



# Spike Hyperostosis in the Frontal Sinus as a Differential Marker of Nasosinus Polyposis and Inverted Nasal Papilloma

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## Abstract

**Background:** Inverted-type Nasal Papilloma (PNI) and Sinonasal Polyposis (SNP) are benign nasal pathologies with similar symptoms and a complicated pre-surgical differential diagnosis. Tomography is only useful to determine the extension and plan a surgical approach.

**Objective:** To assess whether spike hyperostosis in the frontal sinus is a differential radiological marker between sinonasal polyposis and inverted nasal papilloma.

**Material and Methods:** Observational, cross-sectional, descriptive and retrospective study. In the Otorhinolaryngology service, UMAE 25, patients with a diagnosis of sinonasal polyposis and inverted nasal papilloma with frontal sinus involvement were included, patients with a diagnosis of sinonasal polyposis and inverted nasal papilloma were included, with histopathological result, the association of hyperostosis was evaluated spike with the diagnosis of inverted nasal papilloma, between January 01st, 2018 to June 01st, 2021.

**Results:** 76 patients included, 38 PNI, of which 23 (60.3%) presented spike hyperostosis, and 15 (39.5%) did not (OR 8.4, 95% CI,  $p < 0.001$ ). And 38 of PNS, of which 6 (15.4%) presented spike hyperostosis and 32 (84.6%) did not (OR 1.7, 95% CI,  $p = 0.256$ ).

**Conclusion:** hyperostosis could be associated as a differentiating factor between inverted nasal papilloma and sinonasal polyposis.

## Introduction

Inverted Nasal Papilloma (PNI) and Sinonasal Polyposis (SNP) are two very frequent pathologies in the nasal cavity, in addition to being a differential diagnosis between them, with difficult distinction by clinical or imaging study. Due to having different treatments and different prognoses, its timely diagnosis is important.

In the search for new tools to help us differentiate them, it was observed in the articles presented, there was noticeably more hyperostosis in the frontal sinus when it was invaded by inverted nasal papilloma, and this event was almost absent in sinonasal polyposis; due to the type of extension and growth, a type of spike hyperostosis was observed in some of the patients with frontal involvement, for which we decided to see if there was a relationship with the diagnosis of inverted nasal papilloma and if it was statistically significant.

## General objective

To assess whether frontal sinus spike hyperostosis is a differential radiological marker between sinonasal polyposis and inverted nasal papilloma.

## Methodology

### Study design

Observational, transversal, descriptive and retrospective.

### Study location or site

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Received Date: 16 Dec 2021

Accepted Date: 07 Jan 2022

Published Date: 12 Jan 2022

### Citation:

García BT, Vázquez RL, Talamas LMG. Spike Hyperostosis in the Frontal Sinus as a Differential Marker of Nasosinus Polyposis and Inverted Nasal Papilloma. *Am J Otolaryngol Head Neck Surg.* 2022; 5(1): 1169.

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## Sample selection criteria

### Inclusion criteria:

- Patients with a diagnosis of inverted nasal papilloma and sinonasal polyposis, with frontal sinus involvement, in the Otorhinolaryngology Service, UMAE 25, from January 2019 to June 2021.
- Patients with imaging study available.
- Surgical note available.
- Definitive histopathological result available.

### Exclusion criteria:

- Patient who does not have a physical or electronic file at the institution.

Definition of variables

Independent variables

## Spike ossification

Operational definition: Bone formation in the shape of a spike at the level of the frontal recess which is free without insertion points in sagittal cuts in a computed tomography of the paranasal sinuses.

Unit of measure: Yes/No

Measurement scale: Nominal

## Dependent variables

### Sinonasal polyposis:

Conceptual definition: It is a chronic bilateral rhinosinusitis characterized by the development of polyps in the nasal passages of inflammatory origin.

Operational definition: Diagnosis of sinonasal polyposis by histopathological study or imaging study.

Unit of measure: Yes/No

Measurement scale: Nominal

### Inverted nasal papilloma:

Conceptual definition: Benign tumor of the nose and paranasal sinuses, with locally aggressive behavior, with a high risk of recurrence, as well as malignant transformation to nasal carcinoma.

Operational definition: Benign paranasal sinus tumor, diagnosed by histopathological and imaging results

Unit of measure: Yes/No

Measurement scale: Nominal

### Sex:

Conceptual definition: Biological and physiological characteristics that define men and women.

Operational definition: Feminine or masculine organic condition.

Unit of measure: male/female.

Measurement scale: Nominal.

### Age:

Conceptual definition: Time that a person or another living being has lived counting from birth.

Operational definition: Years of life from birth

Unit of measure: Years

Measurement scale: Interval

## Presumptive diagnosis

Conceptual definition: Medical diagnosis based on a reasonable assumption.

Operational definition: It is the diagnosis by clinic or imaging study.

Unit of measurement: Inverted nasal papilloma/sinonasal polyposis

Measurement scale: Nominal

## Definitive diagnosis

Operational definition: Final diagnosis, when the disease has been confirmed with certainty.

Operational definition: It is the diagnosis already corroborated by histopathological study.

Unit of measurement: Inverted nasal papilloma/sinonasal polyposis

Measurement scale: Nominal

## Results

76 patients were included, 38 (50%) had inverted nasal papilloma, and 38 (50%) had sinonasal polyposis. Of those diagnosed by PNI, 23 (60.5%) had spike hyperostosis of the frontal sinus, and 15 (39.5%) did not (OR 8.4, 95% CI,  $p < 0.001$ ). Of the patients with NSP, 6 (15.4%) presented hyperostosis, while 32 (84.68%) did not present it (OR 1.7, 95% CI,  $p = 0.256$ ), (Table 1).

Of patients with a presumptive diagnosis of inverted nasal papilloma, 28 (82%) were confirmed histopathologically, and 6 (17.6%) changed the diagnosis to nasosnasal polyposis; of those initially diagnosed as sinonasal polyposis, 32 (76.7%) confirmed their diagnosis, and 10 (23.3%) changed to PNI.

## Discussion

Polyposis and inverted nasal papilloma are the two most common diseases of the sinonasal tract, only after sinusitis. Ossification in these pathologies is relatively more frequent than in other pathologies. For this reason, it is of great importance to discriminate between inverted nasal papilloma ossification and polyposis since both have different biological properties [1,14]. However, no literature was found that provided a precise description or that took into account any radiological sign for its distinction.

BT Yang et al., expose the difficulty of the clinical and imaging differential diagnosis of inverted nasal papilloma and sinonasal polyposis, and talk about the frequency of ossification, reporting that of 20 patients with inverted nasal papilloma and ossification, 10 (50%) of them presented it in frontal sinus; However, 8 (12.5%) patients with sinonasal polyposis and ossification were observed, of which only 1 presented ossification in the frontal sinus. Due to this study, the presence of ossification in the frontal sinus became relevant; however, no sign or difference is described, so in our study, when comparing, 60.5% of patients with inverted nasal papilloma presented hyperostosis in spike in the frontal recess, and only 15.4% of patients with polyposis presented the sign. Which shows a similar

**Table 1:** Clinical characteristics and diagnosis of inverted nasal papilloma and sinonasal polyposis based on the presence of spike hyperostosis in the frontal sinus.

	Total (n=76)	Spike hyperostosis		OR (95% CI)	p
		Present (n=33)	Absent (n=46)		
PNI	38 (50%)	23 (60.5%)	15 (39.5%)	8.6	<0.001
Woman	26 (34.2%)	7 (27.6%)	19 (40.4%)		
Man	49 (64.5%)	17 (58.6%)	28 (29.6%)		
PNS	38 (50%)	6 (15.4%)	32 (84.6%)	1.7	0.256
Woman	18 (100%)	2 (11.1%)	16 (88.9%)		
Man	20 (100%)	4 (20%)	16 (80%)		
Age (years)	46.3 ± 15.6	-	-		

Results are expressed in absolute frequencies (percentages) or means ± standard deviation

PNI: Inverted Nasal Papilloma; PNS: Sinonasal Polyposis

trend to that studied by BT Yang.

Our study had a sample of 76 patients, larger than the studies found in the bibliography, in addition to establishing the same degree of involvement for all patients in order not to generate bias, since in some studies frontal sinus ossification was underestimated since the pathology was in its initial stages without its involvement, for which reason it was ensured that all patients presented involvement of said paranasal sinus.

A Chi square of 16.7 was obtained, which shows a significant difference between the associations between diseases and hyperostosis, in addition to the contingency coefficient test at 0.422, which allows us to generalize the result to the studied population.

Most studies analyze inverted nasal papilloma with magnetic resonance imaging, obtaining high differentiation figures for it, due to the “cerebriform pattern” image sign. However, magnetic

resonance imaging is not a routine study due to the suspicion of sinonasal polyposis, which has already mentioned is the main differential diagnosis, and which is difficult to distinguish clinically or by imaging, in our study we also evaluated the percentage of patients with a presumptive diagnosis of inverted nasal papilloma, 82%, was confirmed by histopathological study, and 17.6% turned out to be sinonasal polyposis; of all the patients with a presumptive diagnosis of sinonasal polyposis, 76.7% could be corroborated, and 23.3% resulted with a change of diagnosis to inverted nasal papilloma, what is relevant about this data is that 23.3% of the patients with an incorrect diagnosis of sinonasal polyposis they had inverted nasal papilloma, so their treatment is not the treatment of choice for their pathology and the risk of malignancy is 5% to 15%, in addition to the fact that the magnetic resonance study of all patients with polyposis would be an enormous economic implication, due to the high incidence of this pathology.

### Conclusion

As had been estimated, frontal sinus recessed hyperostosis was highly associated with inverted nasal papilloma. With a risk of 8 times more probability of PNI, when presenting it with a significant difference. According to the statistical analysis, the result can be generalized to the sample population, that is, we could take it as valid when saying that spike hyperostosis of the frontal recess is a tool for the diagnosis of inverted nasal papilloma imaging.

The percentage of errors in the diagnosis of PNI and sinonasal polyposis (17.6% and 23.3%) was also evident, which could be lower, when taking into account the sign of spike hyperostosis in the frontal sinus. It is worth mentioning that no difference was made between unilateral and bilateral pathology, not which could also be a predictor factor for the diagnosis of these entities.