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Denker Rhinotomy for Inverted Papilloma of the Nose and Paranasal Sinuses

Samuel A. Mickelson, MD,* and Richard D. Nichols, MD*

Inverted papilloma of the nose and paranasal sinuses is an unusual benign neoplasm that has the propensity for local tissue destruction and an association with malignant degeneration. The tumor represents an inverted growth of epithelium rather than outward proliferation. It most commonly arises from the lateral nasal wall with growth into the nose and paranasal sinuses and only rarely originates from the septum. Presenting symptoms are usually unilateral nasal obstruction and clear rhinorrhea. Surgical excision is the recommended treatment though the aggressiveness of the approach has varied. Transnasal local excision has been associated with a high recurrence rate. Lateral rhinotomy with removal of the lateral nasal wall and wide local excision has a low recurrence rate and has been the recommended treatment by most authors since 1980. However, the poor cosmetic results in some patients due to the visible external scar is especially undesirable in young females.

We present a series of 23 patients treated over a ten-year period. Fifteen underwent a Denker rhinotomy and medial maxillectomy through a sublabial approach without an external incision. The recurrence rate in our group is 27% with a mean 4.7 year follow-up. This recurrence rate lies between that reported for lateral rhinotomy and local transnasal excision. (Henry Ford Hosp Med J 1990;38:21-4)

We report our experience with the Denker rhinotomy (1) for the excision of nasal and sinus inverted papillomas and compare our results to other reports. Inverted papillomas of the nose and paranasal sinuses are uncommon tumors that usually present as unilateral, papillomatous mass lesions. Though recognized for over 100 years, there is still poor understanding why some of these lesions are benign while others undergo rapid growth and may be associated with squamous cell carcinoma. Because of the capacity for local destruction and tendency to recur, most authors recommend wide local excision of inverted papillomas by lateral rhinotomy and medial maxillectomy (2,3). However, to avoid the morbidity and external scar associated with lateral rhinotomy, many surgeons still utilize less aggressive approaches. In fact, with the introduction of the nasal endoscope, sinus endoscopy has been utilized to excise these lesions.

The pathology of inverted papilloma has been well described by Hyams (4) and Batsakis (5). Grossly the tumor is reddish-gray and less translucent than "allergic" polyps. The surface usually has a characteristic papillary irregularity and a fleshy consistency (Fig 1). The histologic appearance is that of epithelium which invades the underlying stroma (Fig 2) instead of proliferating outwardly. The epithelium has a well-defined basement membrane distinct from the underlying connective tissue stroma, and mitotic figures are rare. Cystic spaces within the epithelium which contain mucus and cellular debris is a characteristic finding (Fig 3). These lesions are distinguished from fungiform papillomas, which have an exophytic shape and a thin central core of connective tissue, and from cylindrical cell papillomas, which are characterized by proliferating multilayered

columnar cells. The three papilloma types also exhibit widely different clinical behavior.

Radiographically these tumors cause thinning and destruction of bone by local growth and pressure. The characteristic finding is a loss of medial maxillary bone with smooth expanded margins rather than the "moth-eaten" appearance typical of carcinoma.

Inverted papillomas arise primarily on the lateral nasal wall. Lesions arising on the nasal septum may have similar aggressive growth patterns but have not been associated with squamous cell carcinoma. For septal papillomas, which comprise approximately 8% of all nasal and sinus papillomas, aggressive surgical removal is recommended because local excision and cautery alone has been associated with a 44% recurrence rate. Recurrence may represent either multifocal involvement of the mucosa or incomplete excision (6).

The pathogenesis of inverted papilloma is unknown. A viral etiology has been suggested, but no viral particles could be identified by Gaito et al (7) by electron microscopic studies. No predisposing factors are known. The tumor is thought to arise from the embryonic nasal schneiderian membrane. This membrane separates the mucosa of the nose and paranasal sinuses (ectoderm) from the aerodigestive tract mucosa (endoderm).

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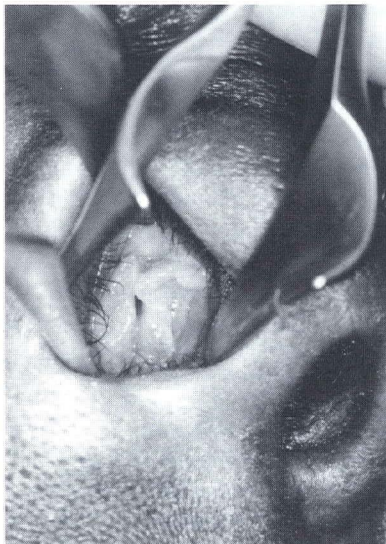


Fig 1—Fleshy papillary unilateral nasal mass presented with only nasal obstruction.

Materials and Methods

Review of surgical pathology reports from 1976 to 1986 revealed 23 cases of nasal or sinus inverted papillomas. Fungiform, cylindrical, and squamous papillomas were excluded from this report. Medical records and original pathologic material were reviewed for accuracy of diagnosis. Fifteen patients were treated by a Denker rhinotomy (1), five in association with an intranasal ethmoidectomy. Two patients were treated with a lateral rhinotomy and six had transnasal local excision. The 15 Denker rhinotomy patients comprise this report. These patients were contacted and asked to respond to a written survey regarding preoperative and postoperative symptoms and any known recurrence. Follow-up surveys were obtained on all patients and repeat examination was accomplished on all but one patient. This patient, who had moved out of state, was examined by his local otolaryngologist.

Surgical Technique

The Denker rhinotomy approach (1) is performed through a sublabial incision in the maxillary buccal gingival crease from the maxillary tuberosity to the midline. The periosteum is elevated from the face of the maxilla up to the infraorbital nerve exposing the frontal process of the maxilla. The soft tissue attached to the pyriform aperture is incised, opening in to the nasal cavity. The lateral nasal wall is then removed with inferior and superior osteotomies. The posterior cut is connected with a heavy curved scissors and the entire lateral wall is removed en bloc with the inferior turbinate. The procedure may also include the middle turbinate if tumor is seen to extend into this area. All mucosa is carefully elevated from the maxillary sinus. Intranasal or transantral ethmoidectomy is performed when indicated. The nasal cavity is packed and incisions closed. External incision is not required unless concomitant external ethmoidectomy is performed.

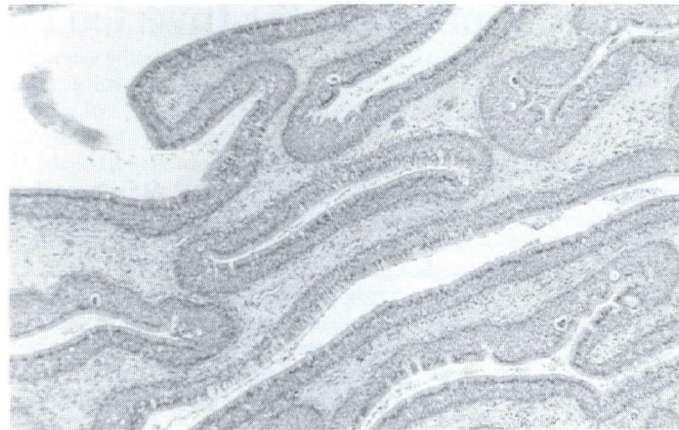


Fig 2—Inverting epithelium into underlying stroma (hematoxylin-eosin stain, 12X).

Results

The 15 patients, nine males and six females, ranged in age at time of diagnosis from 29 to 83 years with a mean age of 57 years. Presenting symptoms (Table 1) had been noted from two months to 20 years before diagnosis. Three patients had undergone previous nasal polypectomies (two, three, and four times) for "allergic" nasal polyps. Postoperative follow-up, obtained on all patients, ranged from two months to 12 years with a mean of 4.7 years.

Postoperative complaints reported in questionnaires completed by all patients are listed in Table 2. Mucosal crusting was usually easily controlled with daily use of saline nasal irrigations. Unilateral vision loss from cataract formation occurred in one patient following radiation therapy for concomitant inverted papilloma and squamous cell carcinoma. No intraoperative complications occurred.

The one patient in this series (7%) who had associated squamous cell carcinoma was treated postoperatively with 6,600 rads of radiation. This patient, followed for over ten years, has no recurrent disease.

Preoperative evaluation included a positive biopsy in all patients. Standard sinus radiographs were completed in 14 patients (Table 3) and bone destruction was seen in only one patient. Computed tomography (CT) or laminography was performed in five patients. In this group, bone destruction was seen in four (80%) patients (Table 4). CT or laminography was generally performed to aid in preoperative planning, not usually because larger or more aggressive lesions were encountered.

Recurrences were demonstrated in four (27%) of 15 patients. Recurrences noted on routine follow-up examination in three patients (1.3, 6.1, and 8.8 years after excision) were not associated with any recurrent symptoms. The fourth patient (examination at 4.5 years) had sought attention because of recurrent nasal obstruction. The site of recurrent disease was in the lateral wall of the maxilla in three patients and in the anterior edge of the middle turbinate in the fourth patient. The two recurrences at 6.1 and 8.8 years were demonstrated during the repeat examination that was part of this study. Both of these patients were

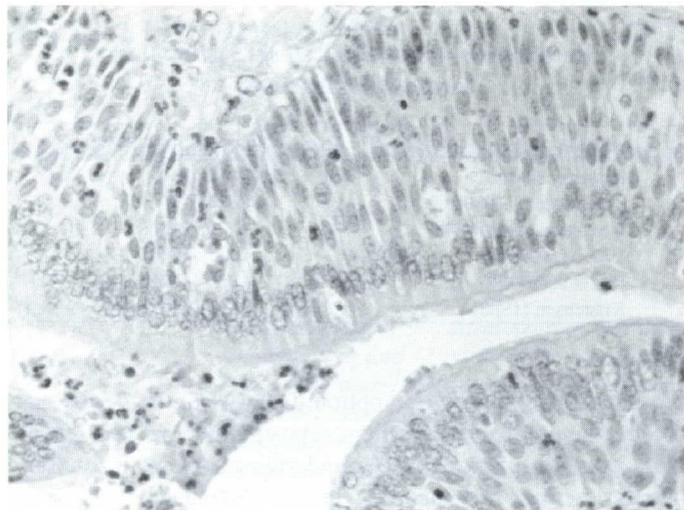


Fig 3—Characteristic cystic spaces within the epithelium contain mucous and cellular debris (hematoxylin-eosin stain, 102X).

asymptomatic and had not been seen by an otolaryngologist since one year after the initial surgical procedure.

Discussion

Prior to the early 1970s, many different terms were applied to the entity inverted papilloma. The various synonyms included schneiderian papilloma, inverting papilloma, transitional cell papilloma, papillary sinusitis, and cylindrical cell papilloma. Once properly described by Hyams (4) and Vrabec (8), the different types of papilloma have been characterized and reported separately.

Most early papers on surgical excision reported high recurrence rates (up to 71%) with transnasal excision or the Caldwell-Luc procedure (2,9-12) (Table 5). The latter procedure involves a sublabial incision and removal of disease from the maxillary sinus. The nasal portion of the tumor is removed transnasally and the lateral nasal wall is preserved. The lateral rhinotomy approach involves an incision along the lateral aspect of the nose extending from the medial canthus of the eye to the filtrum of the upper lip. The nasal bone is usually outfractured in order to improve nasal visibility. The Weber-Fergusson incision involves extension of the incision to divide the upper lip in the midline and to connect with a sublabial buccal-gingival sulcus incision.

In 1975 Vrabec (8) reported use of the lateral rhinotomy approach for inverted papilloma with only one recurrence in 15 patients. Other investigators have reported recurrence rates ranging from 0% to 17% (Table 6) with the same approach (2,3,8,10,13,14). The lateral rhinotomy technique has varied. Some authors perform a complete Weber-Fergusson incision with a lip split (3) while others turn a medially based nasal bone/cutaneous flap for exposure (2), without the lip split. Regardless, the scar is external and visible and may not heal in a cosmetically acceptable fashion due to midfacial scarring. Of interest, Vrabec included aggressive treatment of the bony surgical margins with a surgical burr.

Table 1
Presenting Symptoms

Symptoms	Number of Patients
Nasal obstruction	15 (100%)
Rhinorrhea	8 (53%)
Post nasal drip	6 (40%)
Epistaxis	4 (27%)
Sinusitis	5 (33%)
Headache	1 (7%)
Unilateral serous otitis media	1 (7%)

Table 2
Postoperative Complaints

Complaints	Number of Patients
Crusting	9 (60%)
Teeth numbness	6 (40%)
Lip numbness	3 (20%)
Nasal discharge	4 (27%)
Vision loss	1 (7%)

Table 3
Preoperative Radiographic Evaluations
Sinus Radiographs (14 Patients)

Finding	Number of Patients
Antral opacity	12 (86%)
Nasal mass	8 (57%)
Ethmoid opacity	3 (21%)
Bone destruction	1 (7%)

Sachs et al (15) described a "degloving" approach to the nose and paranasal sinuses which permits better results cosmetically and allows bilateral exposure of the nasal cavity. Used by Sachs et al in 46 cases of inverted papilloma, this approach was associated with minimal complications though the recurrence rates were not reported.

The Denker rhinotomy approach to the nose and paranasal sinuses was originally described in 1926 for treatment of chronic infections and local tumors (1). Some authors have found that the Denker approach exposure is limited by the soft tissues of the lip and nose and therefore have preferred the use of a Weber-Fergusson incision which eliminates this exposure problem. In our series of 15 cases for the resection of inverted papillomas, the recurrence rate was 27% which is higher than in most series with the lateral rhinotomy approach. Two of the four recurrences were found by examination of otherwise asymptomatic patients as part of this study. Recurrence rates of other authors may be inaccurately low if asymptomatic patients were not reexamined. We find that the Denker approach affords excellent exposure to the nose and paranasal sinuses and that the soft tissues of the lip and nose do not limit visibility. In our series, however, recurrent tumor was usually found on the lateral aspect of the maxillary sinus, suggesting that this area is less accessible. Certainly the lateral nasal wall and the ethmoid area can be easily visualized.

Table 4
Computed Tomography or Laminography (Five Patients)

Finding	Number of Patients
Antral opacity	5 (100%)
Nasal mass	5 (100%)
Ethmoid opacity	4 (80%)
Bone destruction	4 (80%)

Table 5
Recurrence Rates with Limited Excision

Authors	Procedure	Number of Patients
Oberman (1964)	Polypectomy and Caldwell-Luc	5/12 (42%)
Suh et al (1977)	Polypectomy and Caldwell-Luc	13/29 (45%)
Trible & Lekagul (1971)	Polypectomy/Intranasal surgery	17/24 (71%)
Calcaterra et al (1980)	Caldwell-Luc and turbinectomy	10/14 (71%)
Cummings & Goodman (1970)	Polypectomy and ethmoidectomy	16/22 (73%)
Calcaterra et al (1980)	Polypectomy	14/18 (78%)

Since there is no external incision, these patients heal without an external scar or deformity. Postoperative complaints of crusting, rhinorrhea, and numbness of the lip and teeth are not uncommon but result from removal of the lateral nasal wall, a procedure performed in all aggressive surgical approaches including lateral rhinotomy. These conditions are usually temporary and are easily controlled with regular nasal saline irrigations.

Recurrences in this series were observed at a mean of 5 years after resection. These patients had been lost to original follow-up and recurrence was noted when they were recalled for this study. Only one of our patients had recurrent symptoms for which he sought attention. Recurrences noted by other authors were usually seen within two years after original surgical resection. The late recurrences in our series relate to these patients usually returning to their primary physician and not being followed by us beyond the time of primary healing.

We conclude that the Denker rhinotomy approach described for resection of inverted papillomas of the nose and paranasal sinuses yields an excellent cosmetic result but a higher recurrence rate than that reported for lateral rhinotomy. The cosmetic result obtained by the Denker approach is superior to that of a lateral rhinotomy and affords excellent exposure to the nose and paranasal sinuses.

Since 1986 we have been using CT of the paranasal sinuses to help determine the approach for excision. If the ethmoid is seen to be involved, we now feel that this area should be approached either through an external ethmoidectomy or concomitant intranasal or transantral ethmoidectomy. If the tumor extends to and involves the nasal septum, then a lateral rhinotomy ap-

Table 6
Recurrence Rates with Lateral Rhinotomy Medial Maxillectomy

Authors	Number of Patients
Myers et al (1981)	0/12 (0%)
Lawson et al (1983)	1/23 (4%)
Calcaterra et al (1980)	1/19 (6%)
Vrabec (1975)	1/15 (7%)
Suh et al (1977)	4/30 (13%)
Kristensen (1985)	12/69 (17%)

proach may well be the best option. Otherwise, the Denker approach alone will give excellent exposure. We have also been more aggressive in treating the underlying bone with a cutting burr as described by Vrabec (8). In patients found to have tumor extension to the lateral maxillary sinus wall, this bone can also be removed if necessary through the Denker approach. We feel that these additional approaches may reduce recurrence rates even further. A prospective review will be necessary to verify the effectiveness of these alterations. In our opinion, follow-up after excision should be a minimum of five years in all patients since symptoms do not correlate with recurrences.

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