

# Management and treatment of sinonasal inverted papilloma

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## Summary

**Aims.** The aim of this paper is to describe the surgical experience of 35 patients with Inverted Papilloma (IP) of paranasal sinuses and its recurrence rate after a year of follow-up.

**Materials.** A retrospective chart review was performed on patients presenting with IP of paranasal sinuses. Thirty-five patients comprised the focus of this study. For all patients was performed a pre-surgery TC, and for more 5 patients it was necessary to perform a Magnetic Resonance (MR) with gadolinium.

**Results.** Among 35 patients selected, 18 patients underwent to open surgery, 4 patients had a combined approach with endoscopy and open surgery, while 13 patients were managed only with an endoscopic approach, with a minimum of 1 year of follow-up. Our results highlighted that the global percentage of success 12 months after the treatment was 93% and it not vary according to the tipology of the approach used if a radical excision of the lesion is achieved. More in depth, among 35 cases, only 2 patients were found to have recurrences and were treated with coronal and endoscopic approach.

**Conclusion.** It is fundamental to underline that surgery must be carried on in a radical manner to treat these tend to recur. A complete removal of the lesion and bone peripheral border filing are essential to perform a correct and definitive treat-

ment. Also, endoscopic approach can be taken into account when tumors are localized median to a sagittal plan crossing the orbit median wall and when they did not massively compromised paranasal sinus walls.

**Key words:** inverted papilloma, papilloma diagnosis, papilloma surgery, sinus open surgery, sinus endoscopic surgery.

## Introduction

Inverted papilloma (IP) is a benign sinonasal epithelial neoplasm, rising from the ectodermal schneiderian membrane. The correct etiology of IP is unknown, although either chronic inflammation and human papilloma virus have been inconsistently associated (1, 2). Sinonasal papillomas were first described by Ward and Billroth in the 1850s, but it was Hyams (3) who classified IP, on the basis of its histological features (4). Although IP is a tumor of benign entity, it often erodes adjacent bone and it may potentially extend to the orbit or to the intracranial cavity. Also, it is associated to a risk of malignancy (5-7) ranging from 5 to 15% and it tends to recur. Because of its high recurrence (8, 9) rate and aggressive nature, the management of IP has changed from conservative intranasal piecemeal excision to a more aggressive wide excision by lateral rhinotomy combined with a medial maxillectomy.

IP involving the paranasal sinus is rare; an endonasal endoscopic approach is difficult to perform due to the nature of the anatomic border of the paranasal recess, but, in the 1980s, it was introduced and it proved to have favorably low recurrence rates (10, 11).

Now, with the refinement of endoscopic techniques, a resection of these challenging lesions may be amenable to an endoscopic approach.

Recent studies have demonstrated the efficacy of the endoscopic approach in management of this kind of neoplasm (12-16), in a number of selected cases where the tumor extension is limited.

This report describes the surgical experience of 35 patients with IP of paranasal sinuses treated at the Department of Maxillo-Facial Surgery of the Policlinico Umberto I of Rome, and its recurrence rate after (at least) a year of follow-up.

## Materials and methods

Retrospective chart review was performed on patients presenting with IP of paranasal sinuses from

October 2003 to October 2011. Thirty-five patients with sinonasal papilloma were observed and treated. Data points collected included age, extend of the tumor, location(s), follow-up, surgery technique and histopathological diagnosis. For all patients it was performed a pre-surgery TC in the three projections with no contrast and for 5 more patients it was necessary to perform a Magnetic Resonance Imaging (MRI) with gadolinium to better define the lesions. Concerning the surgical approach, we started identifying localization and extension of the lesions; afterwards, we performed 18 open surgeries, 13 endoscopic approach and 4 combined approach (open and endoscopic).

After surgery was performed, all patients were put before a thorough follow-up, with periodical check-ups at 1-4-8-12 months. Among 35 patients that were treated, 33 resulted free of any symptoms within a year, while 2 recurrences were noted by radiographic surveillance and were promptly treated with coronal and endoscopic approach.

## Results

Thirty-five patients, 21 males and 14 females, comprised the focus of this study. Mean age of patients was 47 years. The minimal length of their follow-up was 12 months and all patients had a control TC after (at least) 8 months. Location of the tumor included the ethmoid-frontal sinus in 17 cases, the frontal-ethmoid-maxillary sinus in 13 cases and the frontal sinus in 5 cases (Tab. 1); no case involved the sphenoid sinuses and the orbital cavity; skull base violation was not noted in any cases. Initial symptoms were unilateral nasal obstruction (18), epistaxis (5), rhinorrhea (3), facial pain (3), headaches (2), nasal mass (3) and hyposmia (1) (Tab. 2).

Table 1. Localization site of attachment of IP. EFS: ethmoid frontal sinus; FEMS: frontal ethmoid maxillary sinus; FS: frontal.

Site of Inverted Papilloma	N. of cases
EFS	17
FEMS	13
FS	4
Total	35

Table 2. Sympton of presentation of Inverted Papilloma

Presenting symptom	N. of cases
Nasal obstruction	18
Epistaxis	5
Rhinorrhea	3
Facial pain	3
Headaches	2
Nasal mass	3
Hyposmia	1
Total	35

During pre-operative analysis all patients had a thorough head and neck evaluation to assess for regional disease. The face was evaluate to identify asymmetry of distortion, and a complete cranial nerve examination was also necessary. Then, for all patients it was carried on a CT scan in the three projections with no contrast. CT scans can give more information about the extention of the neoplasm, its association with the skull base or orbit, its nature and the eventual recurrence of bony alteration. Moreover, for 5 patients a Magnetic Resonance Imaging (MRI) with gadolinium was required to better discern between inflammation pouring and pathologic tissue among the breast itself. A subsequent magnetic RI can improve understanding of a neoplasm by defining its limits and its post-obstructive effect on secondarily involved sinuses.

Eleven patients of the study group underwent biopsy with referral to definitive histological examination confirmed the diagnosis of IP.

Medical therapy is initiated preoperatively to reduce inflammation in all patients. This can help to minimize eventual bleeding, to reduce tissue edema, and to enhance visualization. Among 35 patients selected, 18 patients underwent to open surgery, 4 patients had a combined approach with endoscopy and open surgery, while 13 patients were managed only with an endoscopic approach.

The histological diagnosis was always IP without any evidence of dysplasia.

No intra or post-operative complications were encountered in this group of patient.

Our results highlighted that the global percentage of success 12 months after the treatment was 93%. More in depth, among 35 patients that underwent the treatment, after a follow up of 1 year only 2 recurrences were noted by radiographic surveillance and were promptly treated with open surgery and endoscopic approach.

## Discussion

Sinonasal IP is a relatively rare entity that poses unique challenges given the difficulty tumor location. IP has an incidence of 0.74-1.5 cases for 100.000 inhabitants per year and accounts for approximately 70% of all sinonasal papillomas (17-19). It prevails in the fifth decades of life and males are four to five times frequently affected than females.

From October 2003 to October 2011, 35 patients with sinonasal papilloma were observed and treated in our experience.

IP treatment has involved from limited intranasal excisions to complete and aggressive surgical resection, as IP demonstrates an intrinsically aggressive behavior with a propensity for local invasion and potential risk of malignant transformation. For a long time, external approaches have been the standard treatment, providing the surgeon with good exposure and a favourable tumor control rate.

The aggressive lateral rhinotomy and medial maxillectomy approach has been the gold standard treatment for many years.

Another important procedure to treat the disease is the Midfacial degloving. It was first described by Casson in 1974 in the management of extensive lesions of the sinonasal tract (20). Buchwald et al. (21) found that midfacial degloving was easily performed and revealed this method instead of or as a supplement to traditional lateral rhinotomy.

Shohet and Duncavage (22) described 2 patients with frontal sinus IP who were treated successfully with osteoplastic flap.

With the advent of minimally invasive endoscopic approaches, many Authors have shown a growing trend toward endoscopic technique (23-27).

It is fundamental to underline that surgery must be carried on in a radical manner to treat these neoplasms that tend to recur, in 8% of cases in malignant forms (28).

Patients comprised in this analysis were treated either with open surgery (18 patients), and with endoscopic approach (13 patients), and with combined approach (4 patients), depending on the location of the lesion. We tried, where possible, to start with an endoscopic approach, to eventually turn it afterwards in open surgery, as happened for 4 cases where lesions had already massively invaded the paranasal sinus walls.

Of 18 patients treated with frontal osteoplastic, presurgery TC shown a massive tumor invasion of the paranasal sinuses, involving, in 13 cases, even the back bony walls of the sinuses.

In 13 cases treated with endoscopic approach, lesions were always localized at the median spot of sagittal plan crossing the orbit medial wall, as reported in international literature as well, and they did not massively compromised the paranasal sinus walls.

Choosing the right approach is always an uncomfortable decision and depends on several variables as lesions localization and size and patients compliance.

Compared to open surgery, endoscopic excision is associated with several advantages, like superior visualization, preservation of normal sinonasal physiologic function and achievement of mucociliary clearance patterns, absence of external scars, minimal morbidity and low recurrence rates. Perhaps, there are two major disadvantages for the successful accomplishment of endoscopic approach: the need of considerable familiarity with the endoscopic technique and its inability to adequately provide access to the anterior and lateral walls of the maxillary sinus.

Open surgery is preferable as it grants better surgical view, better control of bleedings, stronger confidence in removing the neoplasm.

Disadvantages might be found in longer hospitalizations (6 days average in our cases), less compliance for patients, possible lesions of the cervical-frontal branch of facial nerve.

The results we obtained demonstrated that global percentage of success 12 months after surgeries were performed was about 93%, as it is also reported in literature (29) and it did not vary according to the typology of approach used if a radical excision of the lesion is achieved.

More in depth, among 35 cases, after a year of follow-up. 30 patients were totally free of symptoms, while 2 recurrences were noted by radiographic surveillance.

In the first recurrence, after about 17 months, the patient reported, at clinical control, again difficulty breathing with the right nostril. A RM shown the recurrence of the disease at the frontal-ethmoid-maxillary sinus. The patient consequently underwent an endoscopic biopsy that shown IP so another surgery was performed through coronal and endoscopic approach and she is now free of symptoms from 11 months.

In the second recurrence the disease reappeared 11 months after surgery was carried on with epistaxis. Taken a new maxilla-facial CT, the reappearance of disease was shown at the frontal-ethmoid-maxillary sinus. A combined approach with endoscopic and frontal osteoplastic surgery was then performed and now the patients is free of symptoms from 14 months.

## Conclusions

Often, open procedures like osteoplastic flap are essential for a complete excision of IP, depending on the extend and location of the lesion.

It should be noted that imaging studies are often imperfect and intraoperatively the extent of disease may exceed what is predicted. Therefore, in most IP cases of paranasal sinuses the patient should be prepared and should agree on an osteoplastic flap approach, to have a complete tumor removal. The ideal approach is frequently determined intraoperatively, based on the IP attachment sites.

On the basis of clinical and radiological results shown in this report and in accordance with the International literature we noted that endoscopic approach can be taken into account when tumors are localized median to a sagittal plan crossing the orbit median wall and if they did not massively compromised paranasal sinus walls.

Because of its tendency to recur and to harbor carcinoma IP is an aggressive invasive lesion.

A complete removal of the lesion and bone peripheral border filing are essential to perform a correct and definitive treatment.

Careful preoperative planning coupled with meticulous surgical technique are absolute requisites for successful management of these difficult tumors.

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