before the operation.

Globally, the changes in the therapeutic picture of the asthma were as follows:
- interruption of all treatment and complete disapperance of attacks in 32%,
- interruption of basic treatment in 9%,
- interruption of general corticoid therapy in 23%,
- treatment continued, but with smaller doses in 27%,
- treatment continually unchanged in 9%.

Auscultation

Before the operation, wheezing was heard in 40% of the patients on the day they were examined compared to 27%, eighteen months post-operatively.

Spirometry

Similarly, a significant rise in the basic PFR (Figure 4) and FEV_1 (Figure 5) was observed.

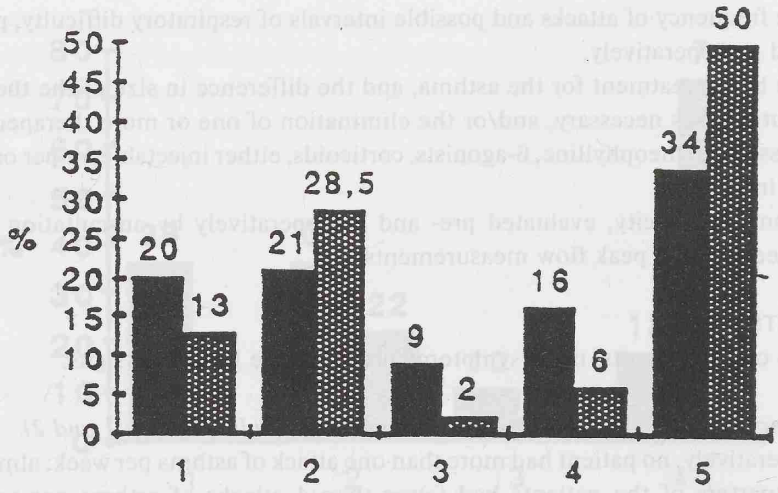

Figure 3. Treatment of the asthma: (1) theophylline; (2) ß-agonists; (3) injectable corticoids; (4) corticoids per os; (5) corticoids by inhalation. Closed columns: before the operation; open columns: 18 months postoperatively.

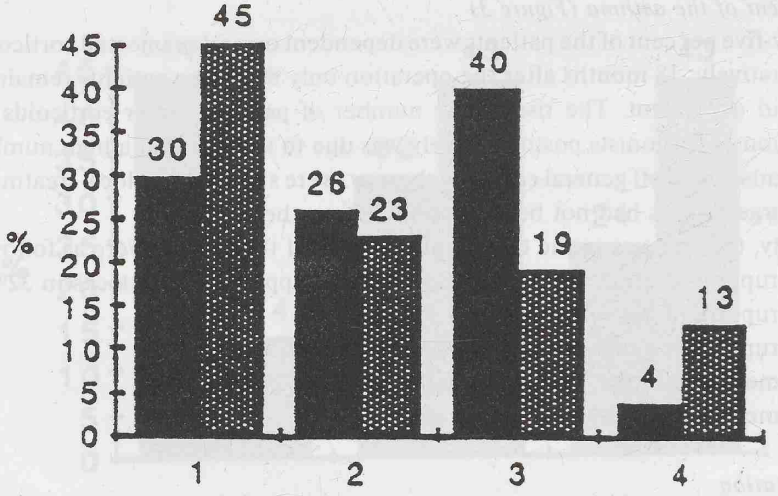

Figure 4. Peak flow rate (PFR): (1) normal; (2) decrease of < 25%; (3) decrease of 25–50%; (4) decrease of > 50%. Closed columns: before the operation; open columns: 18 months postoperatively.

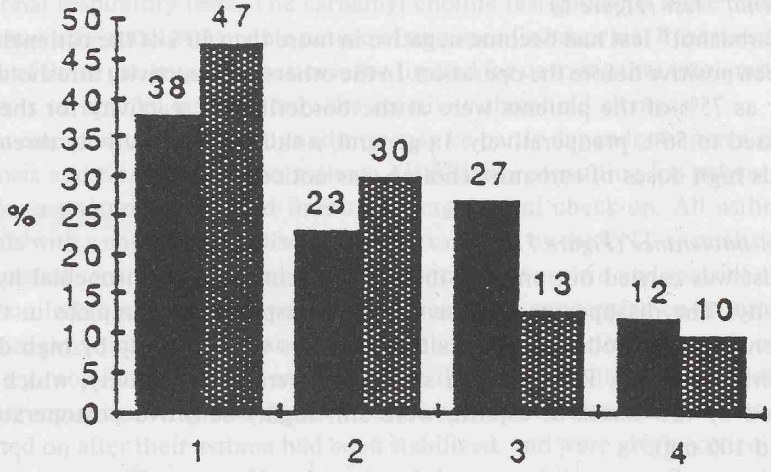

Figure 5. Forced expiratory volume in one second (FEV_1): (1) normal; (2) decrease of <25%; (3) decrease of 25-50%; (4) decrease of > 50%. Closed columns: before the operation; open columns: 18 months postoperatively.

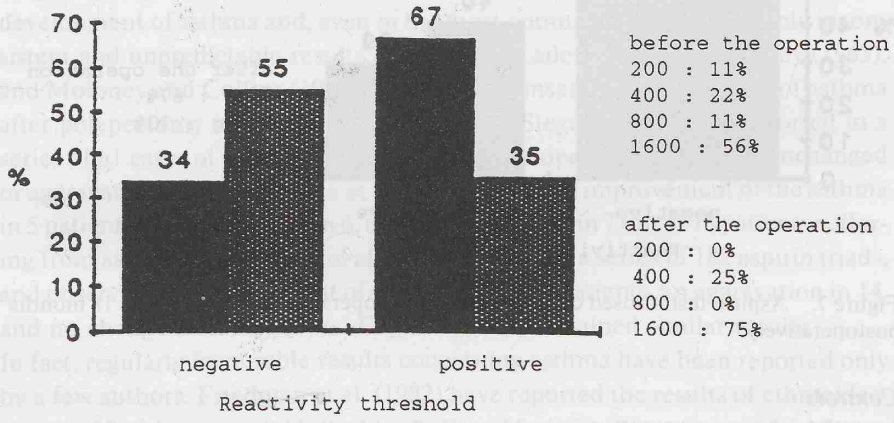

Figure 6. Carbachol® test. Closed columns: before the operation; open columns: 18 months postoperatively.

Carbachol® test (Figure 6)

The Carbachol® test had become negative in more than 30% of the patients who had been positive before the operation. In the others, the reactivity threshold was higher as 75% of the patients were at the borderline of reactivity for the test compared to 56%, preoperatively. In general, a shift in the reactivity threshold towards high doses of carbamyl choline was noticed.

Aspirin intolerance (Figure 7)

The test was carried out only on those 30 patients showing bronchial hyperreactivity. The disappearance of sensitivity to aspirin was complete in those 4 patients with a moderate sensitivity which was revealed only by high doses of aspirin (500 mg). Patients with strong preoperative sensitivity, which was revealed by low doses of aspirin, were still highly sensitive postoperatively (50 and 100 mg).

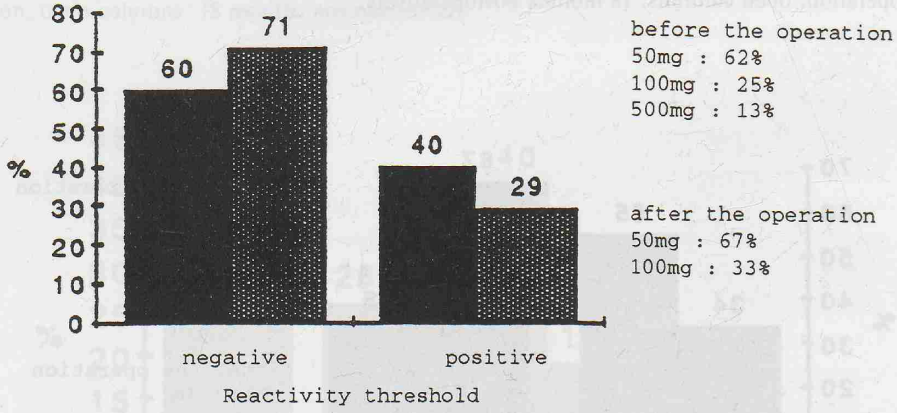

Figure 7. Aspirin test. Closed columns: before the operation; open columns: 18 months postoperatively.

Controls

In the 20 subjects with NP alone, no cases of asthma have been recorded since the operation.

DISCUSSION

Ninety-one per cent of the patients have improved, and now live in less discomfort. The factors studied show a lower frequency of attacks, a distinct decrease of respiratory difficulty in between attacks, less need for anti-asthmatic medication and especially decreased corticoid dependence, and a marked improvement in

functional respiratory tests. The carbamyl choline test confirms these data and even shows the totally reversible nature of non specific bronchial hyperreactivity in 30% of these patients. This series is too limited for us to say that intolerance to aspirin is reversible; perhaps only the reactivity threshold changes.

Improvement of the asthmatic condition may be partly dependent upon a global diagnosis and treatment of the patient. All patients consulting for polyps were sent for a pneumological and immuno-allergological check-up. All asthmatic patients with a chronic nasal disorder were examined by the ENT-specialist. The existence of sensitization to inhalants, intolerance to aspirin and seats of dental infection led to specific therapeutic measures: steps concerning environmental hygiene, eviction of all substances which might aggravate the asthmatic condition (e.g. non-steroidal, anti-inflammatory drugs; pain-killers; food additives such as metabisulfites) and dental treatment. Furthermore, the patients were operated on after their asthma had been stabilized, and were given corticoids by inhalation; the efficiency of local corticoid therapy of chronic inflammation of the sinuses is well established (Drettner et al., 1982; Brown et al., 1979). After surgery, the subjects were placed under prolonged daily nasal corticoid therapy. However, this same diagnosis and therapy does not obtain the excellent results we have just observed, so it can safely be stated that ethmoidectomy represents an important stage in the therapeutic controling of asthma. The nature of the surgical act seems to be of prime importance. Polypectomy often accelerates the development of asthma and, even in the most optimistic series, gives only inconsistent and unpredictable results. Samter and Lederer (1958), Macauley (1963), and Moloney and Collins (1977) observed the onset of the first attack of asthma after polypectomy in several eloquent series. Siegel et al. (1956) reported in a series of 61 cases of intrinsic asthma which were operated on, 69% of unchanged or aggravated asthma. Schenck et al. (1974) found an improvement of the asthma in 5 patients, an aggravation in 6, and a modification in 7 out of 18 patients suffering from aspirin triad. Brown et al. (1979) published a series of 182 aspirin triads, and observed an improvement of the asthma in 30 patients, an aggravation in 14, and no change in 138 patients. Englisch (1986) obtained similar results.

In fact, regularly favourable results concerning asthma have been reported only by a few authors. Friedman et al. (1982) have reported the results of ethmoidectomy in 30 asthma cases, 15 of whom suffered from intolerance to aspirin. It was possible to reduce general corticoid treatment in 80% of their patients, only 6 out of 14 ceased to be dependent on corticoids. MacFaden et al. (1990) have obtained similar results in 17 patients with aspirin triad, and they insist on the improvement in everyday life experienced by these patients, while underlining that – although the illness is better controlled – it is not cured. These authors insist on the need for a radical act to better control NP (Friedmann et al., 1986).

However, surgery for NP must not only be radical, but also functional. Marsupia-

lization of the paranasal sinuses reaches this double goal. Ethmoidectomy, especially when it is carried out as required by the lesions, does not seem to us to be an adequate measure, and it is even less adequate when the patient is asthmatic.

CONCLUSION

The inflammatory illness which underlies the development of asthma and NP is a chronic condition which requires regular and prolonged treatment of these patients. NP worsens the development of asthma and makes its therapeutic control difficult. Adequate, regulated surgery of the paranasal sinuses allows the vicious circle to be broken and also allows medical treatment to recover its full efficacy.

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