

# ASSESSMENT OF BONE INVOLVEMENT AND MALIGNANCY IN SINONASAL INVERTED PAPILLOMAS

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**ABSTRACT: Introduction** - Sinonasal inverted papilloma (IP) is a rare benign epithelial neoplasm of unknown etiology characterized by destructive pattern of local growth, tendency to recur after surgery and associated squamous cell carcinoma. The aim of this study was to evaluate the bone erosions and the malignant transformation in sinonasal inverted papilloma. **Material and methods** - The presence of bone erosions and the association to squamous cell carcinoma, were analysed in 43 patients with histologically proven inverted sinonasal papilloma. All patient data were retrospectively staged using the staging system for inverted papilloma proposed by Krouse. **Results** - The study group consisted of 28 men and 15 women, confirming the male predominance. 25 patients (58.2%) were admitted with a stage II inverted papilloma. Eight patients (18.6%) were admitted with extranasal inverted papilloma, extension beyond the sinuses or even malignant transformation, representing stage IV inverted papillomas. In ten cases (23.2%) localized bone defects were found on the preoperative CT scans as well as intraoperatively. Histological examination revealed inverted papilloma with focal transformation to squamous cell carcinoma in five cases (11.6%). **Discussion and Conclusions** - Although benign, inverted papilloma has an aggressive clinical behavior. Even in the absence of malignancy, the adjacent bone destructions are not uncommon. Close follow-up after surgical removal is necessary and extremely important to detect early recurrence or possible transformation to malignancy.

**KEYWORDS:** *inverted papilloma, squamous cell carcinoma, bone erosions*

## Introduction

Inverted papilloma is a rare, in most cases unilateral epithelial neoplasm, of great interest for the clinicians due to its aggressive clinical behavior, high rate of recurrence and an association with squamous cell carcinoma (1, 2, 3, 4). The most frequent site of origin is the lateral nasal wall and the ostio-meatal complex. The nasal septum, frontal and sphenoid sinuses are rarely affected (5, 6). The tumor may disturb adjacent structures extending beyond the paranasal sinuses into the nasopharynx, pterygomaxillary fossa, orbit or brain (7).

## Material and methods

Forty - three patients (28 men and 15 women) with histologically proven inverted papilloma were analyzed retrospectively. All patient data were retrospectively staged using the staging system for inverted papilloma proposed by Krouse (8) (table 2). The staging was established for every single case after carefully evaluation and corroboration of preoperative nasal video-endoscopy findings, preoperative CT scans, gross intraoperative findings with histopathological features. Destruction of bone and the association to squamous cell carcinoma was established and analysed. The pathological bone changes were

observed on preoperative CT scans and confirmed intraoperatively.

## Results

Out of the 43 patients, 28 were men (65.2%) and 15 women (34.8%), confirming the male predominance (table 1). The peak incidence was registered in the 7th decade of life (60-69 years)

**Table 1 – distribution of patients by age group and gender**

Age group*	Female		Male	
	n	%	n	%
0 – 19	0	0	0	0
20 – 29	2	4.6	0	0
30 – 39	1	2.3	0	0
40 – 49	1	2.3	5	11.6
50 – 59	5	11.6	5	11.6
60 – 69	6	14	8	18.8
70 or above	0	0	10	23.2
Total	15	34.8	28	65.2

\* Ages are registered at the moment of the first diagnosis of inverted sinonasal papilloma

In more than half (58.2%), patients were admitted with a stage II inverted papilloma with tumor involving the ostiomeatal complex, ethmoid sinuses and/or the medial portion of the maxillary sinus. Eight patients (18.6%) were admitted with extranasal inverted papilloma, extension beyond the sinuses or even malignant

transformation, representing stage IV inverted papillomas (table 2).

**Table 2 - Distribution of patients according to Krouse's staging system for inverted papillomas**

Krouse's stage	Patients	
	n	%
I	5	11.6
II	25	58.2
III	5	11.6
IV	8	18.6
Total	43	100

Regarding the adjacent bone erosions that can occur, clinical and/or radiological evidence of bone destruction was found in ten cases (23.2%), five of whom were found with stage II inverted papillomas and five with stage IV inverted papillomas (table 3).

**Table 3 – Distribution of patients with inverted papilloma associated with bone erosion according to Krouse's staging**

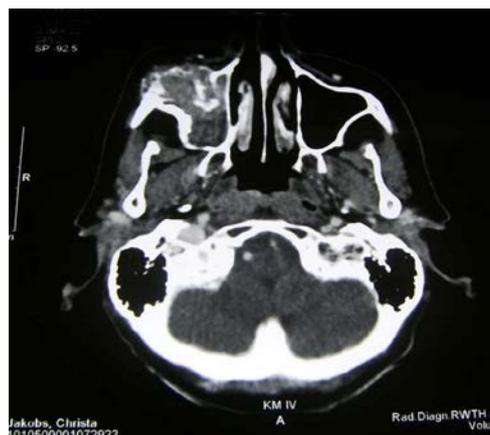
Krouse's stage	Bone erosions (Patients)	
	n	%
I	0	0
II	5	20
III	0	0
IV	5	62.5
Total	10	23.2%

In concordance with the location of the tumor, bone destructions predominantly involved the lateral nasal wall and the lamina papyracea (table 4).

**Table 4 – Distribution of patients with bone erosion associated to inverted papilloma according to the location of the erosion**

Location of bone erosions	Bone erosions (Patients)	
	n	%
Lateral nasal wall	8	18.6
Lamina papyracea	4	9.3
Lateral wall of the maxillary sinus	3	6.9
Orbital wall of the maxillary sinus	2	4.6
Skull base	2	4.6
Floor of the maxillary sinus	1	2.3
Posterior wall of the maxillary sinus	1	2.3

Two patients had evidence of skull base erosions, one of them presenting a dura exposure with dura defect. None of these two patients revealed clinical signs of meningism or any other neurological deficit. In one case inverted papilloma extended into the pterygomaxillary fossa, in two cases there was tumor extension into the soft tissue of the cheek, one case was with tumor extension into the orbit (table 4, figure 1, 2). More than one location of bone destruction was present in five patients.

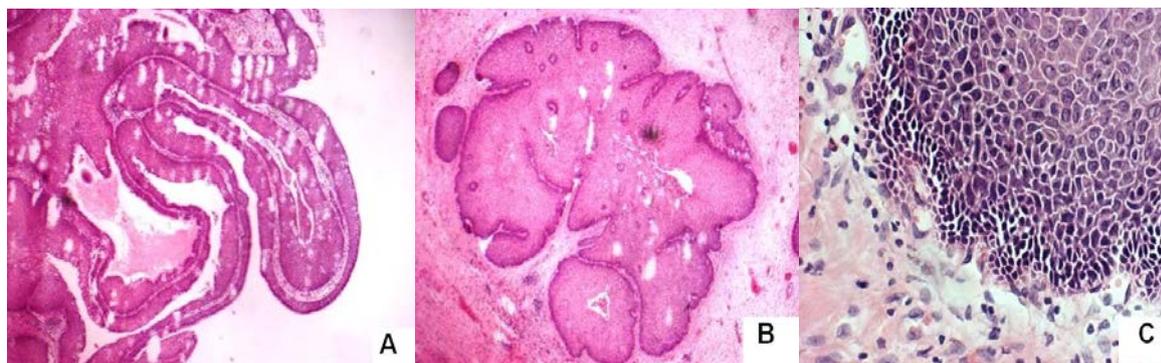


**Fig.1. CT scan of a patient with inverted papilloma of the right maxillary sinus, with tumor extension into the soft tissue of the cheek**



**Fig.2. CT scan of a patient with inverted papilloma of the left ethmoid, with tumor extension into the orbit**

Although a benign epithelial neoplasm, inverted sinonasal papilloma has a significant malignant potential. Out of these 43 cases, five patients (11.6%) had concomitant inverted papilloma and squamous cell carcinoma (table 5, figure 3, 4, 5).



**Fig.3. Histopathological specimen of inverted papilloma (A, B, C ) with associated squamous cell carcinoma (light microscopy, hematoxylin eosin stain, magnification 10X, 20X, 40X)**

**Table 5 – Incidence of malignant transformation in inverted papilloma**

Diagnosis	Patients	
	n	%
IP	38	88.4
IP + SCC	5	11.6
Total	43	100

IP = Inverted papilloma, SCC = Squamous cell carcinoma

Out of the five cases with inverted papilloma and squamous cell carcinoma, three presented with multiple clinical and radiological evidence of focal bone erosions, while two showed no bone destruction.

#### Discussion and Conclusions

IP's of the nose and paranasal sinuses are locally aggressive, uncommon benign epithelial tumors that can mimic sinonasal malignant growth.

The mechanism involved in the pathogenesis of focal bone erosions is debated, but may be related by long-standing pressure generated by the expanding mass or to inflammatory mediators.

Wide extent of the tumor and/or bone destruction cannot be taken as indicators for association with or transition to malignancy.

The severity of erosions correspond with the location and extent of the tumor. Patients with severe erosions tended to have a longer history of disease.

Preoperative computer tomography assessment of sinonasal inverted papilloma with evaluation of bone destructions and tumor extension is important in the planning of surgical treatment.

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