

## 2. Surgical treatment of nasal polyps: past, present and future

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Considerable changes have taken place over the last two decades in the surgical approach to nasal polyposis. The advent of the endoscope has enabled earlier detection and less traumatic and more precise surgical treatment of diseases presenting with nasal polyps. The concept of functional endoscopic sinus surgery (FESS) offers individualized surgery according to the respective patient's disease, and routine radical surgical procedures can be avoided with good functional results. In patients with aspirin intolerance, allergic fungal sinusitis and asthma, nasal polyposis is histologically dominated by dense eosinophilic infiltration and requires a more aggressive approach, often involving combined therapy with corticosteroids. In these cases, extensive postoperative care and follow-up is required to preserve the good postoperative result and to prevent regrowth of polyps.

### Introduction

Although considerable advances have been achieved during the last 20 years in the surgical approach to nasal polyposis, the primary aim in managing the condition is to avoid surgery altogether.

The advent of the endoscope as a diagnostic tool has enabled earlier detection of nasal polyps and greater surgical precision. Functional endoscopic sinus surgery (FESS) allows for a stepwise approach to surgery, and thus radical surgical approaches can often be avoided.

### Polyp formation

Nasal polyposis does not appear to be a single disease entity but, instead, a uniform reaction of the nasal mucosa to a variety of stimuli (1). Polyps tend to originate from

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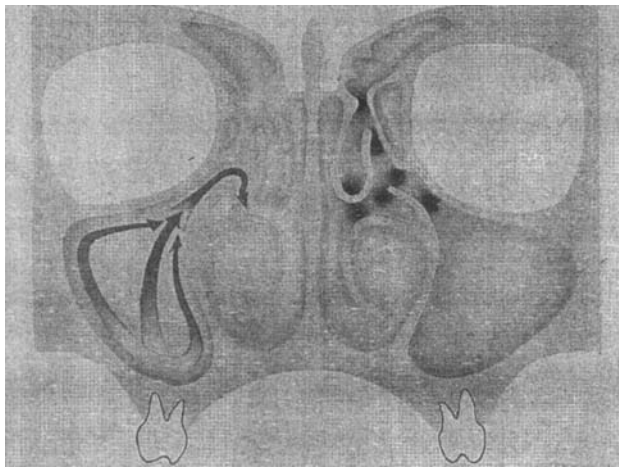


Figure 1. Diagram of sinus.

very definite areas. In the majority of cases, polyps originate from contact areas of the middle nasal meatus, particularly the narrow clefts in the anterior ethmoid region (Fig. 1).

Table 1 shows the sites of origin of polyps in 200 consecutive patients who visited the clinic at Graz, Austria (2). The areas from which polyps frequently originate are where the airstream first comes into contact with the mucosal surfaces. These are the sites where genetically determined drainage pathways transport mucus, which is constantly produced over a 24-h period. Within these drainage pathways, there are narrow “bottleneck” areas, where opposing mucosal areas converge. If mucosal swelling occurs at this site, stasis of mucus transport may occur, resulting in oedema and polyp formation.

Allergens, pollutants, bacteria, viruses and fungal spores are carried in the airflow through the nasal valve passages, and would normally be rapidly washed away in the mucus. However, they may be deposited at the “bottleneck” sites and may contribute to the origin of oedema and polyp formation (3).

Table 1. Origination of polyps in 200 consecutive patients\*

|     |                                                      |
|-----|------------------------------------------------------|
| 80% | Uncinate–middle turbinate–infundibulum               |
| 65% | Anterior face of bulla–hiatus–infundibulum           |
| 48% | Frontal recess                                       |
| 42% | Turbinate sinus (between bulla and middle turbinate) |
| 30% | Inside bulla                                         |
| 28% | Supra-/retrobullar recess                            |
| 27% | Posterior ethmoid/superior meatus                    |
| 15% | Middle turbinate                                     |

\*Stammberger H. FESS. Philadelphia: BC Decker, 1991:204.

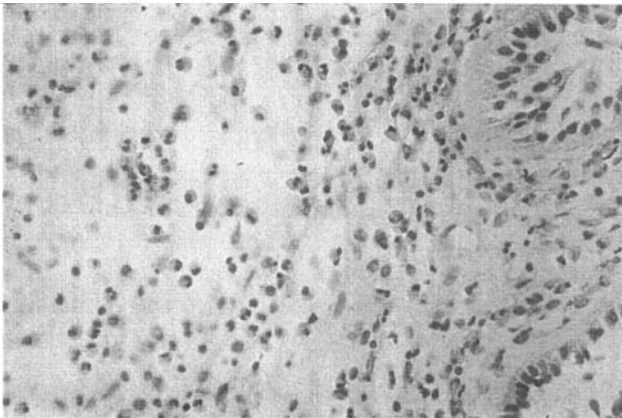


Figure 2. Light microscopy of eosinophil infiltration.

Polyp classification

Although all polyps are similar in appearance, they differ in growth patterns and in their response to pharmaceutical intervention (4). On the basis of clinical experience and histological examinations, five groups of polyps with differing characteristics have been identified.

“Polyposis nasi”: classification

- 1. antrochoanal polyps
- 2. large, isolated (choanal) polyps
- 3. polyps with chronic rhinosinusitis, non-eosinophil-dominated
- 4. polyps with chronic rhinosinusitis, eosinophil-dominated
- 5. polyps with specific diseases (cystic fibrosis, malignancy).

The antrochoanal and large isolated polyps, which may reach the choana, are relatively rare and account for only 3–5% of the average surgeon’s work. The most prevalent types are those associated with chronic rhinosinusitis. Histologically, these can be divided into two groups: one where there is little evidence of eosinophil involvement and a much larger one characterized by the presence of degranulated eosinophils (Fig. 2). The last group of polyps are those associated with specific conditions such as cystic fibrosis, malignancies and foreign bodies.

Treatment options

- 1. Antrochoanal polyps usually originate as cysts in the maxillary sinus and grow through the lateral wall of the nose (the medial wall of the maxillary sinus), where they form into a solid portion which eventually reaches the choana.

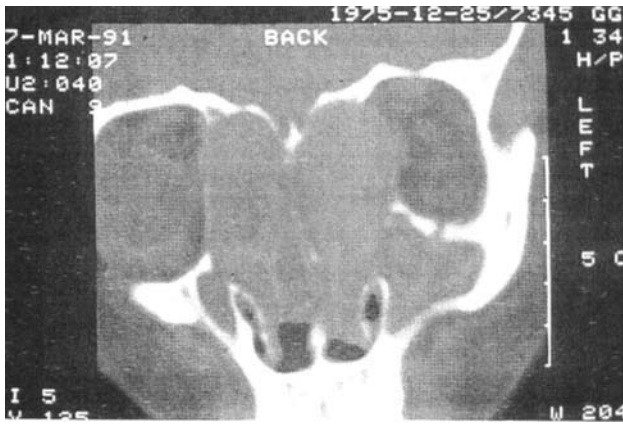


Figure 3. Computed tomography of diffuse polyposis.

These polyps should be removed surgically, together with the mucosa from which they originate within the maxillary sinus. Corticosteroids have little or no effect on antrochoanal polyps because few eosinophils, or other inflammatory cells with corticosteroid receptors, are associated with this type of nasal polyp (5).

2. Large isolated polyps, originating with a stalk from the contact areas of the anterior ethmoid or spenoethmoidal recess and hanging down to the floor of the nose and the choana, can also be removed surgically. Snare resection can be effective if the stalk of the polyp is removed. As with antrochoanal polyps, the value of corticosteroid therapy is limited because inflammatory cells are rarely present (5).

3. In patients with polyposis associated with non-eosinophil-dominated chronic rhinosinusitis, surgery is secondary to corticosteroid therapy. The condition can be controlled with topical corticosteroids. Acute exacerbations may have to be treated with systemic corticosteroids and antibiotics (6). Surgery only becomes necessary in cases where this therapy has failed repeatedly. Again, it is important to identify the origin of the polyp and to remove it. This can avoid or reduce the need for prolonged medical intervention.

4. Patients with eosinophil-dominated diffuse polyposis with chronic rhinosinusitis are the largest group. They usually have a history of nasal obstruction, possibly with postnasal discharge, but they do not necessarily experience pain or other symptoms. Most of these patients have a history of asthma or airway hyperresponsiveness, and many are hypersensitive to aspirin (7). Many have been labelled as having allergic fungal sinusitis, but it is unclear whether the condition is fungal allergic sinusitis or an immunological reaction to fungal material (8). Computed tomography (CT) scans in these patients show deposits of very thick material, sometimes with calcifications (Fig. 3). Common complica-

tions, such as decalcification and destruction of the bone and elevation of the dura, possibly due to eosinophil cationic protein (ECP) and other inflammatory mediators, illustrate the need for aggressive surgical removal of this thick material.

Patients with diffuse polyposis are ideal candidates for long-term topical corticosteroid therapy. It is only recently that ENT surgeons have realized that repeated polyp formation in these patients is not a true recurrence, but the result of an ongoing immunological inflammatory response, that has not been appropriately treated. This response may be a reaction to deposits of fungi in the sinuses (8). If surgery fails to remove all deposits of fungi, recurrence is almost inevitable. Topical corticosteroids should be used postoperatively to counteract the inflammatory response to any residual fungi so as to reduce, or eliminate, the need for further surgery.

Not all of these patients respond to corticosteroid therapy, and there is currently no way to predict which patients will benefit from this therapy. It is not uncommon for a patient to require surgery two or three times despite corticosteroid maintenance therapy. However, the condition may then suddenly improve, the interval between recurrences may increase, or the patient may become symptom-free without any changes in the operative procedure or the corticosteroid regimen. The underlying mechanisms leading to these outcomes are not fully understood, but it is clear that surgeons can offer more than repeated surgery. Corticosteroid therapy, coupled with surgery when necessary and careful follow-up using endoscopy, is the way forward.

The condition described as "cobblestone" mucosa, presented in Fig. 4a, appears to represent the best postoperative situation. In Fig. 4b, the same patient is shown, greatly improved after 14 days of topical corticosteroid therapy. However, not all patients respond to topical, or even systemic corticosteroids, and some patients require frequent and aggressive debridement of the mucosa. Corticosteroid/antihistamine combinations have also been helpful in some cases. Potential therapeutic regimens for non-responders to corticosteroids include topical diuretics (e.g., furosemide), leukotriene antagonists and immune stimulants.

5. *Other polyp-associated conditions.* Not all mucosal changes in the nose are the result of a harmless polyp. Polyposis is also associated with specific diseases such as cystic fibrosis, in which surgery and corticosteroids can help but cannot offer a cure (9). Isolated, unilateral polyposis should be regarded with suspicion because it suggests

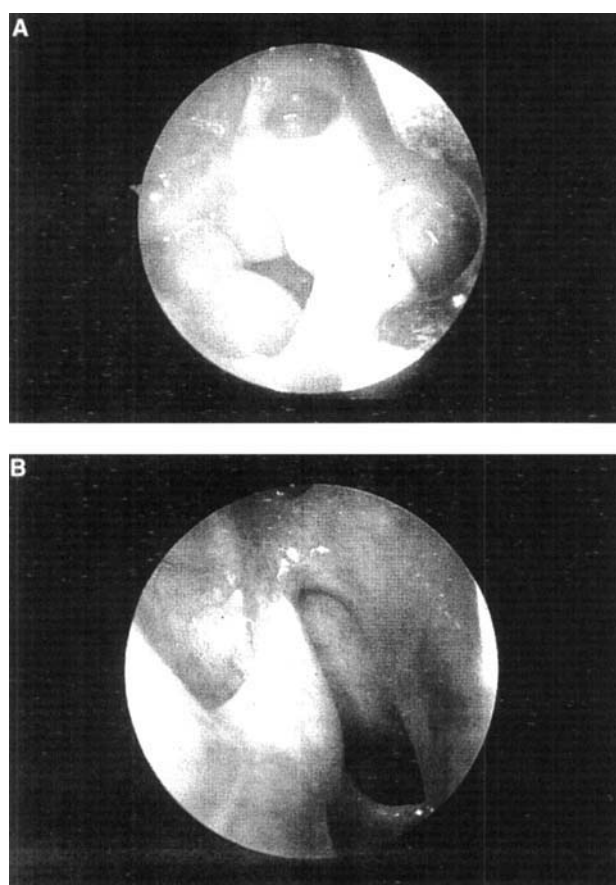


Figure 4. A) Endoscope picture of cobblestone mucosa (before surgery).  
B) Endoscope picture of cobblestone mucosa (after surgery).

malignancy, which requires proper diagnosis and appropriate treatment.

## Treatment guidelines

Universal guidelines for the treatment of polyposis are not yet available. Fig. 5 shows the pre- and postoperative treatment schedule used in the ENT department at Graz. This is not necessarily the definitive schedule, because there

## NASAL POLYPOSIS - THERAPEUTIC SCHEME

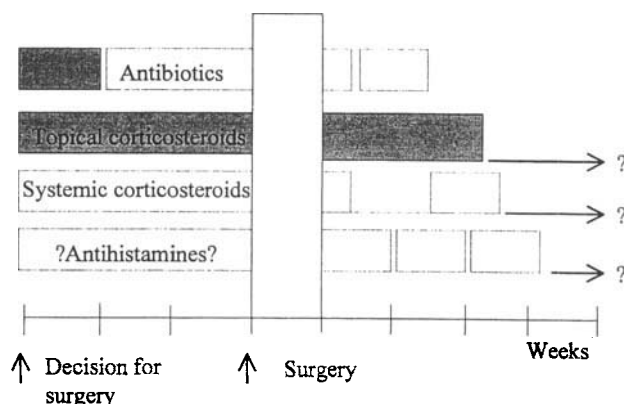


Figure 5. Schematic diagram of therapeutic scheme.

are still many unanswered questions. The appropriate dosage and duration of corticosteroid therapy have yet to be determined. It is of fundamental importance that surgeons approach the problem in conjunction with their patients to establish a pre- and postoperative regimen of topical and/or systemic corticosteroids, coupled with individualized postoperative care. If the patient can be convinced of the value of regular topical corticosteroid treatment in those cases where this therapy is effective, it should be possible to reduce or eliminate the need for further surgery.

## Conclusions

Nasal polyposis appears not to be a disease *per se* but rather the result, or expression, of an underlying mucosal disorder, the cause of which is not yet fully understood. Surgery still plays a major part in the treatment of the condition, but in many cases, pharmacological treatment, with topical corticosteroids as the mainstay, can reduce the frequency of or necessity for surgical intervention.

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