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ENDOSCOPIC TRANSNASAL TUMOR SURGERY

Different endoscopic options in the treatment of inverted papilloma

Piero Nicolai, MD,[a] Davide Tomenzoli, MD,[a] Davide Lombardi, MD,[a] Roberto Maroldi, MD[b]

From the [a]Department of Otorhinolaryngology, University of Brescia, Brescia; and the [b]Department of Radiology, University of Brescia, Brescia.

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The introduction of micro-endoscopic techniques in sinonasal surgery has led to a revolution in the treatment of inverted papilloma. The cumulative experiences in the literature during the last 2 decades have clearly indicated that most inverted papillomas may be treated with satisfactory results using techniques that have minimal morbidity and short hospitalization times. Based on our experience with 98 patients with inverted papilloma, including 83 treated with an exclusive endoscopic approach, 9 with a combined endoscopic-external technique, and 6 with an exclusive external approach, we review the different endoscopic techniques we have applied during a 14-year period.

According to their extent and location, lesions of the ethmoidal-maxillary complex require different types of resections (types 1-3), which can vary from a simple ethmoidectomy with middle antrostomy, sphenoidotomy and frontal sinusotomy (type 1), to a medial maxillectomy (type 2), up to a Sturmann-Canfield approach (type 3), which gives an excellent visualization of the entire maxillary sinus. Inverted papilloma extensively involving the frontal sinus may pose a challenge to the surgeon. Because even magnetic resonance imaging may fail to identify the pattern of mucosal involvement, the surgeon should be ready to switch intraoperatively from an endoscopic approach to a frontal osteoplastic flap. There are indeed other situations (ie, involvement of a largely pneumatized supraorbital cell, extensive adhesion of the lesion to the dura, transperiorbital spread, presence of massive scar tissue) that may require a combined approach.

The term "Schneiderian papilloma" encompasses 3 different subtypes of benign sinonasal neoplasms: fungiform papilloma, oncolytic papilloma, and inverted papilloma.[1] The latter is the most frequent, accounting for up to 60% of all Schneiderian papillomas.[2,3] Data on the annual incidence of the disease have been collected only in Denmark, where it ranges between 0.74[4] and 1.5[5] new cases/100,000 inhabitants. Although the middle meatus is the typical site of origin of inverted papilloma, other areas such as the superior meatus and maxillary sinus may be not uncommonly involved. The occurrence of the lesion in the frontal as well the sphenoid sinus instead must be considered a rare event.

Although histologically benign, the fact that inverted papilloma is associated with an aggressive biologic behavior, in view of its multicentricity, high incidence of local recurrence, and its frequent association with squamous cell carcinoma, has probably been overemphasized. With regards to the first point, a careful review of the literature does not provide convincing data to support the concept that inverted papilloma takes origin from multiple foci; on the other hand, Hyams[2] already in 1971 concluded that ". . . In the majority of cases with involvement of multiple sites, the histologic findings suggested that the spread resulted from an extension from one single lesion by metaplasia of the adjacent mucosa." Only those very rare cases showing an involvement of both nasal cavities without any continuity can be considered to have a definite multifocal origin.

Many investigators have critically analyzed the high incidence of the so-called recurrences, which may be as high as 78%[6] in the era of transnasal removal without optical assistance. Perhaps the most vivid comment came from

Address reprint requests and correspondence: Piero Nicolai, MD, Department of Otorhinolaryngology, University of Brescia, Piazza Spedali Civili, 1, 25100 Brescia, Italy.

E-mail address: E-mail address: pieronicolai@virgilio.it.

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Lund,[7] who stated that: ". . . the term 'recurrence' merely indicates residual disease in the majority of cases and is directly related to the surgical approach and the 'care' with which the papilloma is removed . . ." As expected, the advent of surgical techniques ensuring a more radical resection has dramatically decreased the recurrence rate. Its association with squamous cell carcinoma, which can occur concomitantly to inverted papilloma or as a metachronous event, has also probably been overestimated in the past. In the largest series reported during the last 2 decades,[8-11] this association ranged from 3.4%[11] to 9.7%,[9] with the synchronous occurrence being more frequently observed. In our series of 98 patients, only 4 (4.1%) had a concomitant diagnosis of invasive squamous cell carcinoma.

Surgery has always been considered the mainstay in the treatment of inverted papilloma. Until the late 1960s, the most frequently adopted approach was transnasal removal, without endoscopic or microscopic assistance. This procedure was typically associated with remarkably high rates of local relapse, mainly caused by incomplete excision of the lesion. In the following decades, the widespread use of medial maxillectomy, performed through a lateral rhinotomy or a midfacial degloving, led to more satisfactory results and was established as the gold standard for treatment of inverted papilloma.[12] Reported recurrence rates decreased to 0%-29%,[12,13] although the morbidity associated with medial maxillectomy is not negligible. First of all, external approaches include skin or mucosal incisions and maxillary osteotomies or ostectomies. Second, events such as epiphora, chronic dacryocystitis, cheek paresthesia, temporary diplopia may occur during the immediate or late postoperative period.

The first experiences with the treatment of inverted papilloma by microscopic and/or endoscopic approaches[14,15] were welcomed with some criticism. However, the results subsequently accumulated in the literature have clearly shown that micro-endoscopic surgery may be considered as successful as external techniques for most cases of inverted papilloma.[7,16-21] Furthermore, it is associated with a limited surgical morbidity (ie, no facial scars, no osteotomies), excellent magnification of the surgical field, which is visualized by a multi-angular perspective, and a short hospitalization time.

Because the local extent of the lesion is the most important factor in establishing which endoscopic technique is indicated and whether an additional external approach may be required and, therefore, discussed with the patient as an alternative option in the preoperative counseling, a thorough preoperative imaging evaluation is mandatory. According to our experience, based on a series of 98 patients treated during a 14-year period, including 83 with an exclusive endoscopic approach, 9 with a combined endoscopic-external technique, and 6 with an exclusive external approach, the contraindications for an exclusive endoscopic treatment of inverted papilloma are: (1) massive involvement of the mucosa of the frontal sinus and/or of a supraorbital cell, (2) extensive adhesion of the lesion to the dura or intradural extension, (3) transperiorbital extension, (4) concomitant presence of a malignancy involving critical areas, and (5) abundant scar tissue caused by previous surgery. Although most of these situations may be anticipated by imaging techniques evaluation, the surgeon should keep in mind that in some cases, only intraoperative findings lead to refinements of treatment strategy.

Preoperative assessment

The endoscopic appearance of inverted papilloma, commonly showing ≥1 polypoid masses with multiple digitations and a papillary surface located laterally to the middle turbinate, is quite suggestive for diagnosis. Nevertheless, when the lesion is associated with secondary inflammatory polyps or develops in a patient with preexisting bilateral polyposis, the endoscopic features can be less specific. In any case, inverted papilloma should always be the first pathology considered in the differential diagnosis of unilateral nasal masses that, in our opinion, require imaging evaluation as an initial diagnostic step to obtain information on the nature of the lesion and its spatial relationship with adjacent structures.

Computerized tomography (CT) after contrast agent administration is generally considered the examination of choice in the preoperative assessment of sinonasal expansile lesions. A unilateral mass with a lobulated surface occupying the middle meatus and extending into ≥1 adjacent sinuses is the most common CT profile of inverted papilloma. Tumor growth may cause thinning, remodeling, and even erosion of the surrounding bony walls. Sclerotic bony changes, which are associated with slowly growing processes, may be also seen. However, the CT findings commonly observed in inverted papilloma are highly nonspecific. According to Ojiri et al,[22] this limitation can be overcome by using magnetic resonance imaging (MRI), on which the characteristic histologic pattern of inverted papilloma (organized in regular parallel folds of highly cellular metaplastic epithelium and of an underlying less cellular stroma) has a "convoluted cerebriform pattern" on T2- or enhanced T1-weighted sequences.

Recently, Maroldi et al[23] showed that such a pattern, called "columnar," is a reliable MRI indicator of inverted papilloma, with a positive predictive value of 95.8%. They recommended the use of thin slices and multiple planes of examination (axial, coronal, sagittal) to improve the identification of the pattern. In the absence of extended bone erosion, its detection allows for the confident discrimination of inverted papilloma from malignant tumors.

Furthermore, MRI is superior to CT in assessing the extent of inverted papilloma toward adjacent structures. MRI obtained after contrast agent administration enables the differentiation of enhancing inverted papilloma, not only from secretions retained within a blocked sinus but also from the thickened mucosa projecting from the sinus walls. Nevertheless, what cannot be presently achieved by imaging techniques is to determine whether a lesion is simply occupying the lumen of a sinus growing from an adjacent site or is directly involving the mucosa of the sinus itself. Differentiating these 2 conditions would be, for example, of the utmost importance in selecting the approach of choice (endoscopic vs combined endoscopic-external) for inverted papillomas involving the frontal sinus. The finding